Water Use Reporting for Agricultural Irrigation Use in Arkansas

2017 Nonpoint Source Pollution Stakeholder Meeting
September 27-28, 2017

Update of Arkansas Water Plan

- Data from Water Use Database (WUDB) used to estimate future water demand
- "The accuracy of water use reported for agricultural irrigation has been questioned because the water use is not measured or metered."
- Arkansas Statute A.C.A. § 15-22-302 Withdrawal of Groundwater

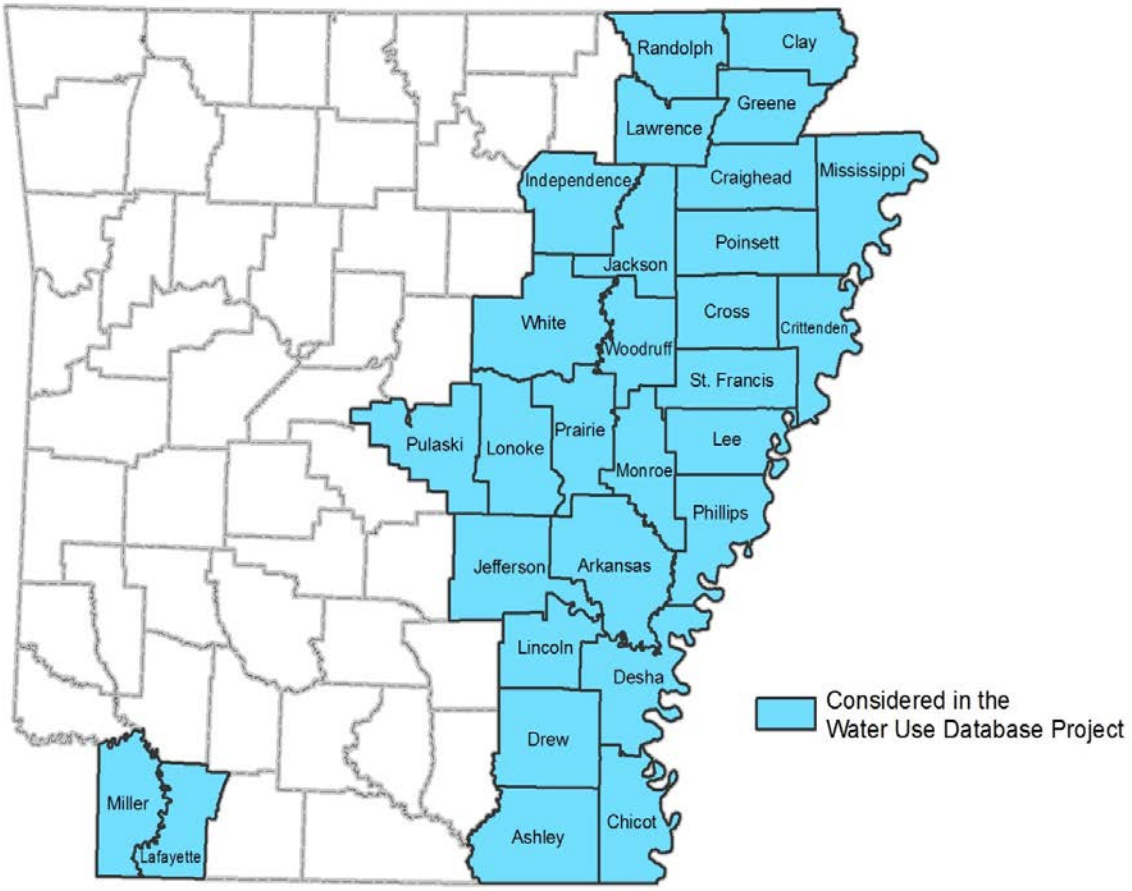
Water Plan Recommendations

1. **Form an Agricultural Irrigation Science Technical Work Group (AISTWG)**
   - **Review the reporting process**
   - **Review ranges for accepted water use by crop type**
   - **Evaluate Quality Assurance Criteria**
   - **Assess adequacy of the existing monitoring network to confirm cumulative withdrawal volumes**
   - **Propose incentives to report water use more accurately**

Recommendations (cont)

2. The Agricultural Irrigation Science Technical Work Group should also periodically review advances in technology
3. Arkansas Natural Resources Commission (ANRC) should continue and improve awareness and education programs with Conservation Districts

Target Counties



Three parts of the Project

- Convene the AISTWG
- Interview Conservation Districts
- Review the Water Use Database (WUDB)

AISTWG Process

- Who – Identify appropriate members
- What - Develop a charge
- When – Four meetings spread over the 11 month project

AISTWG Members

- ANRC
- USGS
- Arkansas Rice Growers
- Natural Resources Conservation Service
- UA Division of Agriculture and Cooperative Extension Service
- Farmers – leaders in AR agriculture community
- Former ANRC Commissioner who is a Delta farmer

AISTWG Charge

- Participate in review of the WUDB
- Identify deficiencies in collection and compilation
- Recommend procedures:
  - Data collection
  - Compilation of the data
  - Framework for getting consistent and quality data
- Develop recommendations for ANRC Commissioners that would provide an accurate database that supports the 2014 Arkansas Water Plan

AISTWG Meetings

- Meeting 1, November 3, 2016
  - Define FTN role in process
  - Background
  - Arkansas Water Plan, UA Div Ag review
  - USGS Role
  - Pilot project with select Conservation Districts
- Meeting 2, December 15, 2016
  - Pilot Project results
  - Database plots
  - Brainstorm goals for recommendations

AISTWG Meetings

- Meeting 3, April 6, 2017
  - Conservation District Interview report
  - USGS software update
  - Draft recommendations by category
- Meeting 4, June 15, 2017
  - Review of draft recommendations
  - Final Report to be completed by June 30, 2017
  - AISTWG members want to stay involved

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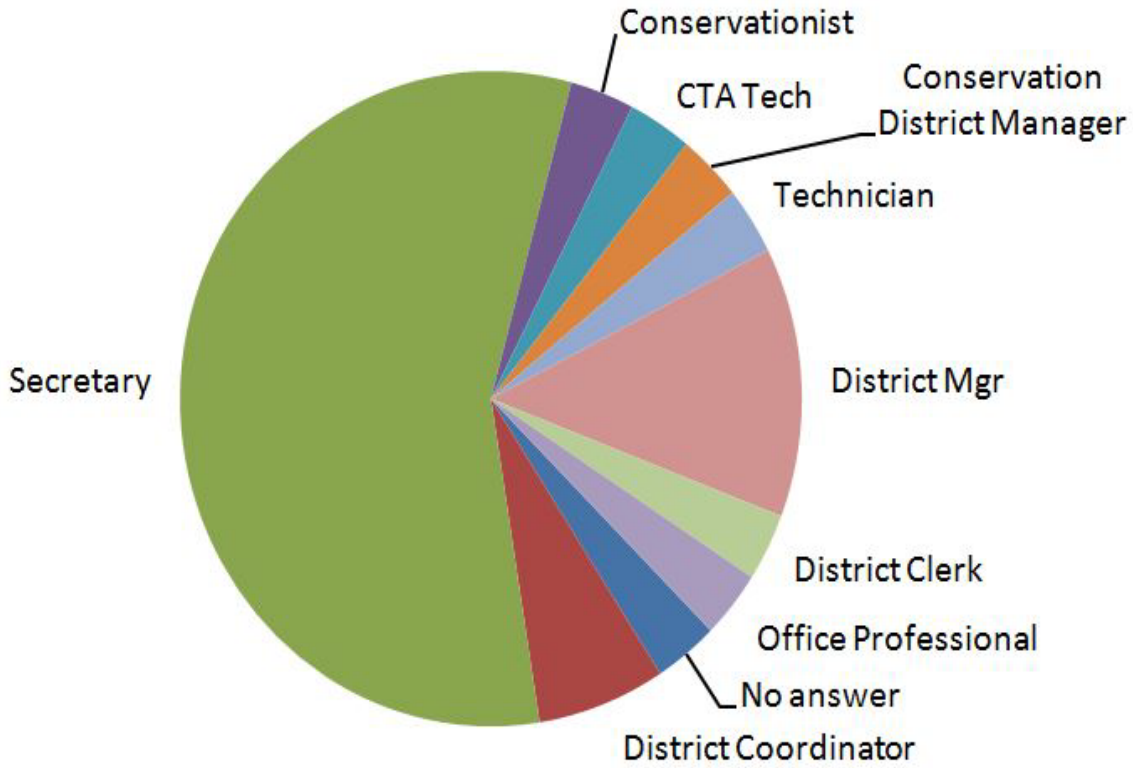
- **Interview Conservation Districts**
- Review the Water Use Database (WUDB)

Conservation District Interviews

- Information sought
  - Who collects the Water Use Information?
  - How information is provided from users/owners?
  - What data is collected?
  - How are data entered into the WUDB?
  - What quality assurance practices in place?
  - Improvement?
- Pilot Project with 5 Districts
- Interviews completed with 28 of 29 Districts

Who Collects Water Use Information



What data is collected?

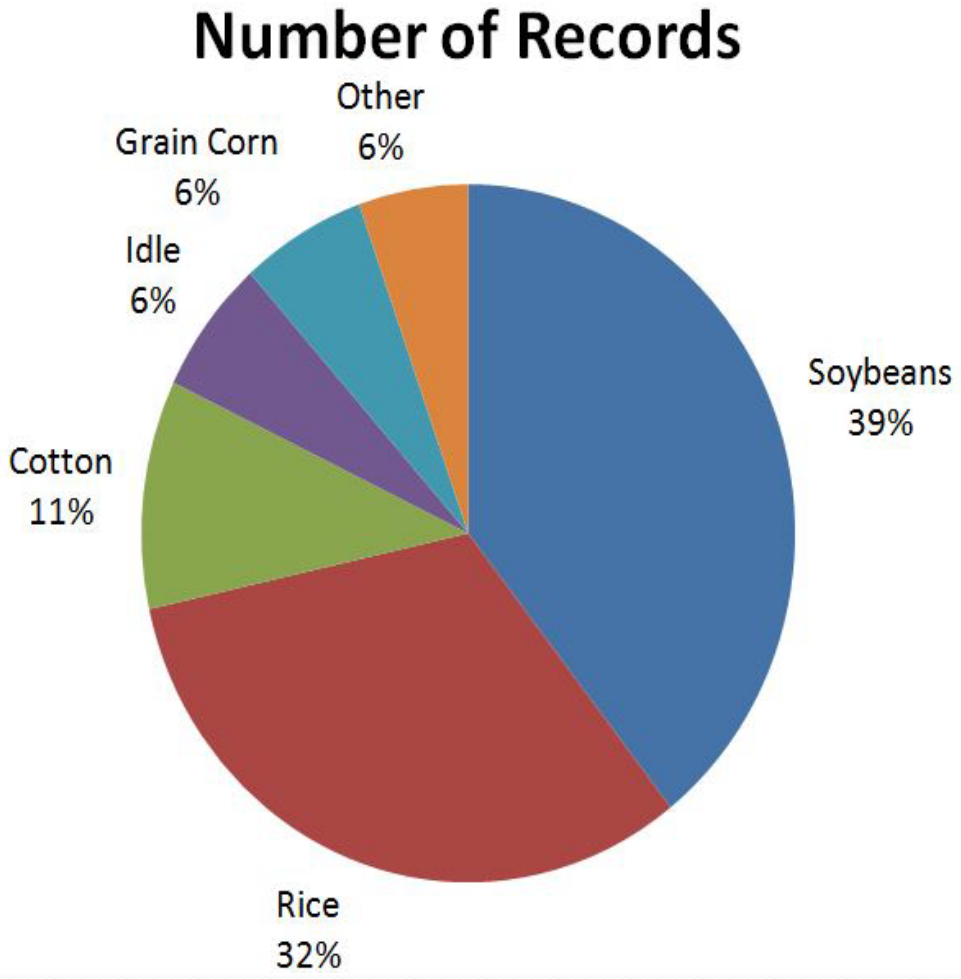
- Crop type irrigated– All Districts
- Acreage of each crop type irrigated– All Districts
- Irrigation method – All Districts
- Number of times watered – 23 of 28 Districts
- Amount of water used
  - User/Owner provided – 9 Districts
  - District applies application rate to estimate
  - “Same as last year”

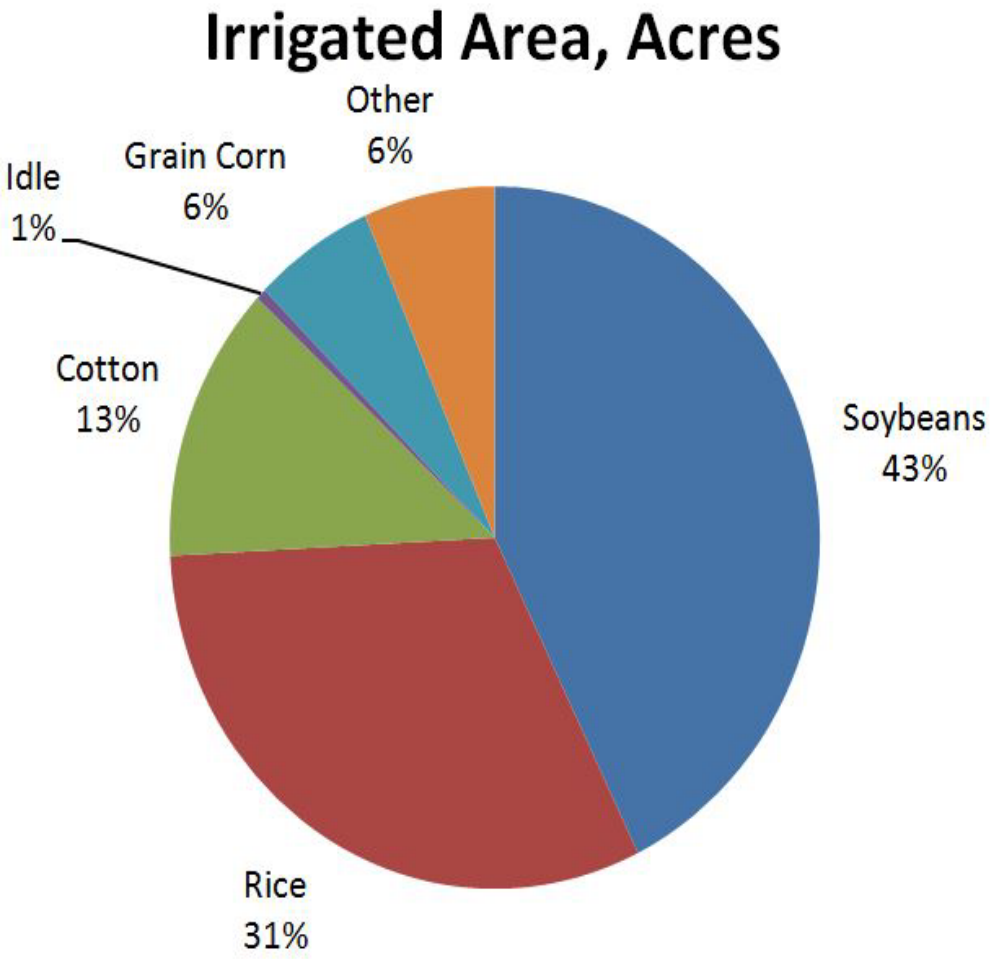
Time period for data

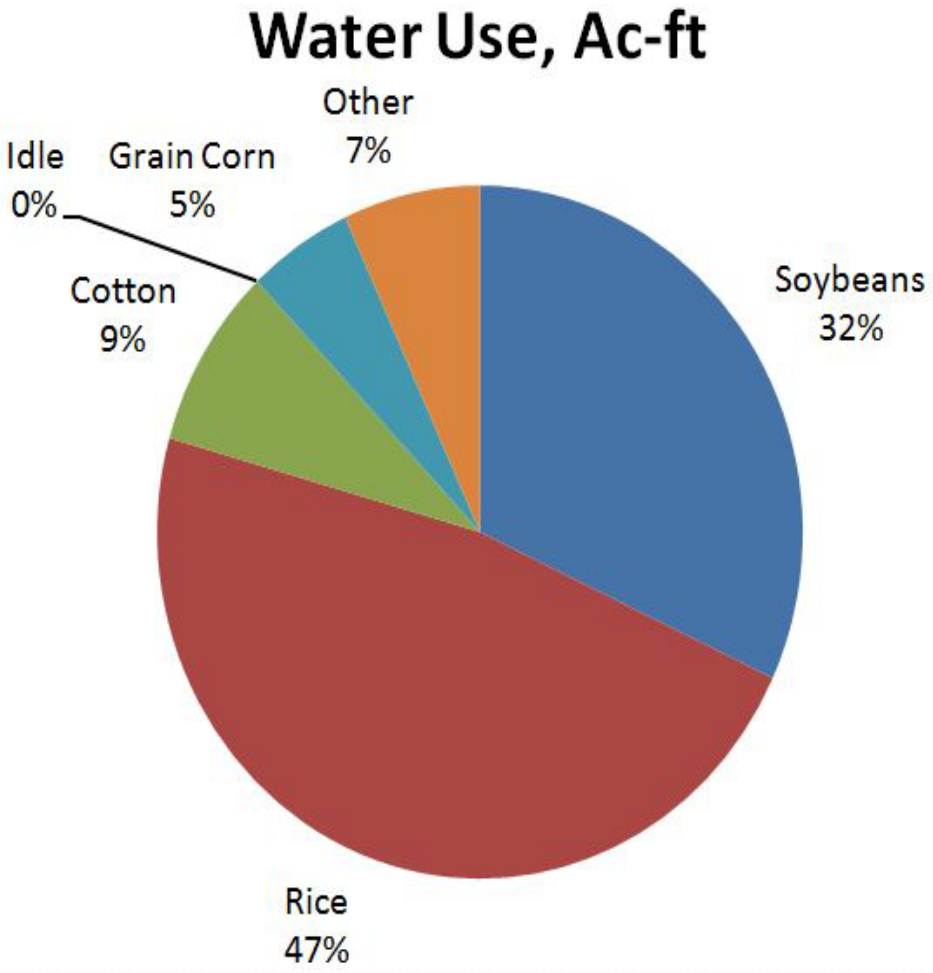
- Statute says data use is to be ***reported*** for previous water year use
  - Confusion
  - Previous crop season – March or April to October or November
- Use Reports are to be ***submitted*** between October 1 and March 1

How are data entered into WUDB?

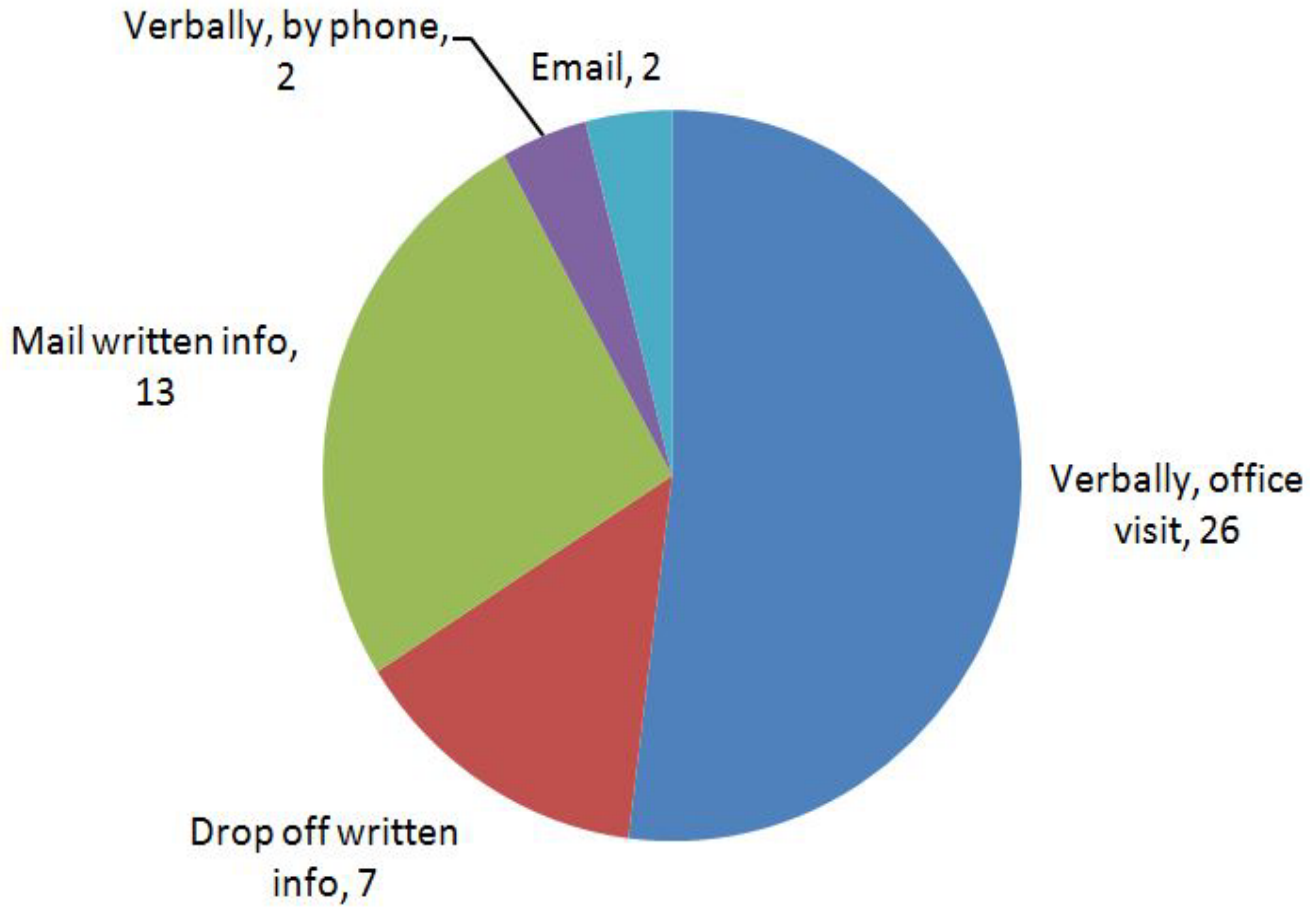
- Data collected from 40 - 2,500 Users/Owners in each District
- Number of wells reported: 543 – 20,000 per District
- Most Users/Owners report data directly in person
- 3-30 minutes per User/Owner on average
- Data Entry
  - Entered on ANRC provided form
  - Direct entry to database


Number of Records
Other
6%
Grain Corn
6%
Idle
6%
Soybeans
39%
Cotton
11%
Rice
32%

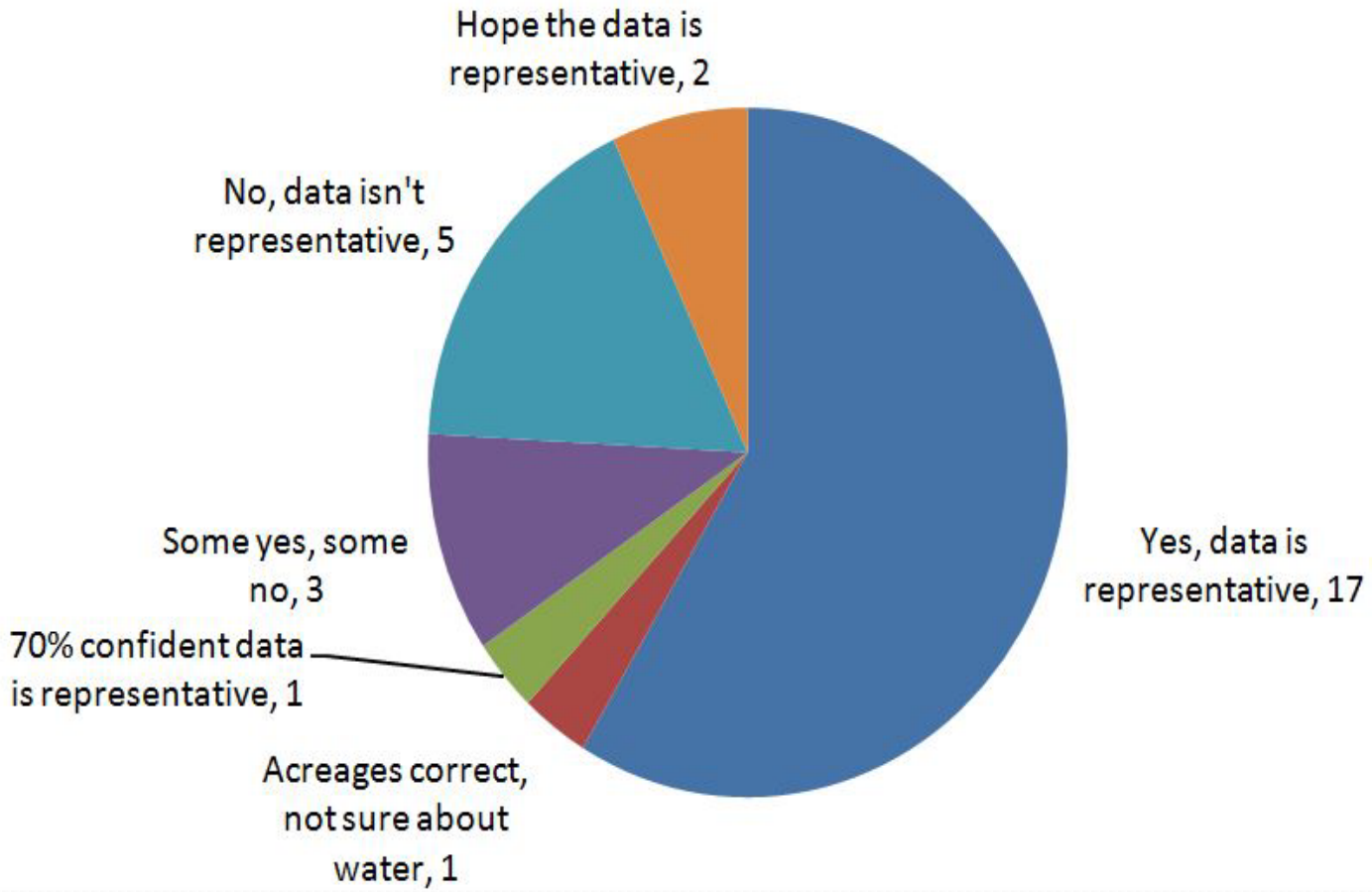

Irrigated Area, Acres
Other
6%
Grain Corn
6%
Idle
1%
Cotton
13%
Soybeans
43%
Rice
31%


Water Use, Ac-ft
Other
7%
Idle
0%
Grain Corn
5%
Cotton
9%
Soybeans
32%
Rice
47%

How Water Use Data is Submitted



District Data Confidence



Comments / Improvements

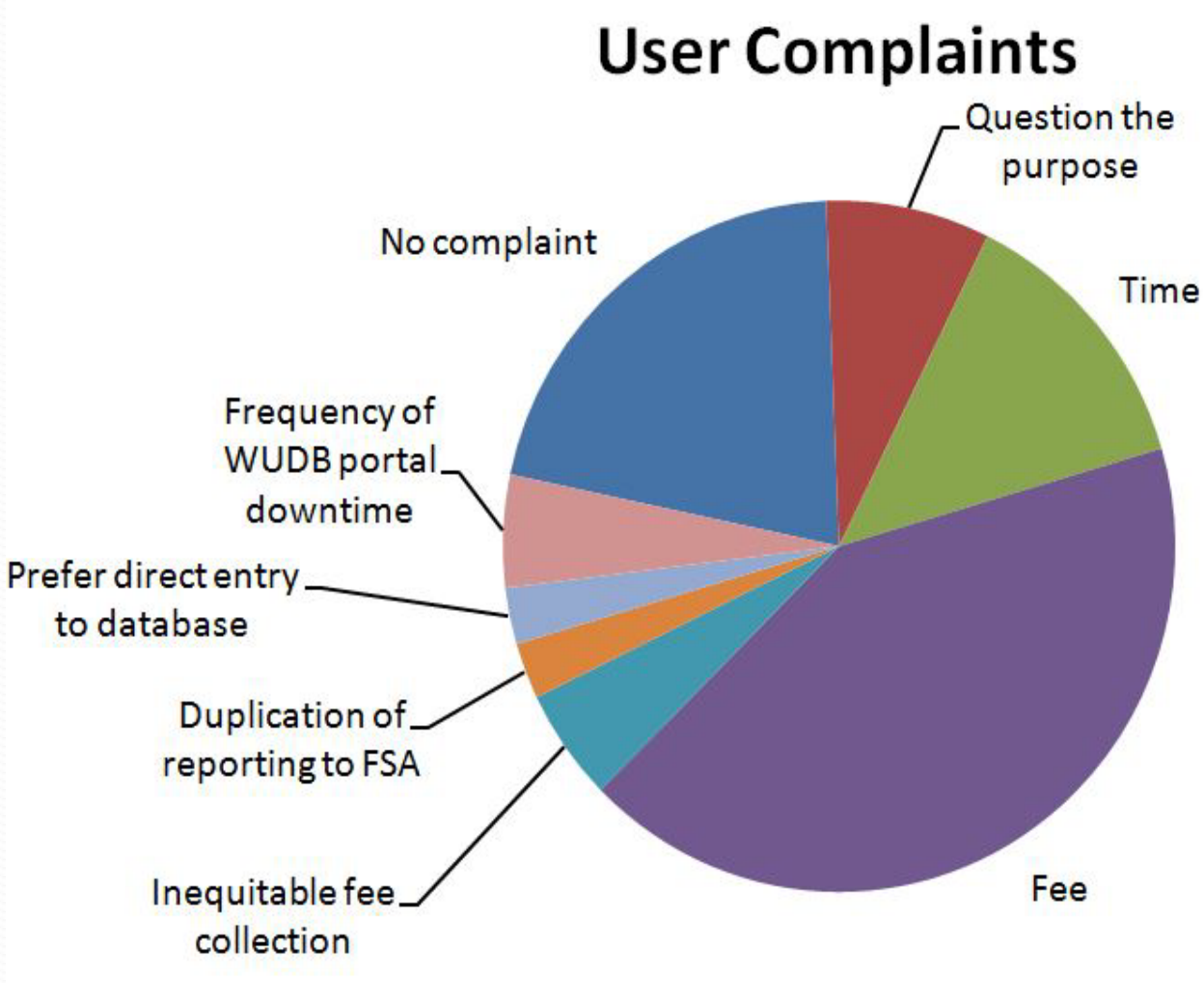
- No real consequences for not reporting
- Timing of the reporting period
- Improve reliability of access to the WUDB
- Need ability to print a status report
- Users/Owners complaints about paying the well fee
- Need better communication on what the data is used for

Some District Concerns

- Multiple User/Owner records for same User/Owner
- Active wells – no fees collected or use information
- New wells not registered, use not being reported
- Site descriptions not useful to Users/Owners
- Well location coordinates are incorrect and cannot be changed

Some District Concerns

- Data collection is not consistent
- Little or no QAQC of the data entered
- All had some concern or complaint about the data or the software
- Users/Owners don't like paying the well fee


User Complaints
Question the purpose
Time
Fee
Inequitable fee collection
Duplication of reporting to FSA
Prefer direct entry to database
Frequency of WUDB portal downtime
No complaint

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Review the Water Use Database

- Reporting Consistency
- Use vs Precipitation
- Application Rates

Water Use Database

- Database at time of project start (1985-2015)
- Henry and Watkins (2014) analyzed 2000-2010
- FTN analyzed 2000-2015
- 32 different crop types
- Corn, Cotton, Rice, and Soybeans (2000-2015):
  - 88% of the irrigation records
  - 93% of the irrigated acres
  - 92% of the reported water use

Reporting Consistency

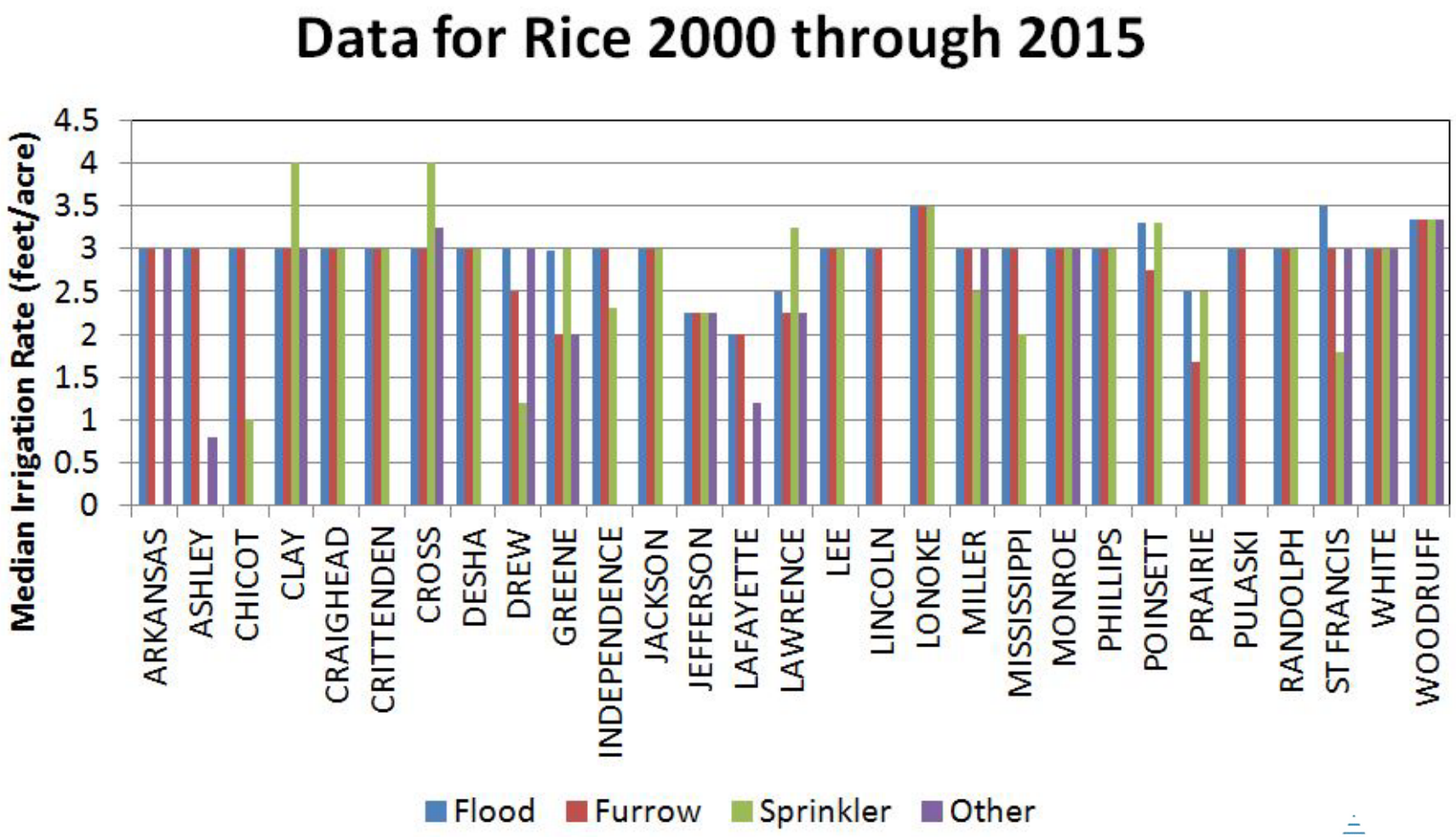
- Irrigated area reported to WUDB consistently greater than area reported to the Census of Agriculture
- Mean application rates for crops are not always similar between adjacent counties for the same months
- Not consistent across Districts
- “Same as last year”

Water Use vs Precipitation

- Compare county mean application rate to total precipitation
- Not able to correlate between precipitation and the amount of water used to irrigate
- No guidance given to Districts on adjustment for wet or dry years

Application Rates

- Majority of rates reported relatively similar among counties (ranges provided by ANRC)
- Outliers not flagged by software: mean of 3.03 feet, but value of 120 feet included
- Rice application rates very similar across counties
- Corn, cotton, and soybeans rates vary widely



Median Irrigation Rate for Rice

Focus Moving Forward

- Education and interaction
- Encourage accurate reporting
- Reduce the time required for reporting
- Improve water use estimates by crop

Questions?

Thank You!

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