Welcome to the Irrigation and Water Management Survey Workshop

2022 Census of Agriculture Follow-On Survey

Background

- Prior to 2018 was known as the Farm and Ranch Irrigation Survey (FRIS). Beginning in 2018, referred to as Irrigation and Water Management Survey.

- It is **required** by law

- This is the 10th Irrigation Survey
  - First conducted in 1979 as a follow-on to the 1978 Census of Agriculture

  - Collects comprehensive data for:
    - ✓ Irrigation
    - ✓ Commodity production
    - ✓ Quality of water applied
    - ✓ Method of application
    - ✓ Operator information

Background con't

- 2023 Irrigation Survey sample size
  - United States: 35,499
    - Arkansas: 1,581
    - Louisiana: 707
    - Mississippi: 830

- Key dates:
  - Pressure sealer postcard mailing: November 17, 2023
  - Initial mailing: January 3, 2024
  - Thank you/Reminder pressure sealer: January 29, 2024
  - Follow-up mailing: February 26, 2024
  - Additional follow-up field work: Beginning of April
  - Release date: November 14, 2024

How Was the Sample Selected?

- Sample is based on responses to the irrigation questions from the 2022 Census of Agriculture

SECTION 5 IRRIGATION

1. Were any acres irrigated on this operation or were there any irrigation systems or irrigation equipment available on this operation in 2022?

INCLUDE
- *Sprinklers, drip or trickle irrigation, etc.*
- *Ditches or furrows, controlled and uncontrolled flooding, etc.*

EXCLUDE
- *Water used exclusively for home use*
- *Water used exclusively for aquaculture*

1166 1 ☐ **Yes** - Continue 3 ☐ **No** - Go to SECTION 6

			Number of Acres
2.	How many acres of harvested cropland were irrigated?	0680 ☐	
3.	How many acres of all other land were irrigated? Include pasture and rangeland, CRP and failed cropland, and all other non-harvested cropland	0681 ☐	
4.	How many acres on this operation have irrigation systems or equipment? Include all acres irrigated in 2022 and acres that could have been irrigated in 2022 using the existing irrigation systems available on the operation, regardless of water rights.	1167 ☐	

5. Do you intend to use the irrigation systems or irrigation equipment on this operation in the future? 1168 1 ☐ Yes 3 ☐ No

Why is the Irrigation Survey Important?

- The Nation's water situation continues to increase in importance to U.S. policy makers
- National issues include:
  - Inadequate supply of surface water
  - **Overuse of ground water**
  - **Concerns about water quality**
  - Competition for available water supplies
- NASS able to publish more comprehensive information for irrigation
- Results will aid efforts to develop and promote efficient irrigation practices and long-term sustainability of water resources

Who Uses Irrigation Data?

- Farmers and ranchers
  - Cost and return data to help determine feasibility of investing in irrigation systems
    - Irrigation equipment
    - Facilities
    - Land improvements
    - Maintenance and repair expenditures
    - Estimating yields of irrigated versus non-irrigated crops

- Irrigation system manufacturers
  - Monitor trends in equipment use
  - Irrigation expansion
  - Other market production activities

Who Uses Irrigation Data? con't

- Economic Research Service (ERS)
  - Assist policymakers
  - Provide essential data to economic models used to analyze farm policies
- National Resource Conservation Service (NRCS)
  - Appraise the status and condition of water and water-use trends on non-federal lands
  - Plan and evaluate a national water-conservation program
- United States Geological Survey
  - Prepare national water estimates for EPA, Army Corps of Engineers, and other agencies for developing water-related programs
- Other Data Users
  - United States Congress and State legislative bodies
  - State water resource agencies
  - Land Grant Universities and other research organizations

How Are the Data Used?

- Compare water use by application method
- Develop improved technologies
- Develop federal programs
- Appraise water use trends
- Assess impact of congressional legislation
- Evaluate the impact of irrigated crops by state

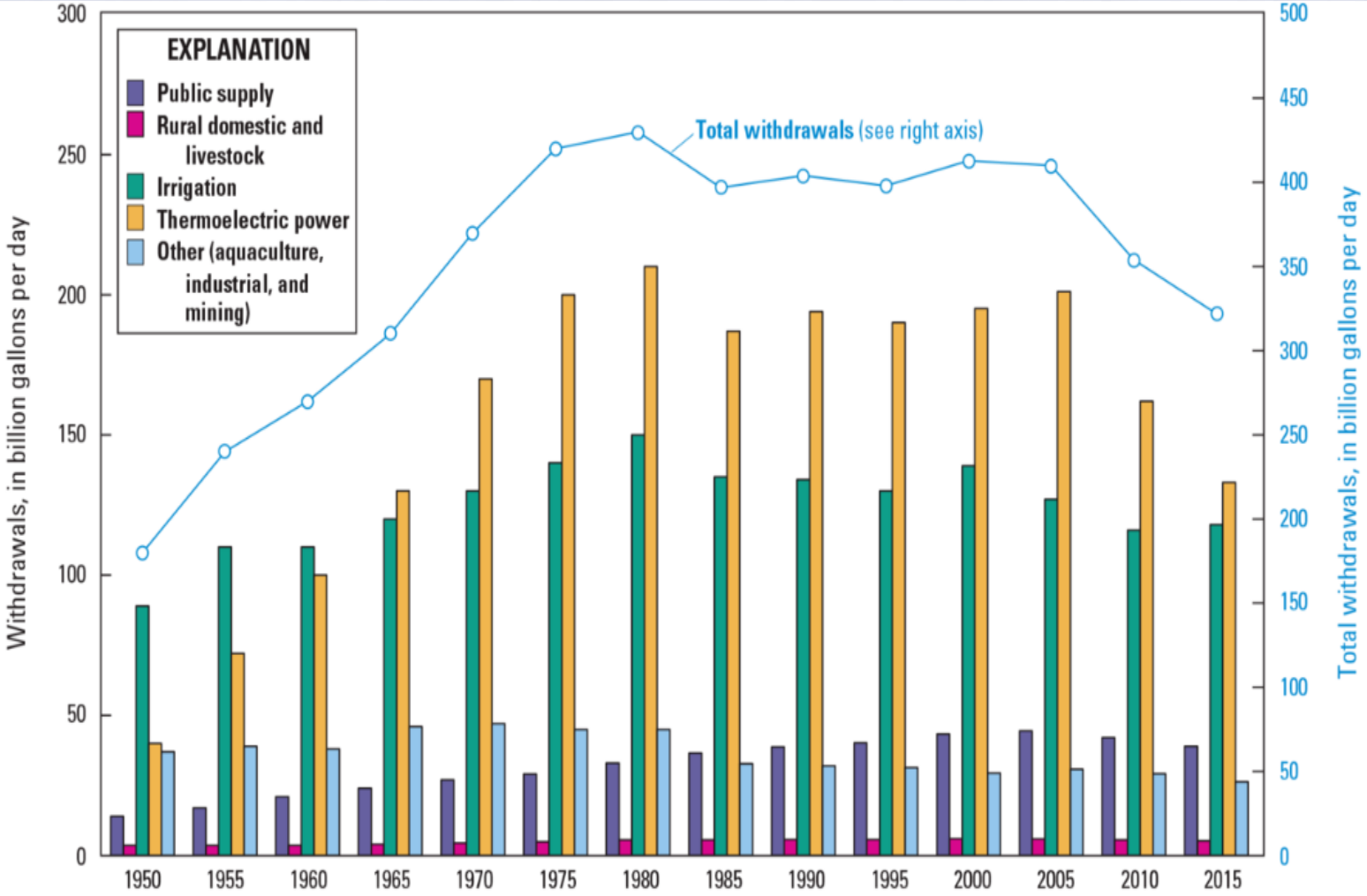
Total Water Withdrawals: 2015
(Million Gallons per Day)

State (Top 5 and other states)	Fresh Water Withdrawal	Percent of Total	State (Top 5 and other states)	Irrigation Water-use	Percent of Total
California (1)	25,600	9.1	California (1)	19,000	16.1
Texas (2)	18,900	6.7	Idaho (2)	15,300	13.0
Idaho (3)	17,700	6.3	Arkansas (3)	11,600	9.8
Arkansas (4)	13,800	4.9	Montana (4)	9,450	8.0
Illinois (5)	10,500	3.7	Colorado (5)	9,000	7.6
Louisiana (12)	8,480	3.0	Mississippi (16)	1,770	1.5
Mississippi (35)	2,670	1.0	Louisiana (18)	1,050	0.9
United States[1]	**281,000**		**United States**[1]	**118,000**	

[1] The United States total includes District of Columbia, Puerto Rico, and United States Virgin Islands.

Source: USGS: Estimated Use of Water in the United States in 2015
https://pubs.usgs.gov/circ/1441/circ1441.pdf

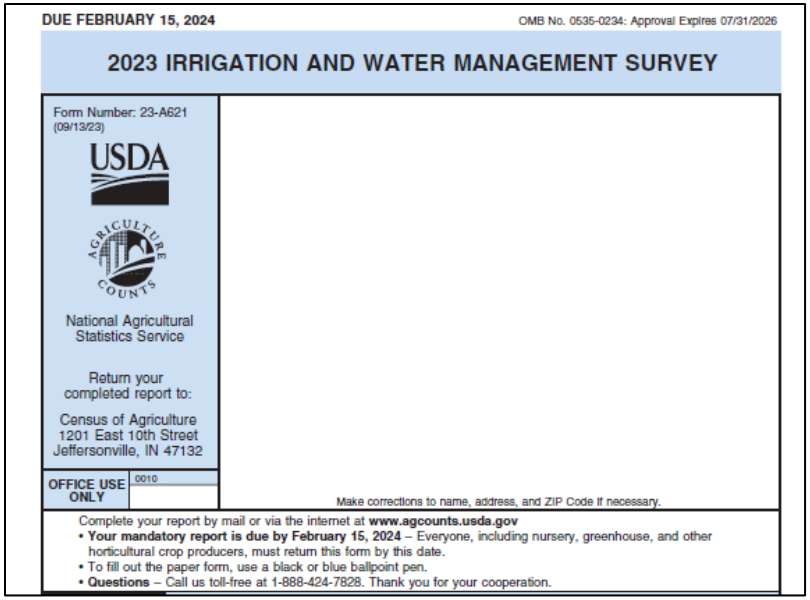
Trends In Total Water Withdrawals by Water-Use Category, 1950-2015



Source: USGS: Estimated Use of Water in the United States in 2015
https://pubs.usgs.gov/circ/1441/circ1441.pdf


Any
questions

QUESTIONNAIRE OVERVIEW AND SCENARIOS



DUE FEBRUARY 15, 2024

OMB No. 0535-0234: Approval Expires 07/31/2026

2023 IRRIGATION AND WATER MANAGEMENT SURVEY

Form Number: 23-A621
(09/13/23)

USDA

AGRICULTURE COUNTS

National Agricultural Statistics Service

Return your completed report to:

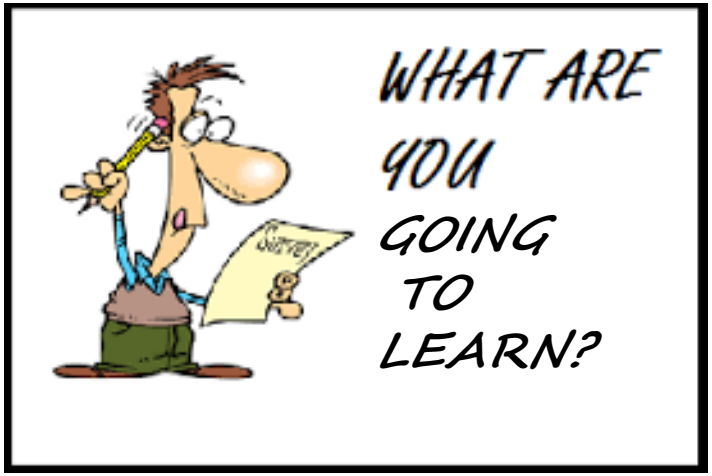
Census of Agriculture
1201 East 10th Street
Jeffersonville, IN 47132

OFFICE USE ONLY 0010

Make corrections to name, address, and ZIP Code if necessary.

Complete your report by mail or via the internet at **www.agcounts.usda.gov**

- **Your mandatory report is due by February 15, 2024** – Everyone, including nursery, greenhouse, and other horticultural crop producers, must return this form by this date.
- To fill out the paper form, use a black or blue ballpoint pen.
- **Questions** – Call us toll-free at 1-888-424-7828. Thank you for your cooperation.



Sections 3-5 Overview
Water Sources

In **Section 3**, report if the target operation irrigated any land using **ground water from wells** at any time during 2023.

- **Item 1**, Only report if well(s) are located on target operation
  - If no wells used to supply ground water for irrigation, check "*No*" & go to **(Section 4)** OR off-farm water source, go to **(Section 5)**
- **Item 2**, report the units of measure in (1)Total Acre-Feet, (2)Total Gallons, OR (3)Inches/Acre for acres in the open ONLY
  - Quantity of water to cover 1 acre to depth of 1 foot: (43,500 cubic feet OR 326,000 gallons)
  - *In 2018, the national avg. of water applied was 1.5 acre-feet per acre. Range expected for avg. acre-feet per acre is < 1 acre ft. to 6 acre ft.*
- **Item 4**, report number of wells used for acres in open OR under protection
  - **(4a)*** Backflow Prevention Devices (check valves)
  - **(4b)*** Flow Meters OR Other Flow Measurement Devices
  - **(4c)*** Free Flowing Well…do not require pumping the water to the surface; water flows naturally
- **Item 5**, report up to 3 primary wells pumped on operation (wells with the greatest quantity of water pumped in 2023)
  - Include the characteristics for each individual well, even if values are similar
  - **(5a)*** If operator used more than 3 wells in 2023, report the avg. for all other wells

Sections 3-5 Overview
Water Sources

In **Section 4**, report if the target operation irrigated any land using **on-farm surface water** at any time during 2023.

- **Item 1**, Only report if source is on-farm surface water which includes recycled water and on-farm reclaimed water
  - Also includes water from a stream, drainage ditch, lake, pond, spring, or reservoir on or adjacent to operator's farm
  - If no on-farm surface water used for irrigation, check "No" & go to **(Section 5)**

- **Item 4**, check "Yes" ONLY if operation used on-farm recycled water to irrigate any crops grown during 2023
  - **(4a)*** Report irrigated number of crop acres in the open OR under protection area only once
  - If no on-farm recycled water used, check "No" & go to **(Item 5)**

- **Item 5**, check "Yes" ONLY if operation used reclaimed water from on-farm livestock facilities to irrigate any crops grown during 2023
  - **(5a)*** Report irrigated number of crop acres in open OR under protection area only once
  - **(5b)*** Report amount of reclaimed water used for irrigation by Acre-Feet OR Gallons

Sections 3-5 Overview
Water Sources

In **Section 5**, report if the target operation irrigated any land using **off-farm water** at any time during 2023.

- **Item 1**, Only report if source is off-farm water from all suppliers which could be ground or surface water
  - Suppliers like U.S. Bureau of Reclamation, other Federal agencies, municipal water suppliers, rural water suppliers, irrigation districts, or other sources
  - Also include off-farm recycled and reclaimed water
  - If no off-farm water used for irrigation, check "No" & go to **(Section 6)**
- **Item 4**, *if purchased*, report total dollars paid (to the nearest whole dollars)
- **Item 5**, *if any*, check "None", "Some", OR "All" for amount of operation's off-farm water supplied, delivered, or transferred through **(5a)***, **(5b)***, or **(5c)***
- **Item 6**, check "Yes" ONLY if operation used reclaimed water from off-farm sources to irrigate any crops grown during 2023
  - **(6a)*** Report irrigated number of crop acres in open OR under protection area only once
  - **(6b)*** Report amount of reclaimed water used for irrigation by Acre-Feet OR Gallons
  - **(6c)*** Report what sources or reclaimed water were used

Section 3 Item 1 - Scenario

(Pages 42-44 of electronic Interviewer's Manual & Page 3 of Questionnaire)

- Operator A has 2 water sources. There is 1 well on the operation, but it is not used for irrigation. The other water source, which was used for irrigation, was from off the operation and the operator said the water originated from 3 separate wells.

  - Will there be any wells reported in Section 3?
  - If yes, how many wells will be reported on for the rest of the section?

Section 3 Item 1 - Scenario

(Pages 42-44 of electronic Interviewer's Manual & Page 3 of Questionnaire)

- Answer
  - No, there will not be any wells listed in Section 3 since the only well on the operation isn't used for irrigation. The other wells will be listed in Section 5.

Section 3 Item 5 - Scenario

(Page 44 of electronic Interviewer's Manual & Page 3 of Questionnaire)

- Operator B has 5 wells that they pumped ground water from in 2023. They do not know the operating pressure at the well head (PSI) for 2 of the wells with the greatest quantity of water pumped.

  - How many wells should get reported on the questionnaire?
  - What do you do with the extra wells that you can't list individually?
  - What do you report for the PSI (item coded 676) for the 2 wells with unknown PSI?

Section 3 Item 5 - Scenario

(Page 44 of electronic Interviewer's Manual & Page 3 of Questionnaire)

- Answer
  - All 5 wells should be listed, but only 3 can be listed individually. The 3 wells listed first should be the 3 that are primary.
  - The other wells should be listed in 5a and you should report the average of all the well characteristics.
  - For the wells with an unknown PSI, you should report the pressure as 20 PSI.

Section 4 - Scenario

(Pages 44-46 of electronic Interviewer's Manual & Page 4 of Questionnaire)

- Operator C tells you they use water from livestock waste that gets treated for non-potable reuse, but it was only about a quarter of an inch in water. They also tell you that they have a tailwater pond that catches excess runoff irrigation water that they can reuse for later irrigation.

  - What are the names of these 2 types of water uses?
  - Do we want to report this operations livestock wastewater that was treated and reused?

Section 4 - Scenario

(Pages 44-46 of electronic Interviewer's Manual & Page 4 of Questionnaire)

- Answer
  - Reclaimed: Livestock wastewater that was treated
  - Recycled: excess runoff irrigation water that is caught and reused.

  - No, we do not want to report reclaimed water since we must have at least half an inch to be considered an irrigation application.

Sections 6-9 Overview
Irrigation Pumps & Methods

In **Section 6**, report if target operation irrigated any land using **pumps** at any time during 2023.

- **Items 2a-2d**, Only report if pumps were used for water from:
  - Well pumps
  - Tailwater pits
  - Ponds, lakes, reservoirs, rivers, canals, etc.
  - Relifting or boosting water within system
- For the categories above, list:
  - Number of pumps used **(column 1)**
  - Avg. vertical lift **(column 2)**
  - Avg. discharge capacity **(column 3)** (GPM)
  - Avg. discharge operating pressure **(column 4)** (PSI)
- **Item 3**, *if any* power source: Electricity, natural gas, LP gas/propane/butane, Diesel/Biodiesel, gasoline, or solar/other pumps without direct energy expense
- For each of the 6 categories above, list:
  - Number of wells and other pumps used **(column 1)** **(reported in item 2)**
  - Cost of energy used to power pumps **(column 2)**
  - Area irrigated with water pumped from wells **(column 3)** (both in open & under protection)
  - Area irrigated from pumped surface water **(column 4)** (both in open & under protection)

Sections 6-9 Overview
Irrigation Pumps & Methods

In **Section 7**, report **energy expenses** for all well and other irrigation pumps used any time during 2023.

- **Expenditure Table,** Only report if any *expenditures* occurred in 2023
  - Report Total cost **(column 1)** (including amount financed)
  - Acres affected **(column 2)** (to the nearest whole acre)
  - Primary purpose **(column 3)**
  - Primary source of funding **(column 4)** (for purpose & source, enter codes above)
- Include any portion of expenditures made by or shared with others (landlords or government agencies)
  - Such as the Environmental Quality Incentive Program (EQIP)
- **Items 1-6**, report *expenditure* type:
  - Purchase of new or replacement irrigation equipment
  - New well construction or deepening of existing wells
  - Construction or improvement of storage and distribution systems
  - Computers and computer-controlled equipment for irrigation management
  - Clearing or leveling non-irrigated land for irrigation
  - Land leveling of previously irrigated land

Sections 6-9 Overview
Irrigation Pumps & Methods

In **Section 8**, report what **method of water distribution** the target operation used to irrigate any fields in the open.

- **Item 1,** Only report information for the field distribution system, NOT for the delivery system used to convey water from the source to the field

- **Item 2**, if *Gravity Irrigation* – Down rows, Controlled flooding, Uncontrolled flooding, Other gravity systems:
  - Report Total Acres irrigated **(column 1)**
  - Report if operator used an Unlined open ditch, Lined open ditch, Poly Pipe, Above ground Pipe, AND/OR an Underground Pipe **(columns 2-6)**

- **Item 3**, if *Sprinkler Irrigation* – Center pivot, Linear move tower, Solid set, Mechanical move, Hand-move, Other sprinkler systems:
  - For **(3a)*, (3b)*, (3c)*** – Report Total Acres irrigated & whether system is Very Low, Low, Medium, OR High Pressure
  - For **(3d)*, (3e)*, (3f)*** – Report Total Acres irrigated for all pressures

- **Item 4**, if *Drip, Trickle, or Low-flow Micro Irrigation* – Surface drip, Sub-surface drip, Low-flow micro sprinklers or sprays, Other drip, trickle, or low-flow micro systems:
  - For **(4a)*, (4b)*, (4c)*, (4d)*** – Report Total Acres irrigated for all pressures

In **Section 9**, additional practices for irrigation methods in the open. (Only answer if Section 8, item 2 is positive)

Section 6 - Scenario

(Pages 48-49 of electronic Interviewer's Manual & Page 6 of Questionnaire)

- Operator E uses:
  - 1 well pumping ground water from a well on the operation
  - 2 pumps to pump water from ponds
  - 2 pumps to pump water from a lake to water his 830 acre soybean field
  - 1 pump to pump excess water captured in ditches at the end of the soybean field to water his 40 acre corn field

➢ If any, what number of pumps used would you report for items 2a-2d of section 6?

Section 6 - Scenario

(Pages 48-49 of electronic Interviewer's Manual & Page 6 of Questionnaire)

- Answer
  - A total of 6 pumps would be reported. Items 2a and 2b would have 1 pump listed, and Item 2c would have 4 pumps listed.

    Note: if it had a booster pump on the well pump, the booster pump would be listed.

SECTION 6 PUMPS USED FOR IRRIGATION AND PUMP EXPENSES

1. Were any pumps used on this operation for irrigation during 2023?

   INCLUDE
   - all pumps supplying irrigation to or through any distribution system (e.g., gravity, sprinkler, drip)
   - all pumps moving water into tanks or reservoirs on the operation for irrigation in 2023

   EXCLUDE
   - any pumps used exclusively for non-irrigation applications such as home use or aquaculture
   - any pumps not owned or rented by this operation, such as pumps operated by a water company

   0488 1 [X] **Yes** - Continue 3 [ ] **No** - Go to Section 7

2. Report pumps by use. If the same pump has multiple uses, report that pump only once in items a through d.

	None	Number of Pumps Used	Vertical Lift (Average Feet)	Discharge Capacity (Average GPM)	Discharge Operating Pressure (Average PSI)
		1135			
a. Well pumps	[ ]	1			
		0490	0774	0491	0687
b. Tailwater pits (pits that hold water previously used for irrigation)	[ ]	1			20
		0492	0775	0493	0688
c. Ponds, lakes, reservoirs, rivers, canals, etc.	[ ]	4			20
		0494	0776	0777	0778
d. Relifting or boosting water within system (pumps providing additional lift, pressure, or lateral movement)	[ ]				

Enumerator Note Add comment stating, "operator does not know vertical lift, discharge capacity, or discharge operation pressure."

Section 6 - Scenario

(Pages 48-49 of electronic Interviewer's Manual & Page 6 of Questionnaire)

- Operator F reports expenses for irrigation on 500 acres of land. However, in section 2 item 4 (Box D, total acres irrigated) the operator reported that they had 1,000 acres of irrigated land.

  - Is this possible, or do these acres have to match?

Section 6 - Scenario

(Pages 48-49 of electronic Interviewer's Manual & Page 6 of Questionnaire)

- Answer
  - Yes, it is possible, they don't necessarily have to match. In this case, 500 acres could have been irrigated using no pumps. If the situation were reversed, part of the irrigated acres could have been water supplied by multiple pumps using different power sources. Verify information and write a comment if they do not match.

Section 8 - Scenario

(Pages 49-52 of electronic Interviewer's Manual & Page 8 of Questionnaire)

- Operator G has 2,500 acres of cropland that is irrigated in the open. Operator irrigates 500 acres by controlled flooding using poly pipe tubing and irrigates 2,000 acres using controlled flooding through an unlined open ditch.

  - What method of water distribution is the operation using in fields in the open? (Gravity vs. Sprinkler vs. Drip/Trickle/or Low-flow Irrigation)
  - How many methods were used and how many acres should be recorded for each method?

Section 8 - Scenario

(Pages 49-52 of electronic Interviewer's Manual & Page 8 of Questionnaire)

- Answer
  - Method of water distribution = Gravity, so it will be listed on Item 2.
  - 2,500 should be listed in item 2b in the total column with 2,000 listed under unlined open ditch and 500 under poly pipe.

SECTION 8 METHODS OF WATER DISTRIBUTION IN THE OPEN

1. Did this operation irrigate any land in the open in 2023?
   - Include acres of horticultural crops grown in the open or under natural shade.
   - Exclude crops grown under protection: glass, rigid plastic, plastic film, including "tunnel" protection. (Methods for crops grown under protection will be reported in Section 13.)

0489 1 [X] **Yes** - Continue 3 [ ] **No** - Go to Section 13

Report acres irrigated by each type of FIELD distribution system listed below. If the same land was irrigated by more than one method of distribution, report acres irrigated by each method used. Report information for the field distribution system, NOT for the delivery system used to convey water from the source to the field, if different.

2. Gravity irrigation	None	Acres in the Open Irrigated by Gravity System (Field Water Conveyance System)					
		Total Acres	Unlined Open Ditch	Lined Open Ditch	Poly Pipe (or other single-year use, lay-flat tubing)	Above Ground Pipe (except poly pipe)[1]	Underground Pipe[2]
		0855	0859	0857	0056	0057	0858
a. Down rows or furrows	[ ]						
		0865	0869	0867	0066	0067	0868
b. Controlled flooding (within borders, levees, or basins) . .	[ ]	2500	2000		500		
		0875					
c. Uncontrolled flooding (rangeland, pastureland, etc.)	[ ]						
		0885					
d. Other gravity systems, including water seepage	[ ]						

[1] Include gated pipe and riser or hydrant systems connected to above ground pipe.
[2] Include riser or hydrant systems connected to underground pipe.

Sections 10-13 Overview
Irrigated Crops

In **Section 10**, report **irrigated crop acres harvested** AND **pastureland**.

- **Item 1,** check "Yes" ONLY if operation harvested any irrigated crops or pastureland grown in the open
  - Include: Horticultural crops grown in the open in **(Item 18)**
  - Exclude: Horticultural crops grown under protection **(Section 13)**

- **Items 2-20**, if any crops or pastureland harvested, report by crop type:
  - Irrigated acres harvested (>= acres reported in **(Section 2, Item 4 Box D)**)
  - Avg. yield per irrigated acre
  - Avg. quantity of water applied (acre-ft. OR inches)

Sections 10-13 Overview
Irrigated Crops

In **Section 11**, report **water distribution** AND **water source**.

- **Items 1**, check "Yes" ONLY if operation used a Gravity/Pressure System for irrigation **(Section 8)**
  - Needs to be consistent with crop specific responses in **(Section 10)**
  - Horticultural crops include/exclude…same as **(Section 10)**

- **Items 2-20**, report each crop type by:
  - Method of water distribution (refer to table above for distribution codes)
  - Water source *may exceed **(Section 10)** acres if multiple water sources used, (ground water from well, on-farm surface water, or off-farm water)
  - Acres of chemigation (commercial fertilizer OR pesticide application)

Sections 10-13 Overview Irrigated Crops

In **Section 12**, report **Total** AND **irrigated nursery / other horticulture crop acres in the open** on target operation in 2023.

- **Item 1**, check "Yes" ONLY if operation has nursery AND other horticultural crops grown in the open
  - Needs to be consistent with crop specific responses in **(Sections 10 AND 11, Item 18)**
- **Items 2-3**, report Total AND irrigated acreage by crop category to the nearest tenths:
  - **(a)*** Floriculture & bedding, **(b)*** Nursery crops, **(c)*** Sod, **(d)*** Propagative materials, **(e)*** Christmas trees and short rotation woody crops, **(f)*** Other (specify)
- **Item 4**, report Total area irrigated or watered by method: **(a)*** *Hand Watered*, **(b)*** *Gravity*, **(c)*** *Sprinkler*, **(d)*** *Drip/Trickle/Low-Flow*, OR **(e)*** *Hydroponics*
  - For each method type, report quantity of water applied OR average flow rate, # of hours per week, AND # of weeks used in 2018
- **Item 5**, report water source by percentage for each irrigation method mentioned above:
  - Ground water **(column 1)**
  - On-farm surface water **(column 2)**
  - Off-farm water sources **(column 3)**
  - **(Sum of sources must total 100%)**

Sections 10-13 Overview
Irrigated Crops

In **Section 13**, report **Total** AND **irrigated nursery / other horticulture crop acres under protection** on target operation in 2023.

- **Item 1**, check "Yes" ONLY if operation has nursery AND other horticultural crops grown under protection
  - **Same questions as (Section 12)**, BUT now asking about nursery AND horticultural crops grown "under protection" RATHER THAN "in the open"
    - Include: Mushroom crops AND Food crops grown under protection (Tomatoes, other vegetables, fresh cut herbs, fruits, and berries)
    - Exclude: Sod AND Christmas trees / short rotation woody crops

Section 10 Example 1 - Scenario

(Page 53 of electronic Interviewer's Manual & Pages 10-11 of Questionnaire)

- Operator H is a Delta crop farmer that has:
  - 470 acres of irrigated pastureland
  - 800 acres of soybeans that are irrigated and harvested
    - 52 bu./acre, 1.5 acre-feet of water
  - 700 acres of rice that are irrigated and harvested
    - 78.5 cwt/acre, 3.0 acre-feet of water
  - 30 acres of peanuts that are irrigated and harvested
    - 3,500 lbs./acre, 0.7 acre-feet of water
  - Total acres of crops harvested and irrigated in the open
    - 1,530 cropland acres + 470 pastureland acres= 2,000 total acres

➢ Knowing the information given by Operator H, how would you record this in Section 10?

Section 10 Example 1 - Scenario

(Page 53 of electronic Interviewer's Manual & Pages 10-11 of Questionnaire)

- Answer

SECTION 10 ACRES IRRIGATED IN THE OPEN

1. Did this operation irrigate any land in the open in 2023?
   • Include irrigated harvested cropland, pastureland, summer fallow, and failed cropland.

1134 1 [N] **Yes** - Continue 3 [ ] **No** - Go to Section 13

For each item listed, report the irrigated harvested acres or acres irrigated for non-harvested items in the first column. For selected crops, report the average yield from the irrigated harvested acres in the second column. Then report the average irrigation water applied per acre for the entire year in either acre-feet or inches/acre for the acres reported in column one. Report the crop as irrigated if water was applied to supplement rainfall, even if the amount of water applied was not sufficient to obtain maximum yields. **Report nursery and other horticultural crops grown in the open in item 18.**

Irrigated Crops, Pastureland, and Other Land	None	Irrigated Land (Include preplant and supplemental or semi-irrigation)						
		Irrigated Acres Harvested	Average Yield per Irrigated Acre Harvested		Average Estimated Quantity of Water Applied per Acre in 2023			
					Acre-Feet	Tenths	OR	Inches/Acre
2. Corn for grain or seed – Exclude popcorn and sweet corn	☐	0050	0051 Bu.		0052		OR	0053
3. Corn for silage or greenchop – Exclude popcorn and sweet corn	☐	0060	0061 Tenths Tons		0062		OR	0063
4. Sorghum for grain or seed	☐	0070	0071 Bu.		0072		OR	0073
5. Wheat for grain or seed	☐	0080	0081 Bu.		0082		OR	0083
6. Soybeans for beans	☐	0106 800	0101 52 Bu.		0102 1	5	OR	0103
7. Beans, dry edible	☐	0110	0111 Cwt.		0112		OR	0113
8. Rice – Include post harvest water applied to improve residue decomposition	☐	0120 700	0121 79 Cwt.		0122 3	0	OR	0123
9. Other small grains (barley, oats, rye, etc.)	☐	0130			0132		OR	0133
10. Alfalfa and alfalfa mixtures (dry hay, greenchop, and silage)	☐	0140	0141 Tenths Tons, dry		0142		OR	0143

SECTION 10 CONTINUED –

Irrigated Crops, Pastureland, and Other Land	None	Irrigated Land (Include preplant and supplemental or semi-irrigation)						
		Irrigated Acres Harvested	Average Yield per Irrigated Acre Harvested		Average Estimated Quantity of Water Applied per Acre in 2023			
					Acre-Feet	Tenths	OR	Inches/Acre
11. All other hay and haylage including small grain, other tame, and wild hay (dry hay, greenchop, and silage)	☐	0150	0151 Tenths Tons, dry		0152		OR	0153
12. Peanuts	☐	0550 30	0551 3500 Lbs.		0552	7	OR	0553
13. Cotton	☐	0160	0161 Lbs. lint		0162		OR	0163
14. All land from which vegetables, potatoes, and melons were harvested	☐	0186 Tenths			0187		OR	0188
a. Sweet corn	☐	0850 Tenths	0851 Cwt.		0852		OR	0853
b. Tomatoes in the open	☐	0860 Tenths	0861 Cwt.		0862		OR	0863
c. Lettuce and romaine	☐	0870 Tenths	0871 Cwt.		0872		OR	0873
d. Potatoes – Exclude sweet potatoes	☐	0190 Tenths	0191 Cwt.		0192		OR	0193
15. All other crops grown in the open and not listed - Specify: 0620	☐	0621			0622		OR	0623
		Irrigated Acres						
16. All berries	☐	0560 Tenths			0562		OR	0563
17. Land in bearing and non-bearing fruit orchards, citrus or other groves, vineyards, and nut trees	☐	0210 Tenths			0212		OR	0213
18. Nursery and other horticultural crops grown in the open (Note: Nursery, greenhouse, and other horticultural crops grown under protection will be reported in a later section.)	☐	0690 Tenths			0691		OR	0692
19. Irrigated pastureland, all types	☐	0230 470			0232		OR	0233
20. All other irrigated land types such as failed cropland, idle land, and land in summer fallow	☐	1144			1145		OR	1146

Operator does not know how much water was applied

Section 10 Example 2 - Scenario

(Page 53 of electronic Interviewer's Manual & Pages 10-11 of Questionnaire)

- Operator I is a Delta specialty crop farmer that irrigated and harvested:
  - 15 acres of watermelons
    - yield unknown 1.2 inches of water
  - 50 acres of sweet potatoes
    - yield and water unknown
  - 10 acres of pecans
    - yield and water unknown
  - 300 acres of sod
    - no yield, 1.2 acre-feet of water
  - Total acres of crops harvested and irrigated in the open equals 375 acres

➢ Knowing the information given by Operator I, how would you record this in Section 10?

Section 10 Example 2 - Scenario

(Page 53 of electronic Interviewer's Manual & Pages 10-11 of Questionnaire)

- Answer

SECTION 10 ACRES IRRIGATED IN THE OPEN

1. Did this operation irrigate any land in the open in 2023?
   • Include irrigated harvested cropland, pastureland, summer fallow, and failed cropland.

1134 1 [X] **Yes** - Continue 3 [ ] **No** - Go to Section 13

For each item listed, report the irrigated harvested acres or acres irrigated for non-harvested items in the first column. For selected crops, report the average yield from the irrigated harvested acres in the second column. Then report the average irrigation water applied per acre for the entire year in either acre-feet or inches/acre for the acres reported in column one. Report the crop as irrigated if water was applied to supplement rainfall, even if the amount of water applied was not sufficient to obtain maximum yields. **Report nursery and other horticultural crops grown in the open in item 18.**

Irrigated Crops, Pastureland, and Other Land	None	Irrigated Land: Irrigated Acres Harvested	Average Yield per Irrigated Acre Harvested	Average Estimated Quantity of Water Applied per Acre in 2023: Acre-Feet / Tenths	OR	Inches/Acre
2. Corn for grain or seed – Exclude popcorn and sweet corn	[ ]	0050	0051 Bu.	0052	OR	0053
3. Corn for silage or greenchop – Exclude popcorn and sweet corn	[ ]	0060	0061 Tenths Tons	0062	OR	0063
4. Sorghum for grain or seed	[ ]	0070	0071 Bu.	0072	OR	0073
5. Wheat for grain or seed	[ ]	0080	0081 Bu.	0082	OR	0083
6. Soybeans for beans	[ ]	0106	0101 Bu.	0102	OR	0103
7. Beans, dry edible	[ ]	0110	0111 Cwt.	0112	OR	0113
8. Rice – Include post harvest water applied to improve residue decomposition	[ ]	0120	0121 Cwt.	0122	OR	0123
9. Other small grains (barley, oats, rye, etc.)	[ ]	0130		0132	OR	0133
10. Alfalfa and alfalfa mixtures (dry hay, greenchop, and silage)	[ ]	0140	0141 Tenths Tons, dry	0142	OR	0143

SECTION 10 CONTINUED –

Irrigated Crops, Pastureland, and Other Land	None	Irrigated Land: Irrigated Acres Harvested	Average Yield per Irrigated Acre Harvested	Average Estimated Quantity of Water Applied per Acre in 2023: Acre-Feet / Tenths	OR	Inches/Acre
11. All other hay and haylage including small grain, other tame, and wild hay (dry hay, greenchop, and silage)	[ ]	0150	0151 Tenths Tons, dry	0152	OR	0153
12. Peanuts	[ ]	0550	0551 Lbs.	0552	OR	0553
13. Cotton	[ ]	0160	0161 Lbs. lint	0162	OR	0163
14. All land from which vegetables, potatoes, and melons were harvested	[ ]	0186 Tenths: 65 0		0187	OR	0188
a. Sweet corn	[ ]	0850 Tenths	0851 Cwt.	0852	OR	0853
b. Tomatoes in the open	[ ]	0860 Tenths	0861 Cwt.	0862	OR	0863
c. Lettuce and romaine	[ ]	0870 Tenths	0871 Cwt.	0872	OR	0873
d. Potatoes – Exclude sweet potatoes	[ ]	0190 Tenths	0191 Cwt.	0192	OR	0193
15. All other crops grown in the open and not listed - Specify: 0620 Sod	[ ]	0621: 300		0622: 1 2	OR	0623
		Irrigated Acres				
16. All berries	[ ]	0560 Tenths		0562	OR	0563
17. Land in bearing and non-bearing fruit orchards, citrus or other groves, vineyards, and nut trees	[ ]	0210 Tenths: 10 0		0212	OR	0213
18. Nursery and other horticultural crops grown in the open (Note: Nursery, greenhouse, and other horticultural crops grown under protection will be reported in a later section.)	[ ]	0690 Tenths		0691	OR	0692
19. Irrigated pastureland, all types	[ ]	0230		0232	OR	0233
20. All other irrigated land types such as failed cropland, idle land, and land in summer fallow	[ ]	1144		1145	OR	1146

Enumerator Note: Item 14 – includes 15 acres watermelons, 1.2 inches of water; and 50 acres sweet potatoes, yield & water unknown. Item 17 – pecans, operator does not know amount of water applied

Section 11 - Scenario

(Page 54 of electronic Interviewer's Manual & Pages 12-13 of Questionnaire)

- Using the information given by Operator H in Section 10, the operator reported irrigating:
  - All 800 soybean acres
    - 30 PSI Center Pivot System with source being ground water from wells
    - Fertilizer and pesticides applied through the irrigation system
  - 250 of the 800 soybean acres
    - On-farm surface water from a nearby pond
  - All rice and pastureland
    - Controlled flooding with source being ground water from wells only using poly pipe
  - All peanut acres
    - Down rows from lay-flat tubing with source being ground water from wells only

➢ Knowing the information given by Operator H, how would you record this in Section 11?

Section 11 - Scenario

(Page 54 of electronic in Interviewer's Manual & Pages 12-13 of Questionnaire)

- Answer

SECTION 11 WATER DISTRIBUTION METHODS AND SOURCES USED IN THE OPEN

1. Did this operation irrigate any land in the open in 2023?
   • Include irrigated harvested cropland, pastureland, summer fallow, and failed cropland.

1143 1 [X] Yes – Continue 3 [ ] No – Go to Section 13

WATER DISTRIBUTION CODES – USE IN THE TABLE BELOW

CODE	PRESSURE SYSTEM
01	Hand-move system
02	Solid set or permanent system
03	Side roll or wheel line system
04	Big gun or traveling gun system
05	Linear move system (under 15 PSI)
06	Linear move system (15 to 29 PSI)
07	Linear move system (30 to 59 PSI)
08	Linear move system (60 PSI or more)
09	Center pivot system (under 15 PSI)
10	Center pivot system (15 to 29 PSI)
11	Center pivot system (30 to 59 PSI)
12	Center pivot system (60 PSI or more)
13	Low-flow irrigation (drip, trickle, or micro sprinkler system)
14	Other pressure system including hydroponics – Specify:

1006 [ ]

CODE	GRAVITY SYSTEM
15	Down rows or furrows from unlined open ditches
16	Down rows or furrows from lined open ditches
17	Down rows or furrows from poly pipe, lay-flat tubing, or above ground or underground pipe
18	Controlled flooding within borders, levees, or basins from unlined open ditches
19	Controlled flooding within borders, levees, or basins from lined open ditches
20	Controlled flooding within borders, levees, or basins from poly pipe, lay-flat tubing, or above ground pipe
21	Controlled flooding within borders, levees, or basins from underground pipe
22	Uncontrolled flooding (rangeland, pastureland, etc.) including open discharge from a well or pump
23	Other gravity system – Specify:

1007 [ ]

Report for irrigated acres in the open. For each irrigated crop in the open, report the primary field distribution method, acres irrigated by water source, and acres on which chemigation was used in the irrigation system. Refer to the table above for the water distribution codes.

Irrigated Crops, Pastureland, and Other Land	Enter Code from Above for Primary Method of Field Water Distribution	Water Source (Column totals may exceed Irrigated crop acres reported in Section 10 when more than one water source was used.) Ground Water from Wells (Acres)	On-Farm Surface Water[1] (Acres)	Off-Farm Water (All Suppliers)[2] (Acres)	Acres on which chemigation was applied through the irrigation system: Commercial Fertilizer (Acres)	Pesticide Application (Acres)
2. Corn for grain or seed – Exclude popcorn and sweet corn ☐ None	0250	0255	0254	0256	0252	0253
	0260	0265	0264	0266	0262	0263
3. Corn for silage or greenchop – Exclude popcorn and sweet corn ☐	0270	0275	0274	0276	0272	0273
4. Sorghum for grain or seed ☐	0280	0285	0284	0286	0282	0283
5. Wheat for grain or seed ☐	0300	0305	0304	0306	0302	0303
6. Soybeans for beans ☐	0310	0315	0314	0316	0312	0313
	11	800	250		800	800
7. Beans, dry edible ☐	0320	0325	0324	0326	0322	0323
8. Rice ☐	0330	0335	0334	0336	0332	0333
	20	700				
9. Other small grains (barley, oats, rye, etc.) ☐	0340	0345	0344	0346	0342	0343
10. Alfalfa and alfalfa mixtures (dry hay, greenchop, and silage) ☐						

[1] On-farm water source includes recycled water and reclaimed water from on-farm livestock operations.
[2] Off-farm water supplies may include water purchased from the U.S. Bureau of Reclamation; a state, county, or local district; mutual, private, cooperative, or neighborhood ditches; or commercial or municipal water systems.

SECTION 11 CONTINUED –

Irrigated Crops, Pastureland, and Other Land	Enter Code from Previous Page for Primary Method of Field Water Distribution	Water Source (Column totals may exceed Irrigated crop acres reported in Section 10 when more than one water source was used.) Ground Water from Wells (Acres)	On-Farm Surface Water[1] (Acres)	Off-Farm Water (All Suppliers)[2] (Acres)	Acres on which chemigation was applied through the irrigation system: Commercial Fertilizer (Acres)	Pesticide Application (Acres)
11. All other hay including small grain, other tame, and wild hay (dry hay, greenchop, and silage) ☐ None	0350	0355	0354	0356	0352	0353
	0580	0585	0584	0586	0582	0583
12. Peanuts ☐	17	30				
	0360	0365	0364	0366	0362	0363
13. Cotton ☐	0474	0479 Tenths	0478 Tenths	0480 Tenths	0476 Tenths	0477 Tenths
14. All acres in the open from which vegetables, potatoes, and melons were harvested ☐	0900	0905 Tenths	0904 Tenths	0906 Tenths	0902 Tenths	0903 Tenths
a. Sweet corn ☐	0910	0915 Tenths	0914 Tenths	0916 Tenths	0912 Tenths	0913 Tenths
b. Tomatoes in the open ☐	0920	0925 Tenths	0924 Tenths	0926 Tenths	0922 Tenths	0923 Tenths
c. Lettuce and romaine ☐	0390	0395 Tenths	0394 Tenths	0396 Tenths	0392 Tenths	0393 Tenths
d. Potatoes – Exclude sweet potatoes ☐	1120	1125	1124	1126	1122	1123
15. All other crops grown in the open and not listed – Specify: 1119 [ ] ☐	0590	0595 Tenths	0594 Tenths	0596 Tenths	0592 Tenths	0593 Tenths
16. All berries ☐	0410	0415 Tenths	0414 Tenths	0416 Tenths	0412 Tenths	0413 Tenths
17. Land in bearing and non-bearing fruit orchards, citrus or other groves, vineyards, and nut trees ☐	1110	1115 Tenths	1114 Tenths	1116 Tenths	1112 Tenths	1113 Tenths
18. Nursery and other horticultural crops grown in the open (Note: Nursery, greenhouse, and other horticultural crops grown under protection will be reported in a later section.) ☐	0430	0435	0434	0436	0432	0433
19. Irrigated pastureland, all types ☐	20	470				
20. All other irrigated land types such as failed cropland, idle land, and land in summer fallow ☐	1148	1149	1150	1151	1152	1153

[1] On-farm water source includes recycled water and reclaimed water from on-farm livestock operations.
[2] Off-farm water supplies may include water purchased from the U.S. Bureau of Reclamation; a state, county, or local district; mutual, private, cooperative, or neighborhood ditches; or commercial or municipal water systems.

Sections 16-17 Overview Operation Details

Complete **Section 16** ONLY if **NO irrigated land** in 2023.

- **Item 1**, if "Yes" land irrigated in 2023, skip to **(Section 17)**
- **Items 2-4**, if "No" land irrigated in 2022:
  - Was any land irrigated on the operation in 2022?
  - Reasons for not irrigating in 2023? (mark all that apply)
  - Is discontinuance of irrigation considered to be permanent?

In **Section 17**, report the target operation's value of sales in 2023.

- **Item 1**, mark ONLY one range that corresponds to the gross value of sale in 2023
  - Include: all agricultural products sold in 2023
  - Include: landlord's share
- **Items 2-3**, report what percent were total sales:
  - From irrigated crop sales including:
    - Irrigated nursery or greenhouse crops
    - Floriculture
    - Sod
    - Mushrooms
    - Vegetable Seeds
    - Propagative Materials
  - From non-irrigated crop and livestock sales

UNIQUE SITUATIONS

Unique Situations

- **Partial year operation**
  - Complete questionnaire for the portion of 2023 the operator was in business
  - Fill out Section 18 (Person Completing This Form)
  - Write comments about the situation

Unique Situations Con't

- **Out of business**
  - Fill out Section 1 (Acreage), should show item 4 as 0 acres for the operation
  - Fill out Section 18
  - Write comments about the situation

- **Out of scope (no land irrigated)**
  - Fill out Section 1 (Acreage) and 2 (Land)
  - Section 2, item 5 "Was any area irrigated on this operation in 2023?"
    - Mark No, then go to Section 16, starting on page 19 (No Irrigated Land) and continue
  - Fill out Sections 16, 17, and 18
  - Write comments about the situation

Due Dates

- Follow the timeline set for ARMS III

Data Collection Benchmarks	
Percent Completed/Mailed in	**Date**
50 Percent	March 15
75 Percent	April 1
100 Percent	April 18

- All work in the office no later than COB April 18 unless there is a hard appointment set after April 18
- **Only 2** attempts combined between ARMS III and Irrigation
- Mileage and interview time will go under ARMS III for any Irrigation matches with ARMS III; project code 904
- All Irrigation Surveys NOT matched with ARMS III; mileage and interview time will go to Irrigation project code 656

Gravity Systems

- Portal or Ditch-Gate System

- Open discharge from well or pump

Gravity Systems con't

- Poly-Pipe (like Fire hose) Type of hose depends on area.

- Gated-Pipe System

Pressure Systems

- Big Gun System

- Linear Move System

Pressure Systems con't

- Center Pivot Systems

- Wheel Line System

Pressure Systems con't

Drip (trickle) irrigation waters crops efficiently.
Credit: Nova Scotia Agriculture and Fisheries

- Drip, trickle, or micro sprinkler system


Any
questions

Supervisor Group Practice