Smartphone-based weather information acquisition on climate change perception accuracy

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Motivation

- Drought is a serious threat to farmers in semi-arid and arid regions
- It has negative impact on agricultural production threatening rural livelihoods

Fig. 1: Drought in agriculture
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- Climate change adaptation critically depends on farmers‘ early recognition of climate change and drought stress

Objectives

- Identify meteorological drought occurrences in the study areas between 2010 and 2020 using the SPEI based drought index.
- Check accuracy of farmers’ perception about meteorological drought changes by tracking objective meteorological drought occurrence between 2010 and 2020 (Fig.2).
- Understand the role of smartphone-based weather information acquisition on accurate meteorological drought perception.

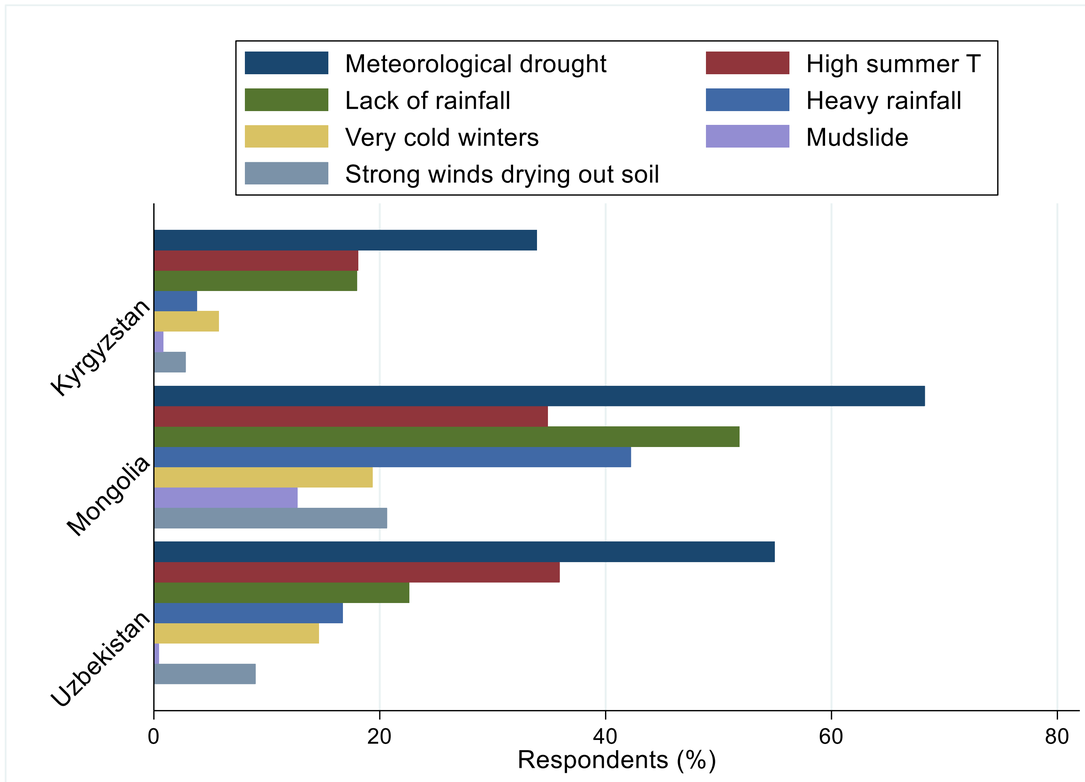

Fig.2: Direct personal experience of extreme weather events in Kyrgyzstan, Mongolia and Uzbekistan

Data and methods

- Primary cross-sectional dataset (n=2830) from Kyrgyzstan, Mongolia and Uzbekistan collected in 2021
- SPEI drought index calculated from satellite data
- PSM estimation method (Nearest Neighbour (NN); Kernel Matching (KM) estimates)

Results

- Severe drought episodes increased in Kyrgyzstan during the period between 2010 and 2020.
- Severe droughts episodes decreased in Uzbekistan and Mongolia during that period (Fig. 3).
- The perception of meteorological drought by 33% of farmers in Kyrgyzstan, 68% in Mongolia and 54% in Uzbekistan was consistent with objective drought identification (SPEI).

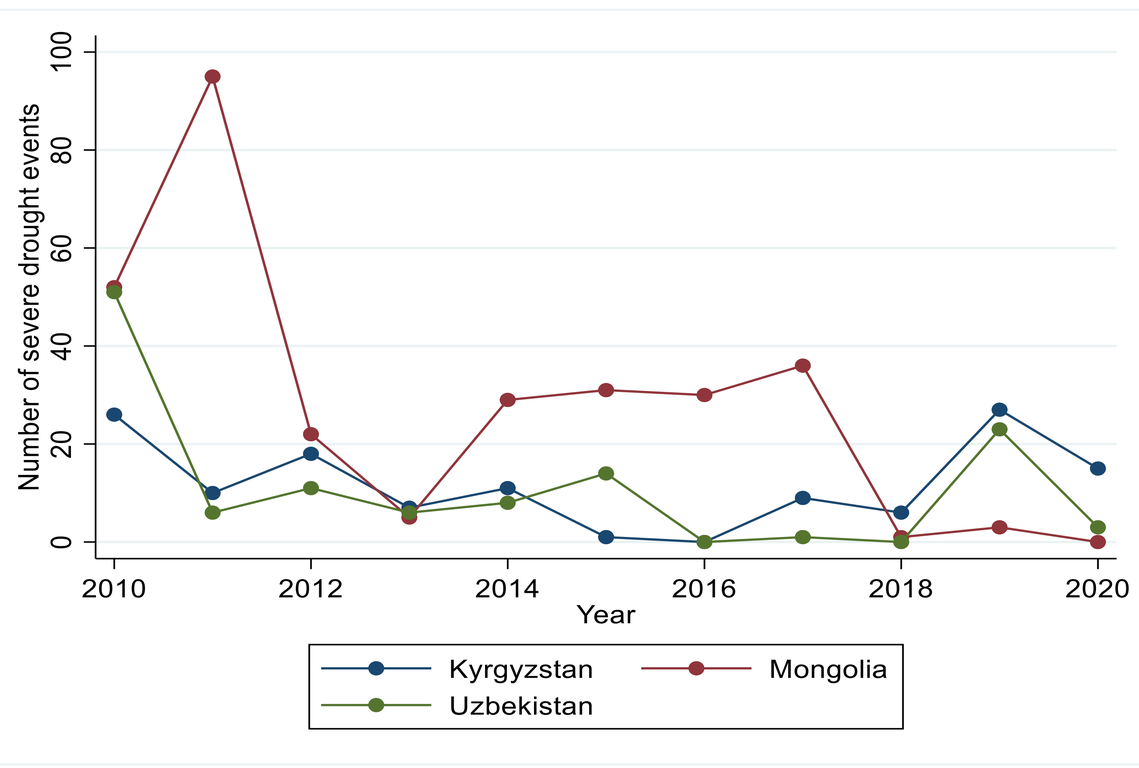

Fig. 3: Total number of severe droughts in each study area during the vegetation season

- Weather information via smartphone significantly influenced the accurate meteorological drought perception in Kyrgyzstan and Mongolia, but insignificantly in Uzbekistan (Tab.1).

Tab.1: ATT results for the impact of smartphone-based weather information Acquisition on accurate meteorological drought perception

Accurate meteorological drought perception	NNM	KM
Kyrgyzstan	0.133 (0.00) ***	0.133 (0.04) ***
Mongolia	0.149 (0.10) ***	0.149 (0.10) ***
Uzbekistan	-0.030 (0.05)	-0.029 (0.05)

Conclusion

- Policy makers should create conducive environment to boost the adoption and usage of apps (e.g. FarmPulse established in KlimALEZ project of IAMO) to access weather information and support risk management.

Acknowledgements and contacts

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KlimALEZ

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