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August 2001 **Las Cruces, NM**
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Department of Agricultural Economics and Agricultural Business

Drip Irrigation and Southern New Mexico Chile Pepper Production: A Survey of Producers

Agricultural Experiment Station • Bulletin 784

New Mexico State University

College of Agriculture and Home Economics

Contents

ACKNOWLEDGMENT

This research was made possible through the support of New Mexico State University's Agricultural Experiment Station

Drip Irrigation and Southern New Mexico Chile Pepper Production: A Survey of Producers

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Concern about the long-term viability of commercial chile pepper production in New Mexico prompted the creation of the New Mexico Chile Pepper Task Force in fall 1998. The purposes of this interdisciplinary team are to identify and implement ways to keep chile pepper production and processing profitable in New Mexico and to maintain and enhance the research and development partnership between the New Mexico chile industry and New Mexico State University (NMSU).

Drip irrigation (DI) is one of the central research issues identified by New Mexico chile growers, researchers, and other industry participants in the Chile Pepper Task Force initiative. Task force members agreed there are many questions about drip irrigation technology that need to be addressed. Many industry members and observers believe drip irrigation is a technology that could increase yields and decrease costs, helping the chile pepper industry compete in the global market. In 1999, several research projects were initiated to examine the current status and the future of drip irrigation within the New Mexico chile industry.

This research bulletin presents information from a survey of New Mexico chile producers that was conducted in mid-1999. The bulletin summarizes information provided by surveyed producers and concludes with a description of future research to be conducted using the summarized data. Larger issues and questions related to on-farm drip irrigation adoption or nonadoption are outlined. Readers interested in additional description of New Mexico's chile industry should obtain Agricultural Experiment Station Research Bulletin No. 782, "A Survey of Southern New Mexico Chile Producers: Production Practices and Problems," by Skaggs, Decker, and VanLeeuwen (January 2000).

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SURVEY PROCEDURES

The Population

A list of New Mexico chile producers was obtained from the U.S. Department of Agriculture (USDA). This list, used by the USDA to collect annual chile production data, had been updated through 1998. As of that year, the USDA records indicated there were 447 chile producers in the state. Of this total, 329 (73.6%) were producing 50 acres or less of chile peppers. On the recommendation of chile producers participating in the Chile Pepper Task Force, this survey research was limited to the 118 growers with more than 50 acres of chile peppers. All of these growers were located in the southern half of New Mexico.

The Questionnaire

A questionnaire (appendix A) designed to assess chile pepper producers' attitudes toward and knowledge of drip irrigation technology was developed by the investigators. This survey instrument was reviewed and approved by faculty members from the College of Agriculture and Home Economics' Agricultural Biometric Service. The questionnaire was divided into two parts. Part I consisted of 57 attitudinal or knowledge statements, with responses ranging from strongly disagree (scored as 1) to strongly agree (scored as 5) and including undecided (equal to 3). Part II included questions about the survey respondents demographic, crop production, and other characteristics.

Response to the Survey

Initially, the survey instrument was mailed to the 118 growers and included a postage-paid return envelope and an explanatory cover letter. Two follow-up mailings (each with a questionnaire and a reminder letter) were sent to nonrespondents. Three individuals sent back their survey packet indicating that they were no longer growing chile peppers or no longer farming. Two survey packets were returned as undeliverable. Removing these five people from the population resulted in a maximum possible return of 113 questionnaires. Sixty-eight questionnaires were returned in varying states of completion. The gross returned response rate was thus 60.2%. However, six of the returned questionnaires were deemed unsuitable for reporting and analysis, because the respondents had not answered at least one page of the questions. The usable response rate was adjusted to 54.9%. All tables referred to in the text are located in appendix B.

Raw Frequency Responses for Drip Irrigation Attitudes and Knowledge Questions

Tables 1-7 show raw frequency responses for the 57 attitude and knowledge questions in Part I. These results are for the 62 respondents who returned completed questionnaires. The attitudes and knowledge questions are divided into seven subcategories reflecting general themes. Survey questions related to water usage and conservation are presented (table 1). Table 2 summarizes questions about plant diseases, soils, and crop rotations. Responses to management practices and yield questions are shown (table 3). Table 4 deals with growers' responses to questions about drip irrigation technical support and research, and research in general. Growers' attitudes about the financial feasibility of drip irrigation are presented (table 5). Attitudes about drip irrigation technology adoption and risks are summarized (table 6). Table 7 deals with growers' attitudes and beliefs about the future of farming and chile pepper production.

Mean Results for Drip Irrigation Attitudes and Knowledge Questions

While the raw frequency counts may be of interest to some readers, mean results for each of the Part I questions provide more concise insight into chile pepper producers' attitudes about and knowledge of drip irrigation technology. Mean results for the questions are presented (table 8).

The 62 respondents also were divided by regions of the state: eastern, central, and western. Mean results for the attitudes and knowledge questions are presented for each region in (table 9). The central region includes growers with mailing addresses in Anthony, Las Cruces, Mesilla Park, Garfield, La Mesa, Mesquite, Hatch, Rincon, and Salem. The western region consists of chile producers near Animas, Columbus, Deming, Rodeo, and Silver City. The eastern growers are located in the Artesia, Hagerman, Hobbs, Lake Arthur, Roswell, and Rogers areas.

Sixty respondents to the survey also were stratified into two groups based on the types of irrigation systems they currently use on their farms. Thirty-nine growers use only flood/furrow methods, while the other 21 growers use sprinkler or drip systems on at least some of their fields. Most growers in the latter group also have some flood/furrow irrigated land. Two growers failed to respond to the survey question that asked them to describe their current irrigation systems, thus these results are for 60 growers only. Table 10 shows mean results for their answers to the attitude and knowledge questions stratified by irrigation system.

Analysis of variance (ANOVA) was conducted for each of the attitudinal or knowledge questions to test for differences in mean results between growers in the three regions. T-tests for differences between means were conducted to test for differences between users of different irrigation systems. These analyses were performed using the SAS System™. The ANOVA and t-test procedures applied to the survey responses are explained in Hoshmand (1988). The null hypotheses are that mean responses are equal between producer subgroups. The alternative hypotheses are that mean responses are not equal. P values (tables 9 and 10) indicate the levels of significance for the survey question analyzed. Results that were significant at least at the 0.15 level are shaded.

As a group, all 62 respondents agreed with technical statements regarding perceived water use and conservation benefits of using drip irrigation (table 8). As a group, they tended to disagree with the statement that drip irrigation can be used only with groundwater. They also did not agree with the notion that they could lose water rights as a result of using less irrigation water.

When stratified by region (table 9), there were some statistically significant differences between grower groups. Growers in the eastern and western regions tended to disagree that drip irrigation is only suitable with groundwater. There also was a strong difference in their responses to the question regarding water rights. Growers in the central region (Doña Ana County) were more pessimistic about the prospect of losing water rights as a result of using less irrigation water. The nature of regional irrigation systems has created different incentives regarding water conservation among growers in the central region relative to those in the eastern and western regions. These differences are reflected in their responses to the survey question.

When stratified by types of current irrigation system, there also were some significant differences found between the two producer groups. Growers who currently use sprinkler or drip systems more strongly agreed with statements that drip irrigation technology increases water application efficiency and that drip irrigation reduces water waste and losses. Growers using only flood/furrow irrigation systems were less supportive of the notion that the primary benefit of using drip irrigation is water conservation.

All 62 growers tended to disagree with statements that drip irrigation increases verticillium infestations, their soils are not well suited to drip irrigation, and they wouldn't have to rotate chile with other crops if they used DI (table 8). They were somewhat positive in their assessment of DI's ability to control Phytophthora root rot, but they were undecided about whether or not DI would make crop rotations more difficult.

In the regional stratification (table 9), there were statistically significant differences in growers' assessments about DI and soil suitability. Eastern and western growers more strongly agreed that DI was appropriate for their soil types, while central growers were somewhat more pessimistic. No significant differences were found when growers were stratified by type of current irrigation system.

All 62 growers agreed that chemigation was possible with DI, that DI required less labor, that it was easier to irrigate odd-shaped and sloping fields with DI, and that DI required more complex filtering and system maintenance (table 8). The group tended to be undecided about whether or not the primary benefit of using drip irrigation technology is higher yields. There were no significant regional differences for these management practice questions (table 9). However, statistical differences were found between irrigation system types (table 10).

Growers using only flood/furrow systems agreed more strongly with the statement that DI makes it easier to irrigate sloping or uneven fields. Flood/furrow irrigators have a stronger opinion that extensive maintenance is required or a DI system will fail. They also more strongly agreed with the statement that the primary benefit of DI is higher yields.

As a group, the 62 growers did not think they would need to pay a consultant to operate a DI system (table 8). They were undecided about the adequacy of local DI technical support. They were somewhat positive about the notion of installing DI on a small scale before installing on an entire farm, and agreed that an on-farm demonstration of DI technology would be very informative. The growers tended to disagree with the statement that research reports on DI are as good as field demonstrations. They were undecided about whether or not NMSU has been effective in assisting chile producers.

Western and eastern growers were statistically different from growers in the central region with respect to whether or not they would need a DI consultant (table 9). Growers in the central region were more likely to indicate they needed a consultant. Growers in the eastern region were significantly more pessimistic about the adequacy of local DI technical support. Western region growers showed significantly greater agreement with the statement that NMSU has effectively assisted chile producers. However, central region growers disagreed with that statement. No significant differences in attitudes about technical support and DI were found between users of different irrigation systems.

Growers' responses to questions regarding financing and feasibility of DI varied widely (table 8). The group saw less difficulty in DI installation than in DI operation. They tended to disagree that a DI system could pay for itself in two years and that DI was unlikely to pay off on their farms. They disagreed that their farms and fields were too small to justify a DI system, but they agreed with the notion that DI is too costly. There was some agreement that financing DI would be difficult. But they tended to disagree with the statement that current debt was an impediment to future DI investment. The growers showed support for tax incentives to encourage farmers to adopt DI. They tended to disagree with the statement that they don't have time to learn how to use and manage DI. But they were more undecided about whether they have already made too many irrigation investments. The growers tended to disagree with statements that all new machinery would be necessary when using DI, that concrete ditches would impede switching to DI, and that they need other new machinery more than they need DI.

Statistically significant regional differences were found for several questions (table 9). Central and eastern region growers

disagreed less strongly with the statement that a DI system could pay for itself in two years. Western region growers disagreed more with the statements about DI and field or farm size. Western growers also agreed most strongly with the statement that the cost of DI is too high. Eastern growers disagreed most strongly with the statement that they would have to buy all new machinery to work the ground if they used DI. Central and western growers tended to be undecided about this statement.

Not surprisingly, growers currently using sprinkler or drip irrigation systems showed greater agreement with statements that installing and operating a DI system would not be difficult (table 10). Current sprinkler or drip irrigation users also tended to disagree with the statement that their fields were too small to justify a DI investment.

The growers disagreed with the statement that they don't like to be the first in their communities to try a new technology (table 8). They were undecided about whether or not DI is too risky. They also were undecided about whether or not local farmers know about DI's benefits. The growers tended to disagree with the statement that local farmers have been wise to not adopt DI. The growers strongly agreed with the notion that switching to DI is a major change from flood/furrow irrigation.

Growers in the western region responded much more positively to the statement that chile growers in their community have favorable opinions of DI. Eastern region growers disagreed most strongly with that statement (table 9). Western growers agreed, while eastern and central growers disagreed with the statement "The benefits of DI are well-known to local farmers." Western region growers tended to disagree more strongly with the statement that local farmers have been wise to not adopt DI technology. Western region growers, possibly due to greater experience with DI, very strongly agreed with the statement that switching to DI would be a major change. Growers in other regions showed less agreement. There were no significant differences between users of different types of irrigation systems (table 10).

All of the growers were undecided about whether or not family members will take over their farming operations (table 8). They tended to disagree with statements that it is likely their farmland will be sold for development and that it will be difficult to continue farming due to urbanization and population growth. The growers disagreed with the statement, "I plan to sell my farmland in the next few years." They were undecided about their optimism regarding the future of chile production and agriculture in New Mexico. The growers agreed strongly with the statement about their desire to increase chile yields, but agreed less about wanting to increase their chile acreage.

There were several statistically significant differences between growers based on region (table 9). Eastern and central region growers indicated they believe there is a greater likelihood their farmland will be sold for development, when compared to western growers. However, all growers tended to disagree with the statement that their land would eventually be developed. Eastern and western growers disagreed with the statement that farming in their regions would be more difficult as a result of development. Central region growers were undecided. Western region growers showed less intention to sell their farmland in the next few years, when compared with eastern and central growers.

Growers using only flood/furrow irrigation systems were more likely to report that they believe their farmland will be sold for development (table 10). Current sprinkler or drip system users tended to more strongly disagree with the notion that it will be difficult to continue farming due to urbanization and population growth. Current sprinkler or drip system users disagreed more strongly with the statement that New Mexico agriculture will not survive very much longer. These growers also showed significantly more agreement with the statement "I would like to increase my chile yields."

RESPONSES TO THE WHOLE FARM, CROP PRODUCTION, DEMOGRAPHIC, AND OTHER QUESTIONS

Part 2 of the survey instrument requested demographic information about the chile growers, their farming operation, crop rotations, irrigation systems, information sources, and likelihood of adopting drip irrigation technology.

Acres Farmed, Owned, and Leased

The growers reported planting an average of 172 acres of chile peppers (table 11). The actual acreage of chile grown ranged from 14 to more than 600. Four of the respondents were producing below the 50-acre minimum that was established for the survey. However, the sampling frame used in the survey indicated these growers were producing at least 50 acres. Central region growers reported the smallest average chile pepper acreages. Average pepper acreages were larger in the east and west due to a small number of very large growers in those regions. Growers using only flood/furrow techniques reported producing an average of 139 acres, which was less than the average chile acreage reported by growers who do at least some irrigation with sprinkler or drip equipment. This acreage difference is strongly related to the regional differences in scale of chile pepper production, because most of the sprinkler or drip irrigators are located in New Mexico's western and eastern regions.

A similar pattern is exhibited with total acres farmed (table 12). Average flood/furrow irrigated farming operations and farms in the central region were the smallest reported. However, average total farm size is largest in the eastern region. Farms with sprinkler or drip irrigation systems reported an average of almost 1,209 acres.

Growers also were asked to report their total acreages of owned and leased farmland (tables 13 and 14). Results show that for central region growers, the average leased acreage is almost equal to the average owned acreage. Tables 12-14 show the makeup of average farms in each respondent category. The mean response for total acres farmed for each farm category (table 12) is equal to the sum of mean responses for owned acres (table 13) and leased acres (table 14) for the same categories. Growers in the central, eastern, and western regions reported average farms with approximately 50%, 60%, and 76.5% owned acres, respectively. Flood/furrow-only irrigators reported 57% owned acres, and chile growers with some sprinkler or drip fields farm an average of 71.6% owned acres.

Flood/Furrow, Sprinkler, and Drip Irrigated Acreages

Survey respondents provided information regarding their current irrigation systems, and the numbers of acres irrigated with each system (tables 15-17). Mean responses are reported for all respondents in each grower category. Means also are reported for responses that were greater than zero in each category, because many growers reported zero acreages for some of the irrigation systems.

When only positive responses are used for calculating means, growers reported an average of 702 acres of all crops under flood/furrow irrigation. The average flood/furrow irrigated area ranged from 629 acres in the west to 710 acres in the east. Growers who also irrigate with sprinklers or drip systems reported an average of 449 flood/furrow irrigated acres. Growers practicing only flood/furrow irrigation reported an average of 666 irrigated acres. This number does not match the 688.5 total acres farmed by flood/furrow irrigators (table 12), because the responses of several survey respondents to questions regarding total acreage farmed did not equal total acres irrigated. Differences were generally slight; however, they were significant enough to result in inconsistent means.

Means (tables 15-17) are not as useful, because of the frequent zero responses, as the distribution of acreages. Most reported drip irrigated acreages are small, although some exceptions are noted for the western region respondents.

Crop Rotations

The growers were asked to provide information for a typical chile rotation sequence. The results of this study are similar to those obtained in a previous survey of southern New Mexico chile growers (Skaggs, Decker, VanLeeuwen, January 2000). In both studies, growers reported a wide variety of chile rotation sequences. In the current study, 55 growers reported 52 different rotations (table 18). The regions and respondents' irrigation systems also are reported for each rotation. Eight growers reported rotations without indicating whether and where chile occurs. Information for the other 47 growers is presented as it was written by the respondents.

Chile Pepper Types

A large variety of responses also were found for the types of chile peppers grown (table 19). Seventy-three percent of all respondents indicated they were growing chile for red harvest only. Another

53% said they harvest red after green chile, while 46.7% reported growing green chile. Clearly, most grow several types of chile. Only 13 growers reported producing just one type of chile. Seven of these growers were located in the central region, four in the west, and two in the east.

Flood/furrow irrigators reported a wide distribution of combinations of chile types. Growers in the central region also showed a wide variety of chile combinations. This is related to the predominance of flood/furrow irrigation in the central region.

Concrete-Lined Ditches

During Chile Pepper Task Force meetings in 1999, a number of growers said that the presence of concrete-lined ditches on farms could be an impediment to adopting drip irrigation technology. This opinion was based on the notion that some producers have made significant investments in lining their current surface irrigation systems and would be hesitant to install new systems that would render previous ones obsolete. Thus, growers were asked to estimate their percentage of on-farm ditches that are concrete-lined (table 20). Mean results are reported for respondents who indicated that at least some of their on-farm ditches were concrete-lined. Western region growers reported the highest prevalence of concrete lining, at 80% of on-farm ditches. Eastern region growers reported an average of 51%, while central region growers reported approximately 71%.

Likelihood of Adopting Drip Irrigation

Growers were asked if they had ever seen a working drip irrigation system. Seventy-four percent of all the respondents reported that they had (table 21). Eastern region growers were less likely to have observed on-farm drip irrigation.

More than three-fourths of the eastern region growers also said they were not likely to install drip irrigation on their farms in the next five years (table 21). More than half of the central and western region growers indicated they were very or somewhat likely to install drip irrigation systems in the next five years. Fifty-six percent of the flood/furrow-only irrigators reported they were unlikely to install drip irrigation systems, while almost two-thirds of the sprinkler/drip irrigators expressed interest in drip irrigation system installation or expansion in the next five years.

Ages, Years Farming, and Years Producing Chile Peppers

The average age of growers participating in the survey was 52 years (table 22). Growers in the eastern region were the oldest with an average of 56 years, while central region growers were the youngest with an average of 50 years.

On average, the respondents have been farming for 28 years (table 23). Eastern region growers are the most experienced, while growers in the west had fewer average years in farming. The survey respondents reported an average of 16 years in chile pepper production (table 24). However, there were large differences among categories of producers. Eastern region growers reported the least experience with chile (11 years), while central region growers reported an average of 23 years in chile production.

Information Sources and Decision Making

Growers were asked where they seek information regarding new agricultural technologies, their frequency of contact with NMSU Cooperative Extension Service personnel, and whom they trust the most when making technology decisions for their farms (table 25). The survey respondents indicated they tend to seek information from other farmers, manufacturers' representatives, and agricultural publications. Extension personnel, the Internet, consultants, and farm shows were mentioned with less frequency.

Eighteen percent of all the respondents reported that they had been in contact with Extension personnel at least six times within the last year (table 25). Less frequent contact (twice, once, or never) was reported by 82%. Western region growers reported the highest frequency of no Extension contact, while eastern region respondents reported the lowest frequency.

The majority of growers in all categories indicated that they trust other farmers the most when making technology decisions (table 25). Manufacturers' representatives had the second highest overall frequency.

Education and Income Information

Growers also provided information about their level of education, off-farm employment, and farm income (table 26). Fifty-nine percent of the chile producers said they had gone to college or completed college. The highest percentage of growers who had completed college was found for the central region; however, growers with some graduate training were surveyed in both the east and west, but not in the central region.

Only 13% of the respondents reported off-farm employment in addition to farming. These growers tended to be flood/furrow irrigators located in the central and western regions. The majority of respondents (in all categories) indicated that at least 75% of their total household income is earned from farming.

A small number (3.3%) of survey participants refused to answer the question that dealt with net farm income over the last year. Of all the respondents, 8.2% reported that their farm operating costs exceeded their farm income. These were all flood/furrow irrigators located in the central and western regions. Almost 15% of the growers said their farms broke even, and another 30% indicated that their net farm income was greater than $100,000. The remaining 44.3% of the growers reported positive net farm incomes of less than $100,000.

Additional Research

The questionnaire that was used in this research was designed after review of previously published research about agricultural technology adoption. The objective was to obtain information from New Mexico chile pepper producers that would permit the development of a technology adoption model consistent with earlier studies for other regions and other agricultural technologies. This research has been conducted (Skaggs, 2001). The results of this research aid in predicting drip irrigation technology adoption by New Mexico chile producers. The prediction models use a variety of explanatory factors including producers' attitudes, farming operation characteristics, and demographic variables. Hypotheses for explanatory factors were formulated using previous technology adoption research, such as Rogers (1995).

Discussion

The cost of drip irrigation technology ranges from approximately $1,500/acre to $3,000/acre. Drip irrigation has many benefits. However, it is not without problems.

When drip irrigation is compared with many other irrigation technologies, its efficiency ratings are generally higher (Cuenca,1989; Hanson et al., 1997). Efficiency in this case refers to the amount of water that is used consumptively by plants in the field relative to the amount of water applied. However, if on-farm water use efficiency is already quite high, then drip irrigation may not lead to significant increases in efficiency. In situations where groundwater resources are scarce and decreasing due to lack of aquifer recharge, drip irrigation can reduce water application use greatly, and thus prolong financially feasible groundwater extraction.

On-farm irrigation efficiencies, defined as irrigation water used by crop relative to irrigation water applied, are already very high in the Mesilla Valley. This has been confirmed by different research teams employing a variety of methodologies (King, 1999a; King, 1999b; Deras, 1999). Thus, the promise of increased on-farm application efficiency may not be a strong incentive for Mesilla Valley farmers to adopt drip irrigation technology. The cost of irrigation water in the Rio Grande corridor is also low, and there is widespread concern that reduced surface water use could lead to farmers losing water rights. These factors create disincentives to adopting new, more costly irrigation technology.

Although drip irrigation is thought to reduce crop consumptive water use, this may not necessarily be true for irrigated crop production in southern New Mexico. Most furrow irrigation, as it is currently conducted in the state, is deficit in nature. Growers allow plants in the fields to use virtually all available water from the root zones. The plants become stressed, then irrigation water is applied. At that point, the water displaces air from the root zone and creates a temporary anaerobic environment. After a short recovery period, the plant again begins to consume water, grow, and produce. Deficit irrigation creates plant stress, which makes crops more susceptible to diseases, insects, and environmental damage. But deficit irrigation also is one of the factors that contribute to the relatively high on-farm water application efficiency (Deras, 1999).

With subsurface drip irrigation, water is reapplied to the plants as water is consumed through the roots. There is little plant stress, and the soil beneath the plants always has the optimal mixture of air and water. Drip irrigation actually may increase consumptive water use because plants are not stressed and grow larger. Yields can increase significantly, water-borne plant diseases can be suppressed, and fertilizer applications can be fine-tuned with drip irrigation. It also permits growers to irrigate while trucks and other equipment are in the fields for harvesting. This phenomenon has been shown to be particularly beneficial for alfalfa hay, which when irrigated on the surface results in many days during the growing season when water cannot be applied (Flynn, 2000).

Drip irrigation can reduce disease infestations of crops, particularly when microorganisms are carried across the surface of fields by irrigation water. NMSU crop production researchers believe this to be one of the primary benefits of drip irrigation use in chile peppers. The researchers have found that the incidence of Phytophthora in chile can be significantly reduced as a result of subsurface drip irrigation (Xie et al., 1999).

Fertilizers and pesticides can be managed closely when drip irrigation is used. Fertilizers are applied directly in the root zone and are not wasted in areas of the field where the plants cannot use them.

When drip irrigation systems are equipped with state-of-the-art controllers and plant monitors, farmers can access a wealth of information to help them understand and manage the factors that create plant stress, reduce yields, and increase susceptibility to diseases and pests. Of course, the scale of a farming operation influences whether a farmer will be financially able and willing to acquire all the technological options available with a drip irrigation system. Thus, drip irrigation technology is similar to many other agricultural technologies, as it is not scale neutral. Drip irrigation is a technology that is best suited for growers who are larger and better capitalized and who can spread out the fixed costs of a complete system over more acreage.

Subsurface drip irrigation requires changes in tillage equipment. However, tillage operations, or passes through fields, are usually reduced by half when drip rather than surface irrigation is practiced. Soil compaction in fields is reduced and operating costs also are lower as a result of reduced labor, fuel, and other machinery costs.

Questions remain about how feasible it is to use river water in a drip irrigation system. Many growers have expressed skepticism that current filtration procedures can adequately clean river water and protect the total irrigation system investment. Most drip irrigation currently taking place in New Mexico uses groundwater rather than river water. Wide-scale adoption of drip irrigation by surface water users may, therefore, be impeded by actual and perceived filtration problems.

A final issue regarding the adoption of drip irrigation technology concerns what is known as the "fallacy of composition." This problem arises when there is an inverse relationship between the pursuit of individual goals and group results (Knutson, Penn and Flinchbaugh, 1998). Individual farmers and landowners may decide to invest in drip irrigation based on their assessment that benefits will outweigh costs for their own farming operations. However, from an overall river basin perspective, their on-farm decisions may negatively impact the larger water system.

This issue has been recognized and described at length by other authors (Seckler, 1996; Burke and Adams, 1999). An on-farm water conservation measure may create on-farm water savings and increase on-farm water use efficiency, but the savings created also may reduce return flows that are obligated for downstream users. This difference has been defined as "wet" versus "dry" water savings (Seckler, 1996). "Wet" water savings result in real gains in efficiency and real water savings, as in when water use by phreatophytes is reduced through removal of the plants. Alternatively, "dry" water savings occur when drainage water or deep percolation is reduced. Water is saved by upstream users, but water availability is decreased for downstream users who had previously made use of the return flows (Huffaker and Whittlesey, 1995; King, 2000).

The Rio Grande and the Pecos River have interstate and international delivery obligations. On-farm irrigation technology decisions in both river basins in New Mexico can affect water use and conservation on a larger scale. The impacts of widespread adoption of drip irrigation technology in New Mexico must, therefore, be examined from both on-farm and larger hydrologic perspectives. In conclusion, while drip irrigation offers many significant advantages over flood/furrow irrigation at the individual farm level, the broader hydrologic impacts may adversely affect multiuser irrigation systems (King, 2000).

SUMMARY AND CONCLUSION

Drip irrigation adoption in New Mexico has lagged behind that of other agricultural regions in the United States. This has provided New Mexico growers with the opportunity to learn from others' mistakes and benefit from more recent advances in irrigation technology. The survey of chile producers reported here provides insight into farmers' attitudes and knowledge about drip irrigation technology. The survey research also provides additional information about chile growers and their farming operations. The data obtained from the growers will be used in future research to predict technology adoption. This report also has outlined and briefly discussed some of the on-farm and hydrologic system costs and benefits of drip irrigation technology. It is hoped that this publication will be of benefit to other researchers and industry members as they seek to understand and address issues facing New Mexico agriculture generally, and chile production specifically.

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APPENDIX A:

Survey Questionnaire: Is drip irrigation part of the New Mexico chile industry's future?

Part 1 - About Drip Irrigation

Please circle the number following each statement that best describes your opinion.

	Strongly Disagree		Undecided		Strongly Agree
1. Drip irrigation uses much less water than flood/furrow irrigation.	1	2	3	4	5
2. I could lose water rights if I used less irrigation water.	1	2	3	4	5
3. Properly used, drip irrigation can control Phytophthora root rot.	1	2	3	4	5
4. I can fertilize and irrigate at the same time with a drip irrigation system.	1	2	3	4	5
5. A drip irrigation system could pay for itself in two years.	1	2	3	4	5
6. Drip irrigation requires less labor to operate than flood/furrow irrigation.	1	2	3	4	5
7. The primary benefit of using drip irrigation technology is higher yields.	1	2	3	4	5
8. Drip irrigation technology increases water application efficiency.	1	2	3	4	5
9. My soils are not well suited to drip irrigation technology.	1	2	3	4	5
10. Drip irrigation makes it easier to irrigate odd-shaped pieces of land.	1	2	3	4	5
11. Drip irrigation makes it easier to irrigate sloping or uneven pieces of land.	1	2	3	4	5
12. Drip irrigation allows for more precise water application.	1	2	3	4	5

	Strongly Disagree		Undecided		Strongly Agree
13. Drip irrigation reduces water waste and losses.	1	2	3	4	5
14. A complex filter is required when using surface water with a drip irrigation system.	1	2	3	4	5
15. Extensive maintenance is required or a drip irrigation system will fail.	1	2	3	4	5
16. Switching to drip irrigation would be a major change from flood/furrow irrigation.	1	2	3	4	5
17. I don't like to be the first farmer in my community to try a new technology.	1	2	3	4	5
18. Chile growers in my community have favorable opinions of drip irrigation.	1	2	3	4	5
19. New Mexico needs to create tax incentives to encourage farmers to adopt drip technology.	1	2	3	4	5
20. Drip irrigation is unlikely to pay off on my farm.	1	2	3	4	5
21. My entire farm is too small to justify an investment in drip irrigation technology.	1	2	3	4	5
22. The sizes of my fields are too small to justify investing in drip irrigation technology.	1	2	3	4	5
23. I don't have time to learn how to use and manage a drip irrigation system.	1	2	3	4	5
24. A drip irrigation system would make my crop rotations more difficult.	1	2	3	4	5
25. The primary benefit of using drip irrigation is water conservation.	1	2	3	4	5
26. The cost of a drip irrigation system is too high.	1	2	3	4	5
27. It would be difficult for me to finance the purchase of a drip irrigation system.	1	2	3	4	5
28. My lenders would not finance a drip irrigation system for my farm.	1	2	3	4	5
29. I already have too much debt on my farm to consider investing in drip irrigation technology.	1	2	3	4	5

	Strongly Disagree		Undecided		Strongly Agree
30. There are too many risks involved with drip irrigation.	1	2	3	4	5
31. I would need to pay a consultant to operate a drip irrigation system and schedule irrigations.	1	2	3	4	5
32. Installing a drip irrigation system is not difficult.	1	2	3	4	5
33. Operating a drip irrigation system is not difficult.	1	2	3	4	5
34. There is adequate technical support locally to fix any problems with drip irrigation.	1	2	3	4	5
35. It is possible to try drip irrigation on a small scale before installing it on my entire farm.	1	2	3	4	5
36. An on-farm demonstration of drip irrigation technology would be very informative.	1	2	3	4	5
37. The benefits of drip irrigation are well-known to local area farmers.	1	2	3	4	5
38. Research reports on drip irrigation are as good as field demonstrations.	1	2	3	4	5
39. I have already made too many investments in my irrigation system.	1	2	3	4	5
40. Other farmers in my area have attitudes toward drip irrigation that are very similar to my own attitudes.	1	2	3	4	5
41. Local farmers have been wise to not adopt drip irrigation technology.	1	2	3	4	5
42. I have at least one child or family member who will take over my farming operation after I retire.	1	2	3	4	5
43. It is likely that my farmland will be sold for development purposes when I retire.	1	2	3	4	5
44. It will be difficult to continue farming in my area due to urbanization and population growth.	1	2	3	4	5
45. I plan to sell my farmland in the next few years.	1	2	3	4	5
46. I am optimistic about the future of chile production in New Mexico.	1	2	3	4	5

	Strongly Disagree		Undecided		Strongly Agree
47. There are so many forces working against New Mexico agriculture that it will not survive very much longer.	1	2	3	4	5
48. I wouldn't have to rotate chile with other crops if I used drip irrigation.	1	2	3	4	5
49. I need a new tractor or other machinery more than I need a drip irrigation system.	1	2	3	4	5
50. I have seen other farmers in the area have bad experiences with drip irrigation.	1	2	3	4	5
51. Drip irrigation is only suitable for using groundwater.	1	2	3	4	5
52. I would have to buy all new machinery in order to work the ground if I used drip irrigation.	1	2	3	4	5
53. New Mexico State University has been effective in assisting chile producers.	1	2	3	4	5
54. Concrete ditches are a problem if you want to switch to drip irrigation technology.	1	2	3	4	5
55. Drip irrigation increases the likelihood a chile field will be infested with verticillium.	1	2	3	4	5
56. I would like to increase my chile yields.	1	2	3	4	5
57. I would like to increase my chile acreage.	1	2	3	4	5

Part 2 - About You

The following information will be used in the analysis of responses to Part 1 questions. Your responses to both Part 1 and Part 2 will be kept confidential.

1. What is your age? _________years

2. How many years have you been a farmer? _______years

3. How many years have you produced chile peppers? _____years

4. What type(s) of chile peppers do you grow? Please circle all that apply.
   A. Jalapeño B. Paprika
   C. Cayenne D. Green only
   E. Red only F. Red after Green
   G.Other_____________

5. How many acres do you typically plant in chile peppers? _______acres

6. How many total acres do you farm? _______acres

7. Of the land that you currently farm, how many acres are owned and how many acres are leased?
   Acres owned ___________
   Acres leased ___________

8. Please describe a typical chile rotation sequence (other crops planted in sequence with chile throughout one complete rotation).
   (1) ________
   (2) ________
   (3) ________
   (4) ________
   (5) ________
   (6) ________

9. What types of irrigation systems do you currently use?
   Flood/furrow ___________ acres
   Sprinkler___________ acres
   Drip___________ acres

10. From whom do you first seek information about new agricultural technologies? Please circle only one.
    A. Other farmers.
    B. County Extension agents/specialists.
    C. Manufacturers' representatives.
    D. Agricultural publications.
    E. Other ___________

11. How often have you been in contact with your Cooperative Extension personnel (county agents or specialists) in the last year?
    A. 1 time per week.
    B. 1 time per month.
    C. 6 times.
    D. Twice.
    E. Once.
    F. Never.

12. Who do you trust most when making decisions about whether to use a new agricultural technology on your farm? Please circle only one.
    A. Other farmers.
    B. County extension agents/specialists.
    C. Manufacturers' representatives.
    D. Agricultural publications.
    E. Other _____________

13. What is your level of education?
   - A. Did not complete high school
   - B. Completed high school or GED
   - C. Some college
   - D. Completed college
   - E. Some graduate work

14. Have you ever seen a drip irrigation system working on-farm?
   - A. Yes
   - B. No

15. Approximately what percentage of your on-farm ditches are concrete-lined?

   __________________%

16. How likely are you to install a drip irrigation system on your farm in the next 5 years?
   - A. Very likely.
   - B. Somewhat likely.
   - C. Not likely.
   - D. Very unlikely.

17. In addition to farming, do you also have an off-farm job?
   - A. Yes
   - B. No

18. What percentage of your total household income is earned from farming?
   - A. Less than 10%
   - B. 10 - 24%
   - C. 25 - 49%
   - D. 50 - 74%
   - E. 75 - 100%

19. Please circle the letter of the statement that best describes your farming operation in the last year.
   - A. My farm operating costs exceeded my farm income.
   - B. My farm broke even.
   - C. My net farm income was positive but less than $10,000
   - D. My net farm income was greater than $10,000 but less than $40,000.
   - E. My net farm income was greater than $40,000 but less than $100,000.
   - F. My net farm income was greater than $100,000.

APPENDIX B:

List of Tables — Page

Table 1. Raw frequency counts: Water usage and conservation–attitudes and knowledge.

Item	Strongly Disagree # (%)	Disagree # (%)	Undecided # (%)	Agree # (%)	Strongly Agree # (%)	Total # (%)
1. Drip irrigation uses much less water than flood/furrow irrigation.	2 (3.2)	1 (1.6)	4 (6.5)	15 (24.2)	40 (64.5)	62 (100.0)
2. Drip irrigation technology increases water application efficiency.	1 (1.6)	1 (1.6)	1 (1.6)	28 (45.2)	31 (50.0)	62 (100.0)
3. Drip irrigation allows for more precise water application.	1 (1.6)	2 (3.2)	6 (9.7)	19 (30.6)	34 (54.8)	62 (100.0)
4. Drip irrigation reduces water waste and losses.	1 (1.6)	2(3.2)	1 (1.6)	18 (29.0)	40 (64.5)	62 (100.0)
5. The primary benefit of using drip irrigation is water conservation.	3 (4.8)	2 (3.2)	8 (12.9)	25 (40.3)	24 (38.7)	62 (100.0)
6. Drip irrigation is only suitable for using groundwater	10 (16.1)	11 (17.7)	28 (45.2)	9 (14.5)	4 (6.5)	62 (100.0)
7. I could lose water rights if I used less irrigation water.	25 (40.3)	8 (12.9)	18 (29.0)	6 (9.7)	5 (8.1)	62 (100.0)

Table 2. Raw frequency counts: Plant diseases, soils, crop rotations–attitudes and knowledge.

Item	Strongly Disagree # (%)	Disagree # (%)	Undecided # (%)	Agree # (%)	Strongly Agree # (%)	Total # (%)
8. Properly used, drip irrigation can control Phytophthora root rot.	4 (6.5)	4 (6.5)	26 (41.9)	16 (25.8)	12 (19.4)	62 (100.0)
9. Drip irrigation increases the likelihood a chile field will be infested with verticillium.	9 (14.5)	8 (12.9)	35 (56.5)	8 (12.9)	2 (3.2)	62 (100.0)
10. My soils are not well suited to drip irrigation technology.	20 (32.3)	15 (24.2)	20 (32.3)	6 (9.7)	1 (1.6)	62 (100.0)
11. I wouldn't have to rotate chile with other crops if I used drip irrigation.	31 (50.0)	16 (25.8)	5 (8.1)	3 (4.8)	7 (11.3)	62 (100.0)
12. A drip irrigation system would make my crop rotations more difficult.	12 (19.4)	7 (11.3)	18 (29.0)	19 (30.6)	6 (9.7)	62 (100.0)

Table 3. Raw frequency counts: Management practices and yields–attitudes and knowledge.

Item	Strongly Disagree # (%)	Disagree # (%)	Undecided # (%)	Agree # (%)	Strongly Agree # (%)	Total # (%)
13. I can fertilize and irrigate at the same time with a drip irrigation system.	0 (0.0)	1 (1.6)	5 (8.1)	22 (35.5)	34 (54.8)	62 (100.0)
14. Drip irrigation requires less labor to operate than flood/furrow irrigation.	4 (6.5)	6 (9.7)	11 (17.7)	20 (32.3)	21 (33.9)	62 (100.0)
15. Drip irrigation makes it easier to irrigate odd-shaped pieces of land.	1 (1.6)	5 (8.1)	13 (21.0)	27 (43.5)	16 (25.8)	62 (100.0)
16. Drip irrigation makes it easier to irrigate sloping or uneven pieces of land.	0 (0.0)	3 (4.8)	5 (8.1)	29 (46.8)	25 (40.3)	62 (100.0)
17. A complex filter is required when using surface water with a drip irrigation system.	3 (4.8)	1 (1.6)	15 (24.2)	19 (30.6)	24 (38.7)	62 (100.0)
18. Extensive maintenance is required or a drip irrigation system will fail.	2 (3.2)	2 (3.2)	17 (27.4)	26 (41.9)	15 (24.2)	62 (100.0)
19. The primary benefit of using drip irrigation technology is higher yields.	4 (6.5)	8 (12.9)	18 (29.0)	25 (40.3)	7 (11.3)	62 (100.0)

Table 4. Raw frequency counts: Technical support and drip technology–attitudes and knowledge.

Item	Strongly Disagree # (%)	Disagree # (%)	Undecided # (%)	Agree # (%)	Strongly Agree # (%)	Total # (%)
20. I would need to pay a consultant to operate a drip irrigation system and schedule irrigations.	18 (29.0)	27 (43.5)	15 (24.2)	2 (3.2)	0 (0.0)	62 (100.0)
21. There is adequate technical support locally to fix any problems with drip irrigation.	5 (8.1)	14 (22.6)	22 (35.5)	13 (21.0)	8 (12.9)	62 (100.0)
22. It is possible to try drip irrigation on a small scale before installing it on my entire farm.	2 (3.2)	4 (6.5)	13 (21.0)	25 (40.3)	18 (29.0)	62 (100.0)
23. An on-farm demonstration of drip irrigation technology would be very informative.	2 (3.2)	1 (1.6)	7 (11.3)	25 (40.3)	27 (43.5)	62 (100.0)
24. Research reports on drip irrigation are as good as field demonstrations.	12 (19.4)	26 (41.9)	13 (21.0)	9 (14.5)	2 (3.2)	62 (100.0)
25. NMSU has been effective in assisting chile producers.	9 (14.5)	5 (8.1)	18 (29.0)	22 (35.5)	8 (12.9)	62 (100.0)

Table 5. Raw frequency counts: Financing drip irrigation and system feasibility–attitudes and knowledge.

Item	Strongly Disagree # (%)	Disagree # (%)	Undecided # (%)	Agree # (%)	Strongly Agree # (%)	Total # (%)
26. Installing a drip irrigation system is not difficult.	5 (8.1)	14 (22.6)	28 (45.2)	10 (16.1)	5 (8.1)	62 (100.0)
27. Operating a drip irrigation system is not difficult.	1 (1.6)	7 (11.3)	31 (50.0)	18 (29.0)	5 (8.1)	62 (100.0)
28. A drip irrigation system could pay for itself in two years.	10 (16.1)	18 (29.0)	29 (46.8)	3 (4.8)	2 (3.2)	62 (100.0)
29. Drip irrigation is unlikely to pay off on my farm.	13 (21.0)	9 (14.5)	26 41.9)	10 (16.1)	4 (6.5)	62 (100.0)
30. My entire farm is too small to justify an investment in drip irrigation technology.	23 (37.1)	20 (32.3)	13 (21.0)	5 (8.1)	1 (1.6)	62 (100.0)
31. The sizes of my fields are too small to justify investing in drip irrigation technology.	22 (35.5)	19 (30.6)	16 (25.8)	3 (4.8)	2 (3.2)	62 (100.0)
32. The cost of a drip irrigation system is too high.	2 (3.2)	1 (1.6)	17 (27.4)	20 (32.3)	22 (35.5)	62 (100.0)
33. It would be difficult for me to finance the purchase of a drip irrigation system.	6 (9.7)	8 (12.9)	16 (25.8)	18 (29.0)	14 (22.6)	62 (100.0)
34. My lenders would not finance a drip irrigation system for my farm.	8 (12.9)	12 (19.4)	32 (51.6)	6 (9.7)	4 (6.5)	62 (100.0)
35. I already have too much debt on my farm to consider investing in drip irrigation technology.	10 (16.1)	18 (29.0)	16 (25.8)	11 (17.7)	7 (11.3)	62 (100.0)
36. New Mexico needs to create tax incentives to encourage farmers to adopt drip technology.	6 (9.7)	2 (3.2)	9 (14.5)	12 (19.4)	33 (53.2)	62 (100.0)
37. I don't have time to learn how to use and manage a drip irrigation system.	22 (35.5)	24 (38.7)	12 (19.4)	3 (4.8)	1 (1.6)	62 (100.0)
38. I have already made too many investments in my irrigation system.	8 (12.9)	20 (32.3)	15 (24.2)	15 (24.2)	4 (6.5)	62 (100.0)
39. I would have to buy all new machinery in order to work the ground if I used drip irrigation.	9 (14.5)	18 (29.0)	16 (25.8)	16 (25.8)	3 (4.8)	62 (100.0)
40. Concrete ditches are a problem if you want to switch to drip irrigation technology.	14 (22.6)	17 (27.4)	17 (27.4)	14 (22.6)	0 (0.0)	62 (100.0)
41. I need a new tractor or other machinery more than I need a drip irrigation system.	12 (19.4)	14 (22.6)	21 (33.9)	9 (14.5)	6 (9.7)	62 (100.0)

Table 6. Raw frequency counts: Technology–attitudes and knowledge.

Item	Strongly Disagree # (%)	Disagree # (%)	Undecided # (%)	Agree # (%)	Strongly Agree # (%)	Total # (%)
42. I don't like to be the first farmer in my community to try a new technology.	17 (27.4)	16 (25.8)	17 (27.4)	5 (8.1)	7 (11.3)	62 (100.0)
43. Chile growers in my community have favorable opinions of drip irrigation.	2 (3.2)	6 (9.7)	29 (46.8)	15 (24.2)	10 (16.1)	62 (100.0)
44. There are too many risks involved with drip irrigation.	9 (14.5)	13 (21.0)	29 (46.8)	7 (11.3)	4 (6.5)	62 (100.0)
45. The benefits of drip irrigation are well-known to local area farmers.	5 (8.1)	17 (27.4)	20 (32.3)	15 (24.2)	5 (8.1)	62 (100.0)
46. Other farmers in my area have attitudes toward drip irrigation that are very similar to my own attitudes.	1 (1.6)	2 (3.2)	34 (54.8)	20 (32.3)	5 (8.1)	62 (100.0)
47. Local farmers have been wise to not adopt drip irrigation technology.	12 (19.4)	17 (27.4)	31 (50.0)	2 (3.2)	0 (0.0)	62 (100.0)
48. I have seen other farmers in the area have bad experiences with drip irrigation.	12 (19.4)	16 (25.8)	15 (24.2)	10 (16.1)	9 (14.5)	62 (100.0)
49. Switching to drip irrigation would be a major change from flood/furrow irrigation.	0 (0.0)	1 (1.6)	1 (1.6)	19 (30.6)	41 (66.1)	62 (100.0)

Table 7. Raw frequency counts: The future of farming and chile production–attitudes and knowledge.

Item	Strongly Disagree # (%)	Disagree # (%)	Undecided # (%)	Agree # (%)	Strongly Agree # (%)	Total # (%)
50. I have at least one child or family member who will take over my farming operation after I retire.	15 (24.2)	6 (9.7)	12 (19.4)	15 (24.2)	14 (22.6)	62 (100.0)
51. It is likely that my farmland will be sold for development purposes when I retire.	18 (29.0)	19 (30.6)	16 (25.8)	5 (8.1)	4 (6.5)	62 (100.0)
52. It will be difficult to continue farming in my area due to urbanization and population growth.	22 (35.5)	17 (27.4)	11 (17.7)	9 (14.5)	3 (4.8)	62 (100.0)
53. I plan to sell my farmland in the next few years.	22 (35.5)	15 (24.2)	12 (19.4)	7 (11.3)	6 (9.7)	62 (100.0)
54. I am optimistic about the future of chile production in New Mexico.	10 (16.1)	7 (11.3)	19 (30.6)	16 (25.8)	10 (16.1)	62 (100.0)
55. There are so many forces working against New Mexico agriculture that it will not survive very much longer.	9 (14.5)	21 (33.9)	14 (22.6)	14 (22.6)	4 (6.5)	62 (100.0)
56. I would like to increase my chile yields.	1 (1.6)	0 (0.0)	1 (1.6)	8 (12.9)	52 (83.9)	62 (100.0)
57. I would like to increase my chile acreage.	3 (4.8)	7 (11.3)	17 (27.4)	17 (27.4)	18 (29.0)	62 (100.0)

Table 8. Mean results for attitude and knowledge questions for all 62 respondents. *

Item	Mean	Std. Error
Water Usage and Conservation		
1. Drip irrigation uses much less water than flood/furrow irrigation.	4.45	0.94
2. Drip irrigation technology increases water application efficiency.	4.40	0.76
3. Drip irrigation allows for more precise water application.	4.34	0.90
4. Drip irrigation reduces water waste and losses.	4.52	0.83
5. The primary benefit of using drip irrigation is water conservation.	4.05	1.05
6. Drip irrigation is only suitable for using groundwater	2.77	1.09
7. I could lose water rights if I used less irrigation water.	2.32	1.32
Plant Diseases, Soils, and Crop Rotations		
8. Properly used, drip irrigation can control Phytophthora root rot.	3.45	1.08
9. Drip irrigation increases the likelihood a chile field will be infested with verticillium.	2.77	0.97
10. My soils are not well suited to drip irrigation technology.	2.24	1.07
11. I wouldn't have to rotate chile with other crops if I used drip irrigation.	2.02	1.35
12. A drip irrigation system would make my crop rotations more difficult.	3.00	1.27
Management Practices and Yields		
13. I can fertilize and irrigate at the same time with a drip irrigation system.	4.44	0.72
14. Drip irrigation requires less labor to operate than flood/furrow irrigation.	3.77	1.21
15. Drip irrigation makes it easier to irrigate odd-shaped pieces of land.	3.84	0.96
16. Drip irrigation makes it easier to irrigate sloping or uneven pieces of land.	4.23	0.80
17. A complex filter is required when using surface water with a drip irrigation system.	3.97	1.07
18. Extensive maintenance is required or a drip irrigation system will fail.	3.81	0.96
19. The primary benefit of using drip irrigation technology is higher yields.*	3.37	1.06

Table 8. Mean results for attitude and knowledge questions for all 62 respondents (cont.).

Item	Mean	Std. Error
Technical Support and Drip Technology		
20. I would need to pay a consultant to operate a drip irrigation system and schedule irrigations.	2.02	0.82
21. There is adequate technical support locally to fix any problems with drip irrigation.	3.08	1.14
22. It is possible to try drip irrigation on a small scale before installing it on my entire farm.	3.85	1.02
23. An on-farm demonstration of drip irrigation technology would be very informative.	4.19	0.94
24. Research reports on drip irrigation are as good as field demonstrations.	2.40	1.06
25. NMSU has been effective in assisting chile producers.	3.24	1.22
Financing Drip Irrigation and System Feasibility		
26. Installing a drip irrigation system is not difficult.	2.94	1.02
27. Operating a drip irrigation system is not difficult.	3.31	0.84
28. A drip irrigation system could pay for itself in two years.	2.50	0.94
29. Drip irrigation is unlikely to pay off on my farm.	2.73	1.16
30. My entire farm is too small to justify an investment in drip irrigation technology.	2.05	1.03
31. The sizes of my fields are too small to justify investing in drip irrigation technology.	2.10	1.05
32. The cost of a drip irrigation system is too high.	3.95	1.00
33. It would be difficult for me to finance the purchase of a drip irrigation system.	3.42	1.25
34. My lenders would not finance a drip irrigation system for my farm.	2.77	1.02
35. I already have too much debt on my farm to consider investing in drip irrigation technology.	2.79	1.24
36. New Mexico needs to create tax incentives to encourage farmers to adopt drip technology.	4.03	1.31
37. I don't have time to learn how to use and manage a drip irrigation system.	1.98	0.95
38. I have already made too many investments in my irrigation system.	2.79	1.15
39. I would have to buy all new machinery in order to work the ground if I used drip irrigation.	2.77	1.14
40. Concrete ditches are a problem if you want to switch to drip irrigation technology.	2.50	1.08
41. I need a new tractor or other machinery more than I need a drip irrigation system.	2.73	1.22

Table 8. Mean results for attitude and knowledge questions for all 62 respondents (cont.).

Item	Mean	Std. Error
Technology		
42. I don't like to be the first farmer in my community to try a new technology.	2.50	1.29
43. Chile growers in my community have favorable opinions of drip irrigation.	3.40	0.98
44. There are too many risks involved with drip irrigation.	2.74	1.05
45. The benefits of drip irrigation are well-known to local area farmers.	2.97	1.09
46. Other farmers in my area have attitudes toward drip irrigation that are very similar to my own attitudes.	3.42	0.76
47. Local farmers have been wise to not adopt drip irrigation technology.	2.37	0.83
48. I have seen other farmers in the area have bad experiences with drip irrigation.	2.81	1.33
49. Switching to drip irrigation would be a major change from flood/furrow irrigation.	4.61	0.61
The Future of Farming and Chile Production		
50. I have at least one child or family member who will take over my farming operation after I retire.	3.11	1.49
51. It is likely that my farmland will be sold for development purposes when I retire.	2.32	1.17
52. It will be difficult to continue farming in my area due to urbanization and population growth.	2.26	1.23
53. I plan to sell my farmland in the next few years.	2.35	1.33
54. I am optimistic about the future of chile production in New Mexico.	3.14	1.29
55. There are so many forces working against New Mexico agriculture that it will not survive very much longer.	2.73	1.16
56. I would like to increase my chile yields.	4.77	0.64
57. I would like to increase my chile acreage.	3.65	1.16

* Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Undecided or Don't Know, 4 = Agree, 5 = Strongly Agree.

Table 9. Mean results for attitude and knowledge questions–respondents stratified by region. *

	Eastern Region (13 Growers)		Central Region (22 Growers)		Western Region (27 Growers)		
Item	Mean	Std. Error	Mean	Std. Error	Mean	Std. Error	P Value
Water Usage and Conservation							
1. Drip irrigation uses much less water than flood/furrow irrigation application efficiency.	4.31	0.95	4.54	1.18	4.52	0.70	.81
2. Drip irrigation technology increases water	4.39	0.51	4.27	0.88	4.52	0.75	.53
3. Drip irrigation allows for more precise water application.	4.23	1.01	4.23	0.97	4.48	0.80	.56
4. Drip irrigation reduces water waste and losses.	4.62	0.51	4.36	1.05	4.59	0.75	.56
5. The primary benefit of using drip irrigation is water conservation.	4.31	0.75	3.82	1.18	4.11	1.05	.38
6. Drip irrigation is only suitable for using groundwater	2.62	0.87	3.32	1.09	2.41	1.05	.01
7. I could lose water rights if I used less irrigation water.	1.46	0.78	3.05	1.17	2.15	1.35	.00
Plant Diseases, Soils, and Crop Rotations							
8. Properly used, drip irrigation can control Phytophthora root rot.	3.23	0.60	3.68	1.04	3.37	1.28	.44
9. Drip irrigation increases the likelihood a chile field will be infested with verticillium.	2.69	0.75	2.82	0.91	2.78	1.12	.94
10. My soils are not well suited to drip irrigation technology.	2.00	1.00	2.68	1.13	2.00	.096	.05
11. I wouldn't have to rotate chile with other crops if I used drip irrigation.	1.92	1.19	2.14	1.36	1.96	1.45	.87
12. A drip irrigation system would make my crop rotations more difficult.	3.23	1.01	3.18	1.26	2.74	1.38	.37

Table 9. Mean results for attitude and knowledge questions–respondents stratified by region (cont.). *

Item	Eastern Region (13 Growers)		Central Region (22 Growers)		Western Region (27 Growers)		
	Mean	Std. Error	Mean	Std. Error	Mean	Std. Error	P Value
Management Practices and Yields							
13. I can fertilize and irrigate at the same time with a drip irrigation system.	4.23	0.83	4.32	0.78	4.63	0.56	.16
14. Drip irrigation requires less labor to operate than flood/furrow irrigation.	3.46	1.13	3.64	1.29	4.04	1.16	.30
15. Drip irrigation makes it easier to irrigate odd-shaped pieces of land.	3.85	1.07	3.59	0.96	4.04	0.90	.27
16. Drip irrigation makes it easier to irrigate sloping or uneven pieces of land.	4.15	0.99	4.23	0.87	4.26	0.66	.93
17. A complex filter is required when using surface water with a drip irrigation system.	3.92	1.04	4.14	1.04	3.85	1.13	.65
18. Extensive maintenance is required or a drip irrigation system will fail.	3.69	0.95	3.82	0.73	3.85	1.13	.89
19. The primary benefit of using drip irrigation technology is higher yields.	3.23	1.17	3.59	0.73	3.26	1.23	.49
Technical Support and Drip Technology							
20. I would need to pay a consultant to operate a drip irrigation system and schedule irrigations.	2.00	0.71	2.32	0.84	1.78	0.80	.07
21. There is adequate technical support locally to fix any problems with drip irrigation.	2.46	0.66	3.05	1.21	3.41	1.15	.04
22. It is possible to try drip irrigation on a small scale before installing it on my entire farm.	3.92	0.76	3.91	0.87	3.78	1.25	.88
23. An on-farm demonstration of drip irrigation technology would be very informative.	4.15	1.07	4.14	1.04	4.26	0.81	.89
24. Research reports on drip irrigation are as good as field demonstrations.	2.15	0.99	2.55	0.85	2.41	1.25	.58
25. NMSU has been effective in assisting chile producers.	3.92	1.12	2.91	1.06	3.19	1.30	.06

Table 9. Mean results for attitude and knowledge questions–respondents stratified by region (cont.). *

Item	Eastern Region (13 Growers)		Central Region (22 Growers)		Western Region (27 Growers)		
	Mean	Std. Error	Mean	Std. Error	Mean	Std. Error	P Value
Financing Drip Irrigation and System Feasibility							
26. Installing a drip irrigation system is not difficult.	2.92	0.64	2.77	0.92	3.07	1.24	.60
27. Operating a drip irrigation system is not difficult.	3.00	0.71	3.27	0.70	3.48	0.98	.23
28. A drip irrigation system could pay for itself in two years.	2.77	0.44	2.72	0.88	2.19	1.08	.06
29. Drip irrigation is unlikely to pay off on my farm.	3.15	0.80	2.73	1.20	2.52	1.25	.27
30. My entire farm is too small to justify an investment in drip irrigation technology.	2.08	0.86	2.41	0.91	1.74	1.13	.08
31. The sizes of my fields are too small to justify investing in drip irrigation technology.	2.15	1.07	2.55	0.96	1.70	0.99	.02
32. The cost of a drip irrigation system is too high.	3.85	0.80	3.50	0.96	4.37	0.97	.01
33. It would be difficult for me to finance the purchase of a drip irrigation system.	3.31	0.75	3.36	1.22	3.52	1.48	.86
34. My lenders would not finance a drip irrigation system for my farm.	3.00	0.58	2.95	0.84	2.52	1.25	.22
35. I already have too much debt on my farm to consider investing in drip irrigation technology.	2.92	0.95	2.77	1.19	2.74	1.43	.91
36. New Mexico needs to create tax incentives to encourage farmers to adopt drip technology.	3.46	1.51	4.05	1.21	4.30	1.23	.17
37. I don't have time to learn how to use and manage a drip irrigation system.	2.08	0.86	2.05	0.72	1.89	1.15	.79
38. I have already made too many investments in my irrigation system.	3.00	1.08	3.00	1.02	2.52	1.25	.26
39. I would have to buy all new machinery in order to work the ground if I used drip irrigation.	2.15	0.99	2.91	0.92	2.96	1.29	.08
40. Concrete ditches are a problem if you want to switch to drip irrigation technology.	2.92	0.86	2.50	0.96	2.30	1.23	.23
41. I need a new tractor or other machinery more than I need a drip irrigation system.	2.85	1.07	2.95	1.09	2.48	1.37	.37

Table 9. Mean results for attitude and knowledge questions–respondents stratified by region (cont.).*

Item	Eastern Region (13 Growers)		Central Region (22 Growers)		Western Region (27 Growers)		
	Mean	Std. Error	Mean	Std. Error	Mean	Std. Error	P Value
Technology							
42. I don’t like to be the first farmer in my community to try a new technology.	2.15	0.98	2.50	1.26	2.67	1.47	.51
43. Chile growers in my community have favorable opinions of drip irrigation.	2.62	0.65	3.41	0.85	3.78	1.01	.00
44. There are too many risks involved with drip irrigation.	2.92	0.76	2.91	1.15	2.52	1.09	.35
45. The benefits of drip irrigation are well-known to local area farmers.	2.61	1.19	2.68	0.89	3.37	1.08	.03
46. Other farmers in my area have attitudes toward drip irrigation that are very similar to my own attitudes.	3.23	0.44	3.41	0.80	3.52	0.85	.54
47. Local farmers have been wise to not adopt drip irrigation technology.	2.62	0.77	2.55	0.74	2.11	0.89	.09
48. I have seen other farmers in the area have bad experiences with drip irrigation.	2.39	1.19	3.09	1.11	2.78	1.53	.32
49. Switching to drip irrigation would be a major change from flood/furrow irrigation.	4.54	0.52	4.41	0.80	4.81	0.40	.06

Table 9. Mean results for attitude and knowledge questions–respondents stratified by region (cont.).*

Item	Eastern Region (13 Growers)		Central Region (22 Growers)		Western Region (27 Growers)		
	Mean	Std. Error	Mean	Std. Error	Mean	Std. Error	P Value
The Future of Farming and Chile Production							
50. I have at least one child or family member who will take over my farming operation after I retire.	2.85	1.52	3.55	1.41	2.89	1.53	.24
51. It is likely that my farmland will be sold for development purposes when I retire.	2.62	1.19	2.64	1.09	1.93	1.14	.06
52. It will be difficult to continue farming in my area due to urbanization and population growth.	1.85	0.98	3.05	1.21	1.81	1.08	.00
53. I plan to sell my farmland in the next few years.	2.92	1.26	2.55	1.44	1.93	1.17	.06
54. I am optimistic about the future of chile production in New Mexico.	3.62	1.26	3.27	1.24	2.81	1.30	.16
55. There are so many forces working against New Mexico agriculture that it will not survive very much longer.	2.38	1.12	2.82	1.26	2.81	1.11	.50
56. I would like to increase my chile yields.	4.85	0.55	4.64	0.90	4.85	0.36	.46
57. I would like to increase my chile acreage.	3.77	1.36	3.86	1.04	3.41	1.15	.36

* Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Undecided or Don’t Know, 4 = Agree, 5 = Strongly Agree.

Table 10. Mean results for attitude and knowledge questions-respondents stratified by type of irrigation system. *

Item	Using Sprinkler or Drip Systems (21 Growers)		Using Only Flood/ Furrow Systems (39 Growers)		
	Mean	Std. Error	Mean	Std. Error	P Value
Water Usage and Conservation					
1. Drip irrigation uses much less water than flood/furrow irrigation.	4.57	0.81	4.39	1.02	.28
2. Drip irrigation technology increases water application efficiency.	4.57	0.51	4.31	0.86	.01
3. Drip irrigation allows for more precise water application.	4.57	0.81	4.24	0.95	.45
4. Drip irrigation reduces water waste and losses.	4.76	0.44	4.39	0.96	.00
5. The primary benefit of using drip irrigation is water conservation.	4.38	0.67	3.87	1.20	.01
6. Drip irrigation is only suitable for using groundwater	2.52	1.12	2.90	1.07	.78
7. I could lose water rights if I used less irrigation water.	2.09	1.34	2.44	1.33	.95
Plant Diseases, Soils, and Crop Rotations					
8. Properly used, drip irrigation can control Phytophthora root rot.	3.52	1.08	3.41	1.12	.89
9. Drip irrigation increases the likelihood a chile field will be infested with verticillium.	2.86	0.96	2.72	1.00	.89
10. My soils are not well suited to drip irrigation technology.	2.09	1.18	2.31	1.03	.46
11. I wouldn't have to rotate chile with other crops if I used drip irrigation.	2.29	1.52	1.87	1.28	.35
12. A drip irrigation system would make my crop rotations more difficult.	2.76	1.30	3.15	1.23	.73
Management Practices and Yields					
13. I can fertilize and irrigate at the same time with a drip irrigation system.	4.62	0.67	4.36	0.71	.81
14. Drip irrigation requires less labor to operate than flood/furrow irrigation.	4.09	0.99	3.62	1.27	.25
15. Drip irrigation makes it easier to irrigate odd-shaped pieces of land.	4.09	1.09	3.74	0.88	.25
16. Drip irrigation makes it easier to irrigate sloping or uneven pieces of land.	4.14	1.01	4.26	0.68	.03
17. A complex filter is required when using surface water with a drip irrigation system.	3.71	1.23	4.15	0.96	.19
18. Extensive maintenance is required or a drip irrigation system will fail.	3.48	1.21	3.97	0.78	.02
19. The primary benefit of using drip irrigation technology is higher yields.	3.09	1.26	3.51	0.94	.12

Table 10. Mean results for attitude and knowledge questions–respondents stratified by type of irrigation system (cont.). *

Item	Using Sprinkler or Drip Systems (21 Growers)		Using Only Flood / Furrow Systems (39 Growers)		
	Mean	Std. Error	Mean	Std. Error	P Value
Technical Support and Drip Technology					
20. I would need to pay a consultant to operate a drip irrigation system and schedule irrigations.	2.81	0.75	2.10	0.85	.55
21. There is adequate technical support locally to fix any problems with drip irrigation.	3.29	1.23	2.67	1.09	.50
22. It is possible to try drip irrigation on a small scale before installing it on my entire farm.	4.14	0.91	3.67	1.06	.47
23. An on-farm demonstration of drip irrigation technology would be very informative.	4.24	0.99	4.15	0.93	.71
24. Research reports on drip irrigation are as good as field demonstrations.	2.29	1.06	2.46	1.10	.88
25. NMSU has been effective in assisting chile producers.	3.62	1.28	3.03	1.18	.64
Financing Drip Irrigation and System Feasibility					
26. Installing a drip irrigation system is not difficult.	3.43	1.16	2.69	0.86	.11
27. Operating a drip irrigation system is not difficult.	3.57	1.03	3.13	0.69	.04
28. A drip irrigation system could pay for itself in two years.	2.62	1.02	2.39	0.88	.40
29. Drip irrigation is unlikely to pay off on my farm.	2.67	1.32	2.79	1.08	.29
30. My entire farm is too small to justify an investment in drip irrigation technology.	1.81	0.98	2.18	1.05	.77
31. The sizes of my fields are too small to justify investing in drip irrigation technology.	1.91	1.22	2.18	0.91	.12
32. The cost of a drip irrigation system is too high.	3.81	1.03	4.05	1.00	.84
33. It would be difficult for me to finance the purchase of a drip irrigation system.	3.00	1.18	3.69	1.24	.85
34. My lenders would not finance a drip irrigation system for my farm.	2.19	1.03	3.08	0.90	.46
35. I already have too much debt on my farm to consider investing in drip irrigation technology.	2.52	1.08	2.95	1.30	.38
36. New Mexico needs to create tax incentives to encourage farmers to adopt drip technology.	4.00	1.52	4.03	1.22	.25
37. I don't have time to learn how to use and manage a drip irrigation system.	1.67	0.86	2.15	0.96	.59
38. I have already made too many investments in my irrigation system.	2.67	1.35	2.82	1.05	.17
39. I would have to buy all new machinery in order to work the ground if I used drip irrigation.	2.43	1.08	2.97	1.16	.74
40. Concrete ditches are a problem if you want to switch to drip irrigation technology.	2.19	1.12	2.64	1.04	.66
41. I need a new tractor or other machinery more than I need a drip irrigation system.	2.24	1.09	3.00	1.19	.69

Table 10. Mean results for attitude and knowledge questions–respondents stratified by type of irrigation system (cont.). *

Item	Using Sprinkler or Drip Systems (21 Growers) Mean	Std. Error	Using Only Flood/ Furrow Systems (39 Growers) Mean	Std. Error	P Value
Technology					
42. I don’t like to be the first farmer in my community to try a new technology.	2.19	1.12	2.67	1.38	.32
43. Chile growers in my community have favorable opinions of drip irrigation.	3.24	1.14	3.51	0.91	.24
44. There are too many risks involved with drip irrigation.	2.24	1.04	2.95	0.94	.58
45. The benefits of drip irrigation are well-known to local area farmers.	2.91	1.09	3.03	1.11	.96
46. Other farmers in my area have attitudes toward drip irrigation that are very similar to my own attitudes.	3.24	0.83	3.49	0.68	.29
47. Local farmers have been wise to not adopt drip irrigation technology.	2.09	0.89	2.54	0.76	.38
48. I have seen other farmers in the area have bad experiences with drip irrigation.	2.48	1.33	2.97	1.33	1.00
49. Switching to drip irrigation would be a major change from flood/furrow irrigation.	4.57	0.51	4.61	0.67	.18
The Future of Farming and Chile Production					
50. I have at least one child or family member who will take over my farming operation after I retire.	2.91	1.48	3.18	1.52	.93
51. It is likely that my farmland will be sold for development purposes when I retire.	1.81	0.87	2.61	1.25	.09
52. It will be difficult to continue farming in my area due to urbanization and population growth.	1.57	0.81	2.56	1.23	.05
53. I plan to sell my farmland in the next few years.	2.00	1.27	2.54	1.37	.71
54. I am optimistic about the future of chile production in New Mexico.	3.53	1.29	2.92	1.29	.95
55. There are so many forces working against New Mexico agriculture that it will not survive very much longer.	2.52	0.93	2.79	1.28	.13
56. I would like to increase my chile yields.	4.91	0.44	4.72	0.72	.02
57. I would like to increase my chile acreage.	3.71	1.19	3.61	1.18	.95

* Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Undecided or Don’t Know, 4 = Agree, 5 = Strongly Agree

Table 11. Survey respondents’ chile pepper acreages.

	All Respondents (n = 61)		Eastern Region (n = 13)		Central Region (n = 21)		Western Region (n = 27)		Sprinkler/Drip Irrigators (n = 21)		Flood/Furrow Only Irrigators (n = 39)	
Acres	#	%	#	%	#	%	#	%	#	%	#	%
45												
< 50	3	4.9	1	7.7	—	—	2	7.4	2	9.5	1	2.6
50 - < 75	8	13.1	3	23.1	4	19.1	1	3.7	1	9.5	6	15.4
75 - < 100	6	9.8	—	—	1	4.8	5	18.5	—	—	6	15.4
100 - < 125	15	24.6	4	30.8	5	23.8	6	22.2	5	19.1	10	25.6
125 - < 150	2	3.3	1	7.7	1	4.8	—	—	1	4.8	1	2.6
150 - < 175	3	4.9	—	—	3	14.3	—	—	—	—	3	7.7
175 - < 200	3	4.9	—	—	2	8.5	1	3.7	1	4.8	2	5.1
200 - < 225	11	18.0	—	—	5	23.8	6	22.2	4	19.1	7	17.9
225 - < 250	2	3.3	1	7.7	—	—	1	3.7	1	4.8	1	2.6
250 - < 275	1	1.6	1	7.7	—	—	—	—	1	4.8	—	—
275 - < 300	—	—	—	—	—	—	—	—	—	—	—	—
300 - < 350	2	3.3	2	15.4	—	—	—	—	1	4.8	1	2.6
≥ 350	5	8.2	—	—	—	—	5	18.5	4	19.1	1	2.6
Mean response:	171.6 acres		143.9 acres		132.4 acres		215.5 acres		237.9 acres		39.1 acres	

Table 12. Survey respondents' total acres farmed.

	All Respondents (n = 60)		Eastern Region (n = 13)		Central Region (n = 20)		Western Region (n = 27)		Sprinkler/Drip Irrigators (n = 21)		Flood/Furrow Only Irrigators (n = 39)	
Acres	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
< 50	1	1.6	—	—	—	—	1	3.7	—	—	1	2.6
50 - < 100	1	1.6	—	—	—	—	1	3.7	1	4.8	—	—
100 - < 200	—	—	—	—	—	—	—	—	—	—	—	—
200 - < 300	4	6.7	—	—	—	—	4	14.8	—	—	4	10.3
300 - < 400	7	11.7	—	—	3	15.0	4	14.8	1	4.8	6	15.4
400 - < 500	5	8.3	1	7.7	1	5.0	3	11.1	2	9.5	3	7.7
500 - < 600	5	8.3	2	15.4	—	—	3	11.1	2	9.5	3	7.7
600 - < 700	9	15.0	1	7.7	6	30.0	2	7.4	3	14.3	6	15.4
700 - < 800	5	8.3	1	7.7	3	15.0	1	3.7	—	—	5	12.8
800 - < 900	2	3.3	2	15.4	—	—	—	—	1	4.8	1	2.6
900 - < 1000	4	6.7	—	—	3	15.0	1	3.7	1	4.8	3	7.7
1000 - < 1500	9	15.0	3	23.1	4	20.0	2	7.4	3	14.3	6	15.4
1500 - < 2000	3	5.0	1	7.7	—	—	2	7.4	3	14.3	—	—
2000 - < 2500	2	3.3	1	7.7	—	—	1	3.7	2	9.5	—	—
2500 - < 3000	—	—	—	—	—	—	—	—	—	—	—	—
≥ 3000	3	5.0	1	7.7	—	—	2	7.4	2	9.5	1	2.6
Mean response:	870.6 acres		1151.7 acres		724.0 acres		843.7 acres.		1208.6 acres		688.5 acres	

Table 13. Survey respondents' owned acreages.

	All Respondents (n = 60)		Eastern Region (n = 13)		Central Region (n = 20)		Western Region Irrigators (n = 27)		Sprinkler/Drip Only Irrigators (n = 21)		Flood/Furrow (n = 39)	
Acres	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
0	5	8.3	2	15.4	1	5.0	2	7.4	2	9.5	3	7.7
< 50	3	5.0	—	—	2	10.0	1	3.7	—	—	3	7.7
50 - < 100	3	5.0	—	—	—	—	3	11.1	1	4.8	2	5.1
100 - < 200	5	8.3	1	7.7	3	15.0	1	3.7	1	4.8	4	10.3
200 - < 300	7	11.7	—	—	3	15.0	4	14.8	2	9.5	5	12.8
300 - < 400	5	8.3	—	—	2	10.0	3	11.1	1	4.8	4	10.3
400 - < 500	8	13.3	3	23.1	4	30.0	1	3.7	2	9.5	6	15.4
500 - < 600	6	10.0	3	23.1	1	5.0	2	7.4	2	9.5	4	10.3
600 - < 700	4	6.7	—	—	2	10.0	2	7.4	2	9.5	2	5.1
700 - < 800	1	1.7	1	7.7	—	—	—	—	—	—	1	2.3
800 - < 900	2	3.3	1	7.7	1	5.0	—	—	—	—	2	5.1
900 - < 1000	2	3.3	—	—	—	—	2	7.4	2	9.5	—	—
1000 - < 1500	4	6.7	—	—	1	5.0	3	11.1	2	9.5	2	5.1
1500 - < 2000	3	5.0	1	7.7	—	—	2	7.4	2	9.5	1	2.3
≥ 2000	2	3.3	1	7.7	—	—	1	3.7	2	9.5	—	—
Mean response:	559.2 acres		685.1 acres		360.7 acres		645.6 acres		866.3 acres		393.8 acres	

Table 14. Survey respondents' leased average acreages.

Acres	All Respondents (n = 60) #	%	Eastern Region (n = 13) #	%	Central Region (n = 20) #	%	Western Region (n = 27) #	%	Sprinkler/Drip Irrigators (n = 21) #	%	Flood/Furrow Only Irrigators (n = 39) #	%
0	14	23.3	2	15.4	3	15.0	9	33.3	5	23.8	9	23.1
< 50	2	3.3	—	—	1	5.0	1	3.7	—	—	2	5.1
50 - < 100	3	5.0	1	7.7	1	5.0	1	3.7	—	—	3	7.7
100 - < 200	9	15.0	—	—	—	—	9	33.3	2	9.5	7	17.9
200 - < 300	7	11.7	2	15.4	4	20.0	1	3.7	3	14.3	4	10.3
300 - < 400	8	13.3	4	30.8	2	10.0	2	7.4	4	19.1	4	10.3
400 - < 500	6	10.0	1	7.7	4	20.0	1	3.7	3	14.3	3	7.7
500 - < 600	2	3.3	—	—	1	5.0	1	3.7	1	4.8	1	2.6
600 - < 700	—	—	—	—	—	—	—	—	—	—	—	—
700 - < 800	2	3.3	—	—	2	10.0	—	—	—	—	2	5.1
800 - < 900	2	3.3	—	—	1	5.0	1	3.7	1	4.8	1	2.6
900 - < 1000	1	1.7	—	—	1	5.0	—	—	—	—	1	2.6
1000 - < 1500	3	5.0	3	23.1	—	—	—	—	2	9.5	1	2.6
1500 - < 2000	1	1.7	—	—	—	—	1	3.7	—	—	1	2.6
≥ 2000	—	—	—	—	—	—	—	—	—	—	—	—
Mean response:	311.4 acres		466.6 acres		363.3 acres		198.1 acres		342.2 acres		294.7 acres	

Table 15. Survey respondents' flood/furrow irrigated acreages.

Acres	All Respondents (n = 60) #	%	Eastern Region (n = 13) #	%	Central Region (n = 20) #	%	Western Region (n = 27) #	%	Sprinkler/Drip Irrigators (n = 21) #	%	Flood/Furrow Only Irrigators (n = 39) #	%
0	4	6.7	2	15.4	1	5.0	1	3.7	7	33.3	—	—
< 50	1	1.7	—	—	—	—	1	3.7	—	—	1	2.6
50 - < 100	—	—	—	—	—	—	—	—	1	4.8	—	—
100 - < 200	2	3.3	—	—	1	5.0	2	7.4	2	9.5	1	2.6
200 - < 300	8	13.3	2	15.4	—	—	6	22.2	3	14.3	4	10.3
300 - < 400	8	13.3	1	7.7	3	15.0	4	14.8	1	4.8	6	15.4
400 - < 500	4	6.7	—	—	1	5.0	3	11.1	1	4.8	3	7.7
500 - < 600	5	8.3	2	15.4	1	5.0	2	7.4	1	4.8	3	7.7
600 - < 700	6	10.0	—	—	4	20.0	2	7.4	2	9.5	6	15.4
700 - < 800	5	8.3	1	7.7	3	15.0	1	3.7	4.8	5	12.8	
800 - < 900	3	5.0	2	15.4	1	5.0	—	—	1	4.8	1	2.6
900 - < 1000	3	5.0	—	—	3	15.0	—	—	—	—	3	7.7
1000 - < 1500	8	13.3	3	23.1	2	10.0	3	11.1	—	—	5	12.8
1500 - < 2000	—	—	—	—	—	—	—	—	—	—	—	—
≥ 2000	3	5.0	—	—	—	—	2	7.4	1	4.8	1	2.6
Mean response:	656 acres		601 acres		641 acres		693 acres		638 acres		666 acres	
Mean (> 0) response:	702 acres		710 acres		675 acres		629 acres		449 acres		666 acres	

Table 16. Survey respondents' sprinkler irrigated acreages.

	All Respondents (n = 60)		Eastern Region (n = 13)		Central Region (n = 20)		Western Region (n = 27)		Sprinkler / Drip Irrigators (n = 21)		Flood/Furrow Only Irrigators (n = 39)	
Acres	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
0	46	76.7	6	46.2	19	95.0	21	77.8	4	19.1	—	—
< 50	—	—	—	—	—	—	—	—	—	—	—	—
50 - < 100	1	1.7	—	—	—	—	1	3.7	—	—	—	—
100 - < 200	2	3.3	1	7.7	—	—	1	3.7	1	4.8	—	—
200 - < 300	3	5.0	1	7.7	—	—	2	7.4	4	19.1	—	—
300 - < 400	1	1.7	1	7.7	—	—	—	—	2	9.5	—	—
400 - < 500	1	1.7	—	—	—	—	1	3.7	1	4.8	—	—
500 - < 600	1	1.7	1	7.7	—	—	—	—	2	9.5	—	—
600 - < 700	2	3.3	1	7.7	1	5.0	—	—	—	—	—	—
700 - < 800	1	1.7	—	—	—	—	1	3.7	—	—	—	—
800 - < 900	1	1.7	1	7.7	—	—	—	—	2	9.5	—	—
900 - < 1000	—	—	—	—	—	—	—	—	—	—	—	—
1000 - < 1500	—	—	—	—	—	—	—	—	3	14.3	—	—
1500 - < 2000	—	—	—	—	—	—	—	—	—	—	—	—
≥ 2000	1	1.7	1	7.7	—	—	—	—	2	9.5	—	—
Mean response:	136 acres		432 acres		30 acres		72 acres		389 acres		0 acres	
Mean (> 0) response:	583 acres		803 acres		600 acres		324 acres		583 acres		0 acres	

Table 17. Survey respondents' drip irrigated acreages.

	All Respondents (n = 60)		Eastern Region (n = 13)		Central Region (n = 20)		Western Region Irrigators (n = 27)		Sprinkler / Drip Only Irrigators (n = 21)		Flood / Furrow (n = 39)	
Acres	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
0	50	83.3	—	—	18	90.0	19	70.4	11	52.4	—	—
< 50	2	3.3	—	—	1	5.0	1	3.7	2	9.5	—	—
50 - < 100	2	3.3	—	—	—	—	2	7.4	2	9.5	—	—
100 - < 200	2	3.3	—	—	1	5.0	1	3.7	2	9.5	—	—
200 - < 300	2	3.3	—	—	—	—	2	7.4	2	9.5	—	—
300 - < 400	—	—	—	—	—	—	—	—	—	—	—	—
400 - < 500	1	1.7	—	—	—	—	1	3.7	1	4.8	—	—
500 - < 600	—	—	—	—	—	—	—	—	—	—	—	—
600 - < 700	—	—	—	—	—	—	—	—	—	—	—	—
700 - < 800	—	—	—	—	—	—	—	—	—	—	—	—
800 - < 900	—	—	—	—	—	—	—	—	—	—	—	—
900 - < 1000	—	—	—	—	—	—	—	—	—	—	—	—
1000 - < 1500	1	1.7	—	—	—	—	1	3.7	1	4.8	—	—
1500 - < 2000	—	—	—	—	—	—	—	—	—	—	—	—
≥ 2000	—	—	—	—	—	—	—	—	—	—	—	—
Mean response:	39 acres		0 acres		8 acres		81 acres		112 acres		0 acres	
Mean (> 0) response:	235 acres		0 acres		83 acres		273 acres		235 acres		0 acres	

Table 18. Crop rotations reported by survey respondents (n = 55).

Crop 1	Crop 2	Crop 3	Crop 4	Crop 5	Crop 6	Number of Respondents	Respondent(s)' Region*	Respondent(s)' Irrigation System(s)**
Two Crops Listed with Chile:								
Chile	Cotton					1	W	FF
Three Crops Listed with Chile:								
Chile	Alfalfa	Cotton				2	C, E	FF, FF
Chile	Cotton	Corn				1	C	FF
Chile	Cotton	Fallow				1	W	SD
Chile	Cotton	Grain				1	W	FF
Chile	Cotton	Sorghum				1	W	FF
Chile	Cotton	Onions				1	W	FF
Chile	Sorghum	Cotton				1	W	FF
Chile	Sorghum	Fallow				1	W	SD
Chile	Wheat	Onions				1	C	FF
Chile	Wheat	Wheat				1	W	FF
Peanuts	Wheat	Chile				1	E	SD
Four Crops Listed with Chile:								
Chile	Cotton	Vegetable	Corn			1	C	FF
Chile	Cotton	Oats	Fallow			1	W	FF
Chile	Cotton	Alfalfa	Silage			1	C	SD
Chile	Cotton	Corn	Grass			1	C	FF
Chile	Cotton	Fallow	Sorghum			2	W, W	FF, FF
Chile	Cotton	Grain	Watermelon			1	W	FF
Chile	Oat Hay	Corn	Cotton			1	W	FF
Chile	Onions	Wheat	Vinecrop			1	W	SD
Chile	Watermelon	Pumpkins	Fallow			1	W	FF
Chile	Wheat	Onions	Sorghum			2	W, W	FF, SD
Chile	Wheat	Corn	Wheat			1	W	SD
Chile	Wheat	Sorghum	Fallow			1	W	SD
Cotton	Chile	Corn	Alfalfa			1	E	FF
Oats	Vegetable	Cotton	Chile			1	W	FF

Table 18. Crop rotations reported by survey respondents (n = 55) (cont.).

Crop 1	Crop 2	Crop 3	Crop 4	Crop 5	Crop 6	Number of Respondents	Respondent(s)' Region*	Respondent(s)' Irrigation System(s)**
Five Crops Listed with Chile:								
Chile	Corn	Alfalfa	Alfalfa	Alfalfa		1	C	SD
Chile	Cotton	Watermelon	Cotton	Wheat		1	W	FF
Chile	Onions	Alfalfa	Fallow	Wheat		1	C	FF
Hay	Oats	Chile	Chile	Oats		1	E	SD
Oats	Lettuce	Chile	Onions	Cabbage		1	C	FF
Onions	Chile	Cotton	Cotton	Wheat		1	C	FF
Sorghum	Cotton	Chile	Wheat	Onions		1	W	SD
Wheat	Cotton	Onions	Chile	Other		1	W	FF
Six Crops Listed with Chile:								
Chile	Cotton	Sorghum	Onions	Chile	Wheat	1	W	SD
Chile	Cotton	Alfalfa	Alfalfa	Alfalfa	Cotton	1	E	SD
Chile	Onions	Lettuce	Corn	Chile	Cabbage	1	C	FF
Chile	Wheat	Onions	Alfalfa	Alfalfa	Alfalfa	1	C	FF
Wheat	Chile	Onions	Onions	Corn	Chile	1	C	FF
Cotton	Watermelon	Chile	Sorghum	Pintos	Wheat	1	W	SD
Hay	Hay	Hay	Hay	Cotton	Chile	1	E	SD
Jalapeño	Cotton	Onions	Cotton	Wheat	Corn	1	C	FF
Wheat	Wheat	Chile	Corn	Wheat	Chile	1	W	SD
Wheat	Onions	Cotton	Wheat	Chile	Wheat	1	C	FF

Table 18. Crop rotations reported by survey respondents (n = 55)(cont.).

Crop 1	Crop 2	Crop 3	Crop 4	Crop 5	Crop 6	Number of Respondents	Respondent(s)' Region*	Respondent(s)' Irrigation System(s)**
Rotations Where Chile Was Not Listed:								
Cotton	Wheat					1	W	FF
Hay	Cotton					1	E	SD
Oats	Corn	Alfalfa				1	E	FF
Wheat	Hay	Onions				1	C	FF
Hay	Corn	Small Grain	Cotton			1	E	SD
Corn	Lettuce	Cabbage	Onions	Sudangrass		1	C	FF
Cotton	Alfalfa	Onions	Corn	Wheat		1	C	SD
Corn	Corn	Alfalfa	Alfalfa	Alfalfa	Alfalfa	1	E	FF

* W = West; C = Central; E = East

** FF = flood/furrow; SD = sprinkler or drip

Table 19. Types of chile peppers produced by survey respondents.

	All Respondents (n = 60)		Eastern Region (n = 12)		Central Region (n = 21)		Western Region (n = 27)		Sprinkler/Drip Irrigators (n = 20)		Flood/Furrow Only Irrigators (n = 39)	
	#	%	#	%	#	%	#	%	#	%	#	%
Individual Pepper Type												
Jalapeño	21	35.0	6	50.0	9	42.9	6	22.2	10	50.0	11	28.2
Paprika	25	41.7	10	83.3	6	28.6	9	33.3	12	60.0	12	30.8
Cayenne	18	30.0	5	41.7	9	42.9	4	14.8	7	3.2	11	28.2
Pimiento	2	3.3	—	—	1	4.8	1	3.7	—	—	2	5.1
Green chile only	28	46.7	—	—	7	33.3	21	77.8	9	45.0	19	48.7
Red chile only	44	73.3	5	41.7	17	80.9	22	81.5	14	70.0	29	74.4
Red after green chile	32	53.3	2	16.7	7	33.3	23	85.2	11	55.0	21	53.8
Bell pepper	1	1.7	—	—	1	4.8	—	—	—	—	1	2.6
Extra-hot	1	1.7	—	—	—	—	1	3.7	1	5.0	—	—
	#	%	#	%	#	%	#	%	#	%	#	%
Combination of Pepper Types												
Jalapeño only	1	1.7	—	—	1	4.8	—	—	—	—	1	2.6
Cayenne only	2	3.3	—	—	2	9.5	—	—	—	—	2	5.1
Paprika only	1	1.7	—	—	—	—	1	3.7	1	5.0	—	—
Red only	8	13.3	2	16.7	4	19.1	2	7.4	3	15.0	5	12.8
Red after green only	1	1.7	—	—	—	—	1	3.7	—	—	1	2.6
Green & red after green	1	1.7	—	—	—	—	1	3.7	—	—	1	2.6
Green only & red only	1	1.7	—	—	1	4.8	—	—	—	—	1	2.6
Jalapeño & paprika	2	3.3	2	16.7	—	—	—	—	1	5.0	1	2.6
Jalapeño & red after green	1	1.7	—	—	—	—	1	3.7	—	—	1	2.6
Paprika & cayenne	2	3.3	2	16.7	—	—	—	—	—	—	2	5.1
Paprika & red only	4	6.7	2	16.7	2	9.5	—	—	1	5.0	2	5.1
Green, red & red after green	9	15.0	—	—	—	—	9	33.3	2	10.0	7	17.9
Jalapeño, cayenne & red only	2	3.3	—	—	2	9.5	—	—	1	5.0	1	2.6
Jalapeño, green & red only	1	1.7	—	—	1	4.8	—	—	—	—	1	2.6
Jalapeño, paprika & red only	1	1.7	1	8.3	—	—	—	—	—	—	1	2.6
Jalapeño, paprika & cayenne	1	1.7	1	8.3	—	—	—	—	1	5.0	—	—

Table 19. Types of chile peppers produced by survey respondents (cont.).

	All Respondents (n = 60)		Eastern Region (n = 12)		Central Region (n = 21)		Western Region (n = 27)		Sprinkler/Drip Irrigators (n = 20)		Flood/Furrow Only Irrigators (n = 39)	
	#	%	#	%	#	%	#	%	#	%	#	%
Paprika, cayenne & red only	1	1.7	—	—	1	4.8	—	—	—	—	1	2.6
Paprika, green only & red only	1	1.7	—	—	—	—	1	3.7	1	5.0	—	—
	#	%	#	%	#	%	#	%	#	%	#	%
Combination of Pepper Types												
Cayenne, green, red & red after green	2	3.3	—	—	1	4.8	1	3.7	—	—	2	5.1
Jalapeño, green, red & red after green	2	3.3	—	—	1	4.8	1	3.7	1	5.0	1	2.6
Jalapeño, cayenne, red & red after green	1	1.7	—	—	1	4.8	—	—	—	—	1	2.6
Jalapeño, paprika, cayenne & red after green	4	6.7	2	16.7	1	4.8	1	3.7	3	15.0	1	2.6
Pimiento, green, red & red after green	1	1.7	—	—	—	—	1	3.7	—	—	1	2.6
Paprika, green, red & red after green	5	8.3	—	—	1	4.8	4	14.8	2	10.0	3	7.7
Jalapeño, green, red, red after green & pimiento	1	1.7	—	—	1	4.8	—	—	—	—	1	2.6
Jalapeño, cayenne, green, red & red after green	1	1.7	—	—	—	—	1	3.7	1	5.0	—	—
Jalapeño, paprika, green, red & red after green	1	1.7	—	—	—	—	1	3.7	1	5.0	—	—
Jalapeño, paprika, cayenne, green, red & red after green	1	1.7	—	—	—	—	1	3.7	1	5.0	—	—
Jalapeño, paprika, cayenne, green, red, red after green, bell	1	1.7	—	—	1	4.8	—	—	—	—	1	2.6

Table 20. Survey respondents and concrete-lined ditches.

	All Respondents (n = 61)		Eastern Region (n = 13)		Central Region (n = 21)		Western (n = 27)		Sprinkler/Drip Irrigators (n = 21)		Flood/Furrow Only Irrigators (n = 39)	
Percentage of on-farm ditches that are concrete-lined	#	%	#	%	#	%	#	%	#	%	#	%
0	9	14.8	3	23.1	1	4.8	5	18.5	5	23.8	4	10.3
10 - 20	5	8.2	2	15.4	1	4.8	2	7.4	2	9.5	3	7.7
21 - 30	—	—	—	—	—	—	—	—	—	—	—	—
31 - 40	3	4.9	1	7.7	2	9.5	—	—	2	9.5	1	2.3
41 - 50	10	16.4	3	23.1	3	14.3	4	14.8	3	14.3	7	17.9
51 - 60	3	4.9	1	7.7	1	4.8	1	3.7	—	—	3	7.7
61 - 70	5	8.2	2	15.4	2	9.5	1	3.7	2	9.53	7.7	
71 - 80	3	4.9	—	—	3	14.3	—	—	—	—	3	7.7
81 - 90	5	8.2	1	7.7	4	19.1	—	—	1	4.8	4	10.3
91 - 100	18	29.5	—	—	4	19.1	14	51.85	6	28.6	11	28.2
Mean (> 0) response:	70.8%		50.9%		70.6%		80.0%		67.8%		71.4%	

Table 21. Survey respondents and drip irrigation.

Survey Item and Responses	All Respondents (n = 61) #	%	Eastern Region (n = 13) #	%	Central Region (n = 21) #	%	Western Region (n = 27) #	%	Sprinkler/Drip Irrigators (n = 21) #	%	Flood/Furrow Only Irrigators (n = 39) #	%
Have you ever seen a drip irrigation system working on-farm?												
Yes	45	73.8	6	46.2	18	85.7	21	77.8	15	71.4	29	74.4
No	16	26.2	7	53.8	3	14.3	6	22.2	6	28.6	10	25.6
How likely are you to install a drip irrigation system on your farm in the next 5 years?												
Very likely	16	26.2	1	7.7	4	19.0	11	40.7	8	38.1	8	20.5
Somewhat likely	14	23.0	2	15.4	8	38.1	4	14.8	5	23.8	9	23.1
Not likely	23	37.7	10	76.9	7	33.3	6	22.2	7	33.3	15	38.5
Very unlikely	8	13.1	—	—	2	9.5	6	22.2	1	4.8	7	17.9

Table 22. Survey respondents' ages.

Years	All Respondents (n = 61) #	%	Eastern Region (n = 13) #	%	Central Region (n = 21) #	%	Western Region (n = 27) #	%	Sprinkler/Drip Irrigators (n = 21) #	%	Flood/Furrow Only Irrigators (n = 39) #	%
21 - 30	1	1.6	—	—	1	4.8	—	—	—	—	1	2.6
31 - 40	7	11.5	2	15.4	2	95	4	14.8	4	19.1	3	7.7
41 - 50	22	36.1	4	30.8	7	33.3	11	40.7	10	47.6	12	30.8
51 - 60	16	26.2	3	23.1	8	38.1	5	18.5	2	9.5	14	35.9
61 - 70	12	20.0	3	23.1	3	14.3	6	22.2	3	14.3	8	20.5
> 70	3	4.9	2	15.4	—	—	1	3.7	2	9.5	1	2.6
Mean response:	52		56		50		52		51		52	

Table 23. Survey respondents' years farming.

Years	All Respondents (n = 61) #	%	Eastern Region (n = 13) #	%	Central Region (n = 21) #	%	Western Region (n = 27) #	%	Sprinkler/Drip Irrigators (n = 21) #	%	Flood/Furrow Only Irrigators (n = 39) #	%
< 5	—	—	—	—	1	4.8	—	—	—	—	—	—
6 - 10	4	6.6	—	—	1	4.8	2	7.4	1	4.8	3	7.7
11 - 15	6	9.8	1	7.7	2	9.5	3	11.1	3	14.3	3	7.7
16 - 20	8	13.1	2	15.4	2	9.5	4	14.8	4	19.1	4	10.3
21 - 30	19	31.2	2	15.4	6	28.6	11	40.7	6	28.6	13	33.3
31 - 40	13	21.3	4	30.8	6	28.6	3	11.1	3	14.3	10	25.6
41 - 50	10	16.4	4	30.8	3	14.3	3	11.1	4	19.1	5	12.8
51 - 60	1	1.6	—	—	—	—	1	3.7	—	—	1	2.6
Mean response:	28		34		28		26		28		28	

Table 24. Survey respondents' years producing chile peppers.

Years	All Respondents (n = 61) #	%	Eastern Region (n = 13) #	%	Central Region (n = 21) #	%	Western Region (n = 27) #	%	Sprinkler/Drip Irrigators (n = 21) #	%	Flood/Furrow Only Irrigators (n = 39) #	%
< 5	2	3.3	2	15.4	—	—	—	—	1	4.8	1	2.6
6 - 10	18	29.5	5	38.5	4	19.1	9	33.3	7	33.3	11	28.2
11 - 15	18	29.5	4	30.8	3	14.3	11	40.7	7	33.3	11	28.2
16 - 20	7	11.5	1	7.7	3	14.3	3	11.1	2	9.5	5	12.8
21 - 30	11	18.0	1	7.7	6	28.6	4	14.8	4	19.1	7	17.0
31 - 40	4	6.6	—	—	4	19.1	—	—	—	—	3	7.7
41 - 50	1	1.6	—	—	1	4.8	—	—	—	—	1	2.6
Mean response:	16		11		23		14		14		17	

Table 25. Survey respondents' information sources and decision making.

Survey Item and Responses	All Respondents (n = 61) #	%	Eastern Region (n = 13) #	%	Central Region (n = 21) #	%	Western Region (n = 27) #	%	Sprinkler/Drip Irrigators (n = 21) #	%	Flood/Furrow Only Irrigators (n = 39) #	%
From whom do you first seek information about new agricultural technologies?												
Other farmers	26	42.6	5	38.5	8	38.1	13	48.1	8	38.1	17	43.6
Manufacturers' representatives	17	27.9	3	23.1	5	23.8	9	33.3	9	42.9	8	20.1
Agricultural publications	17	27.9	5	38.5	7	33.3	5	18.5	4	19.1	12	30.8
County Extension agents / specialists	6	9.8	2	15.4	2	9.5	2	7.4	3	14.3	4	10.3
Internet	1	1.6	—	—	—	—	1	3.7	—	—	1	2.6
Consultants	1	1.6	—	—	—	—	1	3.7	1	4.8	—	—
Farm shows	1	1.6	—	—	1	4.8	—	—	—	—	1	2.6

Table 25. Survey respondents' information sources and decision making (cont.).

Survey Item and Responses	All Respondents (n = 61) #	%	Eastern Region (n = 13) #	%	Central Region (n = 21) #	%	Western Region (n = 27) #	%	Sprinkler/Drip Irrigators (n = 21) #	%	Flood/Furrow Only Irrigators (n = 39) #	%
How often have you been in contact with your Cooperative Extension personnel (county agents or specialists) in the last year?												
1 time per week	2	3.3	2	15.4	—	—	—	—	1	4.8	1	2.6
1 time per month	—	—	—	—	—	—	—	—	—	—	—	—
6 times	9	14.8	1	7.7	2	9.5	6	22.2	3	14.3	6	15.4
Twice	11	18.0	5	38.5	3	14.3	3	11.1	6	28.6	4	10.3
Once	14	23.0	4	30.8	7	33.3	3	11.1	4	19.1	10	25.6
Never	25	41.0	1	7.7	9	42.9	15	55.6	7	33.3	18	46.2
Who do you trust most when making decisions about whether to use a new agricultural technology on your farm?												
Other farmers	44	72.1	7	53.9	16	76.2	19	70.4	13	61.9	30	76.9
Manufacturers' representatives	9	14.8	2	15.4	3	14.3	3	11.1	5	23.8	3	7.7
Agricultural publications	6	9.8	2	15.4	1	4.8	3	11.1	4	19.1	2	5.1
Myself only	4	6.6	1	7.7	2	9.5	1	3.7	2	9.5	2	5.1
County Extension agents / specialists	4	6.6	2	15.4	1	4.8	1	3.7	—	—	4	10.3
Consultants	1	1.6	—	—	—	—	1	3.7	—	—	1	2.6

Table 26. Survey respondents' education and income information.

Survey Item and Responses	All Respondents (n = 61) #	%	Eastern Region (n = 13) #	%	Central Region (n = 21) #	%	Western Region (n = 27) #	%	Sprinkler/Drip Irrigators (n = 21) #	%	Flood/Furrow Only Irrigators (n = 39) #	%
What is your level of education?												
Did not complete high school	8	13.1	4	30.8	3	14.3	1	3.7	2	9.5	5	12.8
Completed high school or GED	11	18.0	1	7.7	3	14.3	7	25.9	4	19.0	7	17.9
Some college	18	29.5	3	23.1	7	33.3	8	29.6	9	42.9	9	23.1
Completed college	18	29.5	3	23.1	8	38.1	7	25.9	4	19.0	14	35.9
Some graduate work	6	9.8	2	15.4	—	—	4	14.8	2	9.5	4	10.3
In addition to farming, do you also have an off-farm job?												
Yes	8	13.1	1	7.7	3	14.3	4	14.8	2	9.5	6	15.4
No	53	86.9	12	92.3	18	85.7	23	85.2	19	90.5	33	84.6
What percentage of your total household income is earned from farming?												
Less than 10%	—	—	—	—	—	—	—	—	—	—	—	—
20 - 24%	1	1.6	—	—	—	—	1	3.7	1	4.8	—	—
25 - 49%	3	4.9	—	—	1	4.8	2	7.4	—	—	3	7.7
50 - 74%	7	11.5	2	15.4	2	9.5	3	11.1	2	9.5	5	12.8
75 - 100%	50	82.0	11	84.6	18	85.7	21	77.8	18	85.7	31	79.5

Table 26. Survey respondents' education and income information (cont.).

Survey Item and Responses	All Respondents (n = 61) #	%	Eastern Region (n = 13) #	%	Central Region (n = 21) #	%	Western Region (n = 27) #	%	Sprinkler/Drip Irrigators (n = 21) #	%	Flood/Furrow Only Irrigators (n = 39) #	%
Which of the following statements best describes your farming operation in the last year?												
My farm operating costs exceeded my farm income.	5	8.2	—	—	3	14.3	2	9.4	—	—	5	12.8
My farm broke even.	9	14.8	2	15.4	4	19.0	3	11.1	6	28.6	3	7.7
My net farm income was positive but less than $10,000.	3	4.9	—	—	1	4.8	2	7.4	1	4.8	2	5.1
My net farm income was greater than $10,000 but less than $40,000.	10	16.4	2	15.4	1	4.8	7	25.9	3	14.3	7	17.9
My net farm income was greater than $40,000 but less than $100,000.	14	23.0	4	30.8	5	23.8	5	18.5	4	19.0	9	12.1
My net farm income was greater than $100,000.	18	29.5	4	30.8	6	28.6	8	29.6	7	33.3	11	28.2
Refused to answer.	2	3.3	1	7.7	1	4.8	—	—	—	—	2	5.1