Green Central Asia

Enhancing environment, climate and water resilience

Federal Foreign Office

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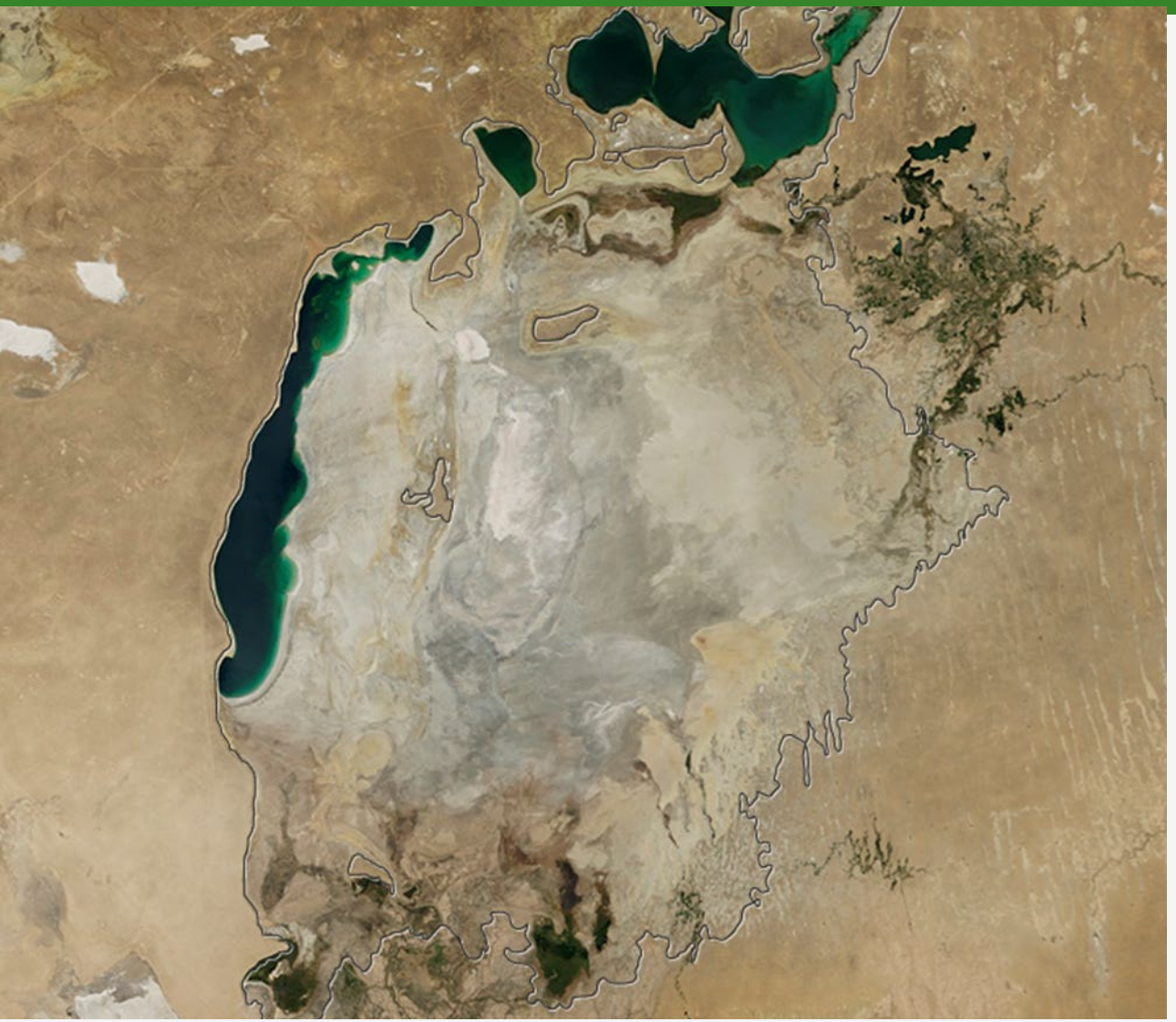

# Monthly drought bulletin in the Areal Sea Basin cropland area


Christopher Conrad, Muhammad Usman, Peter Liebelt

Institute of Geosciences und Geography
Department of Geoecology


Schafft Wissen. Seit 1502.

MARTIN-LUTHER-UNIVERSITÄT
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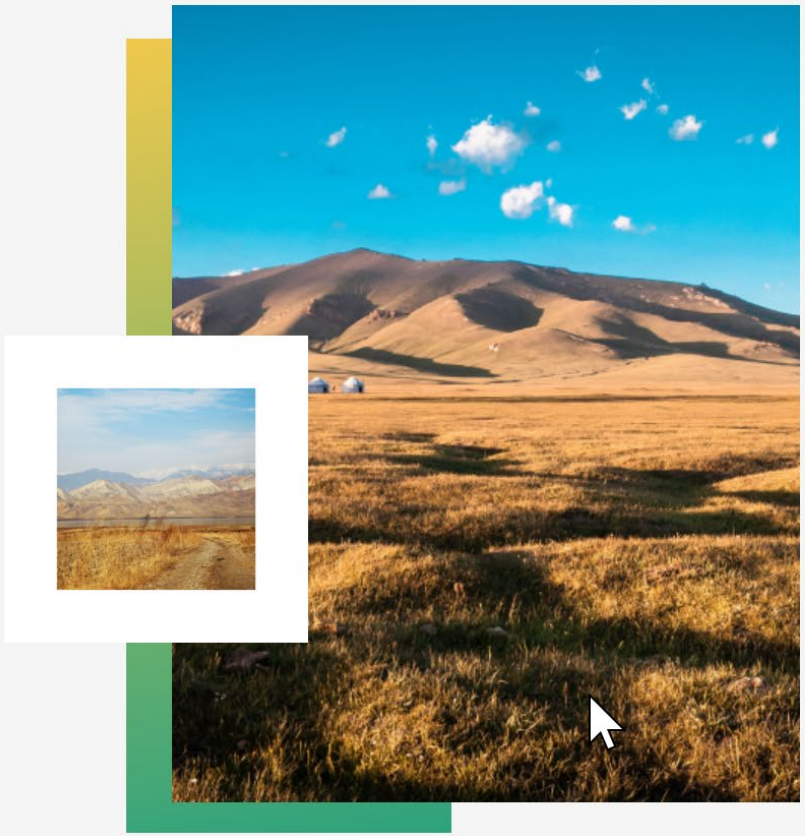


# German Initiative

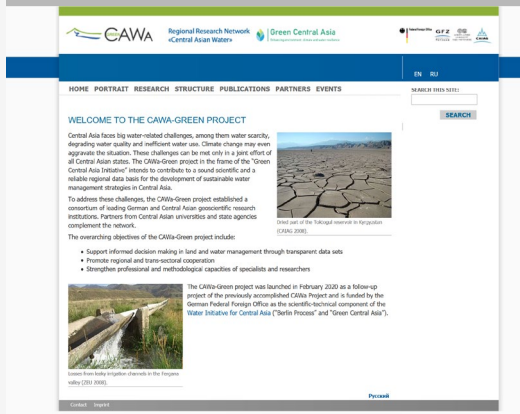
## Green Central Asia: Transboundary dialogue on climate, environment and security in Central Asia and Afghanistan

The aim of 'Green Central Asia' is to develop a political dialogue and consequently create better access to information and data in order to enable countries to assess the impact of climate change more accurately and to develop cooperative preventive measures. The target group of the Initiative consists of the foreign ministries (and, through them, the respective institutions responsible for climate and environmental resources, including educational and research institutions) of Kazakhstan, the Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan as well as Afghanistan.

DISCOVER MORE

http://greencentralasia.org/en

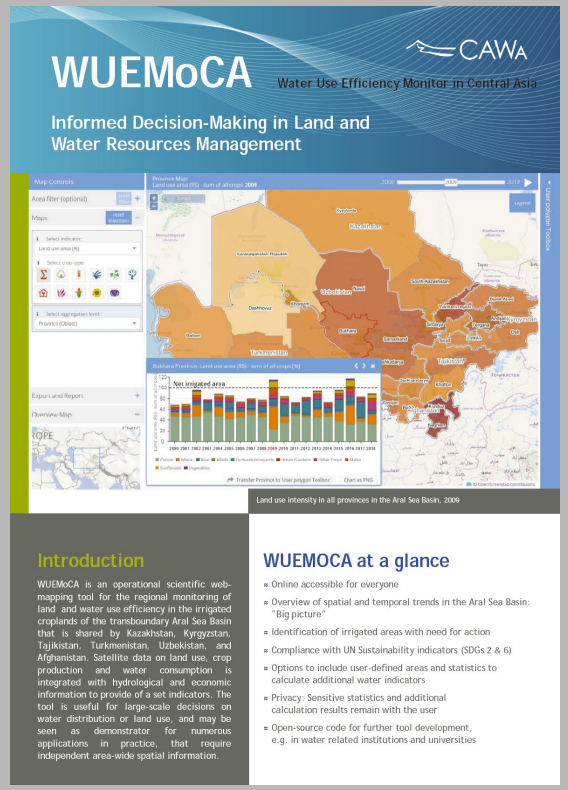

Foreign Minister Maas and his counterparts from Central Asia and Afghanistan in Berlin, 28.01.2020, © Florian Gaertner/photothek.net




http://www.cawa-project.net/welcome-to-the-cawa-green-project/

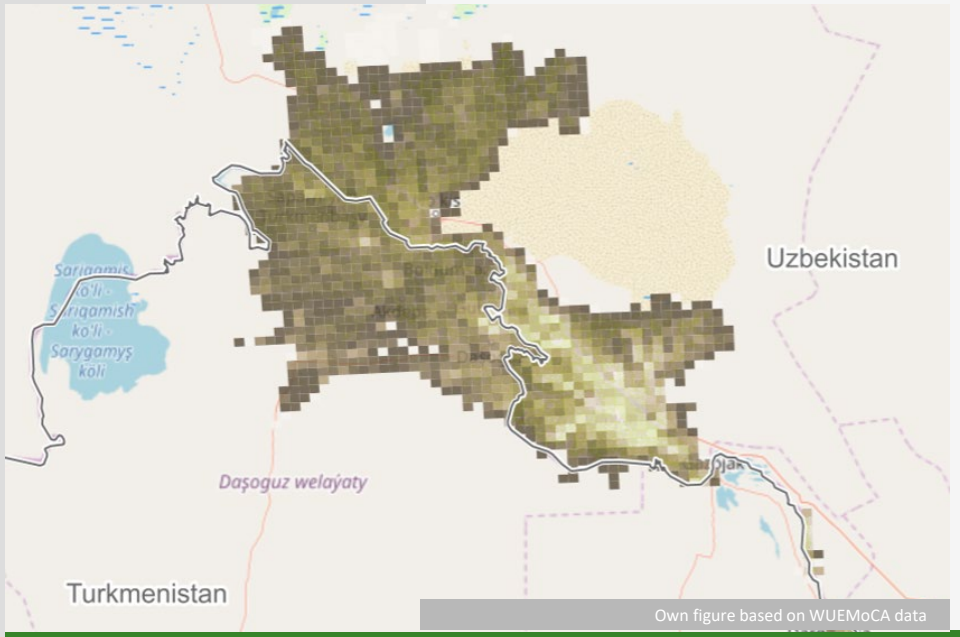
# Water Use Efficiency Monitor for Central Asia WUEMoCA

- → **German Water Initiative in Central Asia** 2009-2019 (*https://www.cawa-project.net/*)
- → **Decision-support tool** for identifying irrigated areas of the Aral Sea Basin with need for action in water management (water scarcity, land degradation and abandonment)
- → **Source of new data**: Integrates satellite RS technology (MODIS), i.e. for land use mapping crop yield estimations and evapotranspiration modelling
- → **Database** for administrative boundaries, water distribution units, regular grid cells and user zones
- → **Calculation tools for user data**
- → **Indicator groups:** land use, productivity and water use efficiency

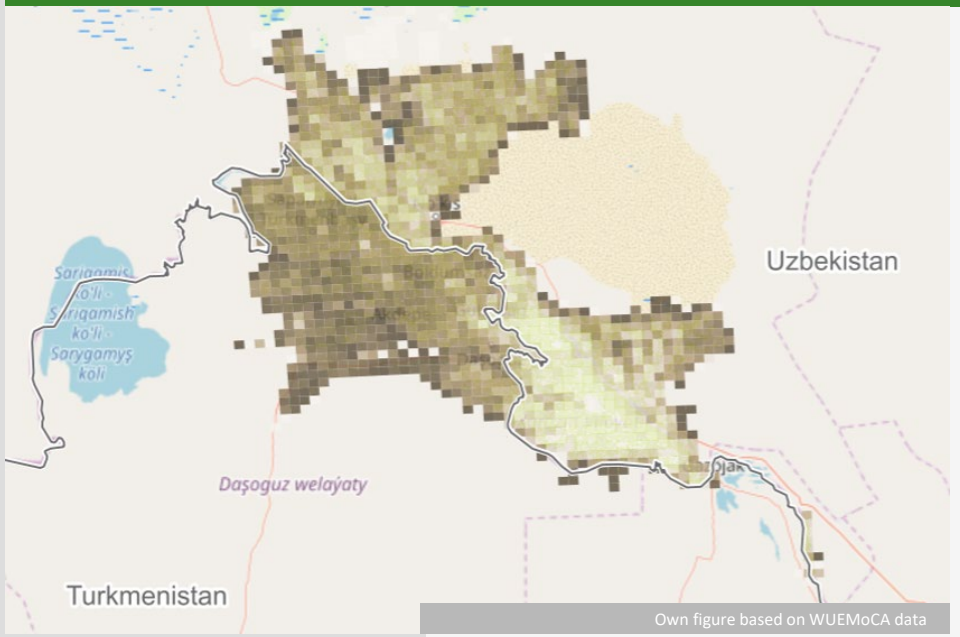



https://wuemoca.geo.uni-halle.de/app/
Conrad et al. 2019

# Example: **Detect unused (fallow) land**



Own figure based on WUEMoCA data



Own figure based on WUEMoCA data

Detect and monitor parts of the irrigated cropland in the Aral Sea Basin that is unused within one or more cropping years (fallow).

**Indicators:** Temporarily unused irrigated land, fallow land frequency

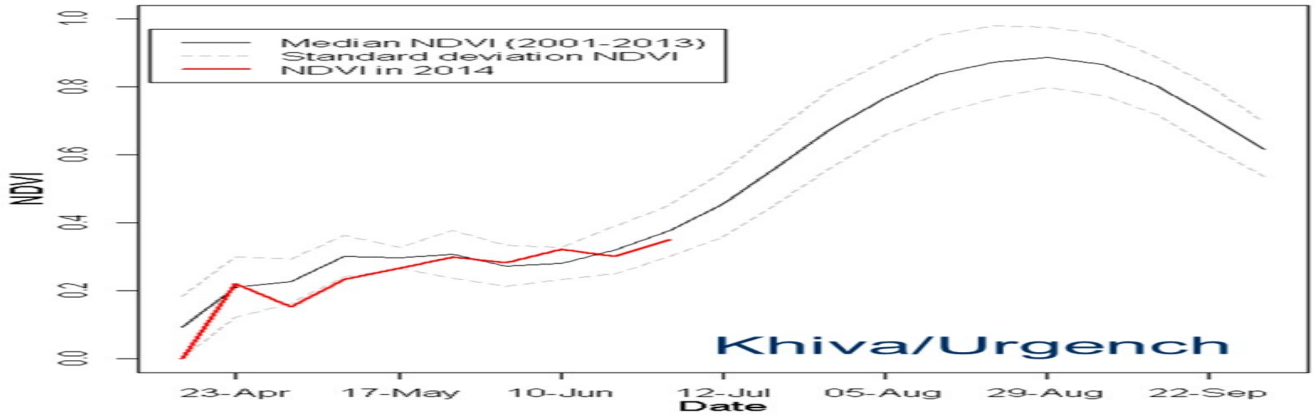
⇒ **Decisions** about the use of unproductive land: planting alternative crops (e.g. agroforestry), abandon land, invest in irrigation and drainage infrastructure, etc.

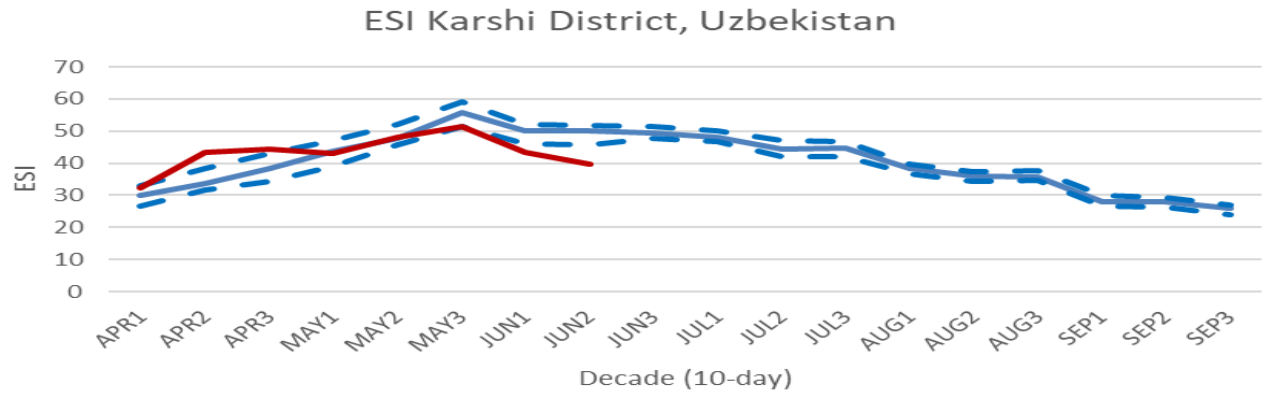
The figures show the **Amu Darya Delta**. Dark and bright cells in raster refer to mainly unused and heavily irrigated areas, respectively.

Top: Drought year 2008

Down: Water rich year 2010

# Drought detection and monitoring tool
# Indicators from satellite data



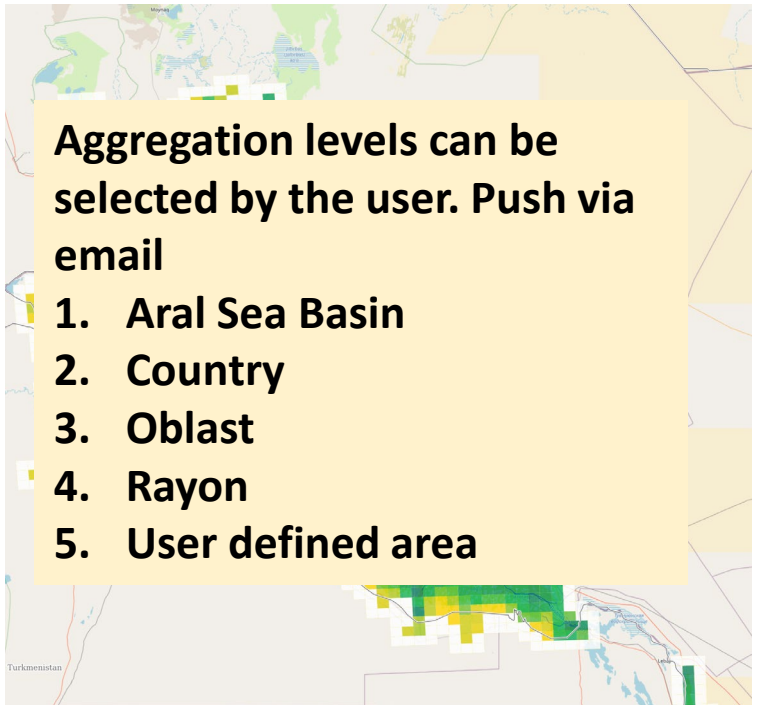




**Indicators**

Cegetation growth

Water consumption

# Drought detection and monitoring tool
# Information at 5 * 5 km grid



**Aggregation levels can be selected by the user. Push via email**

1. **Aral Sea Basin**
2. **Country**
3. **Oblast**
4. **Rayon**
5. **User defined area**

Water surplus

No drought

Initial mild drought

Mid-term mild drought

Long mild drought

Initial severe drought

Mid-term severe drought

Long severe drought

→ Drought Situation: A combination of indicators and a measuring over time indicates drought duration and severity.

# Ideas, questions and conclusions

→ Remote sensing but also other global data archives can contribute to combat droughts

→ But it is a challenging task: Identify pathways to true collaboration (maybe one system instead of two) to have a structured and coordinated approach

→ Data and knowledge exchange between CAREC/ICBA implementation of the drought detection system and Green Central Asia Initiative

→ WUEMoCA can be used to develop adaptation plans (strategic monitoing tool)

# Ideas, questions and conclusions

→ What are the pathways for improved policy communication of scientific results?

⇒ design and information levels of the bulletin

⇒ Integration in databases, e.g. CACIP

→ Which indicators can be implemented?

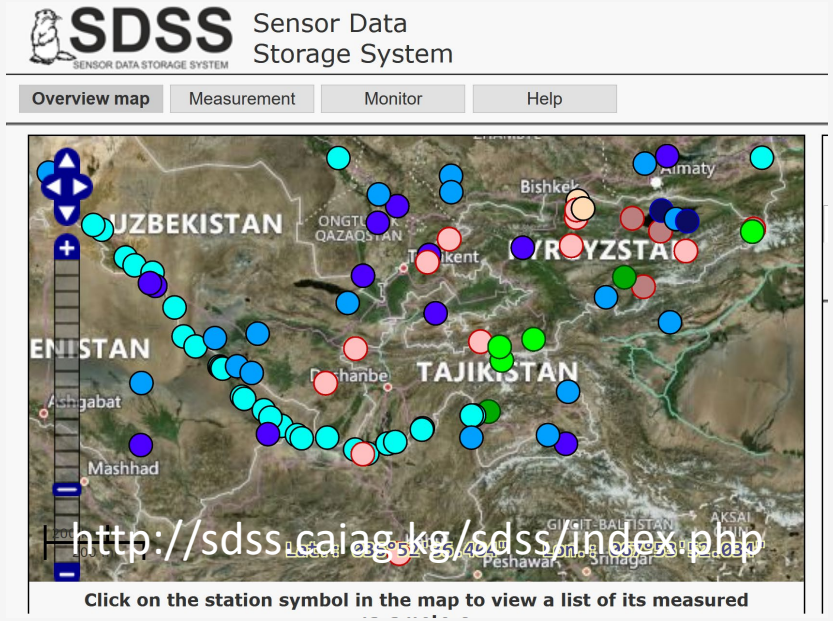
→ What type of recommendation is really required from a satellite-based operational tool / strategic tool

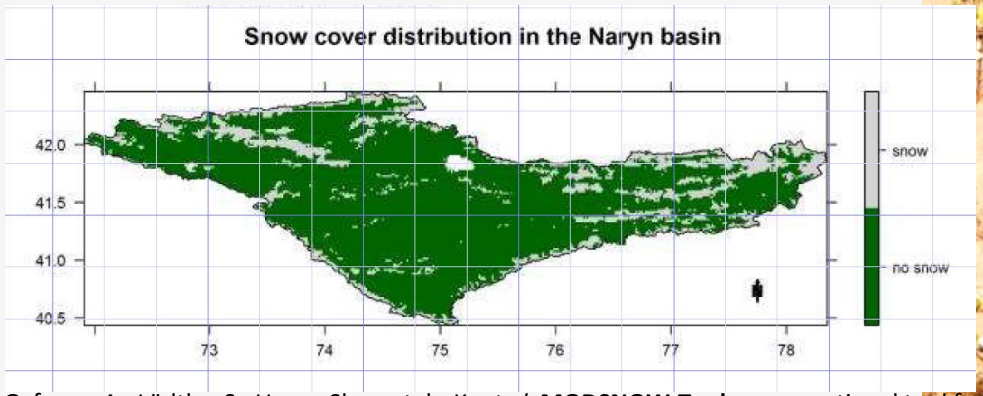
→ What are benchmarks for success?

# Ideas, questions and conclusions

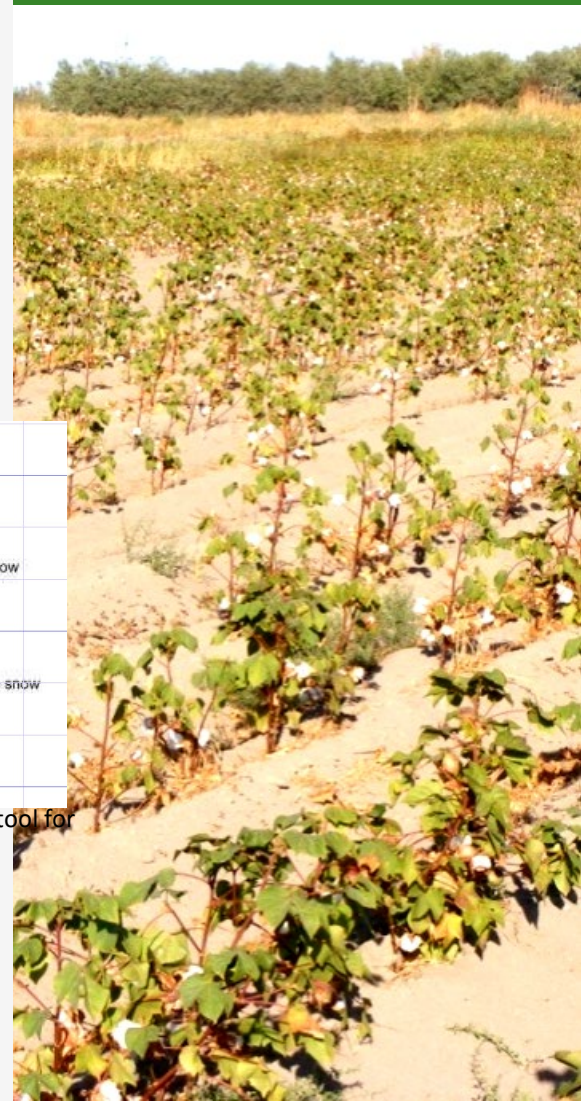
→ Additional common project:
**Drought forecast in the irrigated Aral Sea Basin!**

1. Link work of hydromets
2. Integrate other scientific tools (MODSNOW, SDSS) with the proposed drought monitoring system (ICBA and GCA)
3. Present results on learning platform for different users
4. Include damage information collected through the tool of UNDRR / ministries and committees of Emergency Situations




Gafurov, A., Lüdtke, S., Unger-Shayesteh, K. *et al.* **MODSNOW-Tool**: an operational tool for daily snow cover monitoring using MODIS data. *Environ Earth Sci* **75,** 1078 (2016). https://doi.org/10.1007/s12665-016-5869-x



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Representation of the University of Halle-Wittenberg in Almaty,
Dr. Peter Liebelt (peter.liebelt@geo.uni-halle.de)