

# Introducing the INGENAES field project

## Household Remoteness and Patterns of Food Production and Consumption of Selected Crops in Tajikistan

Heather Anderson, MD  
University of Florida



# Tajikistan Background

- Small, landlocked country in Central Asia
- Established independence in 1991 with collapse of Soviet Union
- Suffered a civil war in 1990s
- Poorest Central Asian republic<sup>1</sup>
- Poverty rate 42%<sup>1</sup>
- Lacks abundant resources to provide stable economy and jobs
- Over 500,000 men emigrate to find work (primarily Russia)<sup>2</sup>



Source: <http://www.turkey-visit.com/tajikistan-map.asp>

Source: <sup>1</sup>World Bank 2016, <sup>2</sup>USAID 2016

# Khatlon Province, Tajikistan

- Agricultural region of Tajikistan
- During Soviet times focus on large scale cotton production at the expense of food production<sup>3</sup>
- During civil war much irrigation and infrastructure destroyed<sup>4</sup>
- 93% rural households have agricultural land<sup>5</sup>
- 80% cultivate land for vegetables, roots, tubers, grains, and fruit<sup>5</sup>



Source: <sup>3</sup>Grand et al 2001, <sup>4</sup>Jones 2017, <sup>5</sup>Dept.of Statistics 2012



# Households in Khatlon Province, Tajikistan

## Primarily resource poor households

- 17% households are female headed<sup>6</sup>
- Most households have limited to no electricity (especially during winter months)<sup>7</sup>
- Most households lack centralized water supply and sewage systems<sup>7</sup>



Source: <sup>6</sup>World Bank 2016, <sup>7</sup>Dept.of Statistics 2012

# Khatlon Province, Tajikistan

- Food preparation and cooking typically occur in separate building or outside to reduce exposure to pollutants
- Cotton wood often used as cooking fuel



# Remoteness

- No access to village stores
- Further distance from markets
- Difficult to access
- Limited resources
- Limited water and electricity
- Determined by Feed the Future Tajikistan Agricultural and Water Activity (TAWA) project





# Tajikistan: Markets

- Markets are located in each district and district capital
- Distance to markets vary for a few minutes to one hour



# Traditional Tajik Diet

Dietary diversity is important to improve nutrition and micronutrient deficiencies

Traditional Tajik Diet consists of:

- Bread
- Plov (rice dish)
- Yogurt
- Chai (tea)





## Significance: Malnutrition and Micronutrient Deficiencies

- Food insecurity, lack of nutritional diversity, poor sanitation and hygiene all contribute to these public health issues
- In children under 5:
  - 26% are stunted
  - 30% are anemic
  - 40% are Vitamin A deficient
  - 53% are Iodine deficient



# Internship Project Background

- Internship Experience: Tajikistan diversity assessment
  - Background literature review, study design, IRB approval, questionnaire design and implementation, 2 weeks in country data collection, data analysis and assessment
- Feed the Future Integrating Gender and Nutrition within Agricultural Extension Services (INGENAES) project
  - Focused on assisting Feed the Future countries by developing and strengthening gender-sensitive and nutrition-responsive extension programs and activities



# Feed the Future Tajikistan Agriculture and Water Activity

## TAWA

- Works with resource poor households to improve dietary diversity and malnutrition
- Provides gender sensitive nutrition and agricultural training

### 20 specific crops/products

Tomatoes	Cabbage
Cucumbers	Apricots
Mung beans	Eggplant
Cauliflower	Bok Choy
Sweet peppers	Turnips
Lima Beans	Radish
Broccoli	Spinach
Potatoes	Milk
*Asparagus	*Sweet potatoes
*Okra	*Brussel sprouts





# Research Questions & Project Objectives

1. Does the remoteness of a household affect production of specific crops among households in Khatlon Province, Tajikistan?
2. Does the remoteness of a household affect dietary diversity among households in Khatlon Province, Tajikistan?



# Methods

- Cross sectional study
- Non randomized
- Household Survey collected qualitative and quantitative data on food production, frequency of consumption and food acquisition
- Administered in the field by Tajikistan Agricultural University students



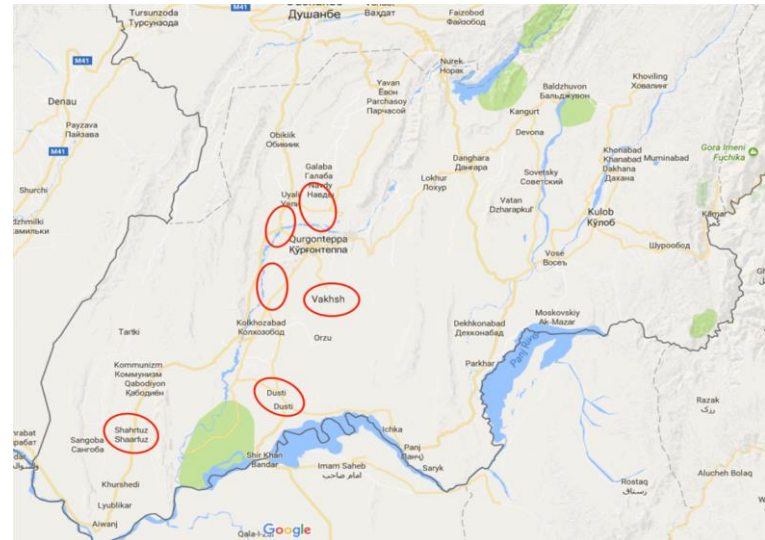
# Study Population

- Women in resource poor households involved in TAWA training
- Preselected by TAWA
- Targeted heads of households





# Study Site: Khatlon Province



107 household surveys in six districts

Villages classified as **REMOTE** and **NOT REMOTE**

# Data Analysis

- Key independent variables: remote and not-remote
- Key dependent variables: crop production consumption frequency, food acquisition
- Data entered into Microsoft Excel
- Analyzed for percentage of households
- Statistical significance determined by a 2 sample T-test



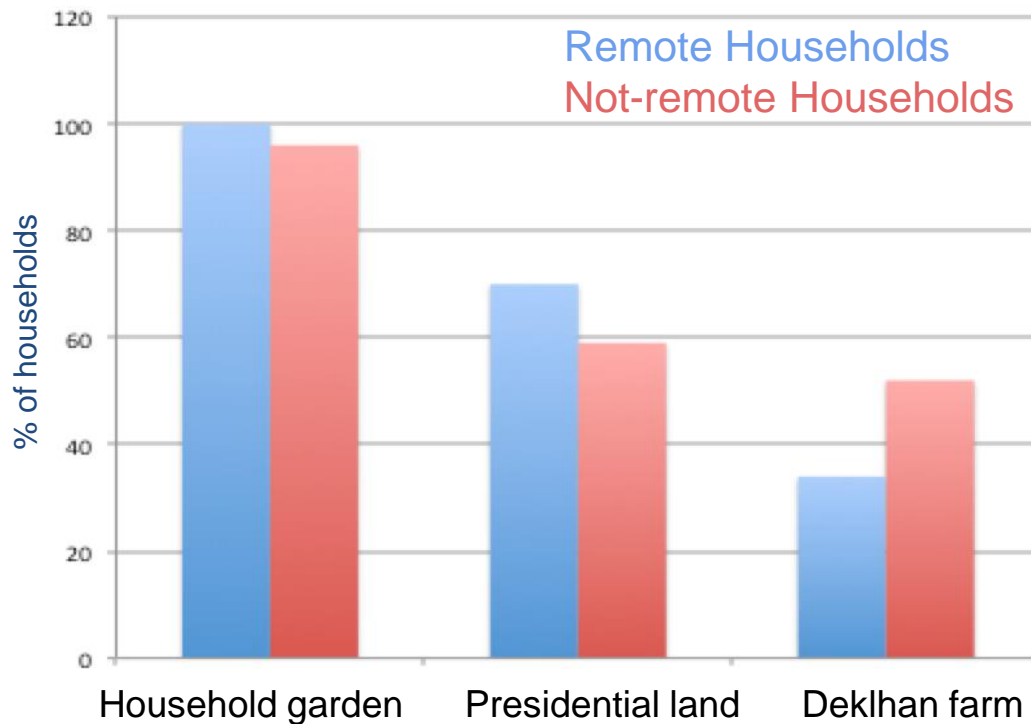
# Findings: Study Population

- 107 women ages 21 to 85 surveyed
- Average of 7 people live in a household
- Remote 53 households
  - Limited access to markets, limited resources, difficult to travel to, far from district market and poor roads
- Not-Remote 54 households
  - More resources, electricity, access to food supplies, easier to access, small store in village selling limited food items





# Findings: Household Agricultural Land



*Percentage of households that had access to agricultural land*

**Household gardens**  
Located adjacent to house and used to grow crops consumed by family.

**Presidential land**  
Separate land allocated by the government to supplement household garden production.

**Deklhan farms**  
Medium sized farms leased from the government for larger scale/commercial production

✧ No significant difference between households when comparing remoteness

# Findings: Household Garden Crops

Household Garden Crops	Remote	Not - Remote	P value	95% CI
	n = 53	n = 54		
	%	%		
Tomato	100	96	0.14	-3.5 – 13.2
Sweet pepper	96	89	0.17	-4.5 - 19
Potato	96	91	0.3	-6 – 16.5
Cucumber	94	83	0.076	-2.4 – 24.5
Eggplant	85	80	0.49	-10.8 – 20.5
Apricot	81	72	0.27	-8.3 – 25.8
Lima bean	79	72	0.4	-10.6 - 24
Cauliflower	72	41	0.0013	11 - 48.5
Radish	64	59	0.59	-14.5 - 24
Cabbage	62	46	0.098	-4.1 – 34.8
Turnip	51	65	0.14	-5.9 – 32.8
Bok choy	44	11	0.0001	15. 2- 48.8
Mung bean	34	24	0.26	-8.4 – 27.8
Sweet potato	32	9	0.0033	6.6 - 38.5
Spinach	23	24	0.9	-16.2 – 18.1
Brussel sprout	8	9	0.85	-11.4 – 13.3
Broccoli	6	2	0.29	-5.4 – 14.3
Asparagus	2	2	1	-8.4 – 8.4
Okra	2	4	0.55	-6.9 – 11.4

*Percentage of households growing particular crops in their household garden*

## Most Frequently Grown:

- Tomatoes
- Cucumbers
- Sweet Peppers
- Potatoes

## Remote households reported growing more:

- Sweet potato
- Bok choy
- Cauliflower

# Findings: Presidential Land Crops

Presidential land Crops	Remote n=53	Not-Remote n=54	P value
Potato	7	12	0.38
Tomato	2	6	0.29
Sweet pepper	2	6	0.29
Cauliflower	2	0	0.29
Eggplant	2	9	0.115
Cucumber	0	6	0.71
Apricot	0	0	0.3
Mung bean	0	2	0.3
Bok choy	0	0	
Cabbage	0	2	0.3
Turnip	0	2	0.3
Radish	0	8	0.16
Lima bean	0	2	0.3
Broccoli	0	2	0.3
Spinach	0	0	
Asparagus	0	0	
Okra	0	0	
Brussel sprout	0	0	
Sweet potato	0	0	

Potatoes most frequently grown

No statistically significant difference in remoteness

*Percentage of households growing particular crops on their presidential land*





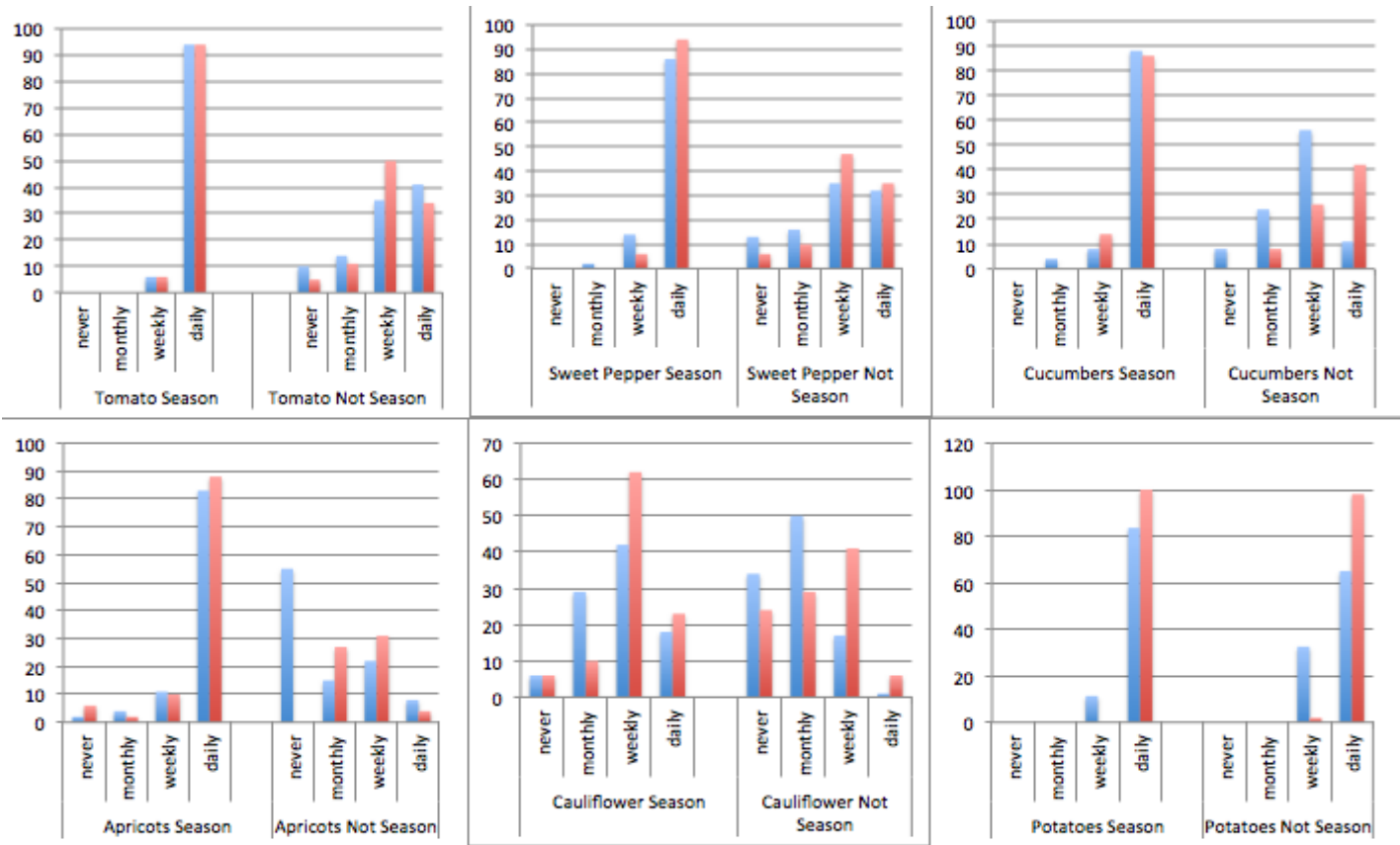
## Findings: Frequency of consumption

Crop	Never (S)	Never (NS)	1-3 times per month (S)	1-3 times per month (NS)	1-2 times per week (S)	1-2 times per week (NS)	3-4 times per week (S)	3-4 times per week (NS)	1 time per day (S)	1 time per day (NS)	2-3 times per day (S)	2-3 times per day (NS)	4 plus times per day (S)	4 plus times per day (NS)
Tomatoes	0	9	0	12	1	34	3	7	23	19	64	18	9	0
Sweet peppers	0	9	2	13	7	36	1	9	43	19	44	14	3	0
Cucumber	0	8	2	17	6	53	1	10	39	6	36	6	16	0
Apricot	1	45	3	19	7	26	2	3	39	3	37	4	11	0
Mung beans	34	33	12	19	36	35	8	8	6	4	3	1	1	0
Cauliflower	5	29	20	39	38	27	14	0	11	2	10	2	2	0
Eggplant	3	34	5	26	26	30	20	3	24	6	17	1	5	0
Bok choy	52	71	9	11	12	10	2	0	6	4	19	3	0	0
Cabbage	2	15	13	30	34	43	14	3	22	7	15	2	0	0
Turnips	32	58	16	14	20	15	6	4	19	7	7	1	0	0
Radish	10	57	7	20	11	17	6	0	32	4	32	2	2	0
Lima beans	8	7	8	14	32	46	16	10	20	15	15	8	1	0
Spinach	43	80	6	9	21	7	7	1	17	2	6	1	0	0
Potato	0	0	0	0	0	4	5	11	31	29	54	52	10	4

S = in season

NS = Not in season

# Frequency of consumption by season

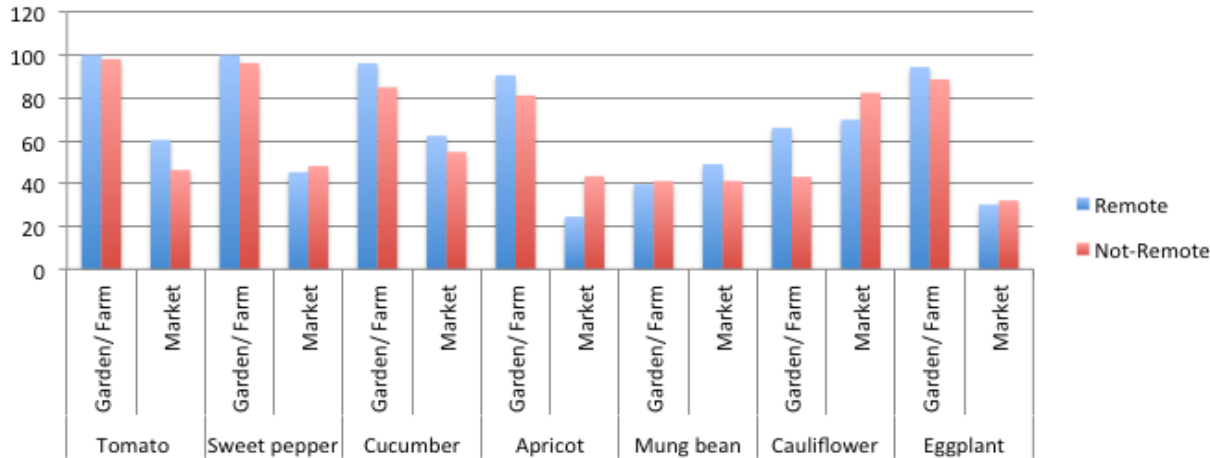


- Large seasonal variation reported in most crops
- Households dependent on crops in season for dietary diversity
- No significant difference in remoteness

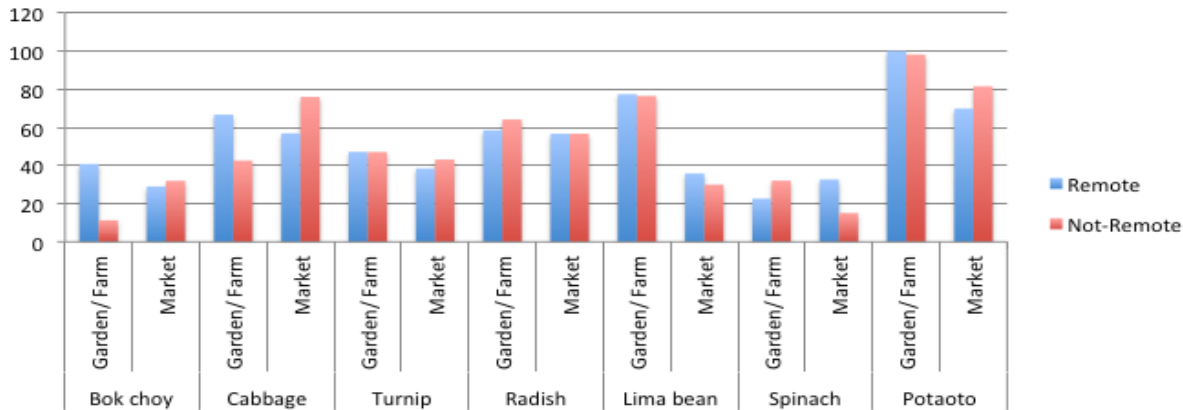
Remote Households

Not-remote Households

# Household food source by crop

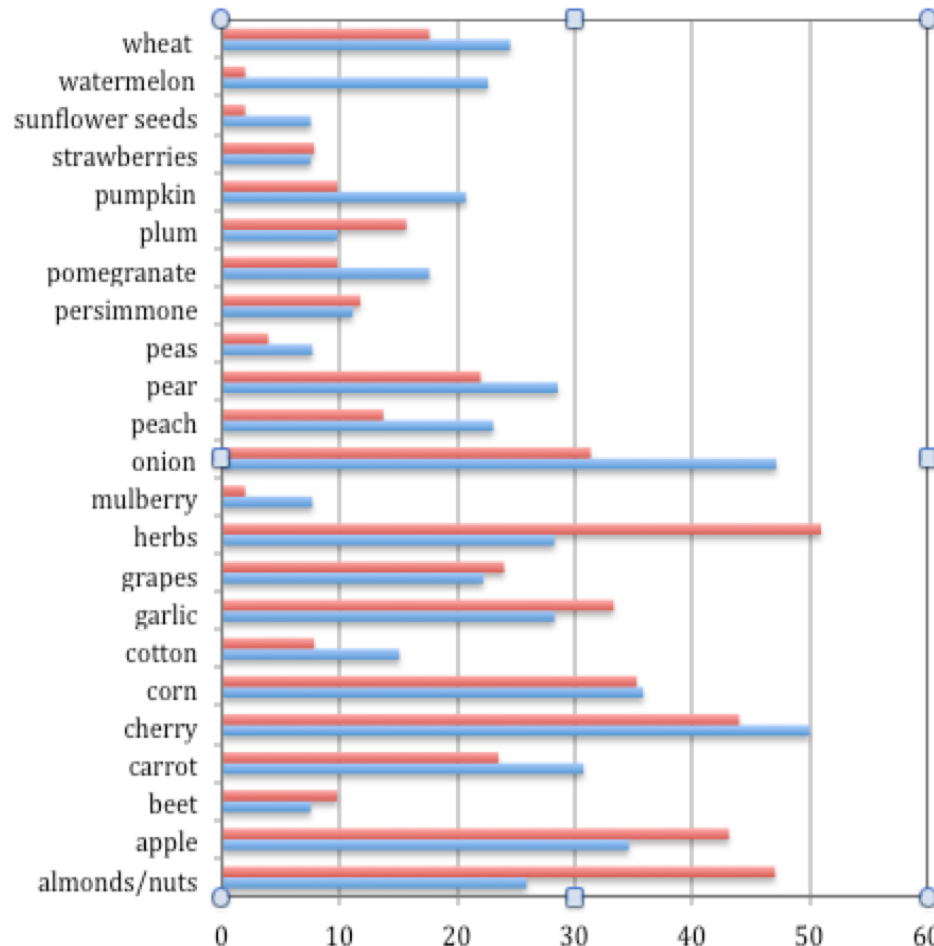


- Self production, garden and farm, is the most reported source for food
- Followed by markets
- Trading with neighbors was not a significant source
- No significant difference in remoteness





# Additional crops grown in household



- A higher percentage of not-remote households reported growing additional crops
- Can not determine significance due to collection bias

Remote  
Not- Remote

# Limitations



- Non-randomized study
- Selection bias
- Questionnaire -limited by time
- Did not quantify amount of food eaten
- Only focused on 20 specific foods, can not truly measure dietary diversity
- Determining remote vs not-remote location subjective

## Implications for practice



### Production

- Most common crops grown- tomatoes, cucumbers, sweet peppers, potatoes
- Households rely on their gardens and farms for food security
- Markets important also important source for food security
- Presidential land reported as not a significant food production source

### Consumption

- Most frequently consumed crops- tomatoes, cucumbers, sweet peppers and potatoes
- Large seasonal variation for consumption
- Dietary diversity limited by what crops can be produced



# Competencies learned

- Conducted research and epidemiologic investigations
- Managed, analyzed and interpreted data
- Effectively managed public health project
- Communicated results
- Participated in global health research





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# Thank you

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**USAID**  
FROM THE AMERICAN PEOPLE



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