

Socio-economic assessment of existing agroforestry production systems for fruit and nut production in Uzbekistan

Md Sofiullah*¹, Jannike van Bruggen¹, Dietrich Darr²
Rhine-Waal University of Applied Sciences, Kleve, Germany
University of Applied Sciences Weihenstephan-Triesdorf, Germany

An Initiative of the Federal Ministry of Education and Research

CLIENT II
International Partnerships for Sustainable Innovations

With funding from the:



SUFACHAIN
Sustainable Forest and Agroforestry Value Chains

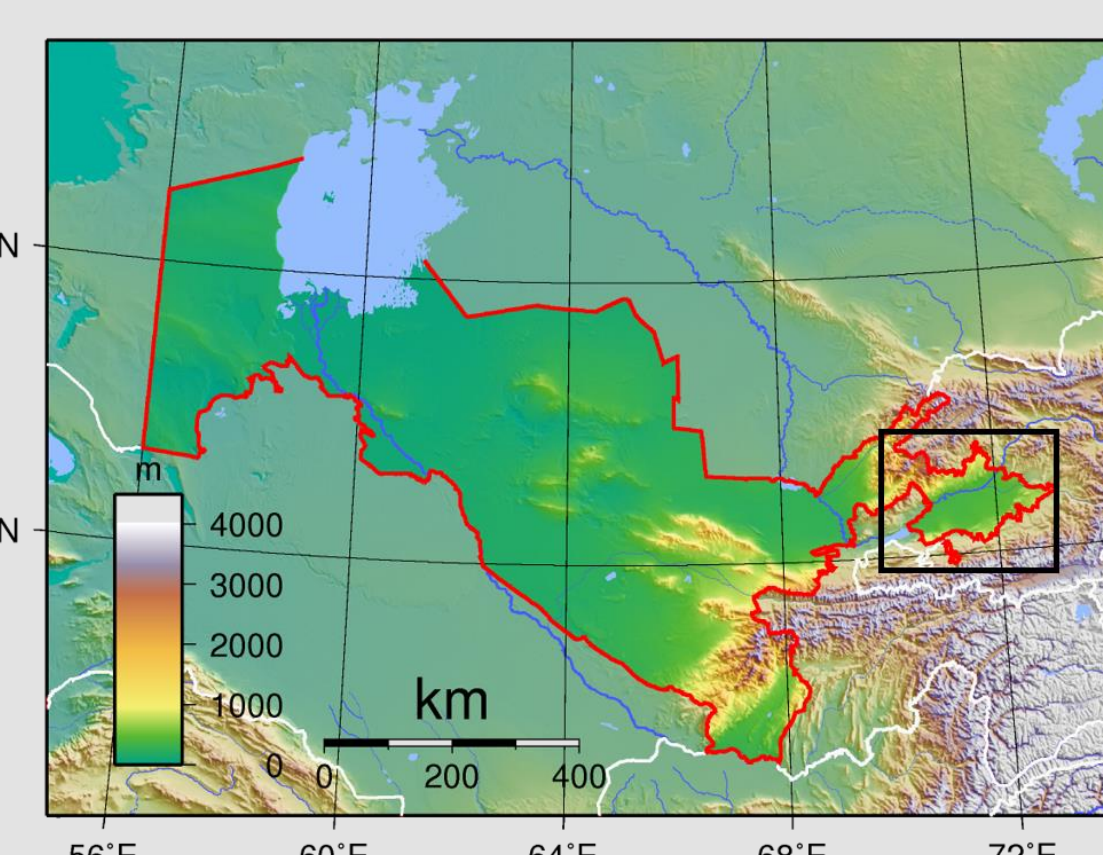
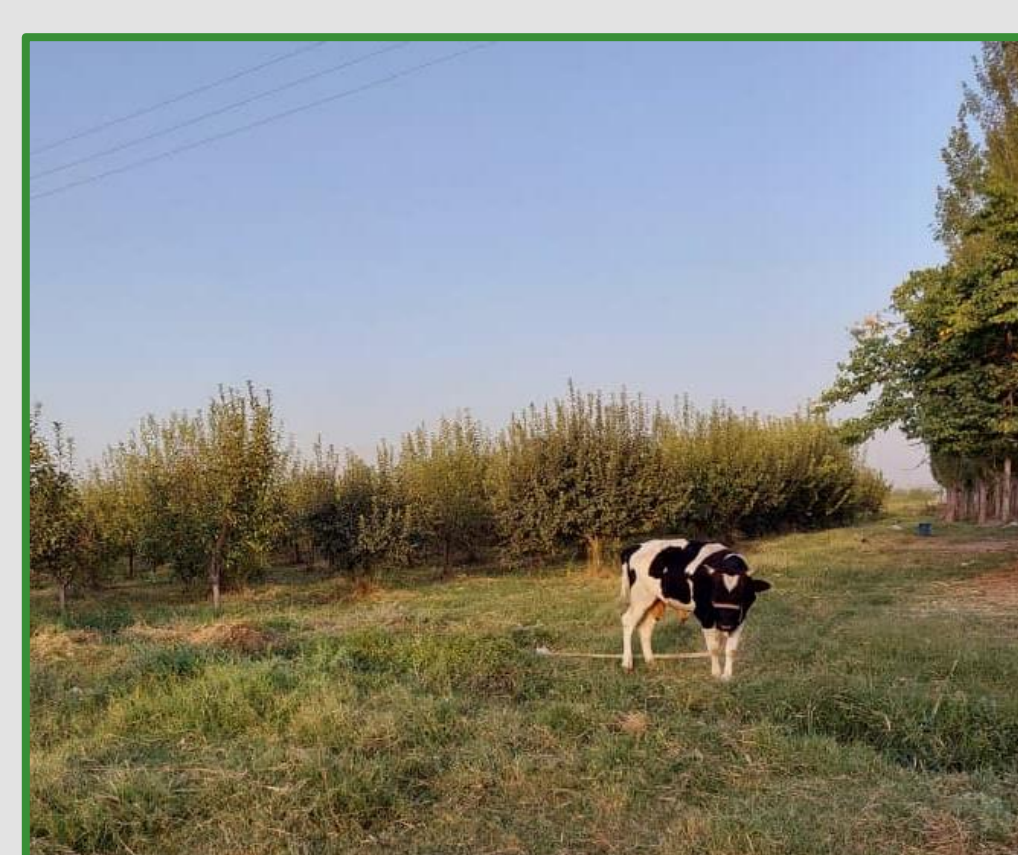
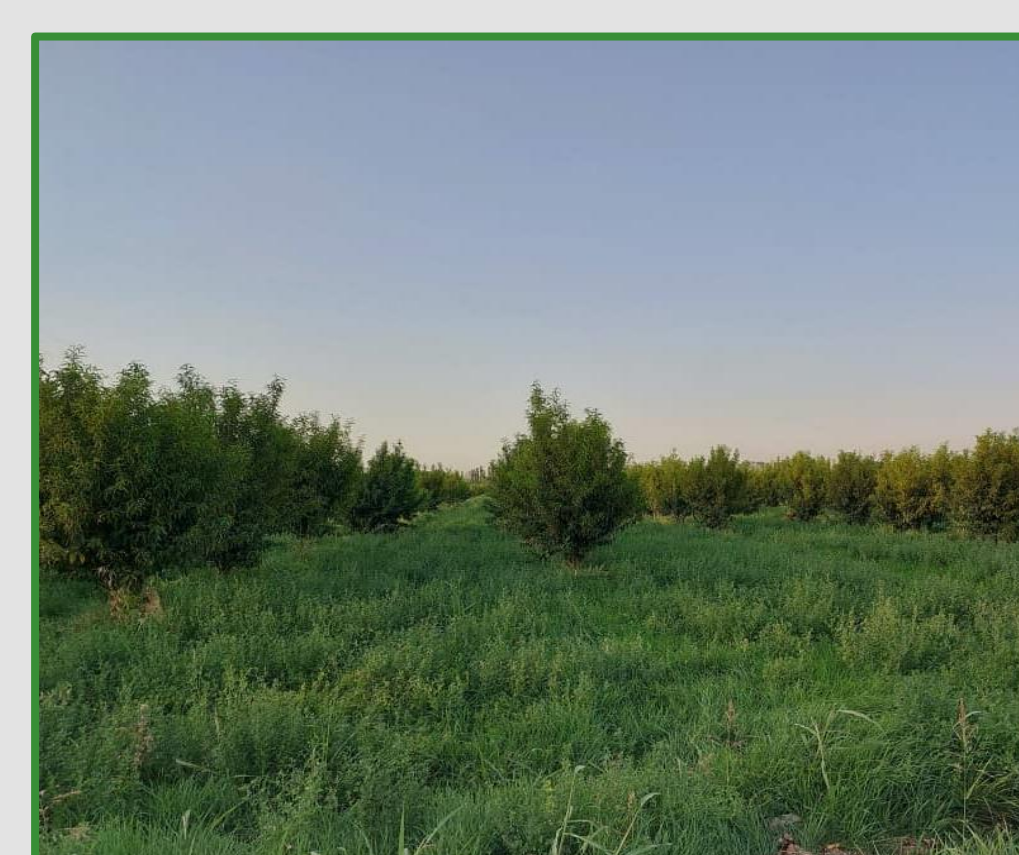
1. Introduction

- Uzbekistan's agricultural production systems are characterized by heightened vulnerability to economic volatility, climate-driven resource constraints, and environmental degradation, posing significant risks to the livelihood resilience of smallholder farming households.
- While **agroforestry systems (AFS)** offer strong potential to enhance food security, employment, and incomes through tree-crop-livestock integration, they remain understudied in the region.

2. Objectives

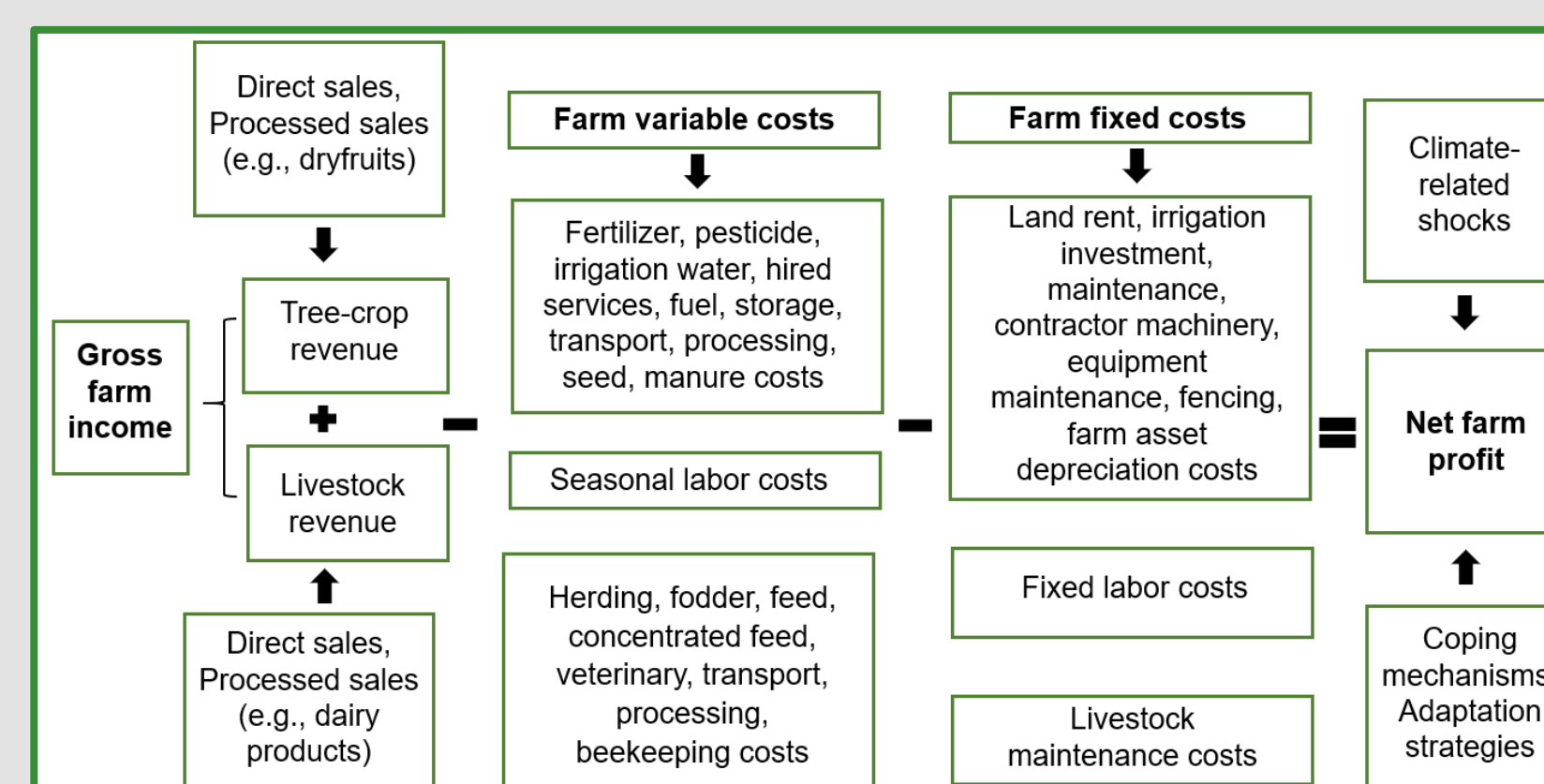
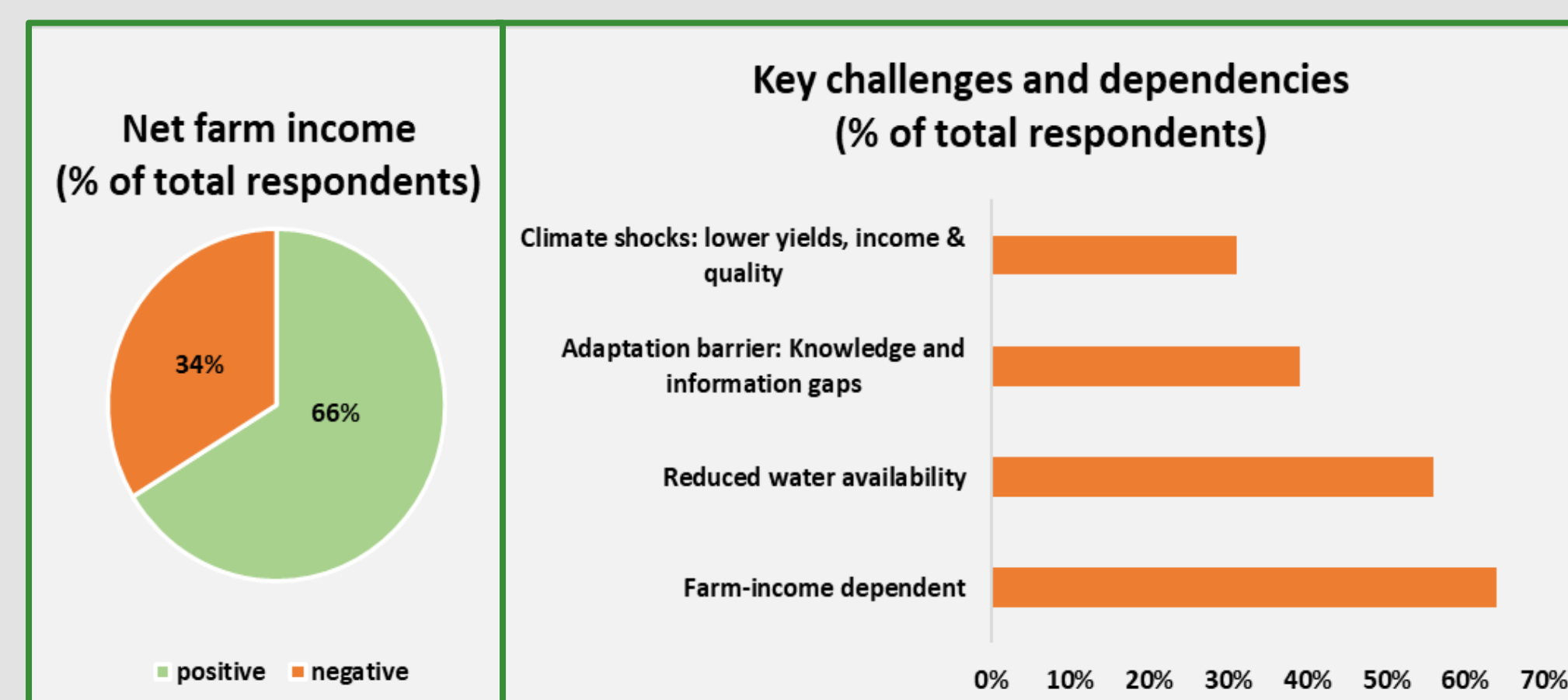
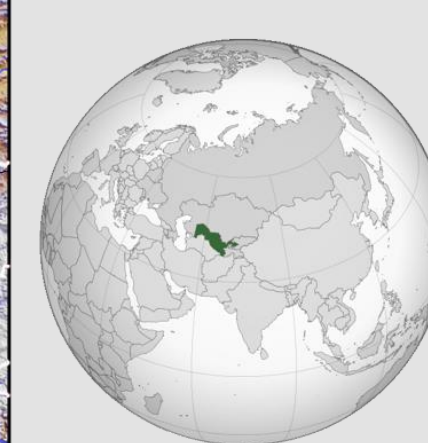
- This study aims to evaluate the financial and economic viability of agrisilvicultural and agrisilvopastoral systems in Uzbekistan compared with non-AFS systems, identify key determinants of farm profitability, and assess their overall contribution to household livelihoods.

Are AFS practical and sustainable solutions for supporting smallholder livelihoods in Uzbekistan?



Study sites:

- Altaryk
- Fergana
- Rishton



Figures: Left top: Peach AFS, Fergana; left top: Apple AFS, Fergana (© Chinara Abdymomunova); Right top: Study sites; Left bottom: Net farm income, key challenges, and dependencies; Right bottom: Analysis framework

3. Methods

3.1. Data collection

- Structured household survey (n = 260)
 - Socio-economic farm and household data
 - Farmer's production and sales decision-making
 - Opportunity costs of land and family labor contribution
 - Snowball sampling method
- Focus group discussions (n = 6)
- Key expert interviews (n = 6)
- Period: June 2025 to September 2025
- Locations: Three districts in the Fergana Valley region of Uzbekistan

3.2. Data analysis

- Static profitability analysis
- Dynamic profitability analysis
- Regression models
- Monte-Carlo simulations

4. Results

- Sample:** 65% agrisilvopastoral systems, 28% agrisilvicultural systems.
- Reason to practice AFS:** environmental benefits, higher yields, improved soil fertility, product diversity, climate adaptation, and water efficiency (80% of respondents).
- Family contribution:** 80% of smallholder farming households.
- Farm income:** mainly from high-value crops such as grapes, apricots, tomatoes, potatoes, peaches, and apples, along with livestock including poultry, sheep, and cattle.
- Irrigation challenges:** conflicts among users, low water pressure, and limited water availability (75% of respondents).
- Coping with shocks:** replanting, adjusting planting/harvesting, cutting non-food expenses, using savings, selling assets, and temporary migration.
- Off-farm income:** two-thirds of households (66%) earned income from off-farm activities, mostly less than or about half of total income, while one-third (32%) relied solely on farming.

5. Discussion

- Farmers have experienced a number of shocks over the past 10 years, including **extreme heat, water shortages, strong winds and storms, heavy rain, and drought**.
- Farming activities are constrained by **labor shortages**, insufficient extension services, limited financial resources, and **declining soil productivity**.
- Climate shocks have significantly affected the profitability of smallholder farming households in Uzbekistan, resulting in **reduced yields and lower quality** of both trees and crops.
- Differences in **crop management practices** and **AFS types** may be associated with **variations in farm profitability**.



5. Conclusions

- Agroforestry improves productivity and resilience but is constrained by labor shortages, irrigation issues, climate shocks, and lack of knowledge.
- Findings highlight that effective farm management practices and agroforestry systems are positively associated with higher farm profitability.

Contact

Md Sofiullah & Dr. van Bruggen
md.sofiullah@hsrw.eu
jannike.vanbruggen@hsrw.eu

Rhine-Waal University of Applied Sciences
Marie-Curie-Strasse 1
47533 Kleve, Germany

