

Master Irrigator

North Plains Groundwater
Conservation District

2024 Project Progress Report



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Executive Summary

The eighth Master Irrigator training was held at the NPGCD Water Conservation Center north of Dumas in February and March. The 2024 Master Irrigator program cycle may be the perfect example of Murphy's Law which states "Anything that can go wrong will go wrong". A myriad of factors including speaker retirements, scheduling conflicts, blizzards, wildfires, illness, etc. impacted registration and flow of the training. Despite all the issues twenty-one individuals initially registered with 19 graduating representing 12 irrigated operations, consultants and a Texas A&M Agrilife Extension Specialist. Two of the operations were from the Panhandle Groundwater Conservation District. The total number of irrigated acres represented by participants was 34,867 which made it the smallest class with respect to acreage so far. This brings the total to 536,986 irrigated acres represented over the eight trainings. It should be noted, a couple of graduates were from an operation that had representatives at a previous training, therefore the acreage of that operation was not included in the totals.

Participant ratings of the 2024 training were excellent. On a 5-point Likert scale the overall training rated 4.50, however, that tied with the lowest rating the overall training has ever received. The individual sessions (Agronomics, Irrigation Scheduling, Systems and Systems & Special Topics) rating between 4.36 - 4.67. Fourteen of fifteen responding graduates indicated they plan to implement one or more irrigation management strategies presented during the course. Cumulatively over all training courses *132 of the 135 graduates* have indicated that they plan on implementing one or more conservation techniques/practices they learned in the training.

An extensive evaluation of past Master Irrigator graduates of the 2016 – 2019 classes was conducted after allowing them at least three years to potentially adopt what they learned in the course. Cumulatively, 91.7% of the respondents to the implementation survey administered to the 2016 - 2019 training graduates reported adopting one or more practices taught in the training (on average 2.44 practices/operation). Fifty-six percent of the respondents indicated they had reduced their water use and 82.0% said they had improved their water use efficiency suggesting that graduates are following through with the adoption of water conservation techniques/strategies that they learned in the training. Finally, when asked whether the training should be continued to be offered, all 23 respondents (question added after the survey of the 2016 class) said yes.

It can be concluded that the Master Irrigator training is extremely effective. Results implementation survey and conversations with graduates it has become apparent that the adoption of new conservation practices is only part of the impact the training is having. Several graduates have mentioned the improvement in management of their current practices as a major impact the training has had on their operations.

Introduction

The last six regional water plans have all projected that at least parts of the North Plains Groundwater Conservation District (NPGCD) will face major water shortages in the future suggesting conservation and efficient use of current water supplies will be critical to maintain the Agricultural industry in the area. In response, the NPGCD in cooperation with the Natural Resource Conservation Service (NRCS) developed the Master Irrigator project. The goal of this effort is to accelerate producer adoption of water conservation techniques/strategies in the district to prolong the life of the aquifer and maintain the economic viability of the agricultural industry. The overall objective of this project is to develop an educational effort that will improve water use efficiency while potentially reducing water use by irrigators in the district. The centerpiece of this effort was the development of the Master Irrigator training an intensive educational program in water and energy conservation techniques targeted to irrigated producers in the district.

Background and Methodology

Creating an intensive educational project is time intensive and sometimes complicated. While several steps are needed to develop a successful effort, three primary components are ultimately critical: the training, evaluation, and project analysis. Successful design and implementation of these components goes a long way in having effective desired results. The approach used in the national award-winning Master Marketer program served as the blueprint for developing the components of the Master Irrigator project. The first step was the development of an overall plan of action for conducting the project in consultation with the NPGCD personnel and interested producers. The second step was to establish a Project Advisory Committee (PAC) which was charged with providing guidance for the development and implementation of the training and project. In addition, the PAC reviews training results & program evaluations during the life of the project. Members of the PAC included representatives from the NPGCD board & staff, producers, Industry, Natural Resource Conservation Service (NRCS), Texas Water Development Board (TWDB) and Texas A&M AgriLife.

The PAC designed a four-session training including identifying speakers & topics. Registration was limited to 25 due to space limitations but more importantly to ensure that participants could easily interact with speakers. Each session had an overall theme: Session I - Irrigation Scheduling; Session II - Agronomics; Session III - Systems; and Session IV - Special Topics. These one-day sessions were held a week apart under the principle “the mind can’t absorb any more than the butt can withstand”. In subsequent years, the training was moved to the last half of March and the first half of April to further minimize producer scheduling conflicts. In 2023, the training was moved up to the mid-February concluding in early March to make the timing even more friendly to producers.

The cost of an intensive educational effort is high, not only in operational dollars, but in time and effort expended. These costs brings up the question of the district’s value of

continuing to offer the Master Irrigator training. To determine the value of the Master Irrigator training, several questions need to be answered:

1. Did producers adopt conservation practices learned in the course?
2. Did producers implementing conservation practices realize improved water use efficiency?
3. Did producers implementing conservation practices realize actual water savings?
4. How important were the participant incentives provided by NRCS?
5. Should NPGCD continue to offer the Master Irrigator training?

A two-level evaluation process is being employed to evaluate the project. The first level of evaluation is of the training itself. Training participants are asked to evaluate the relevance of topics and the effectiveness of speakers for each session. In addition, they are asked for other topics which they would like to see addressed in future trainings. Participant are surveyed to evaluate training topics and speaker effectiveness. Participants were asked to rate topics & speakers using a 5-point Likert scale where 1 = poor and 5 = excellent. In addition, the final evaluation asked them to rate the entire course and give any suggestions for improvement. Results of these surveys are provided to the PAC in consideration for formulating future efforts.

The second level focuses on identifying the level and impact of adoption of conservation equipment and strategies learned in the Master Irrigator training. At the beginning of each training a survey was administered to determine types/amounts of irrigation systems, conservation practices, tillage practices they use. These questions are repeated in the implementation survey. In addition, the implementation survey requests information related to conservation practice implementation, water use efficiency, water savings, importance of funding incentives, suggested improvements to the training and their assessment whether NPGCD should continue to offer the training. This survey is administered to graduates three years after attending the training to measure their level of adoption and their opinions on the value of the course.

2024 & Cumulative Results

The 2024 Master Irrigator training program was held on February 15 (Session I - Agronomics); February 22 Session II - Irrigation Scheduling; February 29 (Session III – Systems); and March 6 (Session IV – Systems & Special Topics). Overall, the topics and most of the speakers were similar to the 2023 training, but there were some changes in speakers, as well as changes in topics due to PAC recommendations, speaker retirements and speaker conflicts. David Reinart and Leon New retired and Nich Kenny changed positions limiting his availability. Three new topics were added to the training. These topics included: “Managing Silage Crops in Water Limited Systems” and “How to use Soil Fertility to Maximize Water Usage in Crops”. These presentations replaced “The Value of Improving Organic Matter in Soils – Potentially a New Approach presented by MyLand”; “Climate Smart Production in a Limited Water Environment”; “Cropping Systems: Water Management with Multiple Species”; “SDI Versus Sprinkler – WCC Demonstration Results”; and “Variable Frequency Drives – Benefits to Agriculture”.

Producer panels remained a critical part of the training, however, representative producers making up the panels changed somewhat. Individual 2024 session agendas are located in Appendix A.

A total of 21 registered for the 2024 training, Table 1. Initial registration for previous training courses ranged 19 – 27 (full capacity 25). It should be noted that the 2020 class sold out before it had to be cancelled due to COVID. Past trainings, due to participant scheduling conflicts the effective number of participants completing all sessions was similar between all eight trainings (19 – 22). A relaxation in the graduation requirement to attending three of the four sessions was adequate given an approved absence coupled with two late cancellations resulted in 19 registrants graduating. The twelve operations represented in the 2024 training reported having 34,867 irrigated acres which was by far the smallest amount of irrigated acreage in a class since the training began. Counting one representative per operation the additional graduates include multiple representatives from the registered operations, representatives from an operation that had previously attended and been accounted for, irrigation consultants and a Texas A&M AgriLife Specialist.

Table 1. Master Irrigator Registration, Irrigated Acreage and Cost-Share Funding by Year.

Year	Initial registration	Irrigated Acreage	Cost Share: Contracts	Cost Share: Funding
2016	25	62,090	46	\$ 392,590
2017	26	64,679	38	\$ 390,963
2018	22	86,766	9	\$ 292,811
2019	25	49,259	7	\$ 343,568
2021	19	91,738	14	\$ 199,259
2022	20	80,375	9*	\$ 170,000
2023	26	67,212	4*	\$ 40,000
2024	21	34,867	*	
Total	163	536,986	114	\$ 1,829,191

* Indicates applications for cost-share funding are still being accepted

The NRCS EQIP cost-share agreement to support the Master Irrigator program came to an end with the 2019 training graduates. The agreement resulted in total of 100 contracts being issued by NRCS providing \$1,419,932 in cost-share to Master Irrigator graduates. The NPGCD has entered into an agreement with the Texas Water Development Board to provide cost-share funding for graduates of the Master Irrigator program for the next three years starting with the 2021 training. Under this cost-share agreement

approximately \$250,000/year will be made available to class graduates for the adoption of water conservation measures. A total of fourteen contracts were issued to 2021 graduates for \$199,259 under this agreement. The application deadline for the 2022 & 2023 graduates of the training for the cost-share funds provided by TWDB are still open so far nine and four applications for \$170,000 and \$40,000 have been received from the 2022 and 2023 classes, respectively. Applications for the 2024 graduates are just now beginning to be received, therefore, are not included in this report.

In 2024, the training was held at the Water Conservation Center (WCC) located five miles north of Dumas. Six of the eight counties in NPGCD were represented in the training. The largest contingent of enrollees had operations in Moore (5) and Dallam counties (4), Table 2. Cumulatively, seven of the eight counties have had 10 or more irrigated operations represented at the training and five have had more than 20 operations represented. The only county with less than ten operations represented was Hutchinson (8) which also has the smallest amount of irrigated acreage. Overall, the distribution is what you would expect given each counties proximity to the WCC where most of the trainings have been held and the amount of irrigated acreage within the individual county.

Table 2. Master Irrigator Participant Geographic Distribution, 2016 - 2024.

	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>Total</u>
Dallam	1	1	2	3	3	0	0	4	14
Hansford	5	5	3	2	1	5	5	1	27
Hartley	4	4	2	3	6	1	2	1	23
Hutchinson	3	1	1	1	0	0	1	1	8
Lipscomb	2	3	3	0	0	1	2	0	11
Moore	7	10	4	6	5	3	4	5	44
Ochiltree	5	3	1	3	3	4	2	0	21
Sherman	2	7	8	7	4	2	5	2	37

There was a good distribution of the primary crops grown in the NPGCD represented in the 2024 training, which was like the previous trainings, Table 3. Corn was the most frequently mentioned crop grown (11 times) by the irrigated operations followed by sorghum, wheat and cotton. Over all eight trainings corn has been mentioned 105 times, cotton 39 times, wheat 37 times and sorghum 30 times. These four crops accounted for 93.0% of the primary crops grown by participants.

Table 3. Master Irrigator Irrigated Crop Distribution, 2016 - 2024.

	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>Total</u>
Alfalfa & Hay	3	0	2	0	1	0	1	1	8
Corn	19	17	9	14	10	9	16	11	105
Cotton	4	7	7	7	3	4	4	2	38
Grass	0	2	1	0	0	1	0	1	5
Potatoes	1	0	0	0	0	0	0	0	1
Oats	0	1	0	0	0	0	0	0	1
Sorghum	1	2	4	2	5	6	4	6	30
Soybeans	0	0	0	1	0	1	0	0	2
Wheat	2	5	5	1	6	8	4	6	37

In the 2024 baseline survey, participants reported having a total of 34,867 irrigated acres which averaged 3,006 acres per operation, Table 4. The total irrigated acreage represented in the training was much smaller than the average reported over all eight trainings (34,867 vs. 66,304) as was the average per operation which was approximately 25% less (4,049 vs. 3,006). Since its inception the irrigated acreage represented now is slightly less than 537,000 acres. It should be noted that some of the irrigated acreage exists outside the NPGCD. Two of the twelve operations in the training were from the Panhandle groundwater conservation district. These operations represented over 40% of the irrigated acreage reported in the training.

The distribution between the irrigation delivery systems employed by 2024 participants was significantly different from previous classes. The type of center pivot systems was different. The most popular system was MESA systems with drops above 18” accounting for slightly more than 53%, followed by LESA with drops 12” – 18” inches above ground (29%) and LEPA accounted for 17% of the irrigation systems utilized. The percentage distribution reported by participants over all eight trainings between these systems was 13%, 53% and 33% for MESA, LESA, and LEPA, respectively. The 2024 as well as all training participants reported having a negligible amount of SDI and furrow irrigation systems (less than 1% total).

Table 4. 2024 and Cumulative Participant Baseline Survey
2024 Participant Irrigation Baseline Survey

Irrigation delivery systems you're using:

	Total Wet Acres (Average)	Total Wet Acres (Sum)	% of Total
Sprinkler irrigation:			
MESA - Drops above 18 inches	1542	18502	53.06%
LESA - Drops 12" - 18" above ground	861	10335	29.64%
LEPA - Drops 12" - 18" with bubblers or drag hoses	599	5990	17.18%
Furrow irrigation		0	0.00%
SDI (DRIP) irrigation	4	40	0.11%
Total Acres	3006	34867	

All Years Participant Irrigation Baseline Survey

Irrigation delivery systems you're using:

	Total Wet Acres (Average)	Total Wet Acres (Sum)	% of Total
Sprinkler irrigation:			
MESA - Drops above 18 inches	537	71910	13.39%
LESA - Drops 12" - 18" above ground	2129	285235	53.12%
LEPA - Drops 12" - 18" with bubblers or drag hoses	1310	175550	32.69%
Furrow irrigation	3	463	0.09%
SDI (DRIP) irrigation	29	3828	0.71%
Total Acres	4007	536986	

When you look at the irrigation management practices currently utilized by the 2024 participants an interesting relative to previous trainings, Table 5. The 2024 participants reported significant increases in the use of some irrigation management practices relative to prior classes. Participants used weather stations (58.2%), irrigation scheduling (79.2%), predictive crop models (57.4%), and delayed planting dates (58.6%). Again, these usage percentages compared to the average over all the trainings that have been conducted were higher. Including the baseline responses from all training courses, the averages for these management practices were weather stations (39.3%), irrigation scheduling (65.7%), predictive crop models (9.7%) and delayed planting dates (25.9%). However, when you look at the percentage of irrigated acres using most of these practices is significantly higher than the percentage of producers suggesting larger producers are

implementing more of these practices than smaller producers. Among the 2024 class two operations accounted for more than half of the total irrigated acreage reported.

Participants reported using some form of conservation tillage on 74.5% of the acreage. Previous classes the distribution was relatively evenly split between general conservation tillage, strip till and no till. Strip till the most common tillage method practiced (37.1%) followed by conventional tillage (25.5%), general conservation tillage (24.4%) and no till (13.0%). It also should be noted that this was a significant change from the previous classes which reported a lesser amount of conventional till and more no-till. Residue management is being practiced on 80.1% of the acreage and in-season fertility management on 80.2% of the acreage, which is higher than what has been reported by participants of previous classes.

Table 5. 2024 Baseline and Cumulative Irrigation Management Practices
2024 Baseline Results

Irrigation Management Practices:	Do you currently use them?			
	Yes	No	Acres	% of total
ET or Weather Station	4	5	16465	58.2%
Variable Frequency Drives	3	6	4854	17.1%
Variable Rate Irrigation	2	7	2000	7.1%
Irrigation Scheduling	7	2	22430	79.2%
Soil moisture probes	8	1	10356	36.6%
Remote pivot tracking	9	0	28312	100.0%
Satellite imagery	6	3	20919	73.9%
Drones	4	5	5800	20.5%
Predictive crop models	3	6	16250	57.4%
Delayed planting dates (corn)	8	1	16595	58.6%
Flow meters	9	0	21059	74.4%
<i>Tillage Practices:</i>				
Conventional tillage	3	6	7215	25.5%
Conservation tillage	4	5	6916	24.4%
Strip Till	7	2	10494	37.1%
No Till	3	6	3687.5	13.0%
Crop residue management	7	2	22665	80.1%
In-season Fert. Management	9	0	22702	80.2%
	No. of Surveys		9	

Cumulative Baseline Results

Irrigation Management Practices:	Do you currently use them?			
	Yes	No	Acres	% of total
ET or Weather Station	48	83	208269	39.3%
Variable Frequency Drives	47	84	95868	18.1%
Variable Rate Irrigation	24	107	38783	7.3%
Irrigation Scheduling	69	61	348509	65.7%
Soil moisture probes	72	59	223120	42.1%
Remote pivot tracking	106	25	488066	92.0%
Satellite imagery	45	86	264827	49.9%
Drones	24	107	79255	14.9%
Predictive crop models	16	115	51470	9.7%
Delayed planting dates (corn)	56	52	137602	25.9%
Flow meters	125	6	449937	84.8%
<i>Tillage Practices:</i>				
Conventional tillage	57	74	89141	16.8%
Conservation tillage	76	54	131139	24.7%
Strip Till	91	40	211264	39.8%
No Till	64	67	98547	18.6%
Crop residue management	100	31	385717	72.7%
In-season Fert. Management	109	22	410124	77.3%
	No. of Surveys		131	

Participant evaluations of topics and speaker effectiveness were conducted after every session. Participants were asked to rate topics & speakers using a 5-point Likert scale where 1 = poor and 5 = excellent. In addition, the final evaluation asked them to rate the entire course and give any suggestions for improvement. On such a scale, any rating of

4.0 or better should be considered very good and any rating of 4.5 or greater should be considered excellent.

The 2024 training participants rated the overall program 4.50 on the 5-point scale, Table 6. The 2024 rating albeit excellent was the lowest the training has rated since the 2021 trainings. The Agronomics session rated 4.67 which was the highest among the 2024 sessions and the second best it has rated overall years the training has been conducted. The sessions on Irrigation Scheduling, Irrigation Systems and Systems & Special Topics were rated 4.41, 4.36 and 4.53, respectively.

Participant ratings of all individual topics, speakers and comments by session are provided in Appendix B. *Fourteen of the 15 participants filling out the final course evaluation indicated they planned on implementing at least some of the information and/or tools they learned in the training. Cumulative over all trainings 132 of 135 graduates have indicated that they plan on implementing one or more conservation techniques/practices they learned in the training.*

Table 6. 2024 Master Irrigator Session and Overall Course Evaluation, 2016 -2024*

	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>
Session I - Agronomics	4.32	4.52	4.62	4.62	4.16	4.81	4.65	4.67
Session II - Irrigation Scheduling	4.38	4.57	4.59	4.67	4.68	4.69	4.92	4.41
Sesstion III - Irrigation Systems	4.69	4.81	4.50	4.52	4.47	4.88	4.84	4.36
Session IV - Systems & Special Topics	4.62	4.70	4.62	4.62	4.53	4.88	4.67	4.53
Master Irrigator - Overall Training	4.77	4.60	4.81	4.71	4.50	4.81	4.83	4.50

*Likert 1 - 5 with 1 = poor and 5 = excellent

These and other evaluation topics were addressed by surveying the graduates of the inaugural 2016 Master Irrigator training during 2019. The 2016 class was selected for evaluation in 2019 because adequate time had passed (three years) since the 2016 training to allow graduates to implement and evaluate conservation strategies presented during the Master Irrigator course. This survey procedure was utilized for the 2017, 2018 and 2019 classes to determine conservation practice implementation levels The survey instrument is located in Appendix C.

A total of 91 individuals graduated from the Master Irrigator training during the 2016 – 2019 time period, Table 7. The 91 graduates included producers, consultants, and various public sector representatives. A total of 73 irrigated operations were represented and graduated from the training. Twelve of the 73 operations were no longer in business for various reasons at the time of the implementation survey. Therefore, 61 of the irrigated operations graduating from the training have been surveyed. Each of the operations was contacted multiple times via personal contact, email, text, and phone. A total of 36 graduates responded to the survey, resulting in an effective response rate of 59%.

Table 7 - Master Irrigator graduate implementation survey response summary, 2016 - 2019.

	2016	2017	2018	2019	Total
Number of Graduates	25	23	22	21	91
Number of Operations	19	19	18	17	73
Number of Operations no Longer Operating	4	1	4	3	12
Number of Operations Currently Operating	15	18	14	14	61
Survey Responses	12	12	7	5	36
Survey Response Rate	80%	67%	50%	36%	59%

The 36 participants who responded to the follow up survey reported having 108,957 irrigated acres in the baseline survey, Table 8. Therefore, follow-up survey respondents represented 41.5% of the total irrigated acreage represented in these classes.

The implementation survey results from the 36 operations were matched to their responses given in the baseline survey they filled out during their training. Responses were compared to identify changes made in their operations. Overall, irrigated acres in these operations increased slightly (6,951 acres) and gpm/acre reportedly declined (4.25 to 3.91). A significant change in the type of irrigation systems utilized was reported. The percentage of the least efficient pivot system (MESA) decreased from 14.9% to 10.6% of the total systems in use. The acreage in the most popular LESA pivot systems with spray drops 12” – 18” off the ground also fell between the two surveys (59.9% vs. 55.0%). The biggest change occurred in the use of LEPA systems which increased more than 12,000 acres (9.0%) from what respondents reported in their baseline survey vs. implementation survey conducted three years after the training. The was negligible amounts and changes in the use of SDI and furrow irrigation.

Table 8 - Cumulative Baseline and Current Irrigation Systems Utilized by Respondents, 2016 -2019.
Respondent Irrigation Baseline Survey: All Years

Average gpm/ac available?		4.25	
Irrigation delivery systems you're using:			
	Total Wet Acres(Average)	Total Wet Acres(Sum)	% of Total
Sprinkler irrigation:			
MESA - Drops above 18 inches	451	16,219	14.9%
LESA - Drops 12" - 18" above ground	1,812	65,241	59.9%
LEPA - Drops 12" - 18" with bubblers or drag hoses	709	25,517	23.4%
Furrow irrigation	4	160	0.1%
SDI (DRIP) irrigation	51	1,820	1.7%
Total Acres	3,027	108,957	

Respondent Implementation Survey: All Years

Average gpm/ac available?		3.91	
Irrigation delivery systems you're using:			
	Total Wet Acres(Average)	Total Wet Acres(Sum)	% of Total
Sprinkler irrigation:			
MESA - Drops above 18 inches	342	12,294	10.6%
LESA - Drops 12" - 18" above ground	1,769	63,693	55.0%
LEPA - Drops 12" - 18" with bubblers or drag hoses	1,045	37,606	32.4%
Furrow irrigation	4	145	0.1%
SDI (DRIP) irrigation	60	2,170	1.9%
Total Acres	3,220	115,908	

The cumulative acreage, percentage use of the irrigation management techniques and tillage practices reported by survey respondents in the baseline and implementation survey (Appendix B) are given in Table 9. Increases in the use of conservation measures such as, Irrigation Scheduling, Soil Moisture Probes, Remote Pivot Tracking, Drones, and Predictive Crop Models from 2.9% - 13.4%. Reported decreases in the use of conservation measures Variable Rate Irrigation, weather stations, Delayed Planting dates, Water Flow Meters and VFDs were relatively minor and ranged from 2.7% - 7.5%.

The trend to implementing more conservation tillage methods is undeniable among respondents. The use of conventional tillage dropped more than 15,000 acres (26,431 – 10,940). It should be noted that changes are somewhat overstated since the amount of irrigated acreage operated by respondents increased (6,951 acres) by the time the implementation survey was conducted. All forms of reduced tillage saw substantial increases in use from the baseline as reported by respondents. The percentage distribution between tillage systems reported in the baseline survey was 24.3%, 26.4%, 34.3% and 18.8% for conventional tillage, conservation tillage, Strip Till and No Till, respectively. Summarizing the distribution from the same respondents from the implementation survey resulted in a distribution between these systems of 9.4%, 37.9%, 34.3% and 18.4%, respectively. In addition to these changes, respondents reported a greater emphasis on practicing Crop Residue management (71.2% to 77.7%). The use of In-season fertility management fell from 86.7% to 80.7%.

Table 9 - Cumulative Baseline and Current Irrigation Management Practices Utilized by Respondents, 2016 -2019.

Irrigation Management Practices:	Baseline Survey		Implementation Survey		% Change
	Acres	% of total	Acres	% of total	
ET or Weather Station	51,601	47.4%	46,933	40.5%	-6.9%
Variable Frequency Drives	25,487	23.4%	23,958	20.7%	-2.7%
Variable Rate Irrigation	14,786	13.6%	7,036	6.1%	-7.5%
Irrigation Scheduling	67,431	61.9%	79,026	68.2%	6.3%
Soil moisture probes	42,803	39.3%	52,400	45.2%	5.9%
Remote pivot tracking	97,322	89.3%	107,224	92.5%	3.2%
Satellite imagery	42,700	39.2%	53,022	45.7%	6.6%
Drones	25,528	23.4%	42,632	36.8%	13.4%
Predictive crop models	17,590	16.1%	22,114	19.1%	2.9%
Delayed planting dates (corn)	26,214	24.1%	20,308	17.5%	-6.5%
Flow meters	90,992	83.5%	94,417	81.5%	-2.1%
Tillage Practices:					
Conventional tillage	26,431	24.3%	10,940	9.4%	-14.8%
Conservation tillage	28,766	26.4%	43,910	37.9%	11.5%
Strip Till	34,214	31.4%	39,723	34.3%	2.9%
No Till	20,496	18.8%	21,384	18.4%	-0.4%
Crop residue management	77,563	71.2%	90,113	77.7%	6.6%
In-season Fert. Management	94,441	86.7%	93,514	80.7%	-6.0%

Total Responses = 36

In the second section of the implementation survey questions targeting the effectiveness of the training in impacting the participants' operations. Unfortunately, detailed responses to some of the questions were limited, however, responses to selected questions are presented in Table 10. Thirty-three of the 36 respondents (91.7%) indicated that they had adopted or increased the use of at least one or more (average 2.44 practices) of the conservation measures learned during the Master Irrigator course. One of the three respondents that had not implemented any conservation practices taught in the training still has plans to do so. Virtually each topic taught was adopted by one or more participants. This is supported by the changes in irrigation systems, conservation management practices and tillage systems reported by survey respondents detailed in Tables 8 and 9.

The second section of the survey also contained questions requesting feedback on five additional topics; water savings, improvement in water use efficiency, savings from using variable frequency drives (VFDs), the importance of cost-share to attending the training and their opinion on whether NPGCD should continue to offer the training. Two of the primary objectives of the Master Irrigator training are to potentially save water and more production from the irrigation water that is applied. Fifty-six percent of respondents to the implementation survey indicated that they have reduced water use and 82% say that they have improved their water use efficiency, i.e., producing relatively more crop for the water applied.

Participants with variable frequency drives (VFDs) on their irrigation wells were asked how much their energy bill was impacted by using a VFD. Six producers responded reporting an estimated energy reduction of 12%. The next question of the survey was included to help identify the value of the NRCS EQIP cost-share as an incentive to attend the Master Irrigator program. Ten respondents reported it was not important at all (rated it a 3 or lower) while 25 (71% of respondents) rated it 6 or higher on a 10-point Likert scale for an overall average of 6.4. Finally, a binary question was added to the implementation survey starting with the 2017 class: "Do you think NPGCD should continue to offer the Master Irrigator program?" All 23 of the respondents indicated in the affirmative that the training should continue to be offered.

It should be noted that the implementation survey was not conducted this year. The survey is conducted when the graduates have had three full years post training to implement what they have learned. Therefore, the class that would have been surveyed is the 2020 class. While the 2020 training sold out it was cancelled due to COVID.

Table 10. Cumulative responses to select questions from the 2016 -2019 Master Irrigator implementation survey.

<i>Have you implemented anything you learned in the MI Training?</i>		2016	2017	2018	2019	Total				
	Yes	12	12	5	4	33				
	No	0	0	2	1	3				
		% Implemented				91.7%				
<i>Number of conservation practices adopted?</i>		2016	2017	2018	2019	Total				
	Respondents	12	11	5	4	32				
	Practices	39	20	10	9	78				
		Practices/respondent Implemented				2.44				
<i>Has it decreased your water use?</i>		2016	2017	2018	2019	Total				
	Yes	8	5.5	2	3	18.5				
	No	4	5.5	3	2	14.5				
		% Decreasing water use				56.1%				
<i>Has it increased your Water Use Efficiency (WUE)?</i>		2016	2017	2018	2019	Total				
	Yes	12	8	4	3	27				
	No	0	3	1	2	6				
		% Increasing WUE				81.8%				
<i>How much do you expect your electrical bill was reduced after using the VFD?</i>		2016	2017	2018	2019	Total				
	Respondents	3	2	1	0	6				
	Ave. %	7	20	10	0					
		Weighted Ave. %				12%				
<i>On a scale of 1-10 how important was cost-share funding in your decision to attend the Master Irrigator training?</i>										
Scale	1	2	3	4	5	6	7	8	9	10
Responses.....									
Year										
2016	2						1	2	2	4
2017	2					1	3	4		2
2018	1	1						2	2	1
2019	2	1	1				1			
Total	7	2	1	0	0	1	5	8	4	7
	Weighted Average =		6.43							
<i>Do you think the NPGCD should continue to offer the MI training?</i>		2016	2017	2018	2019	Total				
	Yes	0	12	6	5	23				
	No	0	0	0	0	0				
		% Believing the Training should continue				100%				

Summary and Conclusions

The NPGCD conducted the eighth Master Irrigator training at the NPGCD Water Conservation Center north of Dumas. The 2024 training started in mid-February and concluded in early March. The 2024 Master Irrigator program cycle may be the perfect example of Murphy's Law which states "Anything that can go wrong will go wrong". A myriad of factors including speaker retirements, scheduling conflicts, blizzards, wildfires, illness, etc. impacting registration and flow of the training. Despite all the issues twenty-one registered for the training with 19 graduating. The 19 graduates included multiple representatives from 12 irrigated operations, representatives from an operation that attended a previous training, two consultants and an Extension Specialist. The 12 operations reported having 34,867 irrigated acres. The largest contingent of enrollees had operations in Moore (5), Dallam (4) and Sherman (2). The crop distribution among participants was very similar to past trainings with corn, sorghum, cotton, and wheat accounting for a vast majority of what they grew.

The summary of the baseline survey conducted at the beginning of the course revealed irrigated delivery systems used by participants are primarily LESA (29.4%), LEPA (17.2%) and MESA (53.1%). This is significantly different from what has been observed over all trainings, LESA (53.1%), LEPA (32.3%) and MESA (13.4%). Participants already reported using several conservation practices at a relatively high level. Remote Pivot Tracking is being used on 100.0% of the acreage, Irrigation scheduling is being used on 79.2% of the acreage, Satellite Imagery 73.9%, and ET/weather stations on 58.2% of the acreage. They reported a relatively balanced usage of tillage methods with conventional tillage, conservation tillage, Strip Till and No Till accounting for 25.5%, 24.4%, 37.1% and 13.0%, respectively. They also indicated using high levels of crop residue management (80.1%) and In-season fertility management (80.2%).

After each session participants are asked to rate the value of the session on a 5-point Likert scale where 1 = poor and 5 = excellent. In addition, the final evaluation asked them to rate the entire course. The 2024 participants rated each individual session higher than all previous trainings: Agronomics (4.67), Irrigation Scheduling (4.41), Irrigation Systems (4.36) and Systems and Special Topics (4.53) with the overall course rating (4.50). With the exception of the Agronomics session, the other sessions and the overall course rated on the lower end of what the course has received. Still all ratings should be considered very good to excellent given the 5-point Likert scale. *Fourteen of fifteen graduates indicated they plan to implement one or more irrigation management strategies presented during the course.*

An intensive educational effort such as the Master Irrigator program requires significant resources to execute, therefore it is paramount to identify any realized benefits to evaluate the cost effectiveness of continuing the training. To determine the effectiveness of the

Master Irrigator training, irrigated operations were surveyed three years after attending the training to see if and what conservation measures, they had implemented from what was taught. In part, this was accomplished by comparing the respondents baseline survey conducted at the beginning of their training to the implementation survey they filled out. Graduates from the 2016 - 2019 trainings have been surveyed. Representatives from 73 irrigated farms graduated from the 2016 -2019 Master Irrigator trainings, 61 of the operations are still viable and 36 responded to the implementation survey.

The use of more efficient delivery systems trended upward with LEPA usage increasing 9.0% while the less efficient systems MESA and LESA decreased 4.3% and 4.9%, respectively, of the total irrigated acreage. Analysis of the eleven conservation measures revealed no significant changes in usage. Six of the conservation measures increased and five decreased in usage, Table 9, none with the exception of Drones changed more than 7.5% between the baseline and implementation surveys. A major shift in tillage systems with conventional tillage falling more than 15,000 acres (58.6%) while reduced tillage increased and the use of No Till remained about the same.

The second section of the implementation survey presents questions targeting the effectiveness of the training in impacting the participants' operations. Thirty-three of the 36 respondents (91.7%) indicated that they had adopted or increased the use of at least one or more (average 2.44 practices) of the conservation measures learned during the Master Irrigator course. Fifty-six percent of respondents reported reducing water use based on what they learned in the training. Eighty-two percent indicated that they have improved their water use efficiency, i.e., getting more production per acre-inch applied. Those respondents that have implemented VFDs reported a 12% energy savings.

Respondents were asked to rate (10-point Likert scale) the offer of potential cost-share funding to their decision to attend the training. Overall respondents rated the importance 6.4, however 71% rated it six or higher suggesting that the possibility of cost-share funding was important in their decision process to attend the training. Finally, when asked whether the training should be continued to be offered, all 23 respondents (question added after the survey of the 2016 class) said yes.

There is one conclusion that can be reached concerning the Master Irrigator training: It is extremely effective. Virtually every graduate of the training has indicated they plan on implementing one or more conservation techniques they learned in the training. Responses to the implementation survey revealed that 91.7% have implemented one or multiple conservation practices taught in the course. The resultant implementation of the adopted conservation techniques is leading to reduced water use, improved water use efficiency as well as energy savings, reduced soil erosion and improved soil health which were the primary and secondary objectives of the NPGCD in developing/conducting this educational effort.



Appendix A

2024 Master Irrigator Training Agendas:

Session I: Agronomics

Session II: Irrigation Scheduling

Session III: Irrigation Systems

Session IV: Systems and Special Topics

Session I: Agronomics

Thursday, February 15, 2024

- 8:30 a.m.** Registration and breakfast
- 9:00 a.m.** Welcome
Kirk Welch, Assistant General Manager, NPGCD
- 9:10 a.m.** Economics of Soil Health and Residue Management
Dr. Stephen H. Amosson, Professor and Management Economist Emeritus, Texas A&M AgriLife Extension Service
- 9:45 a.m.** Getting a Better Handle on What Roots Do – Agronomically Speaking - *Mike Petersen, Retired Agronomist/Soil Scientist, Orthman Manufacturing*
- 10:30 a.m.** Break
- 10:45 a.m.** Infiltration, Water Quality and Soil Carbon Concepts – Part I
Fred Vocasek, Senior Laboratory Agronomist, ServiTech
- 12:15 p.m.** Lunch, sponsored by Senninger
- 1:00 p.m.** Infiltration, Water Quality and Soil Carbon Concepts – Part II
Fred Vocasek, Senior Laboratory Agronomist, ServiTech
- 2:00 p.m.** Relationship of Soil Fertility to Water Management
Dr. David Parker, Associate Professor, Water Engineering, West Texas A&M University
- 3:00 p.m.** Break
- 3:15 p.m.** Considerations for using Cover Crops
Dr. Jourdan Bell, Associate Professor and Agronomist, Texas A&M AgriLife Extension Service
- 4:00 p.m.** Producer Panel: Soil Health and Residue Management
TBD
- 4:40 p.m.** Session I Evaluation
- 4:45 p. m.** Adjourn

Session II: Irrigation Scheduling

Wednesday, February 21, 2024

- 8:30 a.m.** Registration and breakfast
- 9:00 a.m.** Economics of Irrigation Scheduling
Dr. Stephen H. Amosson, Professor and Management Economist Emeritus, Texas A&M AgriLife Extension Service
- 9:30 a.m.** Funding Opportunities to Enhance your Water Savings and/or Improve your Water Use Efficiency
Keith Sides, State Irrigation Engineer, USDA-NRCS
- 9:50 a.m.** What you need to do to obtain TWDB cost-share funding
Kirk Welch, Assistant General Manager, NPGCD
- 10:00 a.m.** Break
- 10:15 a.m.** Pre-Water and Planting Dates
Dr. Jourdan Bell, Associate Professor and Agronomist, Texas A&M AgriLife Extension Service
- 11:15 a.m.** Fundamentals of Crop Water Use and Irrigation Scheduling
Jeff Miller, President, Forefront Agronomy LLC
- 12:15 p.m.** Lunch, sponsored by Aquaspy
- 1:00 p.m.** Measuring Crop Water Use
Dr. David Sloane, Chief Agronomist, GroGuru
- 2:30 p.m.** Break
- 2:45 p.m.** Data Interpretation & Strategic Irrigation Management
Dr. David Sloane, Chief Agronomist, GroGuru
- 4:00 p.m.** Producer Panel: Irrigation Scheduling
TBD
- 4:40 p.m.** Session II Evaluation
- 4:45 p.m.** Adjourn

Session III: Systems

Thursday, February 29, 2024

- 8:30 a.m.** Registration and breakfast
- 9:00 a.m.** Economics of Irrigation Systems
Dr. Stephen H. Amosson, Professor and Management Economist Emeritus, Texas A&M AgriLife Extension
- 9:30 a.m.** Systems and Application Efficiency
Nicholas Kenny, NPK Ag, LLC
- 10:30 a.m.** Break
- 10:45 a.m.** Systems and Application Efficiency (Continued)
- 11:45 a.m.** Mobile Drip Irrigation
Clive Puttick and Monty Teeter, Dragon-Line
- 12:15 p.m.** Lunch, sponsored by Reinke
- 1:00 p.m.** Center Pivot Remote Monitoring & Management
Karlyle Haaland, Site Manager for PivoTrac Valley Irrigation, Inc
- 1:45 p.m.** Genset: A potential alternative for converting natural gas to electric powered irrigation
Nicholas Kenny, NPK Ag, LLC.
- 2:45 p.m.** Break
- 3:00 p.m.** Managing Silage Crops in Water Limited Systems
Dr. Jourdan Bell, Associate Professor and Agronomist, Texas A&M AgriLife Extension Service
- 4:00 p.m.** Producer Panel: Center Pivot Irrigation
TBD
- 4:40 p.m.** Session III Evaluation
- 4:45 p.m.** Adjourn

Session IV: Systems & Special Topics

Wednesday, March 6, 2024

- 8:30 a.m.** Registration and breakfast
- 9:00 a.m.** 2024 Crop Profitability Analyzer
Dr. Stephen H. Amosson, Professor and Management Economist Emeritus, Texas A&M AgriLife Extension Service
- 9:45 a.m.** How to use Soil Fertility to maximize Water Usage in Crops (Part 1)
Neal Kinsey, President, Kinsey Agricultural Services, Inc.
- 10:30 a.m.** Break
- 10:45 a.m.** How to use Soil Fertility to maximize Water Usage in Crops (Part 2)
Neal Kinsey, President, Kinsey Agricultural Services, Inc.
- 11:45 a.m.** The NPGCD/TWDB Cost-share Program for MI Graduates
Kirk Welch, Asst. General Manager, NPGCD
- 12:00 p.m.** Lunch Sponsored by Netafim
- 12:45 p.m.** Subsurface Drip Irrigation Systems
Jerry Funck, Owner, Professional Water Management Associates
- 2:15 p.m.** Break
- 2:30 p.m.** Remote Sensing uses in Agriculture.
John Gibson, Precision Ag Specialist, Crop Quest
- 3:25 p.m.** Producer Panel: SDI and Remote Sensing
TBD
- 4:00 p.m.** Session IV & Course Evaluation
- 4:15 p.m.** Graduation and Closing Reception
- 4:45 p.m.** Adjourn



Appendix B

2024 Master Irrigator Training – Participant Evaluation Results

Session I: Agronomics

Session II: Irrigation Scheduling

Session III: Irrigation Systems

Session IV: Systems and Special Topics

Master Irrigator Course Assessment: Overall

Program Evaluation Master Irrigator Program – February 15, 2024
Session I – Agronomics (18 responses)

1. How would you rate the information presented in the **Economics of Soil Health, and Residue Management** session? (Steve Amosson)
1. (Poor) 1 2 3 4 5 (Excellent)
8 10 **Ave. = 4.56**

2. How would you rate the quality of the presenter?
1. (Poor) 1 2 3 4 5 (Excellent)
5 13 **Ave. = 4.72**

3. How would you rate the information presented in the **Getting a Better Handle on What Roots Do – Agronomically Speaking** session? (Mike Peterson)
1. (Poor) 1 2 3 4 5 (Excellent)
4 14 **Ave. = 4.78**

4. How would you rate the quality of the presenter?
1. (Poor) 1 2 3 4 5 (Excellent)
3 15 **Ave. = 4.83**

5. How would you rate the information presented in the **Relation of Soil Fertility to Water Management** session? (David Parker)
1. (Poor) 1 2 3 4 5 (Excellent)
3 7 8 **Ave. = 4.28**

6. How would you rate the quality of the presenter?
1. (Poor) 1 2 3 4 5 (Excellent)
1 9 8 **Ave. = 4.39**

7. How would you rate the information presented in the **Using Cover Crops to Improve Soil Health** session? (Jourdan Bell)
1. (Poor) 1 2 3 4 5 (Excellent)
6 12 **Ave. = 4.67**

8. How would you rate the quality of the presenter?
1. (Poor) 1 2 3 4 5 (Excellent)
3 15 **Ave. = 4.83**

9. How would you rate the **Producer Panel** session?
1. (Poor) 1 2 3 4 5 (Excellent)
1 5 12 **Ave. = 4.61**

10. How would you rate the Overall **Agronomics** session?
1. (Poor) 1 2 3 4 5 (Excellent)
6 12 **Ave. = 4.67**

What should be deleted/added/changed to improve this session?

- Topics over other crops that are not corn or cotton.
- I think it was all adequate. I gained a lot of knowledge from this session.
- Some coverage on weed control and weed resistance and the effect it can have on soil health.
- Everything was great, learned a lot.
- More real-life trial data on the farm.

Program Evaluation Master Irrigator Program – February 22, 2024
Session II – Irrigation Scheduling (17 Responses)

1. How would you rate the information presented in the **Economics of Irrigation Scheduling** session?
 (Steve Amosson)
 (Poor) 1 2 3 4 5 (Excellent)
 10 7 **Ave. = 4.41**

2. How would you rate the quality of the presenter?
 (Poor) 1 2 3 4 5 (Excellent)
 8 9 **Ave. = 4.53**

3. How would you rate the value of the NRCS session **describing Funding Opportunities to Enhance your Water Savings and/or Improve your Water Use Efficiency.** (Keith Sides)
 (Poor) 1 2 3 4 5 (Excellent)
 1 1 6 9 **Ave. = 4.35**

4. How would you rate the information presented in the **Pre-Water and Planting Dates** session?
 (Jourdan Bell)
 (Poor) 1 2 3 4 5 (Excellent)
 9 8 **Ave. = 4.47**

5. How would you rate the quality of the presenter?
 (Poor) 1 2 3 4 5 (Excellent)
 1 5 10 **Ave. = 4.56 (1 Missing)**

6. How would you rate the information presented in the **Fundamentals of Crop Water Use and Irrigation Scheduling** session? (Jeff Miller)
 (Poor) 1 2 3 4 5 (Excellent)
 1 8 8 **Ave. = 4.41**

7. How would you rate the quality of the presenter?
 (Poor) 1 2 3 4 5 (Excellent)
 8 9 **Ave. = 4.53**

8. How would you rate the information presented in the **Irrigation Scheduling** sessions? (David Sloane)
 (Poor) 1 2 3 4 5 (Excellent)
 6 10 **Ave. = 4.63 (1 Missing)**

9. How would you rate the quality of the presenter?
 (Poor) 1 2 3 4 5 (Excellent)
 1 6 9 **Ave. = 4.50 (1 Missing)**

10. How would you rate the **Producer Panel** session?

(Poor) $\frac{1 \quad 2 \quad 3 \quad 4 \quad 5}{1 \quad 8 \quad 8}$ (Excellent) **Ave. = 4.41**

11. How would you rate the Overall **Irrigation Scheduling** session?

(Poor) $\frac{1 \quad 2 \quad 3 \quad 4 \quad 5}{2 \quad 6 \quad 9}$ (Excellent) **Ave. = 4.41**

What should be deleted/added/changed to improve this session?

- The probe part was way to long but everything else was good.
- Nothing – everything was very informative.
- Class taught in Spanish.
- Might get someone else from NRCS to talk about funding alternatives instead of Keith (technical guy).
- Think the info was good but speakers were trying to keep it long and overdid the info.
- Fundamentals of Crop Water Use and Irrigation Scheduling (Miller) ---- So Good!
- Irrigation Scheduling (Sloan) The best presentation/info today!

Program Evaluation Master Irrigator Program
February 29, 2024
Session III: Irrigation Systems (14 Responses)

1. How would you rate the **Economics of Irrigation Systems** session? (Steve Amosson)
1. (Poor) 1 2 3 4 5 (Excellent)
8 6 **Ave. = 4.43**

2. How would you rate the quality of the presenter?
1. (Poor) 1 2 3 4 5 (Excellent)
7 7 **Ave. = 4.50**

3. How would you rate the **Systems and Application Efficiency** session? (Nich Kenny)
1. (Poor) 1 2 3 4 5 (Excellent)
5 9 **Ave. = 4.64**

4. How would you rate the quality of the presenter?
1. (Poor) 1 2 3 4 5 (Excellent)
5 9 **Ave. = 4.64**

5. Did you find value in the **Mobile Drip Irrigation Discussion**? (Clive Puttick)
1. (Poor) 1 2 3 4 5 (Excellent)
8 6 **Ave. = 4.43**

6. How would you rate the quality of the presenter?
1. (Poor) 1 2 3 4 5 (Excellent)
1 7 6 **Ave. = 4.29**

7. How would you rate the **Center Pivot Monitoring & Management** session? (Karlyle Haaland)
1. (Poor) 1 2 3 4 5 (Excellent)
6 8 **Ave. = 4.57**

8. How would you rate the quality of the presenter?
1. (Poor) 1 2 3 4 5 (Excellent)
5 9 **Ave. = 4.64**

9. How would you rate the Genset: A potential alternative for converting natural gas to electric powered irrigation session? (Nich Kenny)
1. (Poor) 1 2 3 4 5 (Excellent)
4 10 **Ave. = 4.71**

10. How would you rate the quality of the presenter?
1. (Poor) 1 2 3 4 5 (Excellent)
4 10 **Ave. = 4.71**

11. How would you rate the **Managing Silage Crops in Water Limited Systems** session? (Jourdan Bell)
1. (Poor) 1 2 3 4 5 (Excellent)
7 7 **Ave. = 4.50**

12. How would you rate the quality of the presenter?

1. (Poor) 1 2 3 4 5 (Excellent)
5 9

Ave. = 4.64

13. How would you rate the **Producer Panel** session?

1. (Poor) 1 2 3 4 5 (Excellent)
3 2 8

Ave. = 4.38 (1 Missing)

14. How would you rate the overall *Irrigation Systems* session?

1. (Poor) 1 2 3 4 5 (Excellent)
1 1 4 8

Ave. = 4.36

What should be deleted/added/changed to improve this session?

1. Everything was good.

2. Master Irrigators do not need to learn how to grow silage. The producer panel was really bad. Every year is different.

3. Enjoyed previous producer panels more as they were more discussion oriented.

• **Note:** *Three left in the middle of the afternoon session, therefore, didn't complete the evaluation*

**Program Evaluation Master Irrigator Program
March 6, 2024**

Session IV: Systems & Special Topics (16 Responses)

1. How would you rate the **2024 Crop Profitability Analyzer** session? (Steve Amosson)
1. (Poor) 1 2 3 4 5 (Excellent)
7 9 Ave. = 4.56

2. How would you rate the quality of the presentation?
1. (Poor) 1 2 3 4 5 (Excellent)
7 9 Ave. = 4.56

3. How would you rate the **How to use Soil Fertility to Maximize Water Usage in Crops** session? (Neil Kinsey)
1. (Poor) 1 2 3 4 5 (Excellent)
1 3 12 Ave. = 4.69

4. How would you rate the quality of the presentation?
1. (Poor) 1 2 3 4 5 (Excellent)
5 11 Ave. = 4.69

5. How would you rate the **Subsurface Drip Irrigation Systems** session? (Jerry Funck)
1. (Poor) 1 2 3 4 5 (Excellent)
4 6 6 Ave. = 4.13

6. How would you rate the quality of the presentation?
1. (Poor) 1 2 3 4 5 (Excellent)
1 3 6 6 Ave. = 4.06

7. How would you rate the **Remote Sensing** session? (John Gibson)
1. (Poor) 1 2 3 4 5 (Excellent)
1 9 6 Ave. = 4.31

8. How would you rate the quality of the presentation?
1. (Poor) 1 2 3 4 5 (Excellent)
1 6 9 Ave. = 4.50

9. How would you rate the **Producer Panel** session?
1. (Poor) 1 2 3 4 5 (Excellent)
1 5 10 Ave. = 4.56

10. How would you rate the overall **Systems & Special Topics** session?
1. (Poor) 1 2 3 4 5 (Excellent) (1 missing)
7 8 Ave. = 4.53

What should be deleted/added/changed to improve this session?

1. More Neil Kinsey
2. Didn't get much out of the Drip presentation.

Overall 2024 Master Irrigator Course Assessment

How would you rate the entire four-session Master Irrigator Training?

(Poor) 1 2 3 4 5 (Excellent)
8 8 Ave. = 4.50

1. What are the main benefits you received from this training?
2. Ideas and knowledge to utilize the finite resource that is water.
3. Knowledge about how soil health affects water efficiency.
4. Soil fertility
5. Everything
6. New management practices (twice)
7. Great reminders of the things we should be doing to manage water resources and maximize profits.
8. Gained more knowledge about pivot systems.
9. I learned the benefit of saving/minimizing water use.
10. Education on soil health and new products to conserve water and an understanding of root systems & water infiltration in the soil.

What did you expect from the Master Irrigator training that you *did not* receive?

1. Nothing (three times)
2. More information on repairing irrigation systems.
3. Hoped to receive more tangible information on irrigation scheduling – a hands-on training might be beneficial.

What session / topic was the *most* useful?

1. Soil Health and pivot technology
2. Irrigation Scheduling (Session II)
3. Neil Kinsey (Four times)
4. Fertility management
5. Technology based topics – Nich was good.
6. Session III Irrigation Systems
7. Soil Health (Session I) and Irrigation Systems (Session III)
8. Soil Health (Session I) and Irrigation Scheduling (Session II)

What session / topic was the *least* useful?

1. Crop Quest (Three times)
2. Producer panels
3. Silage presentation
4. DragonLine and Pivotractor presentation – basically sales pitches
5. Soil Health (Session I)
6. Irrigation Systems (Session III)
7. SDI

Do you plan to use/adopt the information/tools you learned during your Master Irrigator training?

Yes 14 No 1 (93.3%) Missing 1

Note: Based on the responses to the survey by the one who said no -- suggests probably not a producer

Additional Comments: **(If we have permission to use your comments in advertising the training in the future, please sign.)**

1. Very useful class that everyone using irrigation should attend.
2. Excellent class
3. Do the class in Spanish
4. *“You guys did a great job – one of the most educational classes I have gone to”* L. Taylor



Appendix C

Three Year Post Implementation Survey

Master Irrigator Follow-up Survey

Name: _____

Date: _____

County or counties you operate in: _____

Primary crops grown? _____ Average gpm/ac available? _____

Current Irrigation delivery systems you're using:

Sprinkler irrigation:	Total Wet Acres
MESA – Drops above 18 inches	_____
LESA – Drops 12” – 18” above ground	_____
LEPA - Drops 12” – 18” with bubblers or drag hoses	_____
Furrow irrigation	_____
SDI (DRIP) irrigation	_____

Current Irrigation Management Practices:

Do you currently use them? If yes, what % of irrigated land is it practiced on?

ET or Weather Station	YES NO	_____ %
Variable Frequency Drives	YES NO	_____ %
Variable Rate Irrigation	YES NO	_____ %
Irrigation Scheduling	YES NO	_____ %
Soil Moisture Probes	YES NO	_____ %
Remote Pivot Tracking or monitoring	YES NO	_____ %
Satellite Imagery/Remote Sensing	YES NO	_____ %
Drones	YES NO	_____ %
Predictive Crop Models	YES NO	_____ %
Delayed Planting Dates	YES NO	_____ %
Flow Meters	YES NO	_____ %

Tillage Practices:

Conventional Tillage	YES NO	_____ %
Conservation Tillage	YES NO	_____ %
Strip Till	YES NO	_____ %
No Till	YES NO	_____ %

Other Practices:

Crop Residue Management/Soil Health	YES NO	_____ %
In-season Fertility Management	YES NO	_____ %

Master Irrigator Follow-up Survey

1. Have you implemented anything you learned in the Master Irrigator training into your operation? YES / NO
 - a. If YES, what have you implemented?
 - i. Has it decreased your water use? YES / NO How much? _____ ac-in/acre
 - ii. Has it improved your water use efficiency? YES / NO
If YES, what crop(s) and how much?
_____ (Crop) _____ bu. or lbs./ac-in
_____ (Crop) _____ bu. or lbs./ac-in
 - b. If NO, do you plan on implementing anything you learned in the future? YES / NO
 - i. If YES, what are you thinking about implementing?
 - ii. What factors have prevented you from implementing it?
2. If you have a VFD, what was the average annual bill **prior to** using the VFD? \$ _____
How much do you feel your bill was reduced **after** you started using the VFD? _____ %
Are there other benefits that your operation has experienced by utilizing a VFD?
3. On a scale of 1 to 10, with 1 being not important and 10 being very important, please rate the offer of NRCS EQIP cost-share funding in your decision to attend the Master Irrigator training?

1	2	3	4	5	6	7	8	9	10
NOT IMPORTANT					VERY IMPORTANT				
4. Do you think the NPGCD should continue to offer this training? YES / NO
5. What was the most important information you received from the training?
6. What changes would you suggest any to improve the Master Irrigator program?