Improve performance of drip irrigation in OSSF systems in Texas

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Presentation Outline

- Texas On-Site Sewage Facility Grant Program (TOGP)
- Drip in Texas
- Project goals and plan
- Questions & Answers

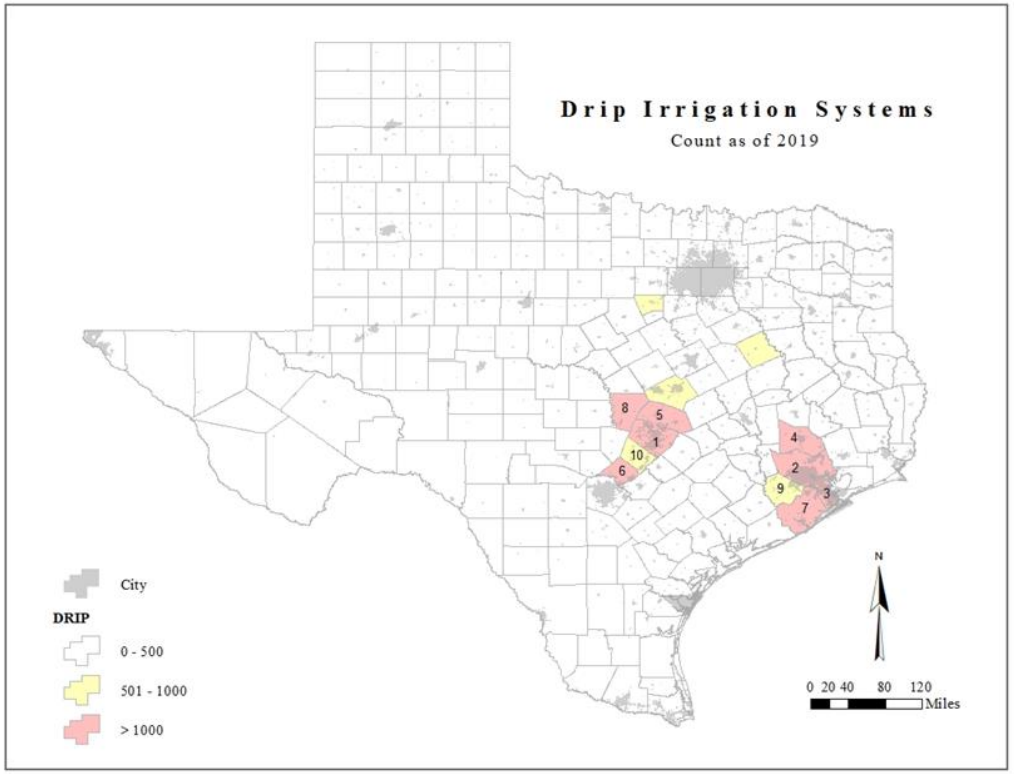
Materials presented represent the author opinions, and do NOT reflect the opinions of NOWRA

Texas On-Site Sewage Facility Grant Program (TOGP)

- Funded by the Texas Commission on Environmental Quality (TCEQ) from permitting fees
- On-Site Sewage Facilities (OSSF) Team: Anish Jantrania, Ryan Gerlich, June Wolfe III
- Round 1 (2019-21): ATU, LPD, Reuse
- Round 2 (2021-23): RV Parks, **Drip**, Effluent Reduction

Drip in Texas

- Increasing in response to issues such as limited space and challenging site conditions: almost 40,000 since 1994 (3% of total), 9% in year 2021
- Lack of standard procedures needed by designers, installers, and maintenance providers
- Quite common in Central-East Texas



Goal

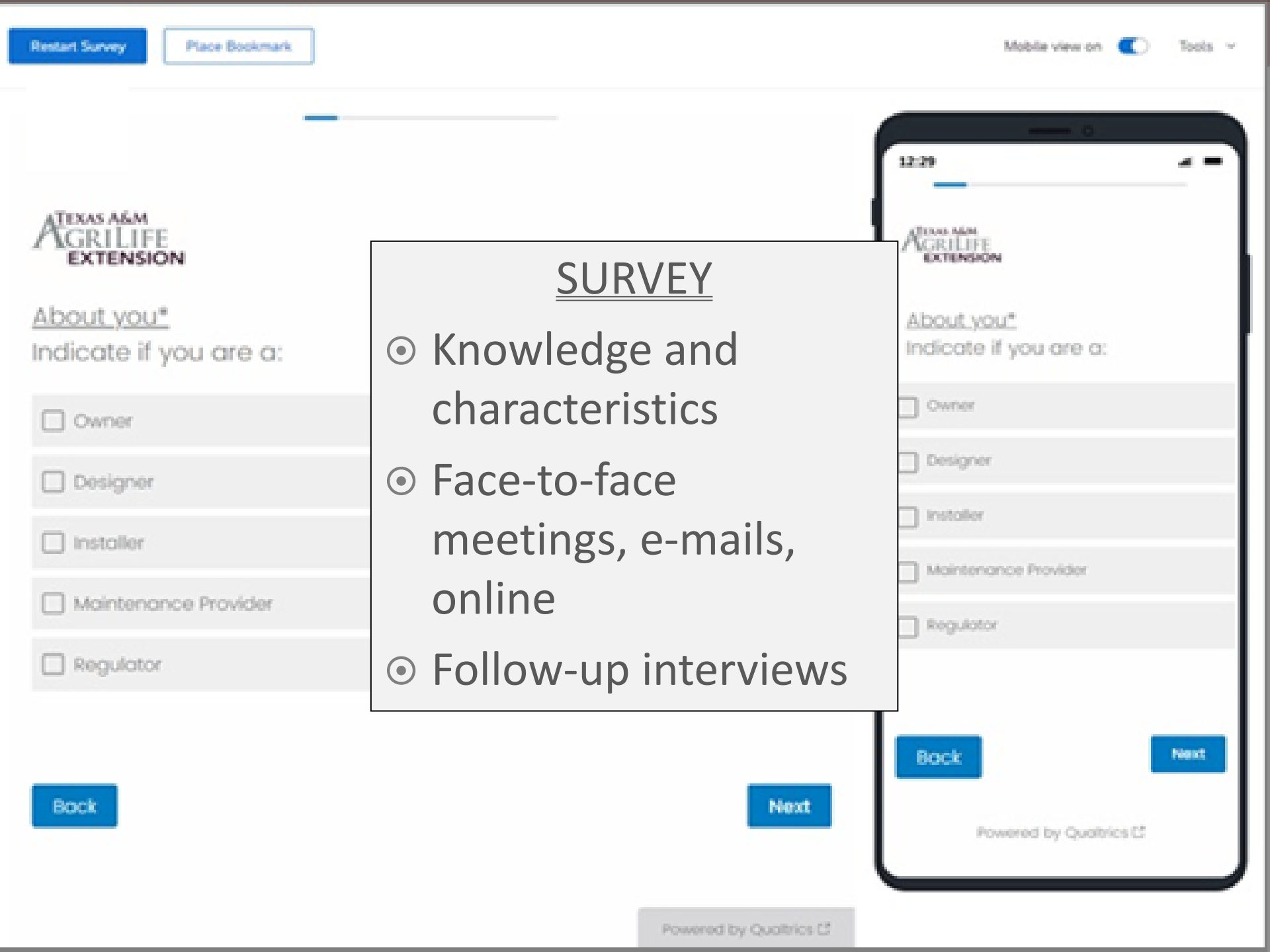
- Develop guidance to assist Texas on-site sewage professionals regarding proper design, installation, operation, and maintenance, and to aid TCEQ identifying gaps in current regulations

Research questions

1) Dosing techniques and application rates relative to structure and texture of soil
2) Installation configurations on flat terrain, slopes, and depressions
3) Continuous flushing vs periodic field flushing
4) Screened filters vs disc filters, and auto-backflushing
5) Techniques for cleaning and unclogging drip tubing

Plan

- Survey to interview regulators and license holders, and literature review of scientific articles and existing local, state, and federal publications (Questions 1-2)
- Field experiments at the Texas A&M RELLIS Campus OSSF center, Bryan Texas (Questions 3-5)
- Summarize gathered information


Restart Survey
Place Bookmark
Mobile view on
Tools
TEXAS A&M AGRILIFE EXTENSION
About you*
Indicate if you are a:
Owner
Designer
Installer
Maintenance Provider
Regulator
Back
Next
Powered by Qualtrics
12:29
SURVEY
Knowledge and characteristics
Face-to-face meetings, e-mails, online
Follow-up interviews

15A NCAC 18E .0908 DRIP DISPERSAL SYSTEMS

North Carolina

(a) This Rule provides for the permitting of drip dispersal systems receiving DSE. Drip disper
provisions of this Rule and Section .1600 of this Subchapter.

(b) Drip dispersal systems with advanced pretreatment shall comply with Rule .1204 of this Subchapter.

(c) Drip dispersal systems shall meet the following soil and site criteria:

(1) A minimum of 18 inches of naturally occurring suitable soil above a LC, 13 inches of naturally occurring suitable soil above a SWC, and the minimum vertical separation to any LC shall be 12 inches. A groundwater lowering system may be used to comply with the vertical separation to a SWC when only Group I or II soils with suitable structure are present within 36 inches of the naturally occurring soil surface.

(2) For new fill, the soil and site shall meet the following criteria:

12VAC5-610-955. Drip dispersal.

Virginia

A. Drip dispersal applies wastewater in an even and controlled manner over an absorption area. Drip dispersal system components may include treatment components, a flow equalization pump tank, a filtration system, a flow measurement method, supply and return piping, small diameter pipe with emitters, air/va electromechanical components or controls.

LITERATURE REVIEW

B. Drip dispersal system tubing shall be color coded and certified by the manufacturer as designed and manufactured for the dispersal of wastewater. All drip dispersal system tubing shall

Texas

(3) Drip irrigation. Drip irrigation systems using secondary treatment may be ll soil classes including Class IV soils. The system must be equipped with a filtering device capable of filtering particles larger than 100 microns and that meets the manufacturer's requirements.

(A) Drainfield layout. The drainfield shall consist of a matrix of small-diameter pressurized lines, buried at least six inches deep, and pressure reducing emitters spaced at a maximum of 30-inch intervals. The pressure reducing emitter shall restrict the flow of effluent to a flow rate low enough to ensure equal distribution of effluent throughout the drainfield.

(B) Effluent quality. The treatment preceding a drip irrigation system shall treat the wastewater to secondary treatment as described in §285.32(e) of this title unless

FIELD EXPERIMENTS

- RELLIS Campus effluent, treated in two ATU units, and distributed inside two wetlands' beds used for the Effluent Flow Reduction project (one covered by 11'x24' Big Barn Greenhouse)
- About 300 ft of drip tubing, laid out uniformly less than six inches below the gravel
- Control panel to manage and monitor the flow


A: RELLIS Wastewater Treatment Plant (WWTP)
B: Cleanout
C: Feed Tank
D: ATU Septic Tank
E: ATU 1
F: ATU 2
ATU
G: LPD Septic Tank
H: LPD Drainfield (H1-4 = Design Replicates)
LPD
I: ATU
J: MBR
Reuse
N
J
I
29
154
H1
H2
H
H3
H4
C
D
38
25
E
28
F
102
185
61
G
B
Drip Field
420
WWTP

Wetland cells, one covered with the Greenhouse

Wetland cells and Greenhouse entrance view

Greenhouse inside view

Performance

- Survey and literature review: Performance of failing systems will be characterized and compared to successful design in terms of dosing techniques, applications rates, and depth of installation
- Field experiments: Performance will be determined by comparing measurements of Total Suspended Solids (TSS), drip rate/volume and pressures

Address challenges

- Obtain sufficient responses from administered surveys
- Field experimentation that can be accomplished within the specified budget (i.e., flushing, filters, cleaning)

- Well-designed survey with follow-up interviews combined with a comprehensive literature review
- Standardized documentation for Texas license providers and regulators

Questions?