



EMS Annual Meeting Abstracts

Vol. 19, EMS2022-476, 2022, updated on 30 May 2023

<https://doi.org/10.5194/ems2022-476>

EMS Annual Meeting 2022

© Author(s) 2023. This work is distributed under the Creative Commons Attribution 4.0 License.



## A low-cost approach to develop Weather, Water and Climate Services (WWCS) in rural areas of Tajikistan

**Omar Bellprat**<sup>1</sup>, Christoph Spirig<sup>1</sup>, Moritz Flubacher<sup>1</sup>, Jacques Grandjean<sup>1</sup>, Yves-Alain Roulet<sup>1</sup>, Lionel Moret<sup>1</sup>, Mathias Bavay<sup>2</sup>, Joel Fiddes<sup>2</sup>, Boris Orłowsky<sup>3</sup>, Shinan Kassam<sup>3</sup>, Hafiz Kalandarov<sup>3</sup>, Safarali Yatimov<sup>3</sup>, Akramkhanov Akmal<sup>4</sup>, Stefan Martin Strohmeier<sup>4</sup>, Ram Sharma<sup>4</sup>, Mira Haddad<sup>4</sup>, Ajit Govind<sup>4</sup>, Kaya Fatih<sup>5</sup>, and Dominique Berod<sup>5</sup>

<sup>1</sup>Federal Office of Meteorology and Climatology (MeteoSwiss), Switzerland

<sup>2</sup>Swiss Federal Institute for Snow and Avalanche Research (SLF), Switzerland

<sup>3</sup>CARITAS, Switzerland

<sup>4</sup>International Center for Agricultural Research in the Dry Areas (ICARDA)

<sup>5</sup>World Meteorological Organization, WMO, Switzerland

Severe weather and climate change take a high toll on the most vulnerable population of Tajikistan. Every year, droughts, flooding or avalanches and non-optimal management practices cause food insecurity and affect the lives of exposed rural communities. Weather, Water and Climate Services (WWCS) that support agronomic decisions and early warning systems can greatly reduce socio-economic and environmental impacts on vulnerability and well-being. However, a lack of resources and local capacities have so far inhibited their development. In response to this urgent need, a consortium of Swiss federal institutions, the WMO and ICARDA, led by CARITAS Switzerland and with co-funding from the Swiss Agency for Development and Cooperation, support governmental and private sector partners in Tajikistan to develop WWCS. The project improves the observational database by deploying a large number of low-cost automated weather stations complemented by citizen observations in remote areas. These stations enable post-processing of forecasts and thereby the development of reliable services tailored to local user-needs. The underlying hardware and software developments follow a strict open-source policy and combine technical expertise in sensor development and statistical post-processing. The approach enables therefore replicability and scaling of the services at minimal costs. Comparative measurement studies show promising accuracy and stability of the data retrieval in comparison to more standard approaches. Post-processing of ECMWF ensemble predictions, which are now publicly available at a resolution of 0.4° (~40km), proved efficient to develop reliable air temperature forecasts. Pilot WWCS based on citizen observations have already helped to increase agricultural yield at a test site.