Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
https://foodsystemsjournal.org

A pilot study exploring the impacts of COVID-19 on small-scale direct-marketing farmers in Northwest Arkansas and their responses to the pandemic

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Submitted February 15, 2022 / Revised May 27 and August 24, 2022 / Accepted August 24, 2022 / Published online November 5, 2022

Citation: Florick, L., & Park, C. H. (2022). A pilot study exploring the impacts of COVID-19 on small-scale direct-marketing farmers in Northwest Arkansas and their responses to the pandemic. *Journal of Agriculture, Food Systems, and Community Development*. Advance online publication. https://doi.org/10.5304/jafscd.2022.121.006

Abstract

The COVID-19 pandemic has led to many disruptions and challenges in local and national food systems in America. Many farms and market gardens were forced to innovate quickly and take action to survive ongoing disruption as these businesses struggled with finances and distribution of products among other challenges. Many small-scale, local farming operations in particular were able to respond to these disruptions in unique ways, which may offer useful insight into how to better prepare small farming communities for public health and other kinds of disasters in the future. This pilot study aims to better understand how COVID-19 affected the local food system in the region of Northwest Arkansas in the mid-southern United States and how small-scale, direct-sales farmers responded to the pandemic, through a survey and interview about their experiences from 2019 to 2021. Participating farmers reported changes in farming procedures and challenges in owning or working on their farms due to ongoing climate-related environmental issues or issues specific to the pandemic, such as distributing products, utilizing financial and other resources of support, and partnering with local supply-chain partners and community members to ensure local businesses' survival during COVID-19. This pilot study can provide insight into how local farming operations and their regional and smaller-scale supply chain partners have built and utilized community resilience strategies to survive COVID-19 challenges in the Northwest region of Arkansas. A statewide follow-up study will be con-

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Funding Disclosure
This research did not receive any specific grant from funding agencies in the public, commercial, or nonprofit sectors.

ducted to observe how these producers navigated these challenges on a larger scale, including in different regions of Arkansas following the start of the pandemic.

Keywords
COVID-19, Pandemic, Small-scale Farming, Direct Marketers, Local Food Systems, Food Security, Climate Resilience, Community Resilience, American Rescue Plan

Introduction

The COVID-19 pandemic has led to many disruptions and challenges in food systems and supply chains. Local, state, and national government response measures to the spread of disease, including lockdowns, the closure of indoor operations at restaurants, and restrictions on mobility, also tended to exacerbate these disruptions (Teng, 2020).

Farmers, in particular, faced many challenges during the pandemic, and farms of all sizes faced difficulty accessing stable marketing channels, significant decreases in regular income, and increased input costs (Jackson-Smith & Veisi, 2021). In some instances, farmers were forced to dump or destroy "excess milk or fresh produce, while grocery stores are left with empty shelves and people waiting in long lines to acquire food assistance" early in the pandemic because of a sudden disruption in supply chains (Liang et al., 2021, p. 125).

Notably, many small-scale, local farming operations were able to respond to these various disruptions in a resilient manner. They fluidly adjusted their production and distribution to adapt to sudden changes in demand for food during the pandemic (Patillo et al., 2021), with some small farms even changing their main marketing channels from institutional buyers to individuals in local communities, creating home delivery systems and online ordering applications (Jackson-Smith & Veisi, 2021).

Although many studies are emerging that focus on how COVID-19 has exacerbated food insecurity and the global supply chain crisis, the literature is limited on the impacts of public health crises like COVID-19 on small farms and their responses to public health crises, particularly with a focus on the Mid-South region of the United States. Because the COVID-19 pandemic is still in effect, we are only beginning to fully understand how this pandemic has and will continue to affect local food economies and communities. To fill these research gaps, this pilot study aims to answer the following questions: (1) How has COVID-19 impacted small-scale direct-marketing farmers, particularly those in Northwest Arkansas (2) How have the small-scale direct-marketing farmers responded to COVID-19?

We employed a mixed case study method, surveying and interviewing local farmers about their experiences from 2019 to 2021. This study contributes to the literature by offering a glimpse at responding actions taken by small-scale direct-marketing farmers in the U.S. during the pandemic and how they have enabled their resilience, as well as contributing to the literature on farm resilience and community-based crisis response. It will also provide a starting point for a larger, statewide study that will aim to deliver a complete picture of how farmers were affected by and managed disruptions by COVID-19 in the state of Arkansas.

Literature Review

Risks to Small, Locally Owned Farms

The U.S. Department of Agriculture categorizes a farming operation as 'small' if the gross cash income is under US$250,000 (USDA, 2021a). Although the largest number of farms in America as a whole are small, locally owned farms, just 5% of farming operations produced 75% of all sales in 2017 (Moon, 2019).

There are a number of risks involved in keeping a small-scale, independent farm that can stay operating and competitive (Hanson et al., 2008). Small farms, in general, are costly to run, require access to capital and land, and owners typically receive substantial income from elsewhere in order to keep the family and the farm afloat (Hanson et al., 2008). Private insurers and federal crop insurance programs, such as the new Whole-Farm Revenue Protection program through the USDA (National Sustainable Agriculture Coalition, 2022), can offer coverage to farms in case of drought and other risks to agriculture (Brusentsev & Vroman, 2017), but many only provide aid for "high value"

crops, which represent only a small percentage of what a small-scale farm might produce (Reynolds-Allie et al., 2013).

An additional risk receiving greater attention is the effect of climate change on temperature, precipitation, and an increase in potential natural disasters worldwide. While climate is always a challenge for farmers, climate change not only poses further risk to the agriculture sector, it also can affect the abundance and distribution of disease, as witnessed globally during the COVID-19 pandemic (Khasnis & Nettleman, 2005; Patz et al., 2003). Potential effects of climate change in our globalized world are predicted to include overcrowding, famine, water contamination, human migration, and alterations in vector ecology, all of which may increase the potential for further spread of infectious disease (Khasnis & Nettleman, 2005; McDermott, 2022; Medlock & Leach, 2015; Thomas, 2020).

Disrupted Food Systems during COVID-19

Several major corporations dominate the food sector in Northwest Arkansas, including the headquarters for Wal-Mart, the largest food retailer in the world, and Tyson Foods, the largest poultry and meat processor in the country (Arkansas Farm Bureau, n.d.). However, even with this abundance of agricultural revenue, food security is an ongoing challenge for Arkansans. Nationally, over 10% of households in the U.S. were food insecure in 2020, compared to over 16% of households in Arkansas in 2019 (University of Arkansas for Medical Sciences, n.d.). In the region of Northwest Arkansas specifically, just over 13% of households were food-insecure. Fortunately, there are significant initiatives aiming to address these disparities in Northwest Arkansas. One new initiative, the University of Arkansas for Medical Sciences' Northwest Arkansas Food Insecurity Community of Practice, brings together 24 diverse organizations that address food insecurity in the region, including food pantries, nonprofits, farms, health care facilities, and others, and includes an advisory board made up of community partners (Jessen, 2022).

Previous studies have used the Food and Agriculture Organization of the United Nations (FAO)'s four pillars of food security to elucidate how the COVID-19 pandemic affected local, national, and international food systems (Béné, 2020; Laborde et al., 2020). The four pillars consist of access (economic and physical access to food), availability (adequacy of the food supply), utilization (food intake), and stability (steadiness in the other pillars over time) (Devereux et al., 2020). In particular, scholars emphasize that the pandemic had a tremendous effect on food access and food availability, particularly among higher-risk communities (Larson et al., 2020; Niles et al., 2020).

Various pandemic-related government measures, including the temporary closure of restaurants, schools, and workplaces, created significant economic stresses, such as layoffs and furloughs, thus leading to negative consequences for individuals' economic access to food, food security, and hunger (Campbell, 2021; Devereux et al., 2020). These government measures, in particular restrictions on mobility, also generated adverse consequences for individuals' physical access to food (Devereux et al., 2020).

The pandemic not only affected food security and access for consumers, but also affected how food producers themselves ran their businesses to survive. Since the beginning of COVID-19, farms of all kinds have had difficulty accessing markets to sell their crops and animal products (Laborde et al., 2020). In some cases, when farmers were unable to find alternative markets, they had no option but to destroy their products, such as surplus milk and vegetables (Hansen et al., 2020).

Scholars have additionally noted farmers' income losses due to pandemic disruption. During the first year of the pandemic, in particular, some agricultural product prices suddenly declined "as demand from restaurants, colleges, schools, and other institutions … evaporated" (Jackson-Smith & Veisi, 2021, p. 164), although input costs (e.g., fertilizers) conversely sharply increased due to the global supply-chain crisis generated by the pandemic (Patillo et al., 2021). However, the pandemic did open up new opportunities for smaller operations as many consumers wanted to buy directly from local farmers, cutting out the complex supply chain that exposed vulnerabilities during the start of the pandemic (Jackson-Smith & Veisi, 2021). This was a challenge for many producers, as such a sudden increase in demand for local foods caused

small farmers to struggle with accessing services, such as processing and distribution, to accommodate the demand (Patillo et al., 2021).

Small Farmers' Responses to COVID-19

In March 2021, US$6 billion of the American Rescue Plan was put toward supporting operations run by farmers of color, organic and small farms, and other producers in the form of grants, loans, and programming (Reiley, 2021; USDA, 2021b). However, efforts by lobbyists and federal judges, among others, have effectively blocked the distribution of relief or assistance through this program, and after nearly two years of disruption, many small or isolated American farms and businesses have not been able to access the financial relief needed to survive the pandemic (Reiley, 2021).

Fortunately, the USDA has taken steps to provide additional support for producers and incorporate climate adaptation into its programs over the course of the pandemic. Through rolling out a climate adaptation and resilience plan, the USDA aims to address the impacts of climate change on the agriculture sector by providing incentives for farmers to implement climate-conscious conservation practices, build resilience, increase support for research and new technologies, and foster a culture of climate risk management practice across the U.S. (USDA, 2021c). The USDA has also offered relief for low-income consumers and small-scale producers, among others, through its Pandemic Assistance initiative (Farmers.gov, n.d.). These government assistance programs may provide support for small-scale farmers as they respond to ongoing challenges, such as COVID-19 and climate change.

Although large-scale food supply chains may continue to face significant challenges due to the import and export conflicts and labor shortages that occurred over the past three years, there is evidence that many smaller-scale producers may have had a different experience during the pandemic due to their size, community relationships, and proximity to and existing relationships with local or regional supply chain partners (Jackson-Smith & Veisi, 2021; Thilmany et al., 2021).

One way to illustrate how small-scale direct-marketing farmers responded to COVID-19 is by utilizing a resilience framework (Darnhofer, 2014; Jackson-Smith & Veisi, 2021). In the context of the pandemic, farm resilience refers to "the ability of an individual farm operation to continue food production and distribution to customers in light of the ongoing COVID-19 pandemic" (Bachman et al., 2021, p. 285), such as by becoming more localized (Ahmed et al., 2020; Atalan-Helicke & Abiral, 2021).

During the pandemic, farmers developed and implemented various responses to sustain their essential functions. These responses to the pandemic can be categorized according to a farm resilience framework suggested by Darnhofer (2014) and Jackson-Smith and Veisi (2021). The framework concentrates on three key resilience capabilities of farmers: buffer capability, adaptive capability, and transformative capability. Buffer capability is the ability of farmers to absorb a perturbation without a substantial change in farming operations, for example, by maintaining food production with fewer inputs and relocating existing resources. Adaptive capability is the ability of farmers to adjust their operations to respond to disruptions in an incremental manner while maintaining the same goals and values of their operation. For example, this could be by introducing marginal changes to established routines by improving production processes in a more flexible manner and adopting a new technology (e.g., mobile applications) to sell their food products to existing customers more efficiently. Finally, transformative capability is the ability of farmers to design and implement radical changes. Transformative responses include changing "farm enterprise type, establishing new production and marketing relationships, reorganizing the flow of labor and financial resources, and altering the balance of farm and off-farm activities" (Jackson-Smith & Veisi, 2021, p. 159).

According to Jackson-Smith and Veisi (2021), the most common examples of farmers' responses to COVID-19 are buffer responses without changing any basic operating processes. For example, many farmers destroyed or dumped their farm products in order to cope with oversupply caused by the closure of restaurants and institutional buyers such as schools, although some farmers concerned about food security in their local communities willingly donated their excess agricultural

products to families, neighbors, and hunger-relief organizations (Bachman et al., 2021).

Farmers' adaptive responses also focused mostly on "short-term incremental adjustments in their production or marketing practices" (Jackson-Smith & Veisi, 2021, p. 167). Those operations that already used direct sales to individuals adjusted their selling methods to be more socially distanced during the pandemic. In Northwest Arkansas, several of the largest farmers markets quickly pivoted to a virtual market model through websites and mobile applications and providing curbside pickup during the early months of 2020 (Della Rosa, 2020).

Compared to buffer responses or adaptive responses, transformative responses were less common during the pandemic (Jackson-Smith & Veisi, 2021). A notable example of a transformative response is a case where a small farm in North Carolina known as Ran-Lew Dairy lost half its businesses due to the closure of local restaurants, but the farm responded to the crisis by launching "a socially distanced on-farm pick-up system" to sell their dairy products to people in their community (Huber, 2020, pp. 269–270). When larger local grocers struggled to stock dairy products during the pandemic due to supply chain disruptions, this small farming operation was able to adapt rapidly to meet the larger grocers' needs (Huber, 2020). Ran-Lew Dairy's transformative response effectively changed its marketing channels from local restaurants to an on-farm pick-up system and local large-scale grocers.

Several studies demonstrate why some smaller farms were able to respond to the pandemic more successfully compared to large-scale producers (Ahmed et al., 2020; Bachman et al., 2021). According to Huber (2020), the reason is partially related to the size and agility of smaller farms. Smaller farming operations with fewer staff "can be trained more rapidly and can adapt to market changes more fluidly than industrial-scale farms" (p. 270), and the creation of new marketing channels, and direct marketing in particular, can make for an effective response to COVID-19 (Bachman et al., 2021; Marusak et al., 2021; Thilmany et al., 2021). Despite a larger share of the expenses, "direct market sales return a larger share of the food dollar back to the farmer than traditional marketing channels do" (Bachman et al., 2021, p. 285), and "is associated with higher business survival rates among small … farmers" (Bachman et al., 2021, p. 285). Another unique quality present in many successful small-scale farming operations is the ability to build robust relationships between partners in local and regional supply chains, including consumers, farmers markets, small businesses, university extension offices, and other partners. Small-scale farmers who had their own social networks and relationships of trust with local consumers and partners tended to receive timely support from them to respond to the pandemic in a resilient manner (Fardkhales & Lincoln, 2021; Haynes-Maslow et al., 2020).

With a number of adaptive responses noted in the literature, we aimed to discover what responses or adaptations, if any, were utilized in Northwest Arkansas among small-scale direct-market farmers through the first two years of pandemic disruption.

Methodology

This pilot study utilized a mixed case-study approach focusing on small-scale direct marketing farms in Northwest Arkansas. Qualitative and quantitative data were collected and analyzed separately, and then results were compared in order to capture a full picture of the effects of the pandemic on local farmers. Quantitative data were collected first from 17 farmers who either owned or worked on small direct-marketing farms or market gardens in Northwest Arkansas, using a short online SurveyMonkey survey. The link to the survey was emailed to farmers through the Northwest Arkansas Farmers' Market Alliance, a community organization that provides support and programming to 17 farmers markets across the Northwest Arkansas region, and through Northwest Arkansas–based farming-focused Facebook communities (groups). Attempts were made to increase the sample size by bringing an iPad to farmers markets and inviting farmers to take the survey, but this was ultimately unsuccessful as farmers were busy with their sales. Farmers took the survey during the summer of 2021, to observe changes between the 2019 market season before the pandemic, the 2020 market season during the first year of the pandemic, and the

market season in 2021, after the first year of the pandemic.

The quantitative portion of the study contained a mix of questions on a Likert scale, such as "If you farm (food) produce/crops, how much did you grow in 2020?" with answer options ranging from "much less than in 2019" to "much more than in 2019." Other questions that required a number response included "How many part-time staff did you employ in 2019?" Others required a "yes" or "no" response, such as "Did your farm/business receive financial support during the 2020 season?" or a "check all that apply" response for questions such as "Which of these, if any, is your business struggling with in 2021?" with a list of possible choices. Some of these choices included food safety challenges, personal challenges, and climate/pest/environmental challenges, for which the mode was calculated. Descriptive quantitative analysis was completed in Excel after the data was generated from the responses in SurveyMonkey.

This survey was followed up by qualitative interviews through Zoom in the fall of 2021 with five of the farmers who voluntarily agreed to interviews when they took the survey. The follow-up interviews aimed to gather more information about the results of the quantitative data analysis and additional context about local farmers' experience of the pandemic in their own words, and to find out if there were additional challenges or innovations that were not included in the survey instrument. This time period was chosen for interviews because it allowed the farmers to reflect on the market seasons before, during, and the year following the first year of the pandemic before transitioning into the 2021 winter market season.

Once the interviews were recorded, the recordings were transcribed and then coded using Microsoft Word rather than a software program for qualitative analysis, due to the small sample size. The qualitative portion of the study included several larger themes that were listened for throughout the interview recordings through thematic qualitative analysis, including 'community,' 'resources,' 'change in farming procedures,' and 'farming challenges,' each including several subthemes stemming from the larger themes (see Table 1). These themes identified similar patterns throughout the recordings, which were then compared with results from the quantitative data analysis. This study was also approved by the University of Arkansas for Medical Sciences' Institutional Review Board to ensure the protection of the participants prior to the data collection.

While the sample size of this study appears to be small and is specific to a single region of Arkansas, this limitation is appropriate for a pilot study aiming to capture a small population of farmers in

Table 1. Qualitative Coding Scheme

Code	Description	Subtheme
Community	Statements that refer to the importance or non-importance of local farming in Northwest Arkansas	- Support for local farms in Northwest Arkansas
Resources	Statements in references to financial and other resources that farmers used during the pandemic to keep the farm running	- Were these resources sufficient - Were these resources used in non-pandemic years
Change in farming procedures due to the pandemic	Statements that allude to a change in the way the farm ran due to the pandemic	- Differences in where products were sold - Differences in the amount of product raised or grown - Differences in the kinds of products raised or grown
Farming challenges	Statements that refer to challenges faced by small farms in Northwest Arkansas	- Kinds of challenges present before the pandemic - Kinds of challenges present during the pandemic - Kinds of challenges after the first year of the pandemic

Table 2. Characteristics of Surveyed Farmers and Farms

	n	%	Mean (SD)
Gender	17	100%	
Male	4	24%	
Female	13	76%	
Race	17	100%	
White	15	88%	
Non-white	2	12%	
Farming experience (years)	15		14.9 (12.6)
Farm size (acres)			
	n		%
< 50 acres	11		65%
50–99.9 acres	3		18%
100–149.9 acres	1		6%
150–199.9 acres	2		12%
Total	17		100%
Farm location by county			
	n		%
Washington	11		69%
Benton	3		19%
Marion	1		6%
Crawford	1		6%
Total	16		100%

Types of products the farmers sold *

Farm	(Food) produce/crops	(Material or ornamental) produce/crops	(Non-meat) animal products	(Meat) animal products
F1	X			
F2	X			
F3	X			
F4	X			X
F5	X			
F6	X	X		X
F7	X	X	X	
F8	X		X	
F9	X	X	X	X
F10	X			X
F11	X	X	X	X
F12	X		X	X
F13	X			
F14	X			X
F15	X			
F16	X			X
F17				X

*Note that the amount produced of each product varies by farm.

a specific area of the state. A larger, statewide study will be conducted to follow up on the results of the pilot study and expand to more regions of Arkansas to include a broader and more representative sample. This study will also include additional years following the first year of the pandemic disruption to discover how farmers adapted two and three years later.

Results

The focal population for this pilot study was farmers who owned or worked on small-scale, locally run farms or market gardens in the Northwest Arkansas region during COVID-19. Only one farm that participated in this study reported earning more than US$50,000 annually in gross farm sales. Study participants represented 12 cities in four Northwest Arkansas counties, and the majority lived in Washington County. The farmers who participated in this study were 76% female, had an average farm size of around 49.6 acres, and the majority have been farming in Arkansas for approximately 15 years. The interview participants were primarily fruit and vegetable growers.

Eighty-eight percent of the farmers were white, which is reasonably reflective of the general population of the region, especially those who own farmland (see Table 2). This reflects an overall trend in American agriculture as well. While the number of

white farmers is decreasing, according to the most recent (2017) census of agriculture, 95% of American farm owners are white (Moon, 2019). However, the number of female producers, including those taking the helm of farming operations, has increased in recent years. The 2017 census of agriculture indicates that 56% of farms in the U.S. have at least one female producer (Moon, 2019).

In the results section, we illustrate three main themes we found from this study: The impacts of COVID-19 on local farmers in Northwest Arkansas, local farmers' responses to the pandemic from the farm resilience framework, and the importance of local communities in response to the pandemic.

The Impacts of COVID-19 on Small-Scale Direct-Marketing Farmers

This study focuses mainly on the unique challenges the pandemic brought to farmers, often specific to the kind of products they sold. The key categories of challenges that small-scale direct-marketing farmers in Northwest Arkansas faced during the pandemic are related to finances, the distribution of products, and the environment. For example, produce farmers struggled in part because they were unable to freeze their products and needed to figure out how to sell their goods while they were still fresh. Farmers raising animals struggled to find feed for their animals. Meat producers also struggled, even with high demand, to get their animals processed quickly enough to sell, and some animals got too big to process in time, which in turn led to more mouths to feed the following winter. Particularly since these farms were small operations, some also struggled because they did not have the infrastructure at their farm to process or store food long-term.

> A lot of produce has gone to waste because it's got to move right now. And the next thing you know the COVID numbers go up and the restaurants close and everything stops, and it's just the unknowing that's the tough part. (Interview participant 2)

Table 3 represents a variety of challenges that local farmers faced over the past three years. First, note that compared to the 2019 season, there was an increase of 23 percentage points in farmers reporting financial troubles in the 2020 season, and 11 percentage points more farmers reported that they were still experiencing financial struggles in the 2021 season. This is aligned with findings from Table 4. According to Table 4, only 12.5% of the survey respondents reported that they received financial support (e.g., government loans, private

Table 3. Responses to the Question: "Which of these, if any, did your farm/business struggle with? Choose all that apply."

	2019 (*n*=17)		2020 (*n*=17)		2021 (*n*=17)	
	n	%	*n*	%	*n*	%
Financial challenge	3	18%	7	41%	5	29%
Food safety challenge	0	0%	3	18%	2	12%
Distribution of products	0	0%	7	41%	3	18%
Climate, pest, or environmental challenges	9	53%	9	53%	10	59%
Personal challenges	3	18%	4	24%	2	12%

Table 4. Financial Support Status for the Past Three Years (2019–2021)

	Yes		No		Row Total	
	n	%	*n*	%	*n*	%
Did your farm/business received financial support in 2019?	2	12.5%	14	87.5%	16	100%
Did your farm/business receive financial support in 2020?	5	31%	11	69%	16	100%
Did your farm/business receive financial support in 2021?	2	12.5%	14	87.5%	16	100%

loans, personal gifts, etc.) in 2019, but there was an increase of almost 20 percentage points in farmers who received financial support in 2020. However, the percentage of farmers who received financial support in 2021 fell to the pre-pandemic level (12.5%).

The farmers who took part in this study expressed concerns not only about ensuring the financial survivability of their farms, but also the social responsibility of feeding their community.

> We were really kind of caught between a rock and a hard place because we really felt the burden of, like, wanting to feed people and, like, knowing that we needed to provide this food for the community, but not having the capacity to do that. (Interview participant 4)

Notably, as can be seen in Table 3, when asked what kinds of challenges farmers faced in 2019, 2020, and 2021, climate, pest, and environmental challenges were the most consistent among all farms. More than half the farmers surveyed agreed that this was a problem for them all three years, the worst being 2021, when the region experienced a surprise heavy snow in February, highly unusual snow in April, and an unusually wet and long spring followed by an extremely dry, long summer.

> I mean the weather is for sure like the worst variable, with climate change and what's going on everything is so crazy. … The biggest variable for me as a stressor is weather. (Interview participant 1)

Based on this finding, it seems that COVID-19 was a challenge for the farmers, but weather and pests were a greater challenge regardless of what kind of farm it was.

> I think the top priority that … we need to teach consumers is, know who's growing your food, because if you have a relationship with the person who's growing your food, then you will start to understand all the things that they have to go through and all of the challenges, all of the issues that are being brought up because of climate change. (Interview participant 4)

Further, as reflected in Table 5, during the 2020 season most local farmers surveyed produced either the same amount or more than they did dur-

Table 5. Production, Processing, and Sales in 2020

	Slightly or much less than in 2019		The same amount as in 2019		Slightly or much more than in 2019		Row Total	
	n	%	*n*	%	*n*	%	*n*	%
If you farm (food) produce/crops, how much did you grow in 2020?	5	33%	2	13%	9	56%	16	100%
If you farm (food) produce/crops, how much did you sell in 2020?	7	47%	4	27%	4	27%	15	100%
If you farm (material or ornamental) produce/crops, how much did you grow in 2020?	1	25%	2	50%	1	25%	4	100%
If you farm (material or ornamental) produce/crops, how much did you sell in 2020?	3	75%	1	25%	0	0%	4	100%
If you farm (non-meat) animal products, how much did you produce in 2020?	0	0%	4	80%	1	20%	5	100%
If you farm (non-meat) animal products, how much did you sell in 2020?	2	40%	3	60%	0	0%	5	100%
If you farm (meat) animal products, how much did you process in 2020?	2	22.2%	2	22.2%	5	55.6%	9	100%
If you farm (meat) animal products, how much did you sell in 2020?	3	37.5%	1	12.5%	3	50%	8	100%

ing the 2019 season. However, compared to 2019, they sold less during the first year of the pandemic (2020). This may align with the result shown in Table 3 that more than half the farmers struggled to distribute their products in 2020. Specifically, according to Table 5, 56% of produce farmers surveyed reported that they grew more during the 2020 season than the 2019 season. However, 47% of the farmers sold less in 2020 than they did in 2019. Simply speaking, approximately 10% of farmers grew more but sold less during the 2020 season compared to the 2019 season. Unfortunately, the survey did not provide an opportunity to explain in detail why this happened.

As can be seen in Table 5, half the farmers who grew material or ornamental crops reported that during the 2020 season, they grew about the same amount as the 2019 season, but 75% of them sold less in 2020 compared to 2019. Eighty percent of the non-meat animal product sellers reported processing the same amount as the previous year, while 20% of them reported processing more compared to the previous year. Sixty percent of them sold the same amount as the 2019 season, but 40% sold less compared to the previous year. Notably, meat producers seemed to fare better in 2020 than plant growers and non-meat animal product producers. The majority of meat producers surveyed reported both producing and selling more in 2020 than in 2019. Note that since Table 5 shows only the comparison between the 2019 season and the 2020 season with respect to production, processing, and sales, it cannot provide details on how the amount of production, processing, and sales changed before, during, and after the pandemic.

Farmers' Responses and Adaptation

As stated earlier, Darnhofer (2014) suggests three types of farmers' responses to the external environment: buffer response, adaptive response, and transformative response. According to the literature, the most common responses that farmers implemented during the pandemic were buffered responses, such as destroying their farm products and cutting costs (Jackson-Smith & Veisi, 2021). However, local farmers in Northwest Arkansas appeared to use primarily more innovative and adaptive responses to the COVID-19 pandemic, which focused on short-term incremental changes in their production and marketing processes. We discovered that their responses were based mainly on adaptive changes in sales procedures, including farmers market drive-through pick-up and online ordering applications.

However, these farmers did not want to continue using these new marketing methods (e.g., the sale of crops in a socially distanced manner and the use of mobile applications) if the spread of coronavirus was controlled effectively and properly. This may be because these farmers considered having in-person interactions with local customers one of the most important values for their farming business and therefore did not put any transformative changes in place to adapt to the pandemic in the long term.

Adaptive changes in sales procedures

According to Table 6, out of the options listed on the survey question, "Where did you sell your crops in 2019, 2020, and 2021"? which included farmers markets, local restaurants, grocery stores,

Table 6. Responses to the Question: "Where did you sell your products for the past three years [2019–2021]? Choose all that apply."

	2019 (*n*=17)		2020 (*n*=17)		2021 (*n*=17)	
	n	%	*n*	%	*n*	%
Farmers markets	8	47%	7	41%	7	41%
Local restaurants	5	29%	3	18%	4	24%
Community supported agriculture	0	0%	1	6%	1	6%
Grocery stores	4	24%	2	12%	2	12%
Local businesses	3	18%	4	24%	2	12%
Other	9	53%	10	59%	11	65%

CSAs, and local businesses, farmers listed 'other' the most frequently. With regard to the percentage of 'other' sources that farmers sold to, there was an increase of 12 percentage points from 2019 (53%) to 2020 (65%), potentially due in part to the increase in online sales that many small farms switched to during the pandemic or in small part by U-pick or roadside operations when COVID safety procedures allowed for more outdoor activities. The second most frequently chosen option was farmers markets, which stayed mostly the same even with the interruption of the pandemic year, as many farmers markets in the region either continued to meet in-person outdoors or switched to online sales.

The farmers noted that due to the small size of their farms, they were able to be flexible and pivot quickly to different methods of distribution when disruption started during the pandemic, such as initiating drive-through and online options for their businesses. Some farmers who normally sold to restaurants received support from local chefs who helped them distribute their products, so that both the farmers and the restaurants could benefit while restaurants were closed to in-person dining. Restaurants and farmers markets provided online sales and delivery options to move products while in-person options became unsafe or unavailable.

> I think there were a lot of farms like mine that really survived because of [online sales from restaurants] because we had already planted, we had already managed our year, our produce, our crops and you know … what are you going to do with 20 bags of salad mix or whatever, you know you gotta find an outlet. (Interview participant 3)

Community

Community is a theme of farmers' experience of the pandemic that came from the qualitative interviews. This theme is closely related to local farmers' adaptive responses to the pandemic that we illustrated above. Although there is a paucity of explanations in the farm resilience literature (Darnhofer, 2014; Fardkhales & Lincoln, 2021) for how and why a certain type of farmer's response to the crisis is selected and implemented, this study can provide a plausible example and explanation for that. Collaborative relationships that local farmers already had with their customers, local businesses, and other farmers in the immediate community enabled the farmers to respond effectively to the pandemic in an adaptive manner. In particular, local food economy partners in Northwest Arkansas came together in moving ways to support each other's businesses and help each other continue running. For example, local meat processors helped farms to process smaller animals even if they did not make as much money as they did with large animals like cattle. Farm-to-table restaurants and local chefs worked with farmers to cater to online orders in the absence of wholesale sales.

> The farm to table movement started before COVID and has really taken root here in Northwest Arkansas. And so the ball had already been moving successfully when COVID came and … and they weren't just going to abandon it at that point. (Interview participant 4)

These may be good examples of local farmers' adaptive responses to the pandemic that were enabled through collective action between local farmers and other immediate community stakeholders, such as restaurants and meat processors, and importantly, including consumers who continued to buy and eat locally.

> I think that's one of the side benefits from a situation like COVID where people are forced to count on one another, you know in times of need and duress like this, the relationships between not just the chefs and the farmers but between just individuals. (Interview participant 5)

This community support is not just a result of the pandemic. Farmers described conversations with other farmers about ways to improve their methods or to support greater sustainability even before the pandemic, creating close personal relationships with local supply-chain partners, such as chefs and butchers, inviting others to visit their farms and offer advice to those who wanted to

start farming, personal relationships with repeat customers, and other avenues of connection. Several farmers also noted that the Arkansas Cooperative Extension Service has been helpful to them in maneuvering through some of the challenges they faced with their operations, and one farmer voiced encouragement for more farmers to get involved with their local extension boards.

> I will say if we have learned one thing, it is to appreciate the farmer, we have retired from [other jobs]. We have retirements come in. God bless the farmer that's trying to make a living doing this, I don't know how they do it. (Interview participant 5)

Discussion and Conclusions

Although studies are continuing to emerge that focus on how COVID-19 disrupted food systems and how farms responded to the pandemic, few have focused on case studies of small-scale farming communities in the Mid-Southern U.S. (Jackson-Smith & Veisi, 2021; Marusak et al., 2021; Thilmany et al., 2021). To fill this research gap in the literature, we conducted a mixed case pilot study with a focus on small-scale direct-marketing farms in the region of Northwest Arkansas. We aimed to answer two research questions regarding how COVID-19 affected small-scale direct-marketing farmers and how the farmers responded to the pandemic.

Our small sample of direct-marketing farmers reported struggling financially during the first year of the pandemic, as can be seen in Table 3. This seems to be closely related to another finding from this study that the majority of farmers struggled to find distribution channels for their products and sold less in 2020, as can be seen in Tables 3 and 6.

The most important and enduring finding from this study may be that while environmental challenges have always been a struggle for farms, the farmers who participated in this study demonstrated that environmental disturbance has been a greater challenge overall than the COVID-19–related disruptions, as shown in Table 3. Climate change is likely to pose further risk to farmers by increasing weather-related extreme events (Stott, 2016). Strategies need to be in place to protect these small farms and incentivize them to invest in environmentally sustainable farming methods while also making these efforts financially viable. We applied Darnhofer's farm resilience framework and found that small-scale direct-marketing farmers primarily chose adaptive responses instead of buffer or transformative responses. Importantly, it seems that the changes farmers made during COVID-19 were mostly meant to be temporary to respond to the public health crisis, and those who participated in the qualitative interviews were all glad to see their customers face-to-face again. However, at the time that this study was conducted, some of these innovations, such as online ordering, persisted to a lesser extent through farmers markets and may continue to provide easier access to locally grown food for those with limited mobility or who are unable to attend in-person markets in the future.

Small-scale producers in Northwest Arkansas did struggle with production and distribution, but many had opportunities to remedy this, while large-scale operations did not. This may confirm that it is possible for resilient small farms to respond to crises more successfully compared to large and industrial-scale farms (Ahmed et al., 2020; Bachman et al., 2021). However, to fully understand the resilience of farms in crises, it is important to consider that different farmers have different challenges depending on what kinds of produce or animal products they sell, what kinds of community connections they have, what sort of infrastructure their farm has, and what kind of resources they have or need (Darnhofer, 2020). Simultaneously, successful innovations in local food economy resilience during the pandemic may offer an opportunity to reimagine an alternative, healthier, more sustainable food system that can be more resilient to disasters and promote better health outcomes for the environment and communities (Atalan-Helicke & Abiral, 2021; Campbell, 2021). The lesson here then may be less about what strategies might work to ride through hardships on a small-scale farm and more about how communities' support of small local farms and smaller supply chains can help those farms survive and persist even as larger supply chains suffer.

This pilot study has several limitations. First, only English-speaking farmers participated in this

study, although there are non–native-English-speaking direct-marketing farmers in Northwest Arkansas. Thus, a future researcher may invest in translation services, such as in Hmong and Spanish, to provide the survey or conduct interviews in other languages spoken locally among small farmers in Northwest Arkansas or other regions. Next, this study focused primarily on Northwest Arkansas' agricultural sector. Therefore, findings from this study may have a limit of generalizability. That is why a larger, statewide study will be conducted to follow up on the results of this pilot study and expand to more regions of Arkansas to include a broader and more representative sample. This study will also include additional years following the first year of pandemic disruption to discover how farmers adapted two and three years later from the farm resilience perspective, as well as to observe the looming effects of climate challenges on small farmers across the state. This expanded study might provide insight into how needs and adaptations were similar or different across the state and how successful pandemic responses can be replicated across small farming communities in the future to support community and food system resilience.

Acknowledgments

Until settlers drove them out, the Osage, Caddo, and Quapaw Nations cared for the land that now houses Northwest Arkansas. While members of these communities continue to live in Northwest Arkansas today, it is important to acknowledge that the majority of the local farmers and caretakers today in the Arkansas Ozarks are not members of those communities and are not indigenous to the area. May we all respect the land we live on, more deeply understand its history, and remain thoughtful and intentional about the stories we tell about it and its people, past, present, and future. The authors would like to thank the community participants for their generous time and involvement in this study.

References

Ahmed, S., Downs, S. M., Yang, C., Chunlin, L., ten Broek, N., & Ghosh-Jerath, S. (2020). Rapid tool based on a food environment typology framework for evaluating effects of the COVID-19 pandemic on food system resilience. *Food Security*, *12*(4), 773–778. https://doi.org/10.1007/s12571-020-01086-z

Arkansas Farm Bureau. (n.d.). *Agriculture facts*. Retrieved August 14, 2022, from https://www.arfb.com/pages/education/ag-facts/

Atalan-Helicke, N., & Abiral, B. (2021). Alternative food distribution networks, resilience, and urban food security in Turkey during the COVID-19 pandemic. *Journal of Agriculture, Food Systems, and Community Development*, *10*(2), 89–104. https://doi.org/10.5304/jafscd.2021.102.021

Bachman, G. H., Lupolt, S. N., Strauss, M., Kennedy, R. D., & Nachman, K. E. (2021). An examination of adaptations of direct marketing channels and practices by Maryland fruit and vegetable farmers during the COVID-19 pandemic. *Journal of Agriculture, Food Systems, and Community Development*, *10*(4), 283–301. https://doi.org/10.5304/jafscd.2021.104.010

Béné, C. (2020). Resilience of local food systems and links to food security – A review of some important concepts in the context of COVID-19 and other shocks. *Food Security*, *12*(4), 805–822. https://doi.org/10.1007/s12571-020-01076-1

Brusentsev, V., & Vroman, W. (2017). *Disasters in the United States: Frequency, costs, and compensation*. WE Upjohn Institute for Employment Research.

Campbell, C. G. (2021). The impact of COVID-19 on local government stakeholders' perspectives on local food production. *Journal of Agriculture, Food Systems, and Community Development*, *10*(2), 71–88. https://doi.org/10.5304/jafscd.2021.102.035

Darnhofer, I. (2014). Resilience and why it matters for farm management. *European Review of Agricultural Economics*, *41*(3), 461–484. https://doi.org/10.1093/erae/jbu012

Darnhofer, I. (2020). Farming from a process-relational perspective: Making openings for change visible. *Sociologia Ruralis*, *60*(2), 505–528. https://doi.org/10.1111/soru.12294

Della Rosa, J. (2020, April 19). COVID-19 affects opening for Northwest Arkansas farmers markets. Talk Business and Politics. https://talkbusiness.net/2020/04/covid-19-affects-opening-for-northwest-arkansas-farmers-markets/

Devereux, S., Béné, C., & Hoddinott, J. (2020). Conceptualising COVID-19's impacts on household food security. *Food Security*, *12*(4), 769–772. https://doi.org/10.1007/s12571-020-01085-0

Fardkhales, S. A., & Lincoln, N. K. (2021). Food hubs play an essential role in the COVID-19 response in Hawai'i. *Journal of Agriculture, Food Systems, and Community Development*, *10*(2), 53–70. https://doi.org/10.5304/jafscd.2021.102.036

Farmers.gov. (n.d.). *USDA Pandemic Assistance for Producers*. Retrieved August 15, 2022, from https://www.farmers.gov/coronavirus/pandemic-assistance

Hansen, A. R., Ronning, E., & Collier, K. (2020). Food systems resilience through dialogue: Localizing a food systems approach in pandemic response. *Journal of Agriculture, Food Systems, and Community Development*, *10*(1), 265–268. https://doi.org/10.5304/jafscd.2020.101.033

Hanson, J. D., Hendrickson, J., & Archer, D. (2008). Challenges for maintaining sustainable agriculture systems in the United States. *Renewable Agriculture and Food Systems, 23*(4), 325–334. https://doi.org/10.1017/S1742170507001974

Haynes-Maslow, L., Hardison-Moody, A., & Byker Shanks, C. (2020). Leveraging informal community food systems to address food security during COVID-19. *Journal of Agriculture, Food Systems, and Community Development*, *10*(1), 197–200. https://doi.org/10.5304/jafscd.2020.101.005

Huber, A. G. (2020). "Let us be small": A case study on the necessity for intentionally small producers. *Journal of Agriculture, Food Systems, and Community Development, 10*(1), 269–272. https://doi.org/10.5304/jafscd.2020.101.032

Jackson-Smith, D., & Veisi, H. (2021). Media coverage of a pandemic's impacts on farmers and implications for agricultural resilience and adaptation. *Journal of Agriculture, Food Systems, and Community Development*, *10*(2), 157–179. https://doi.org/10.5304/jafscd.2021.102.039

Jessen, J. (2022, March 6). UAMS joins with community partners to address food insecurity in Northwest Arkansas. *Northwest Arkansas Democrat Gazette*. https://www.nwaonline.com/news/2022/mar/06/uams-joins-with-community-partners-to-address/?news-arkansas-nwa

Khasnis, A. A., & Nettleman, M. D. (2005). Global warming and infectious disease. *Archives of Medical Research*, *36*(6), 689–696. https://doi.org/10.1016/j.arcmed.2005.03.041

Laborde, D., Martin, W., Swinnen, J., & Vos, R. (2020). COVID-19 risks to global food security. *Science*, *369*(6503), 500–502. https://doi.org/10.1126/science.abc4765

Larson, T., Ong, P. M., Mar, D., & Peoples, Jr., J. H. (2020, November 11). *Inequality and COVID-19 food insecurity.* UCLA Center for Neighborhood Knowledge. https://knowledge.luskin.ucla.edu/wp-content/uploads/2020/12/Inequality-COVID-19-Food-Insecurity.pdf

Liang, C.-L., Kurkalova, L., Hashemi Beni, L., Mulrooney, T., Jha, M., Miao, H., & Monty, G. (2021). Introducing an innovative design to examine human-environment dynamics of food deserts responding to COVID-19. *Journal of Agriculture, Food Systems, and Community Development*, *10*(2), 123–133. https://doi.org/10.5304/jafscd.2021.102.037

Marusak, A., Sadeghiamirshahidi, N., Krejci, C. C., Mittal, A., Beckwith, S., Cantu, J., Morris, M., & Grimm, J. (2021). Resilient regional food supply chains and rethinking the way forward: Key takeaways from the COVID-19 pandemic. *Agricultural Systems*, *190*, Article 103101. https://doi.org/10.1016/j.agsy.2021.103101

McDermott, A. (2022). Climate change hastens disease spread across the globe. *Proceedings of the National Academy of Sciences, 119*(7). https://doi.org/10.1073/pnas.2200481119

Medlock, J. M., & Leach, S. A. (2015). Effect of climate change on vector-borne disease risk in the U.K. *The Lancet Infectious Diseases*, *15*(6), 721–730, https://doi.org/10.1016/S1473-3099(15)70091-5

Moon, E. (2019, April 12). Agriculture census data shows the U.S. has more female farmers than ever. *Pacific Standard.* https://psmag.com/news/ag-census-finds-more-female-farmers-than-ever

National Sustainable Agriculture Coalition. (2022, March). *Whole-farm revenue protection for diversified farms.* https://sustainableagriculture.net/publications/grassrootsguide/credit-crop-insurance/whole-farm-revenue-protection-for-diversified-farms/#basics

Niles, M. T., Bertmann, F., Belarmino, E. H., Wentworth, T., Biehl, E., & Neff, R. (2020). The early food insecurity impacts of COVID-19. *Nutrients*, *12*(7), Article 2096. https://doi.org/10.3390/nu12072096

Patillo, A. R., Millsap, J. C., Byers, P., Gundel, J. A., Peregoy, K., Lake, A., Denkler, S., Meusch, E., & Burton, D. (2021). Missouri's specialty crop beginning farmers cultivate resilience during COVID-19. *Journal of Agriculture, Food Systems, and Community Development, 10*(2), 225–239. https://doi.org/10.5304/jafscd.2021.102.052

Patz, J. A., Githeko, A. K., McCarty, J. P., Hussein, S., Confalonieri, U., & de Wet, N. (2003). Climate change and infectious diseases. In A. J. McMichael, D. H. Campbell-Lendrum, C. F. Corvalán, K. L. Ebi, A. Githeko, J. D. Scheraga, & A. Woodward (Eds.), *Climate change and human health: Risks and responses* (pp. 103–132). World Health Organization.

Reiley, L. (2021, March 8). Relief bill is most significant legislation for Black farmers since Civil Rights Act, experts say. *The Washington Post*. https://www.washingtonpost.com/business/2021/03/08/reparations-black-farmers-stimulus/

Reynolds-Allie, K., Fields, D., & Rainey, R. (2013). Risk management issues for small farms within local food systems. *Choices, 28*(4), 1–4, http://www.jstor.org/stable/choices.28.4.02

Stott, P. (2016). How climate change affects extreme weather events. *Science*, *352*(6293), 1517–1518. https://doi.org/10.1126/science.aaf7271

Teng, P. (2020). Assuring food security in Singapore, a small island state facing COVID-19. *Food Security*, *12*(4), 801–804. https://doi.org/10.1007/s12571-020-01077-0

Thilmany, D., Canales, E., Low, S. A., & Boys, K. (2021). Local food supply chain dynamics and resilience during COVID-19. *Applied Economic Perspectives and Policy*, *43*(1), 86–104. https://doi.org/10.1002/aepp.13121

Thomas, M. B. (2020) Epidemics on the move: Climate change and infectious disease. *PLoS Biology*, *18*(11), Article e3001013. https://doi.org/10.1371/journal.pbio.3001013

U.S. Department of Agriculture [USDA]. (2021a, March 11). *Small farms, big differences* [Press Release]. https://www.usda.gov/media/blog/2010/05/18/small-farms-big-differences#:~:text=USDA%20defines%20a%20small%20farm,fell%20between%202002%20and%202007.

USDA. (2021b, March 24). *After identifying gaps in previous aid, USDA announces 'Pandemic Assistance for Producers' to distribute resources more equitably* [Press release]. https://www.usda.gov/media/press-releases/2021/03/24/after-identifying-gaps-previous-aid-usda-announces-pandemic

USDA. (2021c, October 7). *USDA announces plan to integrate climate adaptation into its missions and programs* [Press release]. https://www.usda.gov/media/press-releases/2021/10/07/usda-announces-plan-integrate-climate-adaptation-its-missions-and

University of Arkansas for Medical Sciences. (n.d.). *Community of practice*. Retrieved February 15, 2022, from https://nwa.uams.edu/chr/cop/