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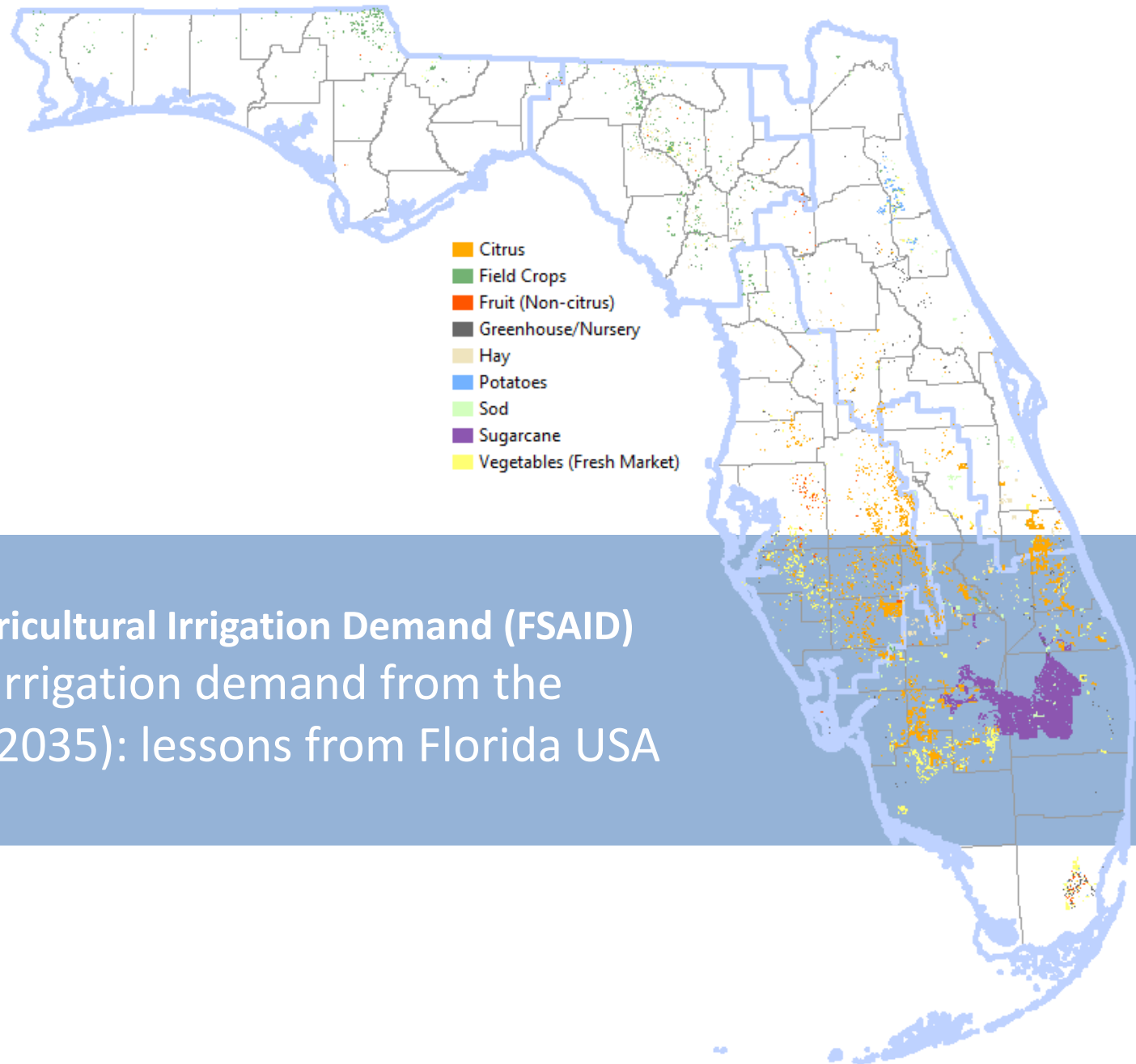
## **Florida Statewide Agricultural Irrigation Demand (FSAID)**

Modelling future irrigation demand from the ground-up  
(2015-2035): lessons from Florida USA

Valerie Seidel, Paul Yacobellis, John Fountain

Contributed presentation at the 60th AARES Annual Conference,  
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## Florida Statewide Agricultural Irrigation Demand (FSAID)

Modelling future irrigation demand from the ground-up (2015-2035): lessons from Florida USA

# FSAID

## Study area

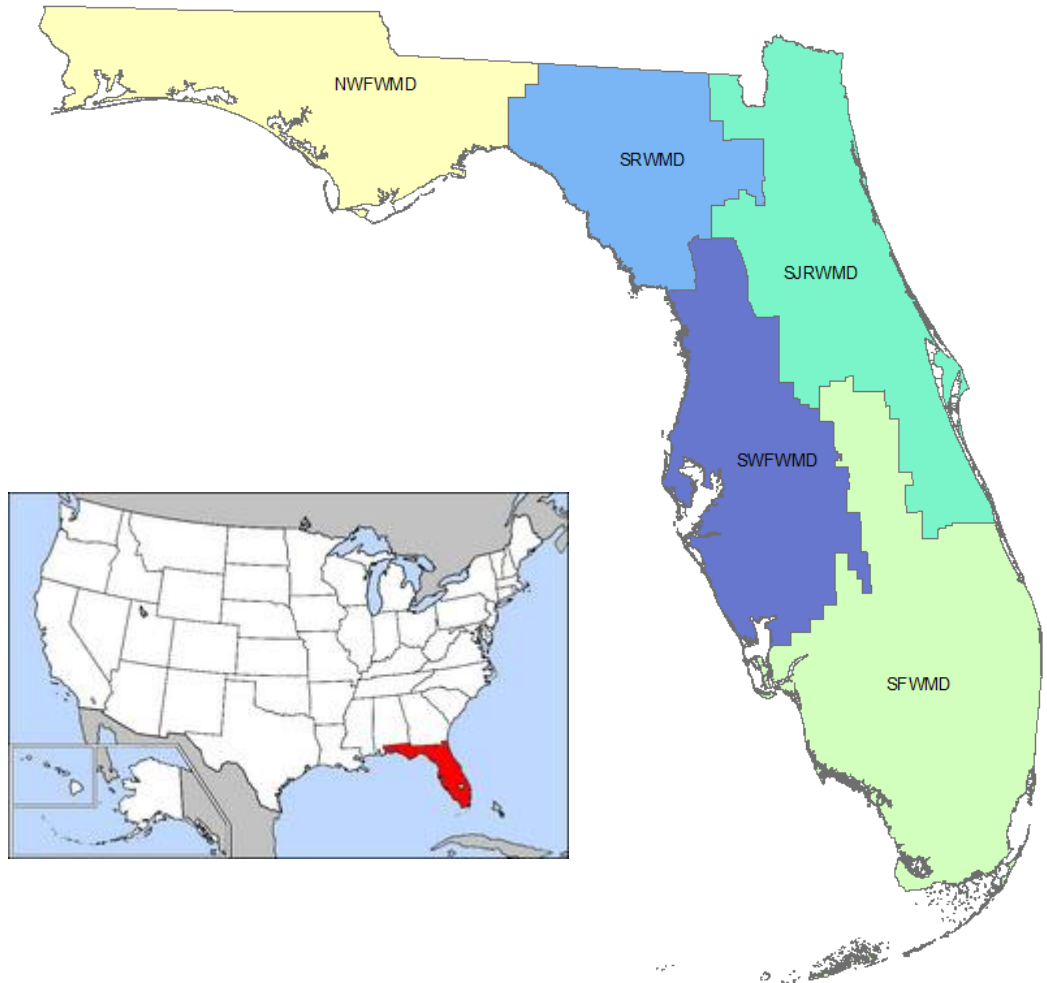
Florida USA (think: Miami, Orlando, Gatorade, NASA)

## Goal

Improve planning, reduce risk of litigation

## Project

Develop statewide estimates of agricultural water use at the property level, and forecast to 2035



# FSAID

## Obvious differences: Florida and Australia

- Size: less than 1/5 of NSW
- Pop: more than 2 x NSW
- Gross Value of Irrigated Ag Production: 1/10 of NSW

Approximate scale	Florida	NSW	Australia
Population (million)	19.8	7.52	23.5
Area (million ha)	13.8	80.9	769.2
Agricultural land (million ha)	3.8	58.3	406.2
Irrigated Agricultural land (million ha)	0.693	0.674	~ 2
GVIAP (\$b)	0.4	3.5	14.6
Ag Water use (GL)	3,484	4,506	11,561
Average annual rainfall (mm)	1,518	919*	443

\* average annual rainfall for Orange

# FSAID

## Problem

- Water supply conflicts: authorities getting caught in litigation among themselves and with other states

## Charge

- Florida Department of Agriculture and Consumer Services legislated requirement to project water supply for its 5 Water Management Districts over next 20 years, and to locate irrigated Ag spatially (GIS)

## Problem

- Each District used its own methodology (same crop 1km away using 70% more water/acre), plus inconsistent data (content, coverage, missing years, spatial gaps)

## Approach

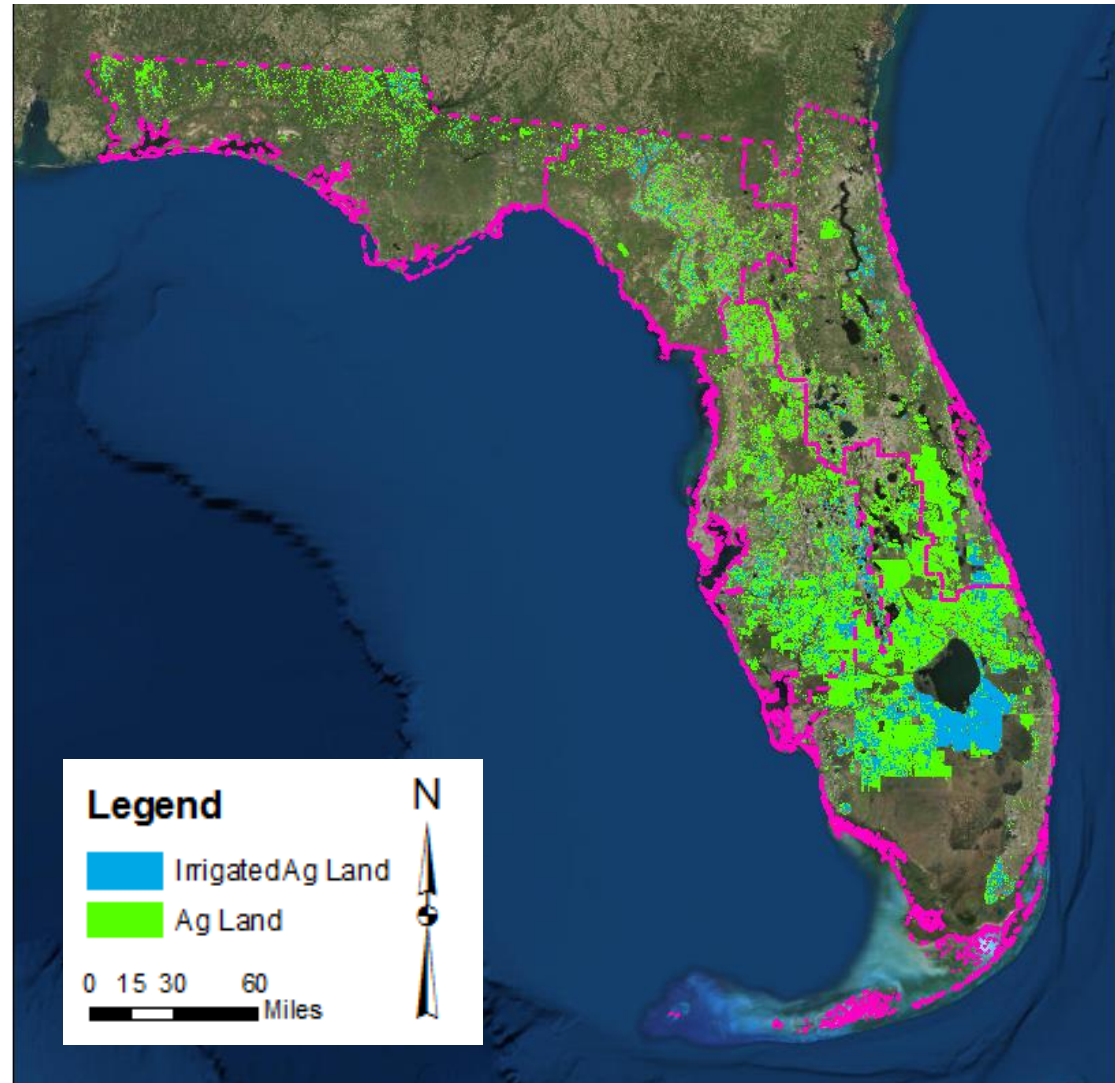
- Collated existing data and GIS layers: landuse, soil type, irrigation type, rainfall, evapotranspiration  
⇒ consistent statewide map of irrigated agriculture (1<sup>st</sup> FL)
- Fed water meter data (2,300 farms) into an bio-economic to model water demand for each farm given crop price, soil type, rainfall, evapotranspiration, chemical costs, location ...  
⇒ base-year estimates of agricultural water demand
- Forecast crop prices, chemical costs, combined with long-term average rainfall & ET  
⇒ future changes in Ag water demand and landuse



# FSAID

## Outputs

- 1) Irrigated Lands  
Geodatabase (spatial  
dataset, 2015-2035)
- 2) Agricultural water use:  
by crop, by irrigation  
type, by county  
(irrigation, livestock,  
cold protection)
- 3) Water use projections
- 4) Soils Geodatabase
- 5) Conservation potential





# FSAID

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- 1) Irrigated Lands Geodatabase (spatial dataset, 2015-2035)
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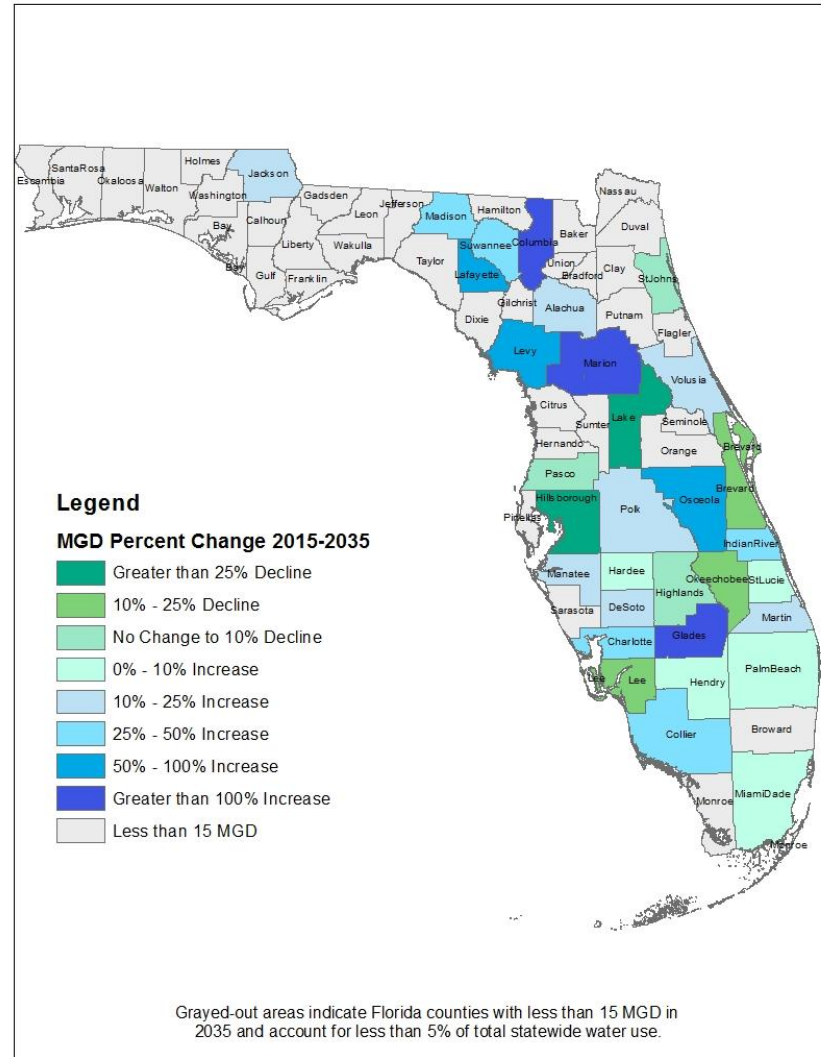
**Irrigated Acreage Comparison by County, RWSP, and Crop Category**

COUNTY	Citrus	Sugar Cane	Vegetables /Melons /Berries	Pasture	...
<b>SFWMD – Lower West Coast RWSP</b>					
Broward	0	0	1,006	1,187	...
Collier	0	0	0	0	...
Hendry	12,457	43,572	22,362	511	...
MiamiDade	657	0	20,172	118	...
PalmBeach	1,031	387,012	5,230	432	...
Monroe	0	0	0	0	...
<i>SFWMD -LEC Total</i>	<i>14,145</i>	<i>430,585</i>	<i>48,770</i>	<i>2,248</i>	<i>...</i>
<b>SFWMD – Lower East Coast RWSP</b>					
Charlotte	4,330	0	4,843	2,708	...
Collier	33,077	0	43,939	553	...
Glades	7,985	14,874	465	0	...
Hendry	49,248	56,007	7,806	740	...
Lee	11,710	0	7,701	566	...
<i>SFWMD -LWC Total</i>	<i>106,350</i>	<i>70,881</i>	<i>64,754</i>	<i>4,567</i>	<i>...</i>
...	...	...	...	...	...

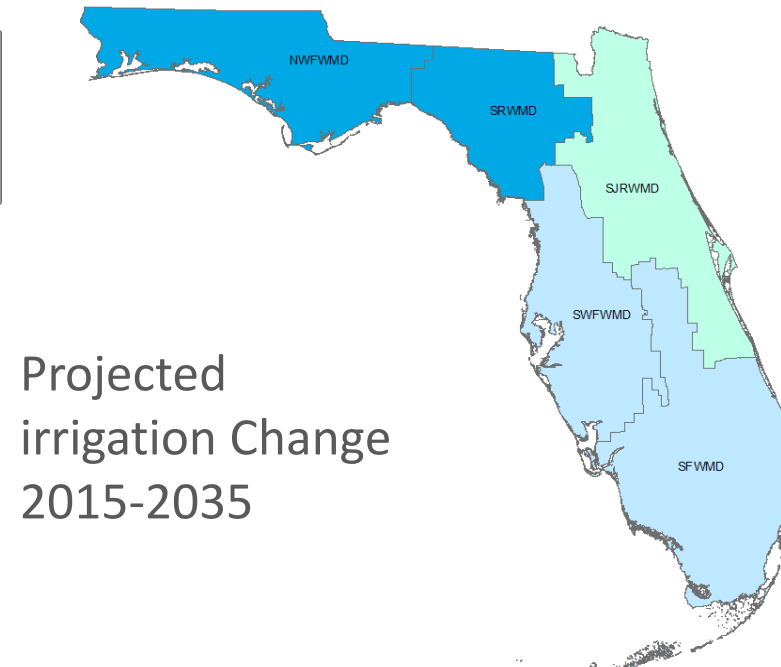
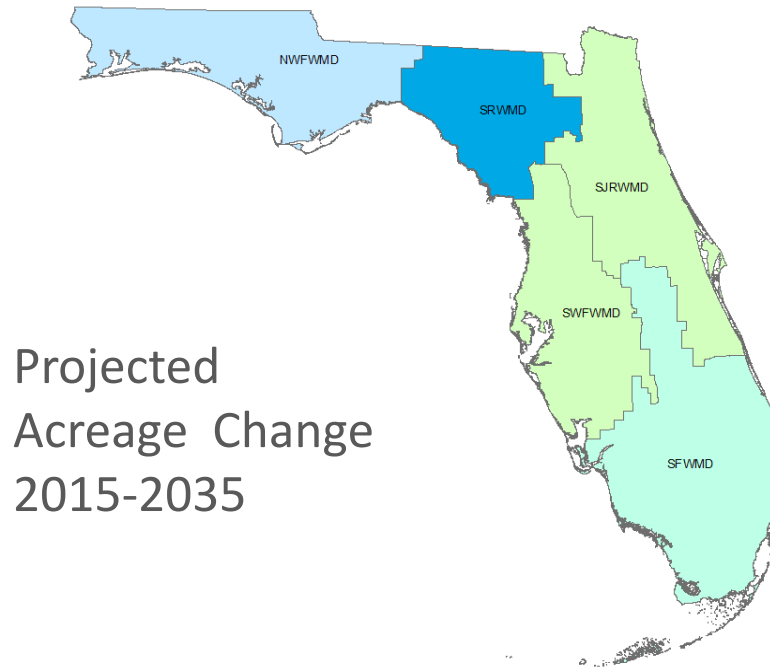
# FSAID

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# FSAID



## Projections:

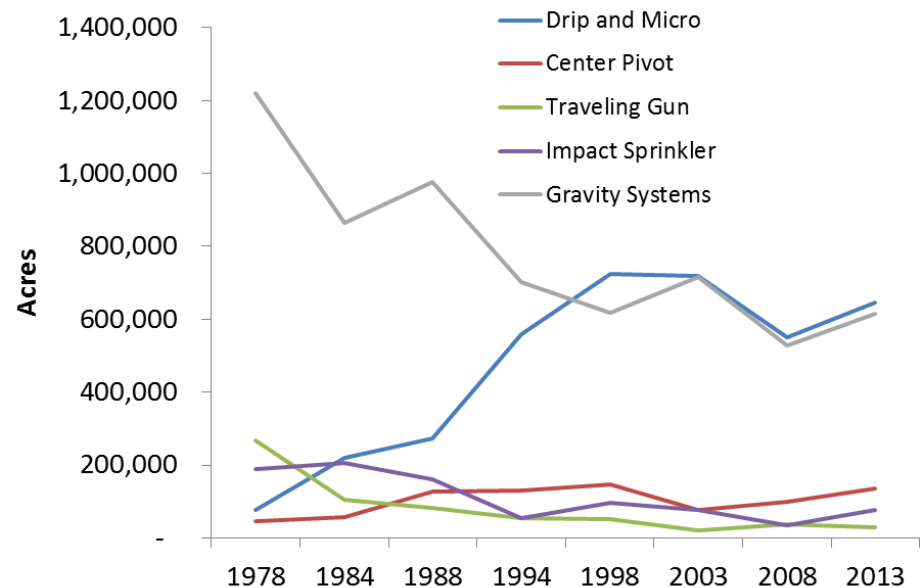
5% increase in irrigated acreage, but 17% increase in water use

# FSAID

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**USDA FRIS, acreage trends for selected irrigation systems**



### Costs of irrigation water conservation

Data source	Total project cost	Water savings (MGD)	\$/kgal (5 years)	\$/kgal (10 years)	\$/kgal (15 years)
FRIS data, Florida; 2003,2008,2013	\$7,901,227	20.1	0.23	0.13	0.09
FRIS data, U.S.; 2003,2008,2013	\$339,027,408	400.0	0.51	0.27	0.20

# FSAID

## Improvements

- User interface: FSAID2.com

### Setup Table

#### Columns

Irrigated Acreages

#### Rows

County

### Filter Results

#### Filter By

Water Management District (WMD)

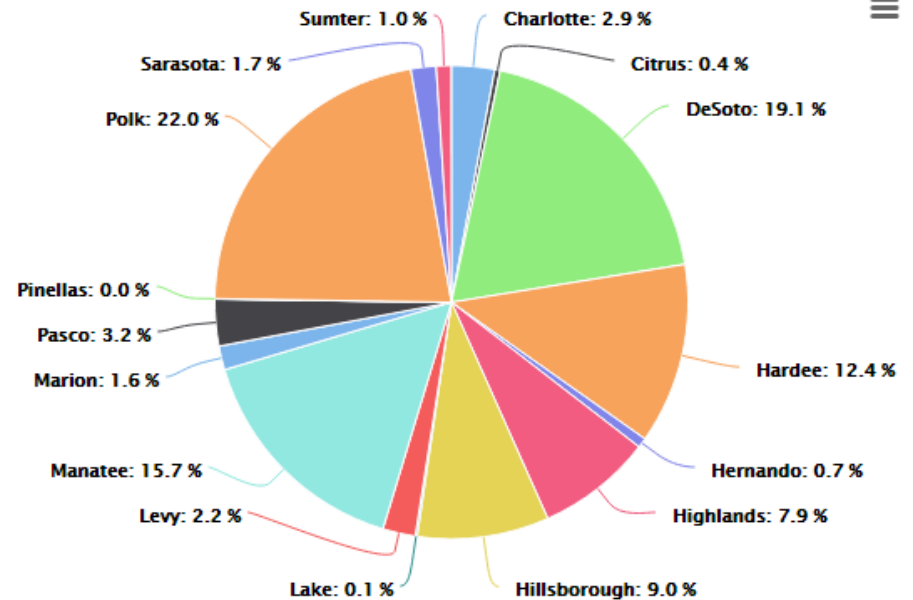
#### Filter Categories

× SWFWMD

### Chart

#### Year

2015



## Differences in Australia

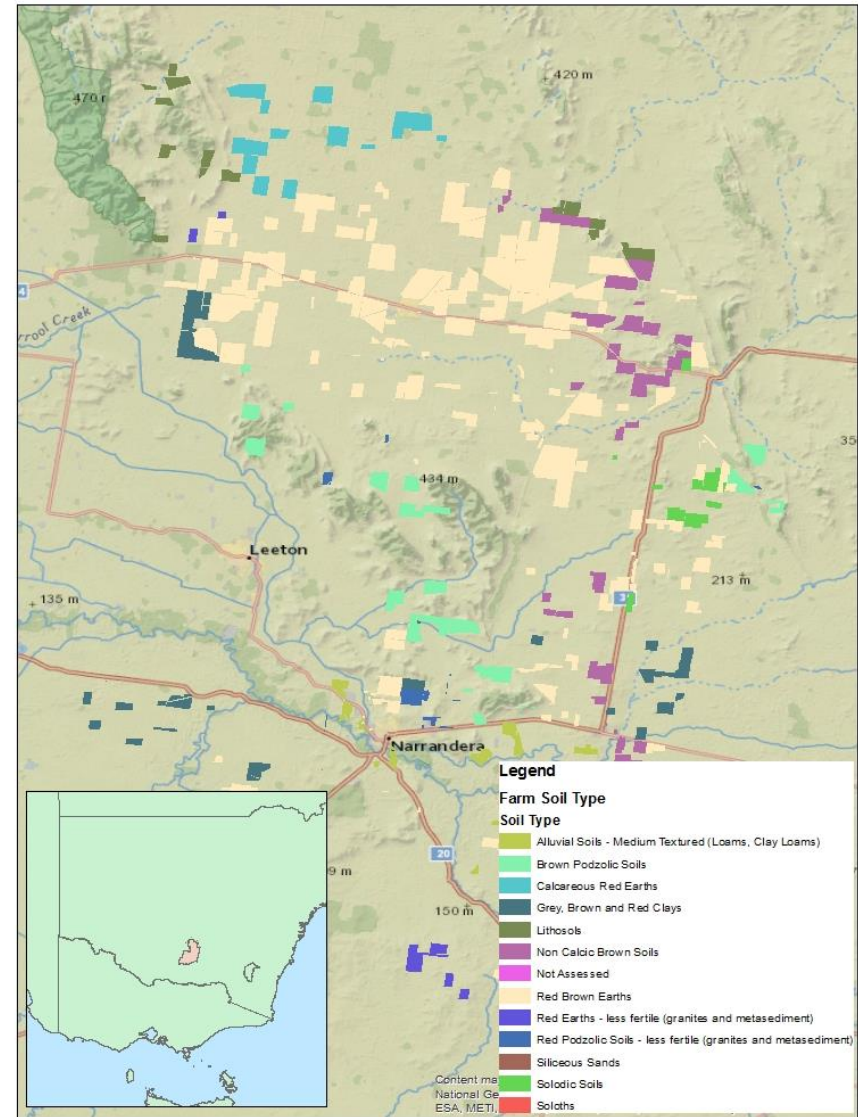
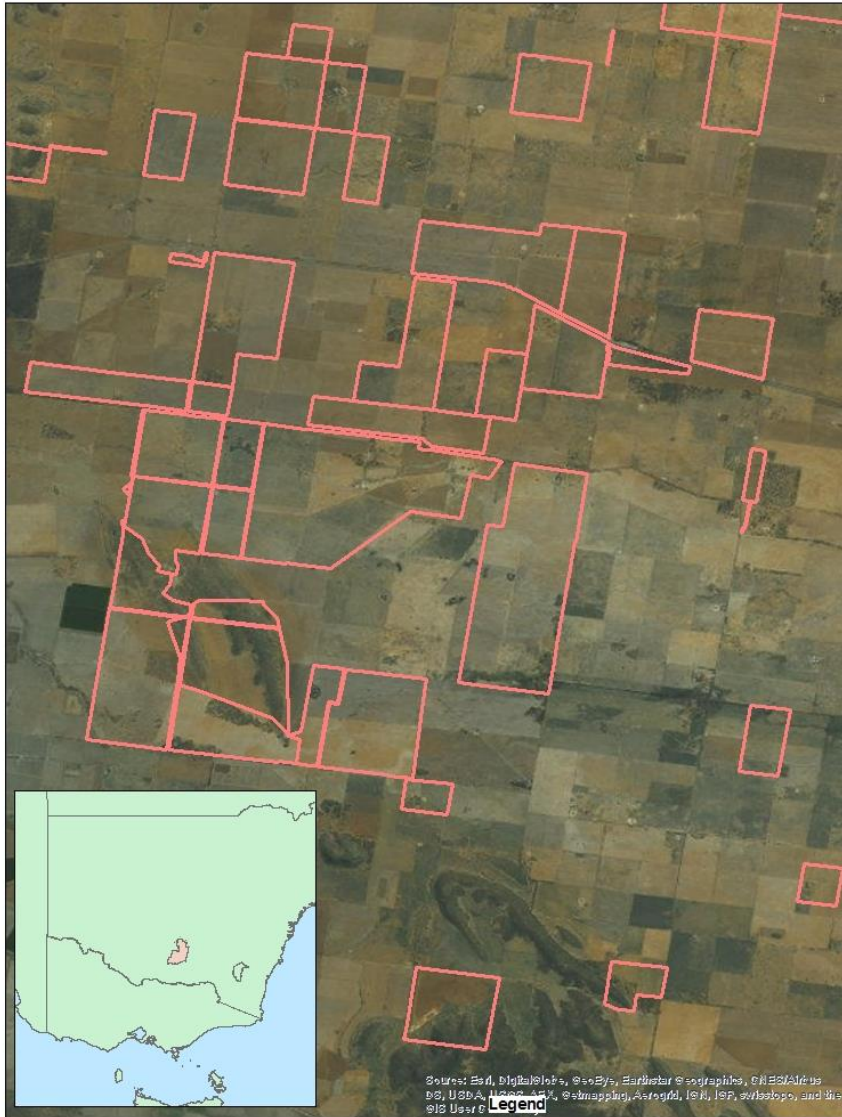
- Physical: less rainfall, fewer lakes, dryer rivers
- Drought: no crops sown in a bad year
- Data: property-level landuse data
- Institutional: water trading, response to world prices

## Potential outcomes

- Potential scale of future Ag water demand
- Identify supply constraints
- Identify landuse conflicts
- Geodatabase: landuse, Irr Ag, soil
- Values: GVIAP, opp. cost of water (MDBP)
- Conservation: water quality, excess runoff vs. recharge vs. re-use



# AID





# FSAID

Questions...

