On-Farm Water Management Program

PRESENTED BY DALE BOOTH

11/28/2018

Introduction: On-Farm Water Management Program (OFWMP)

- Water quantity is one of the central limiting factors facing every ag operation.
- Municipal water is not available everywhere and where it is available it comes with a monthly bill
- Farming operations have to share with surrounding communities, and in times of shortage may find their supplies restricted

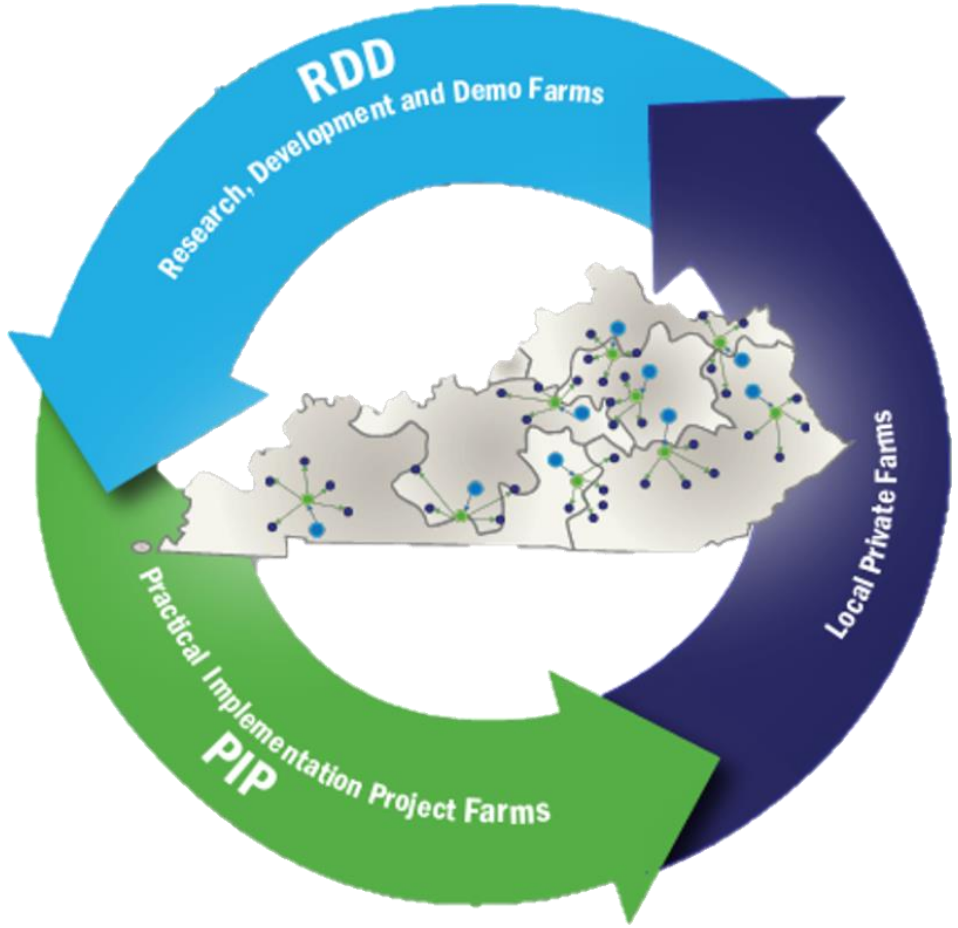
OFWMP

A collaboration between KADB and the Energy and Environment Cabinet's Water Resources Board (WRB) that seeks to fund Best Management Practices that:

- *Promote innovation in on-farm water management*
- *Decrease production dependence on municipal water sources*
- *Increase on-farm water availability and farm profitability*

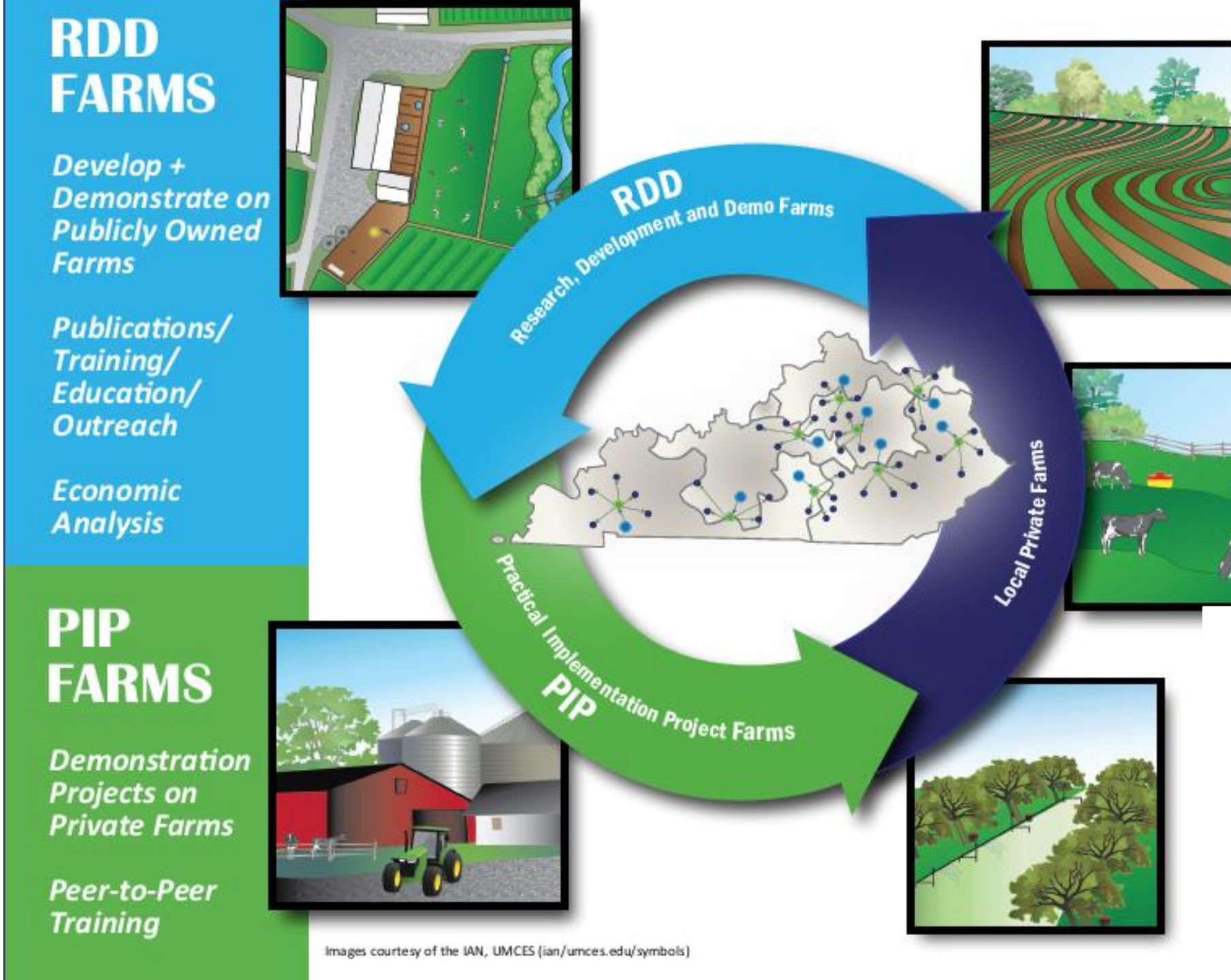
Long Term Goals:

- *Institutionalize practices into traditional funding programs*
- *Normalize innovative practices*
- *Improve data on costs/benefits of new practices*



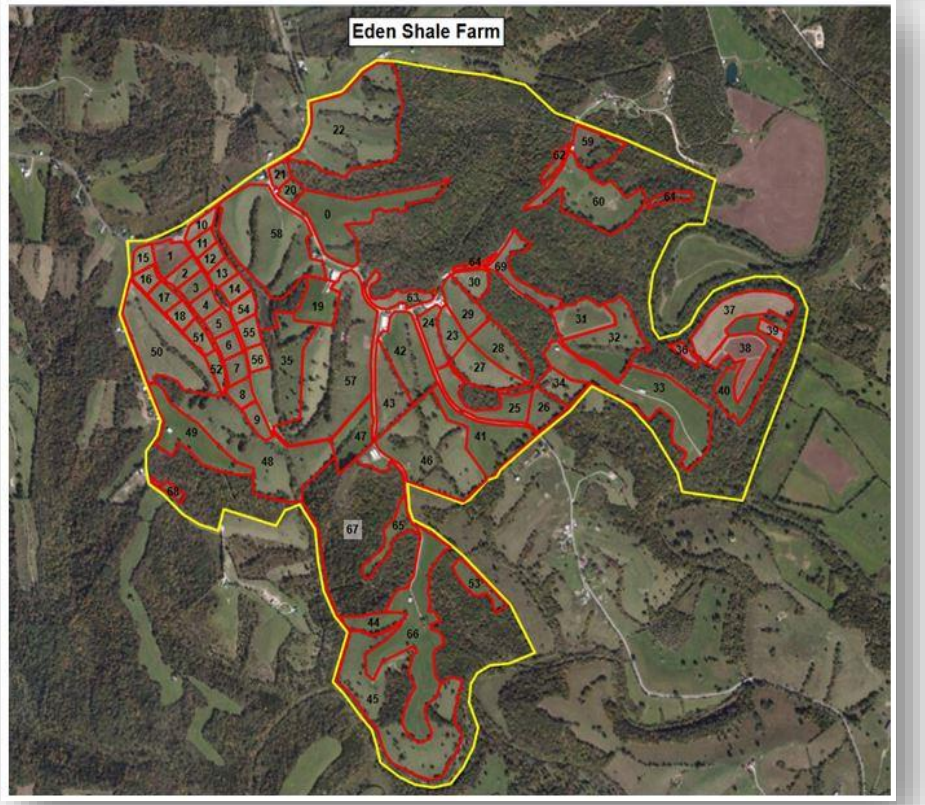
OFWMP Project Categories:

- Research, Development, and Demonstration Farms (RDDs)
- Practical Implementation Projects (PIPs)



Research, Development, and Demonstration Farms: The Eden Shale Model

- Eden Shale Farm was established in 1955 as a research farm for the University of Kentucky. Currently managed by KBN
- Provides on-farm support, education, and resources to Kentucky farmers
- Working farm with an educational mandate
- Laboratory for testing innovative practices
- Cost/Benefit analysis
- Impact on productivity and profitability
- Information used to educate producers as well as state and federal agencies and develop new Best Management Practices



RDDs: What Are We Looking For?

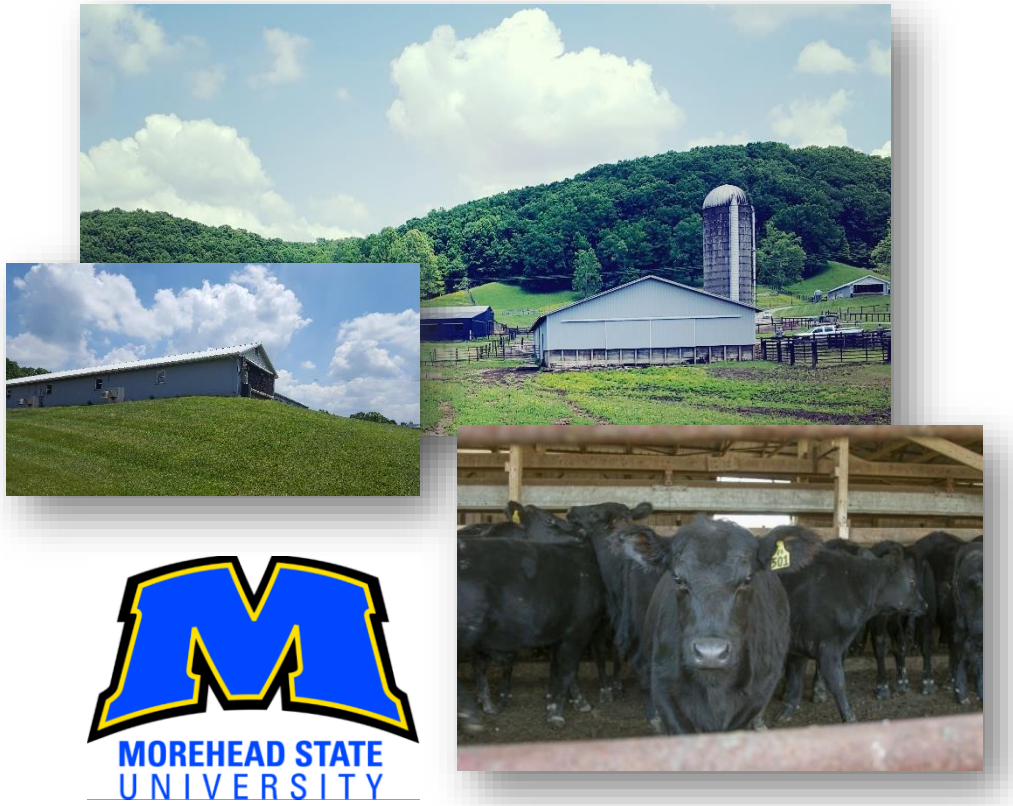
- “Eden Shale” type farms spread across the state to improve accessibility and peer to peer teaching opportunities for producers about Water Quantity BMPs
- Projects using innovative new practices and/or redesign of old practices
- Multiple water quantity Best Management Practices
- Multiple types of ag (livestock, row crop, orchards, vegetables, etc.)
- Long term interest in education and outreach. Must be willing to host farm field days, arrange tours, assist with production of technical information based on results of BMP implementation
- Ability to track metrics that show:
  - Return on investments and paybacks
  - Pre and post water consumption rates and use
  - Changes in efficiency and productivity
  - Short term and long term maintenance requirements

Project cap $250,000

RDDs: Funded Projects

Morehead State University's Derrickson Agricultural Complex

- Land Based (Pond) Water Harvesting and Distribution Systems for Livestock
- Hog Gestation House Evaporative Cooling Water Harvesting System
- Water Harvesting Systems for Livestock Consumption at the Bull Barn
- Greenhouse Evaporative Cooling System/Water Harvesting System



Maysville, Cattle Operation

- Compost Bedded Pack Barn with rainwater harvesting system for animal use
- Water redirection to prevent erosion and muddy conditions
- Covered manure storage to prevent nutrient runoff and contamination of other onsite water source (creek)

PIPs: What Are We Looing For?

- At least one water harvesting practice
- Innovation
- Ability to track metrics that show:
  - Return on investments and paybacks
  - Pre and post water consumption rates and cost
  - Changes in efficiency and productivity
  - Short term and long term maintenance requirements
- No requirement to invite the public onto the operation

Project cap: $50,000 (50/50 cost share)

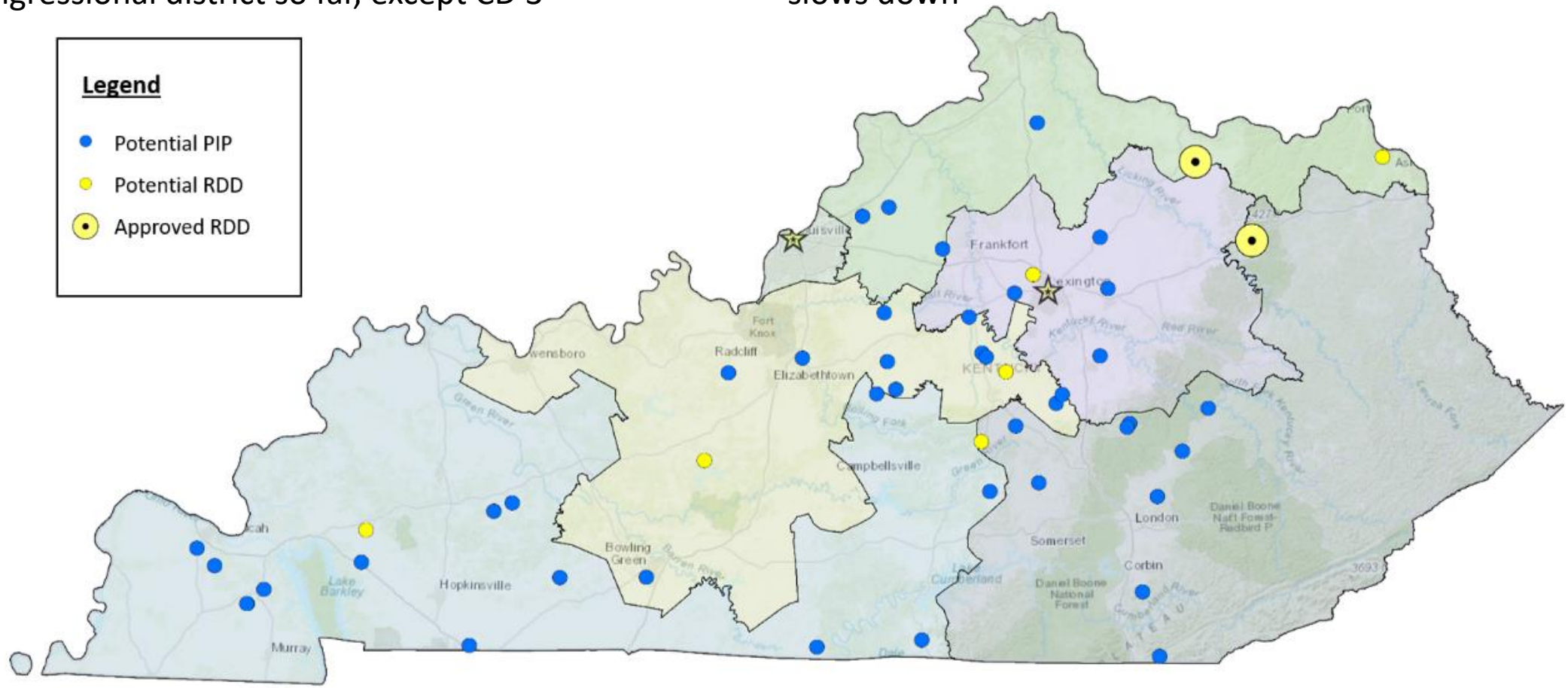
What do we hope to see?

- Information about BMP effectiveness in a real world scenario
- Whether the practice would be appropriate for traditional cost share programs
- If the practice would have a significant impact on water resiliency in times of shortage

Rain Water Harvesting w/solar pump

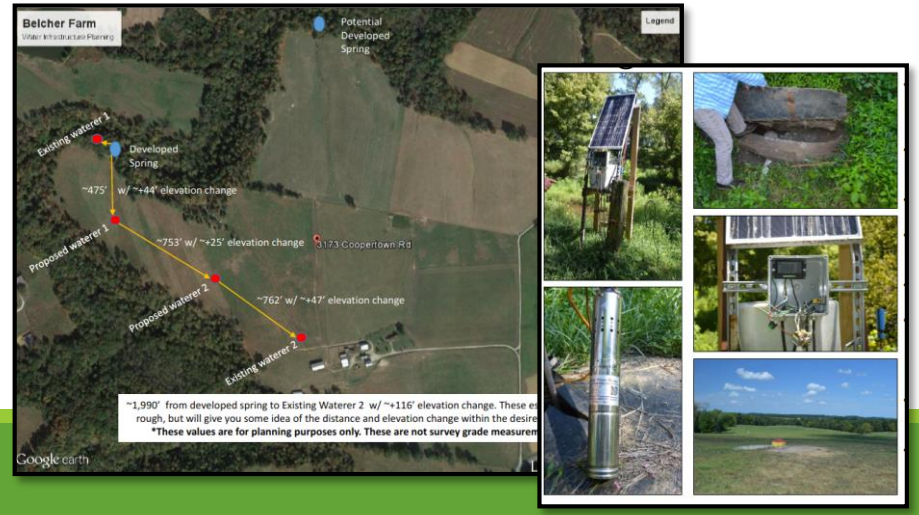
- 53 farms visited
- 2 approved as RDDs
- Potential farms located in every congressional district so far, except CD 3

- 4 applicants currently in active communication with the TAG
- Expecting more applicants as the season slows down



Potential applications

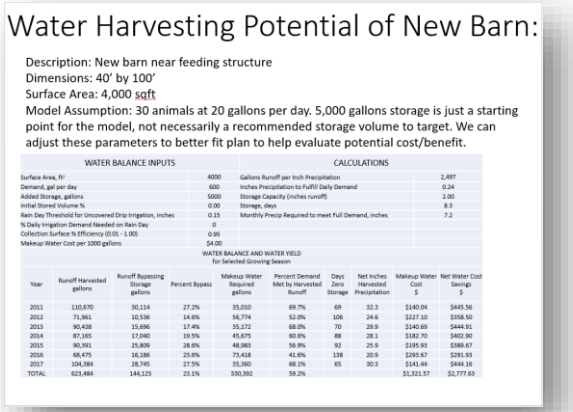
- Solar pump from river to supply subsurface irrigation of vegetables. Improve irrigation efficiency using soil moisture probes to determine optimum watering schedule.
- Pond construction and water collection off of poultry houses to supply water needs for 6 chicken houses and 100 head dairy cows.
- Collection of rainwater and use of pond for watering plants in a greenhouse operation. Innovative recirculating water tables that are supplied by onsite water will reuse water and improve operation efficiency.
- Spring development and solar pumps to supply Ritchie waterers for rotational grazing system for cattle.



Application Process

- Call to arrange a site visit with the OFWMP Technical Advisory Group (Dale Booth, dale.booth@ky.gov, 502-782-6895)
- TAG will determine eligibility and produce a site visit summary to help the producer complete the application
- Applications are reviewed quarterly or as needed by a 6 person committee made up of 3 members from the Ag Development Board and 3 from the Water Resources Board
- All funds must be allocated by December 2019

Questions?

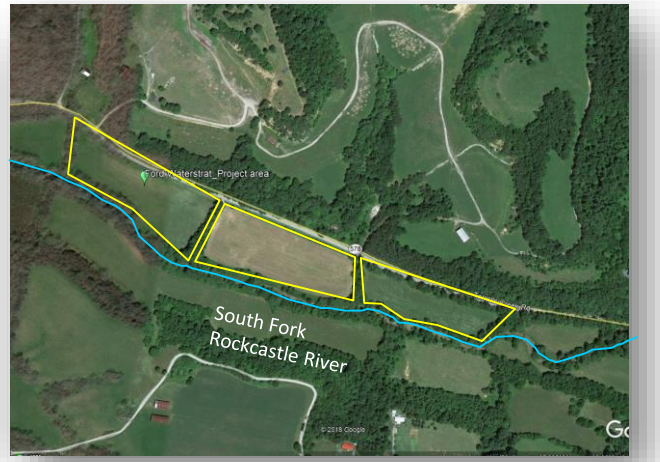

Water Harvesting Potential of New Barn:

Description: New barn near feeding structure
Dimensions: 40' by 100'
Surface Area: 4,000 sqft
Model Assumption: 30 animals at 20 gallons per day. 5,000 gallons storage is just a starting point for the model, not necessarily a recommended storage volume to target. We can adjust these parameters to better fit plan to help evaluate potential cost/benefit.

WATER BALANCE INPUTS		CALCULATIONS	
Surface Area, ft²	4000	Gallons Runoff per Inch Precipitation	2,497
Demand, gal per day	600	Inches Precipitation to Fulfill Daily Demand	0.24
Added Storage, gallons	5000	Storage Capacity (inches runoff)	2.00
Initial Stored Volume %	0.00	Storage, days	8.3
Rain Day Threshold for Uncovered Drip Irrigation, inches	0.15	Monthly Precip Required to meet Full Demand, inches	7.2
% Daily Irrigation Demand Needed on Rain Day	0		
Collection Surface % Efficiency (0.01 - 1.00)	0.95		
Makeup Water Cost per 1000 gallons	$4.00		

WATER BALANCE AND WATER YIELD for Selected Growing Season

Year	Runoff Harvested gallons	Runoff Bypassing Storage gallons	Percent Bypass	Makeup Water Required gallons	Percent Demand Met by Harvested Runoff	Days Zero Storage	Net Inches Harvested Precipitation	Makeup Water Cost $	Net Water Cost Savings $
2011	110,670	30,114	27.2%	35,010	69.7%	69	32.3	$140.04	$445.56
2012	71,961	10,536	14.6%	56,774	52.0%	106	24.6	$227.10	$358.50
2013	90,438	15,696	17.4%	35,172	68.0%	70	29.9	$140.69	$444.91
2014	87,105	17,040	19.5%	45,675	60.8%	88	28.1	$182.70	$402.90
2015	90,391	25,809	28.6%	48,983	56.9%	92	25.9	$195.93	$389.67
2016	68,475	16,186	23.6%	73,418	41.6%	138	20.9	$293.67	$291.93
2017	104,384	28,745	27.5%	35,360	68.1%	65	30.3	$141.44	$444.16
TOTAL	623,484	144,125	23.1%	330,392	59.2%			$1,321.57	$2,777.63



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Fence Line Feeder

Filter Strips

Four Way Waterer

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