



# **Adaptive capacity of apricot farm communities in response to changes in climate and water availability in Batken Oblast, Kyrgyzstan**

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# Introduction



- Apricot cultivation is a key source of income for the rural communities
- Surface irrigation using water from glacial and snow-fed runoff
- Progressing climate change and increasing water demand jeopardise these irrigated apricot systems
- Adaptation to these changes is needed for sustainable apricot cultivation
- This study aims to assess awareness and adaptive capacity of apricot farmers to climate change
- *This study is part of the SUFACHAIN project on sustainable agroforestry value chains in Central Asia*



# Research objectives



- I. Understand how farmers cope with and adapt to current climate variability**
- II. Identify factors influencing farmer strategies to cope and adapt (exploratory)
- III. Determine farmer adaptive capacity and constraints to adapt to future climate shocks



# Mixed-methods approach



## 1) Qualitative data:

- 9 Focus Group Discussions (FGDs)
- 5 villages
- 31 female, 22 male farmers
- Age 28 – 69 years
- Key expert interviews

## 2) Quantitative data:

- Household survey
- 7 villages
- 85 households, 66 male and 34 female respondents
- Sections on agronomics, socio-economics, shocks & adaptation strategies

Data collection took place in August 2024



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# Mixed-methods approach



## 3) Data analysis:

- Thematic analysis: Categorization of strategies, identifying patterns and pathways of coping & adaptation strategies (FGDs)
- Descriptive and inferential statistics to identify influencing factors on coping and adaptation strategies (Household survey data)



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# Preliminary results FDG: Major shocks



## Climate-Related Shocks:

- Noticeable atmospheric changes: warmer winters, reduced snowfall, and hotter summers.
- Water scarcity: Lack of irrigation water due to reduced glacier melt and erratic rainfall patterns.
- Droughts: Frequent droughts result in poor crop yields and water shortages.
- Heavy rains and mudslides: Excessive rainfall causes floods and damages apricot orchards, leading to gray mold and rot.

## Agricultural impacts:

- Apricot diseases: Gray scale lesions ("Boz tyshty") and various spots on apricots, resulting in smaller fruits with lower marketability.
- Pest infestations: Locusts and other pests attack crops, exacerbated by climate change and reduced pest control measures.

# Preliminary results FDG: Major shocks



## Border Conflicts:

- Kyrgyz-Tajik conflict (2021-2022): Farmers lost access to fields and markets, with significant damage to crops due to cross-border violence. In 2022, many could not harvest apricots as they were forced to flee from the fighting.

## Socio-Economic Challenges:

- Marketing difficulties: The conflict disrupted traditional trade routes with Tajikistan, leading to a decline in market access and income
- Land degradation: Decreasing groundwater levels and degraded pastures further exacerbate farming challenges



# Preliminary results (FGD): Coping mechanisms and barriers



- **Common Coping Mechanisms:**
  - Drip irrigation (adopted by a few)
  - Borehole drilling for groundwater (limited by costs)
  - Migration to supplement income
- **Significant Barriers:**
  - Limited access to water for irrigation
  - Lack of resources to combat pests (e.g. locusts)
  - Market limitations due to conflict
- Farmers with greater wealth and access to water have more resources for adaptation



# Preliminary results: Household survey



- Farm characteristics
  - Median cultivated land area: 2 ha
  - Median irrigated land area: 1.75 ha
  - 15 years median farm experience
  - 87% of households make  $\geq 50\%$  of their income off-farm
- Irrigation characteristics
  - 91% of interviewed households irrigate their crops (alfalfa, apricots, tomato and varveget)
  - Common irrigation period Mar/April – July, irrigating 3x/month
  - Flood and furrow irrigation most common (97% of all respondents)
  - Greatest challenges:
    - water pressure (50%)
    - water availability (22%)
    - infrastructure (16%)
    - weather (28%)



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# Main shocks and farm impacts (HH survey)



## Shocks:

Region	Batken <i>n</i> =85
Shocks related to the irrigation system (% responses of all HHs)	
Broken irrigation infrastructure	0
<b>Irrigation water restrictions</b>	26
High costs for irrigation	0
Shocks related to climate events (% responses of all HHs)	
<b>Droughts</b>	<b>45</b>
<b>Floods</b>	<b>45</b>
<b>Hail</b>	<b>36</b>
Heat waves	21
<b>Heavy rain</b>	<b>49</b>
Late frost	1
Storms and strong winds	15
Other (% responses of all HHs)	
Pests and diseases	6

## Farm impacts:

Region	Batken <i>n</i> =85
<b>Poor crop quality</b>	34
<b>Crop yield decline</b>	44
Poor tree product quality	4
<b>Tree product yield decline</b>	32
Higher product prices on the market	0
Lower product prices on the market	7
Lower farm household income	5

# Coping and adaptation mechanisms (HH survey)



## Coping mechanisms:

Region	Batken <i>n</i> =62
Get a loan	0
Reduce food expenses	1
Replant the affected crop(s)	6
Work more off-farm or on other farms	0
Sell assets	0
None	90

## Adaptation strategies:

Region	Batken <i>n</i> =85
Changed irrigation water source	0
Changed irrigation method	2
Changed irrigation frequency/ schedule	0
Irrigated less	1
Irrigated more	1
Changed crop/ tree type	1
Changed crop/ tree variety	0
Planted crops earlier	0
Planted crops later	0
Planted more trees on the field	1
Introduced/ used agroforestry practices	0
Decreased livestock holding	1
Diversified income sources	0
Increased off-farm income	1
Migrated for income generation	0
<b>None</b>	<b>66</b>

*\*20% no response*



# Coping and adaptation mechanisms (HH survey)



## Coping mechanisms:

Region	Batken <i>n</i> =62
Get a loan	0
Reduce food expenses	1
Replant the affected crop(s)	6
Work more off-farm or on other farms	0
Sell assets	0
None	90

## Barriers to adoption:

- Lack of access (5%)
- Lack of money (25%)
- Lack of knowledge (30%)
- None (25%)

## Adaptation strategies:

Region	Batken <i>n</i> =85
Changed irrigation water source	0
Changed irrigation method	2
Changed irrigation frequency/ schedule	0
Irrigated less	1
Irrigated more	1
Changed crop/ tree type	1
Changed crop/ tree variety	0
Planted crops earlier	0
Planted crops later	0
Planted more trees on the field	1
Introduced/ used agroforestry practices	0
Decreased livestock holding	1
Diversified income sources	0
Increased off-farm income	1
Migrated for income generation	0
<b>None</b>	<b>66</b>

*\*20% no response*

# Expected changes in water availability (HH survey)



Region	Batken <i>n</i> =85
Expected changes in irrigation water availability (% households)	
Water available earlier in the year	4
Water available later in the year	11
<b>Less irrigation water available</b>	<b>75</b>
More irrigation water available	7
No change expected	9
Expected adjustments in on-farm water management (% households)	
Switch to drought tolerant crops/ trees	38
<b>Switch to more efficient irrigation techniques</b>	<b>60</b>
Own a reservoir/ borehole for irrigation water	16

# Conclusions



- Over the past decade, farmers in Kyrgyzstan have faced multiple climate-induced shocks, including severe water shortages, droughts, extreme heatwaves, and heavy rainfall, all of which have negatively impacted crop and tree yields and the quality of crops.
- Migration has become a central coping strategy, with many households relying on off-farm income. For over half of the surveyed households, off-farm income contributes significantly to their livelihood.
- The Kyrgyz-Tajik border conflict has further exacerbated challenges for farmers by limiting access to fields during times of armed conflict and cutting off cross-border trade opportunities.
- Despite widespread awareness of climate-related issues and water scarcity, actual adaptation strategies at the farm level remain limited. Farmers acknowledge that worsening irrigation conditions will require future adjustments, but there has been little on-the-ground adaptation so far observed.
- Gulbara, can you add a sentence from the FGDs explaining why farmers adopt so little?



# Contact

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