

# Groundwater challenges faced by Southeast Asian smallholder farmers in Fresno County, California

Ruth Dahlquist-Willard<sup>1</sup>, Jennifer Sowerwine<sup>2</sup>, Michael Yang<sup>1</sup>, Xai Chang<sup>1</sup>, and Sia Vue<sup>1</sup>

<sup>1</sup>University of California Cooperative Extension, Fresno County

<sup>2</sup>University of California, Berkeley

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## Southeast Asian farmers in Fresno County

- Hmong, Mien, Lao, and Cambodian
- Estimated 1300-1500 small farms
  - About 900 Hmong
- From 0.5 – 60 acres, median 8.8 acres
- Limited annual income (\$5,000 – \$50,000 gross)

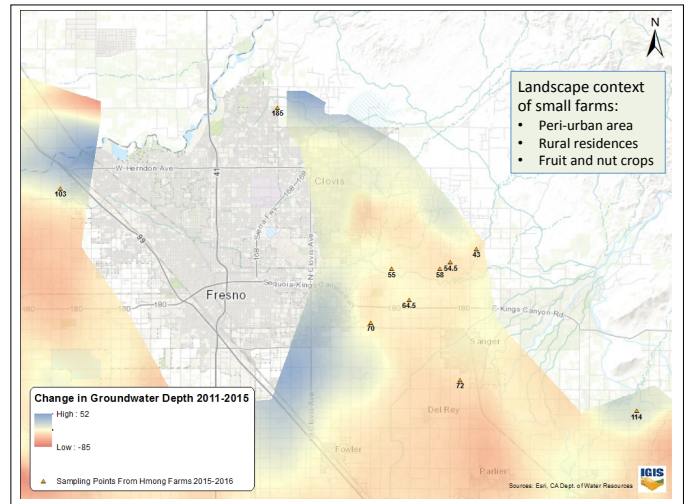


Luffa, winter melon, eggplant, daikon, bok choy, taro, lemongrass, sugarcane, and many other specialty Asian crops

Molinar and Yang, 2007  
Sowerwine and Getz, 2013



- Many farmers lease small parcels
  - Mostly in peri-urban areas around Fresno and Clovis
- Some have purchased land
  - Can be farther from city



## Questions:

- What are the effects of the drought on the Hmong farmers?
- How are Hmong farmers responding to the drought?
- What programs are available to assist this population during the drought?
- To what extent have Hmong farmers been able to access them?

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## Survey Methods

- Total of 68 Hmong growers interviewed anonymously
  - Aug – Nov 2015
  - 49 growers interviewed by phone or in person
  - Additional 19 interviewed by phone with subset of questions
- Data reported as % of those who responded
  - not all responded to every question
- Supplemental data from UCCE Fresno
  - Well completion reports
  - Pump efficiency tests

## Survey results: Effects of drought

Q: Has the drought affected your farm in any way this year (2015) or last year (2014)?

Yes	No
88.14%	11.86%

Most common responses:

Flow of water decreased	50.85%
Well dried up	22.03%
Crops were stressed	13.56%
Broken pump	8.47%
Landlord has not deepened well	6.78%
Crops died	6.78%
On waiting list for well	5.08%

73%

(N=59)

Q: How have you addressed these problems? (N=50)

Fixed pump	12.0 %
Farmed less area or crops	12.0 %
Contacted landlord for assistance	10.0 %
Deepened well	10.0 %
Changed irrigation timing (time of day, length, sharing with others)	8.0 %
Watered smaller sets	8.0 %
Lowered pump shaft	8.0 %
Changed to drip irrigation	6.0 %
Changed crops	4.0 %
Stopped farming	4.0 %
Cleaned or replaced casing of well	4.0 %
Used less water	2.0 %
Added layflat for irrigation	2.0 %
Added booster pump to increase water flow	2.0 %
Used house well to irrigate	2.0 %

## Responses to loss of well

- Of 13 farmers reporting that the well went dry:

	# of farmers
Deepened well	4
Contacted landlord for assistance	2
Stopped farming	2
Used house well to irrigate	1

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## Well depth reported in survey

Q: How deep is your well?

Average well depth	123.3 ft (±58.4 SD)
Range	70 – 300 ft
Median	105
Mode	80

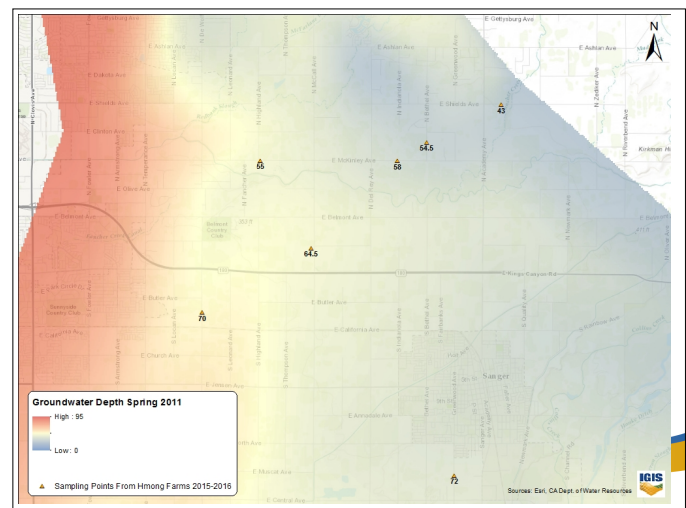
(N=16)

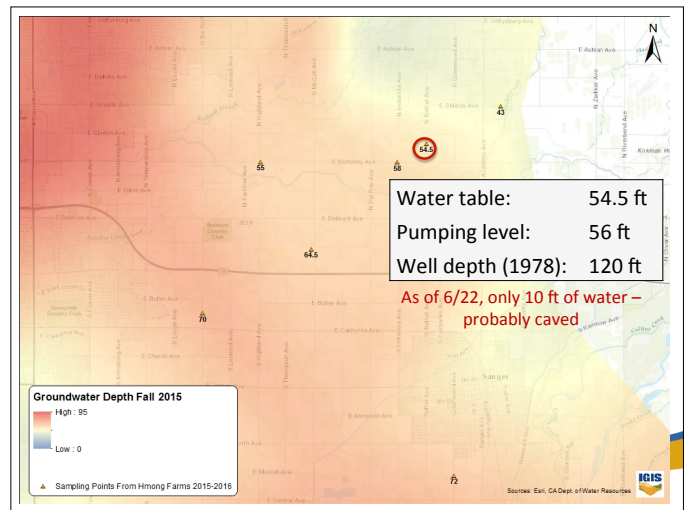
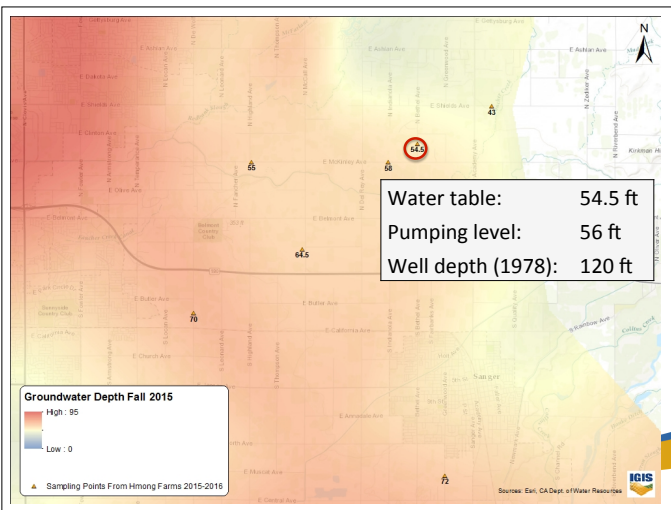
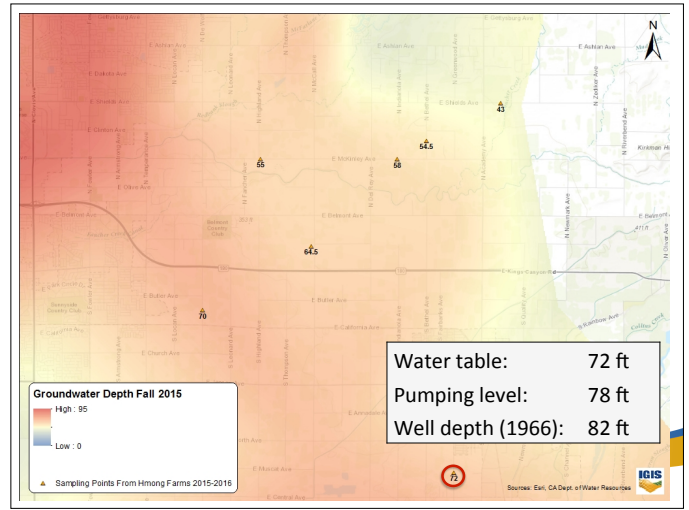
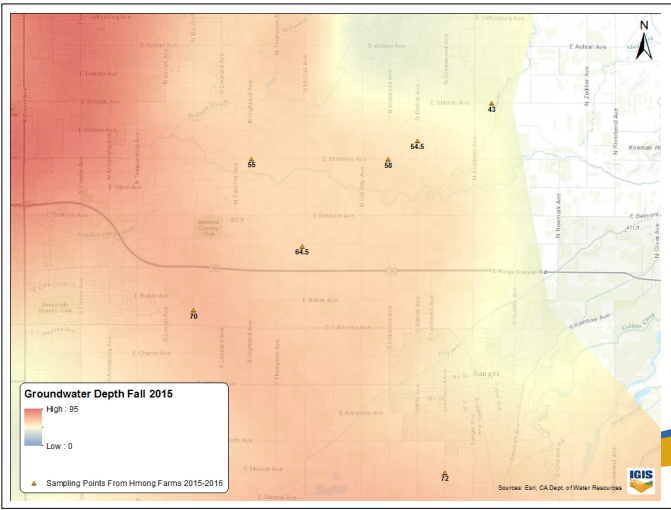
Q: What is the source of water for your farm?

City water	Groundwater (well)	Surface water
4.17%	95.83%	0.00%

(N=48)

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## Energy use

- 87% of farmers reported an increase in electric bills (N=45)
  - Pumping from lower water level
  - Running pump longer

### Pump tests (2015-2016):

Average pump efficiency	0.45 ( $\pm 0.08$ SD)
Maximum efficiency	0.64
Minimum efficiency	0.34



(N=10)

## Drought-related assistance programs:

- Financing for well drilling
  - USDA-FSA microloans
  - Loan financing through nonprofit organizations
  - Fresno County Housing Assistance Rehabilitation Program (HARP)
- Conversion from flood to drip irrigation
  - USDA NRCS-EQIP: cost-share for conversion to drip irrigation
  - State Water Efficiency and Enhancement Program (SWEET)
- PG&E energy efficiency programs
  - Free rate analysis
  - Rebates for small (<25 hp) pump repairs
- USDA-NAP (Noninsured Crop Disaster Assistance Program)

Q: Have you applied for any of these programs?

Program	# applied	# successful
USDA-NRCS EQIP (tractor and/or high tunnel)	3	1 (1 still waiting)
USDA-FSA microloan	3	2

Reasons for not applying: (N=46)

Don't know/haven't heard about it	56.52%
Know about programs, but not ready to apply yet	15.22%
Don't know if I would qualify	10.87%
Issue with not owning land	6.52%
Heard of programs, but don't know how to apply	4.35%
I'm not interested	4.35%
Requirements are too complicated	2.17%
Credit issues	2.17%
No time	2.17%
Close to retiring	2.17%

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## Summary

- Southeast Asian growers in Fresno County are almost entirely dependent on groundwater
  - Old, shallow wells with old, inefficient pumps
- Increased energy costs in the drought affect profitability
- Cost of drilling a new well is prohibitive (\$20 – \$50,000)
  - Difficulties in obtaining financing; challenges on leased land

→ **These farms are at risk if groundwater levels continue to drop**
- Opportunity to increase outreach/support to Hmong and other limited resource farmers for existing programs

## Acknowledgements:

- Fresno Regional Workforce Investment Board
- USDA Office of Advocacy and Outreach (OAO)
- Kings River Conservation District
- UCANR Informatics and GIS Program

