



Diverse Agroforestry Systems of Central Asia: Exploring the Traditional Practices

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An Initiative of the Federal Ministry of
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 Sustainable
Food Systems

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Challenges ahead in Central Asia



In the agricultural and forest landscapes

- ↳ One of the most vulnerable regions to climate change (*Vakulchuk et al. 2023*)
- ↳ Greater temperature rise than other parts of the world (*Sabyrbekov et al. 2023, IPCC 2022*)
- ↳ Agricultural sector is an important source of livelihood for the rural population in Central Asia!

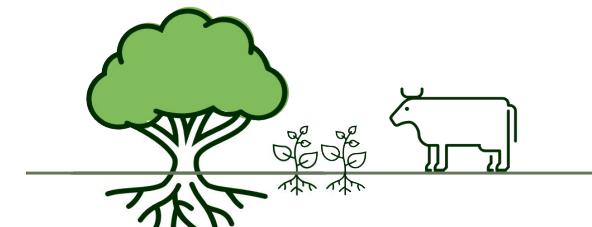
Threats now & future:

- ↳ Excessive water use & scarcity
- ↳ Land degradation
- ↳ Overgrazing
- ↳ Erosion
- ↳ Population increase



A possible solution...

Agroforestry systems (AFS)



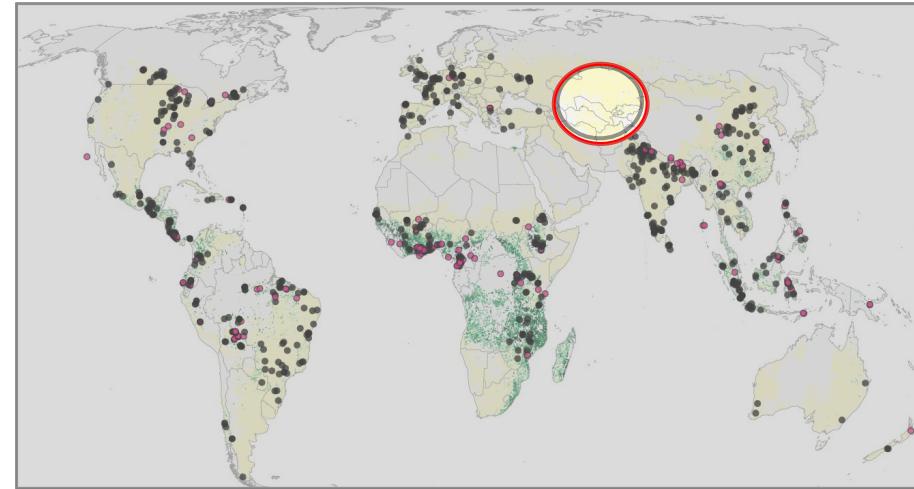
AFS in Central Asia



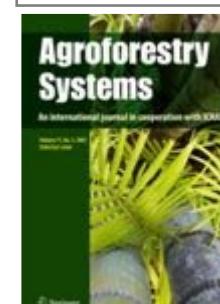
Current knowledge of AFS practices:

Practice	Spread
Alley Cropping	Moderately practiced
Silvopasture	Rarely practiced
Windbreaks	Rarely practiced
Live fences	Rarely practiced
Fruit-based agroforestry	Moderately practiced, but increasing
Kitchen gardens	Extensively practiced
Managed woodland for NTFP	Rarely practiced
Riparian buffers	Moderately practiced

Defined by *Djanibekov et al. (2016)*



Modified from *Terasaki Hart et al. (2023)*

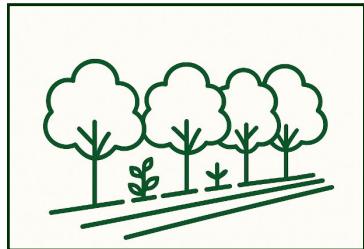


Publications mostly describing poplar & windbreaks

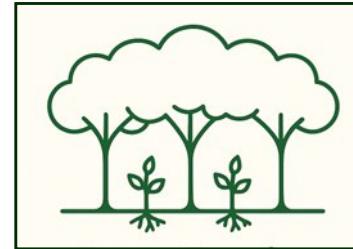
What AFS practices exist?



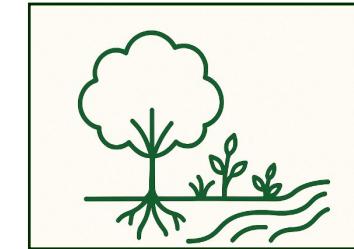
Different systems possible



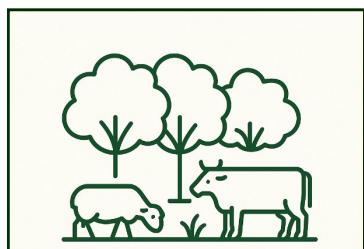
Alley Cropping



Forest Farming



Riparian Buffer



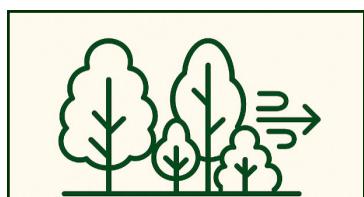
Silvopasture



Food Forest



Homegarden



Windbreak,
live fences

[...]

What inter- and intra-diversity exist?
incl. tree, crop, animal species



How to get an AFS overview?

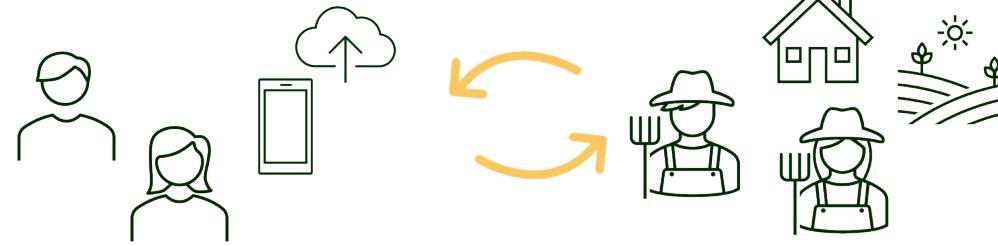


Mixed method approach: collecting observations

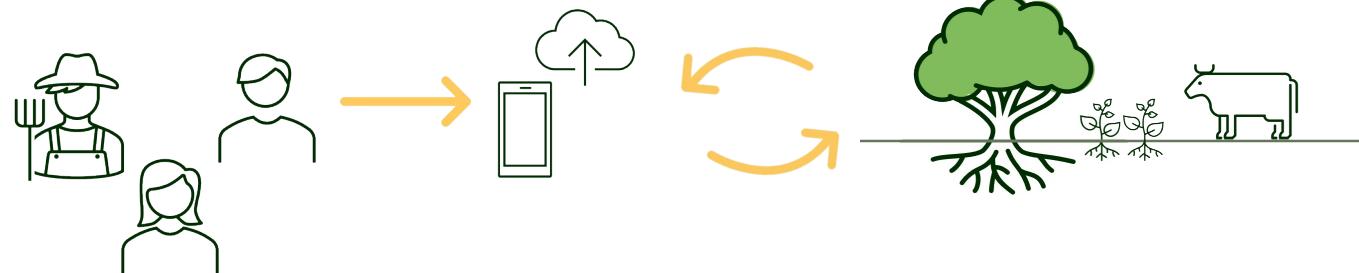
A. Literature review



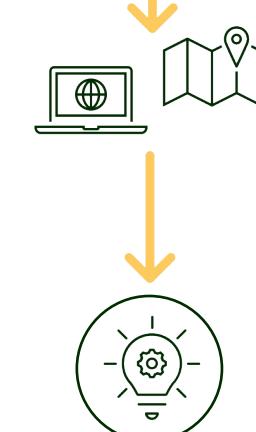
B. Household survey



C. Agroforestry survey tool



tree, crop, animal, place, photo



Agroforestry survey tool



A randomized and easy access approach

- Permanent survey link which allows to access via mobile or desktop
- Data collection of photos, GPS position, and more details
- Automatic upload to University's server, GDPR compliant
- Open-Source Software (ODK & Enketo)
- Shared among stakeholders

Expected output: Online map & structured glimpse



Welcome to the Agroforestry Survey Tool!

This survey will ask you several questions about agroforestry systems (AFS). The answers will contribute to an overview of the AFS present in Central Asia. This assessment is part of the SUFACHAIN project. For more information, visit <https://sufachain.org>

The survey will guide you through several questions.

An AFS is defined by the combination of trees with crops and/or livestock. Herein, trees include all woody structures as trees or shrubs. The term crop refers to all arable plants, including vegetables.

Please see the defining picture below:



First, which of the following best describes your role?
Select one.

- Researcher
- Farmer
- Consultant
- Other

Results: Insights via photos

AFS inter-diversity



Visual knowledge



Case: “The land of apricots”



Apricot (*Prunus armeniaca*) in the Batken Oblast - Kyrgyzstan

- ↳ Semi-arid, cold desert climate (BWk)
- ↳ ~ 10,000 hectares of apricot orchards
- ↳ Mostly furrow irrigated and management varies
- ↳ Highly susceptible to climatic events (e.g. frost, drought)
- ↳ Variable yield (e.g. alternance)
- ↳ Main source of income for the local people
- ↳ Export: mostly CIS countries, and increasingly to the EU





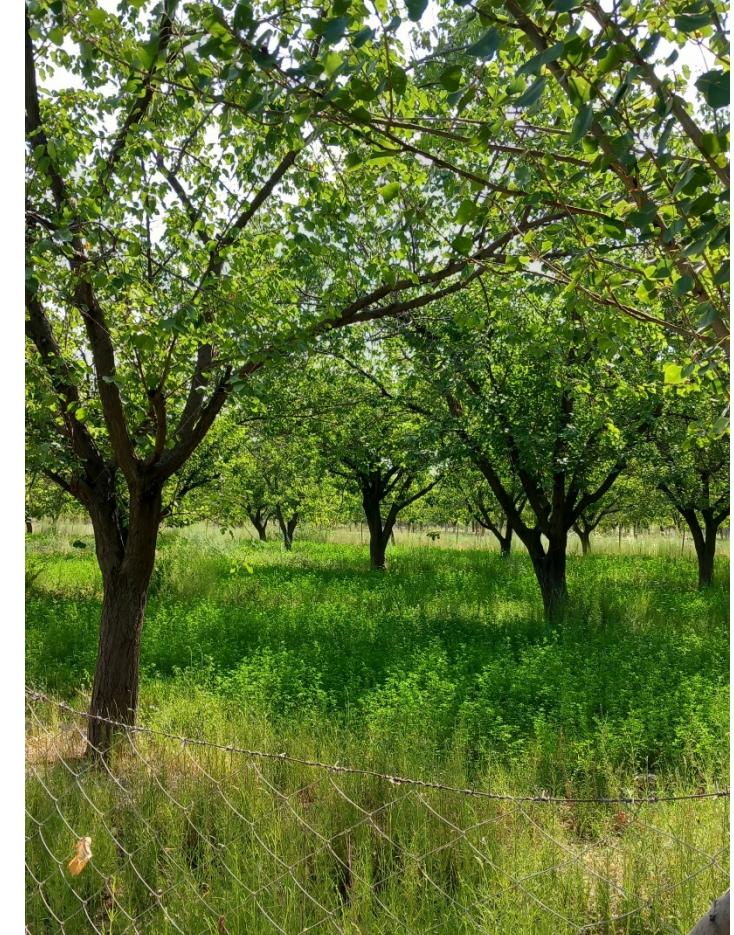
“Land of apricots” |



AFS intra-diversity



AFS of apricot & alfalfa



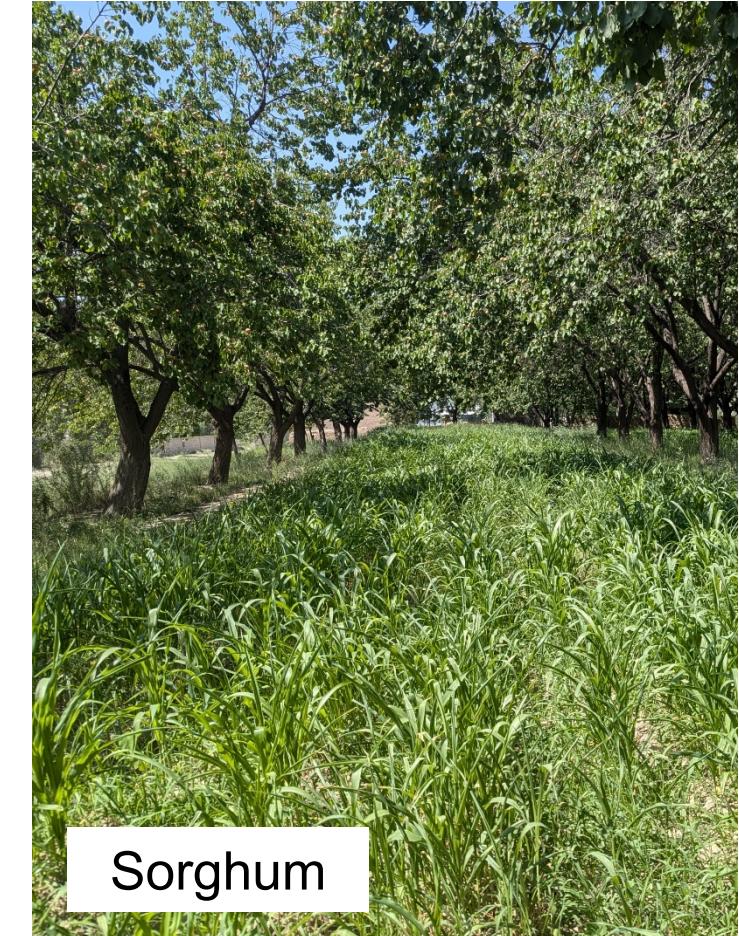
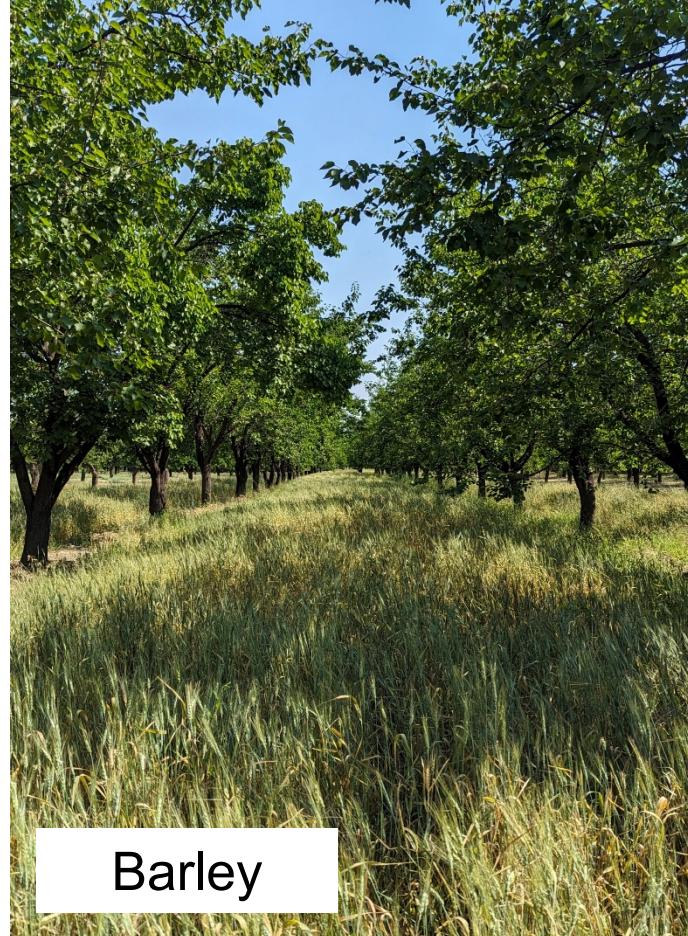
“Land of apricots” ||



AFS intra-diversity



More combinations, apricot & ...



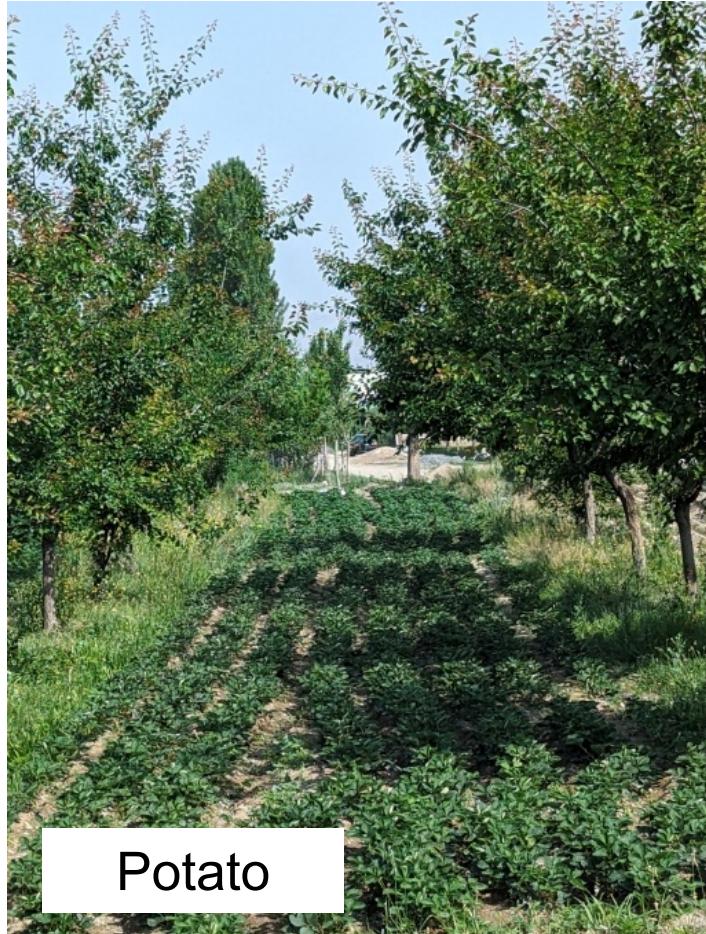
“Land of apricots” III



AFS intra-diversity



More combinations, apricot & ...



“Land of apricots” IV



AFS intra-diversity



More combinations, apricot & ...





& animals...

What to expect?



Preliminary conclusions

Inter-Diversity

- ↳ Manifold AFS practices exist
- ↳ Photos create visibility

Future research (ongoing)

- ↳ Assessing AFS management: apricot, walnut
- ↳ Creating a map of AFS practices
- ↳ Understanding distribution

Intra-Diversity

- ↳ Apricot AFS show several examples of combinations:
 - ↳ crops
 - ↳ animals

Discussion

- ↳ AFS practices definition?
- ↳ Multifunctionality and resilience assessment?
- ↳ Response via AFS tool very low, how to improve?

A paradigm shift...



Diversified agriculture outperforms specialized agriculture!

The screenshot shows a Science magazine article. The header includes the Science logo and a red navigation bar. Below the header, the article title is displayed: "Joint environmental and social benefits from diversified agriculture". The authors listed are LAURA VANG RASMUSSEN, INGO GRASS, ZIA MEHRABI, OLIVIA M. SMITH, and CLAIRE KREMER, with a note for 153 other authors. The article is categorized as a "RESEARCH ARTICLE" under "FARMING PRACTICES". Social media sharing icons for Facebook, X, LinkedIn, and others are present. The bottom of the screenshot shows the journal information: "SCIENCE" (Vol 384, Issue 6691, pp. 87-93, DOI: 10.1126/science.adj1914).

Rasmussen et al. (2024)

Contact



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Find out more www.sufachain.org



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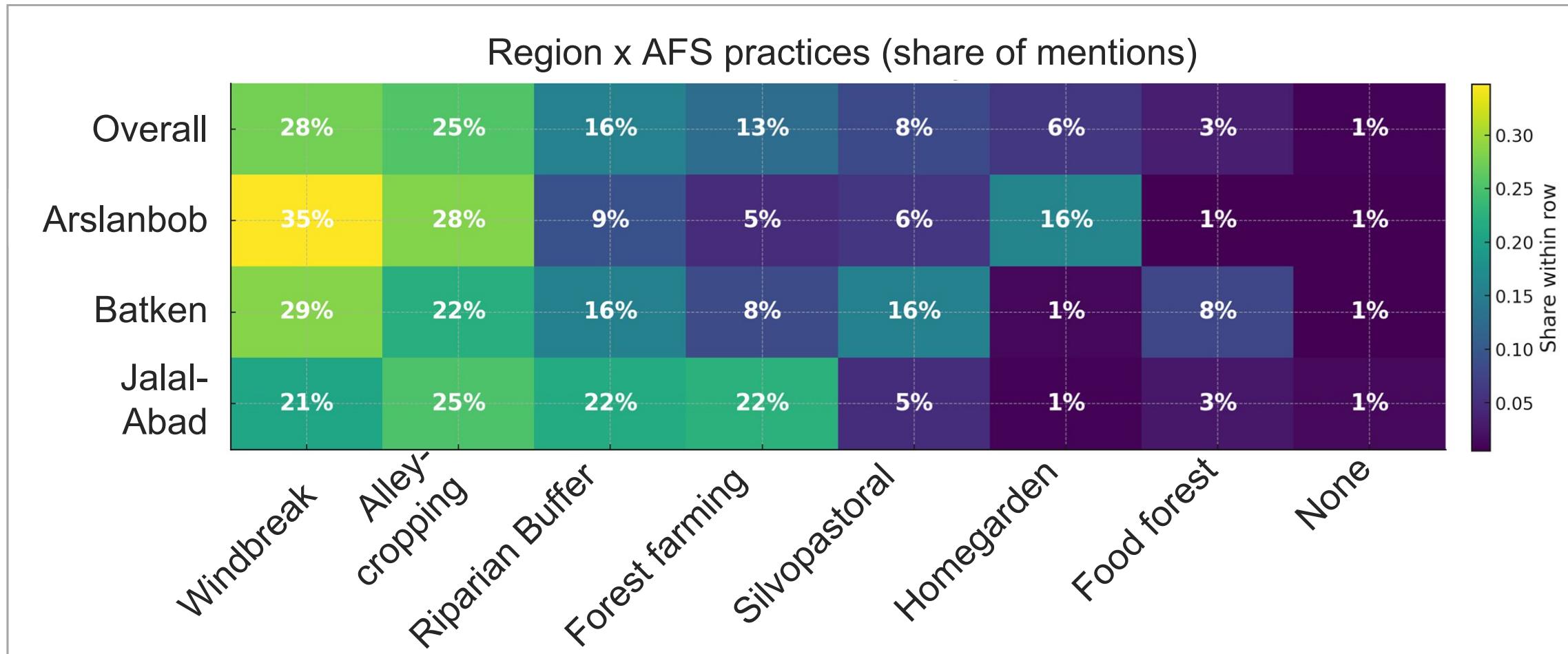
With funding from the:



Household survey: Kyrgyzstan



First insights: distribution (n=250)





Walnut &
Alfalfa

Walnut &
Pasture & Cow



Windbreak Poplar



Walnut & Potatoe



Walnut &
Turkey



Lavender
& Cherry



Übersetzung
milk thistle



Hazelnut



Onion



Birch



Thistle