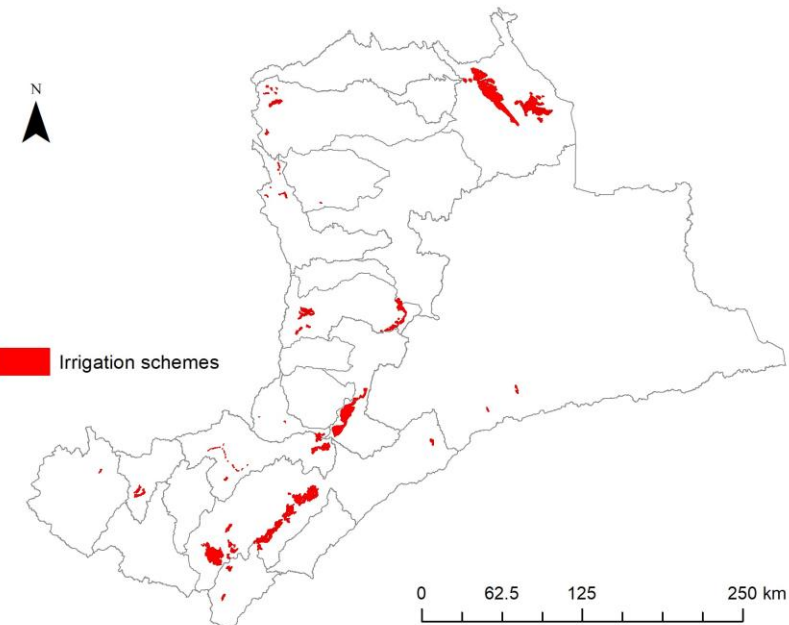
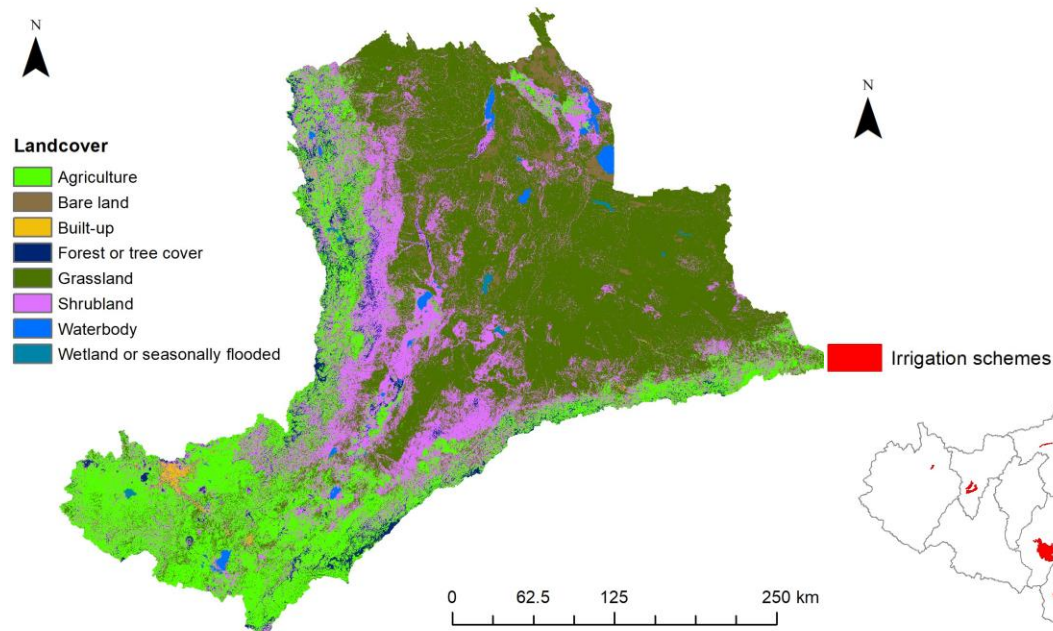
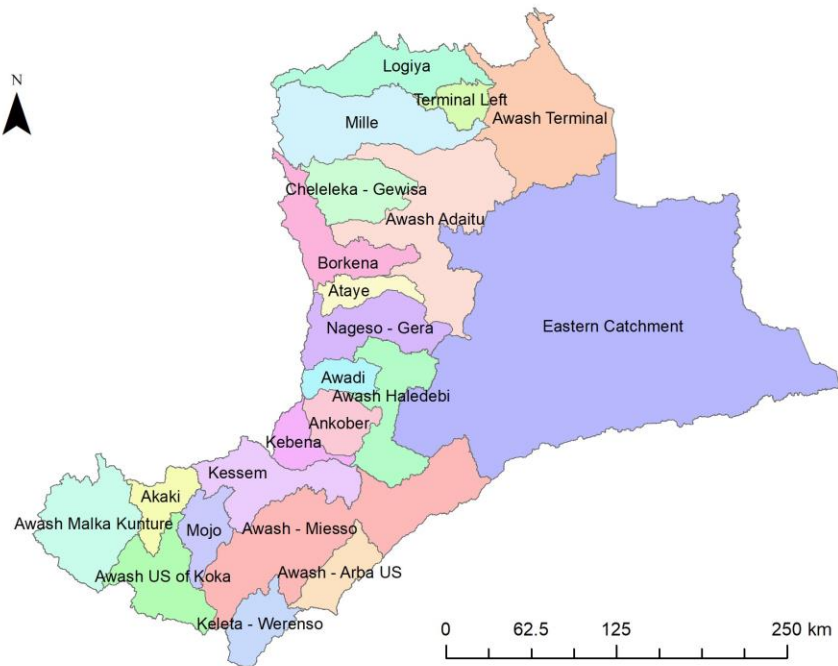


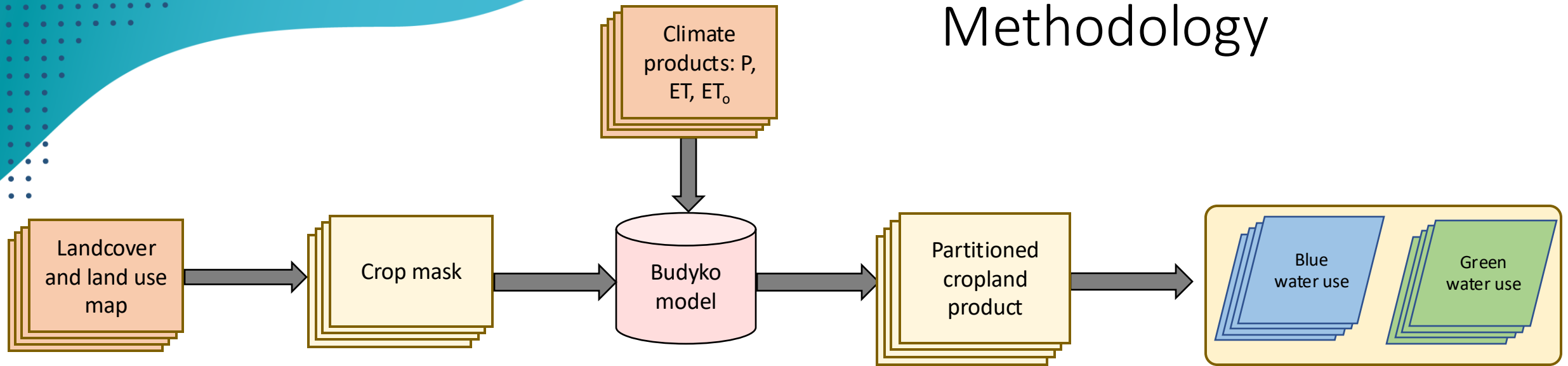
Water use in Awash basin

A. Owusu, K. Akpoti, M. Leh, N. Velpuri

Awash basin

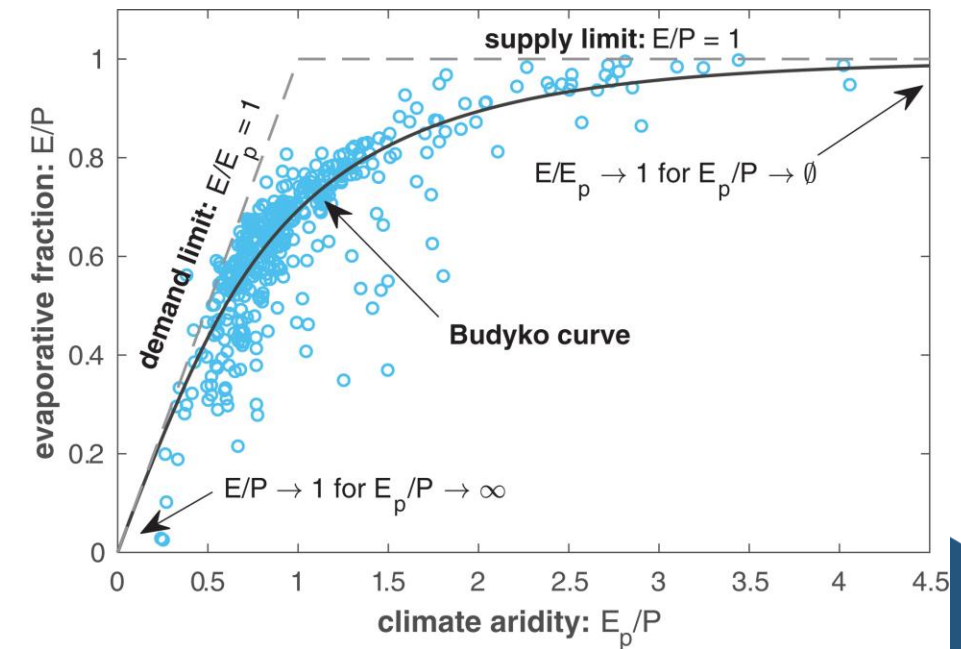


Methodology

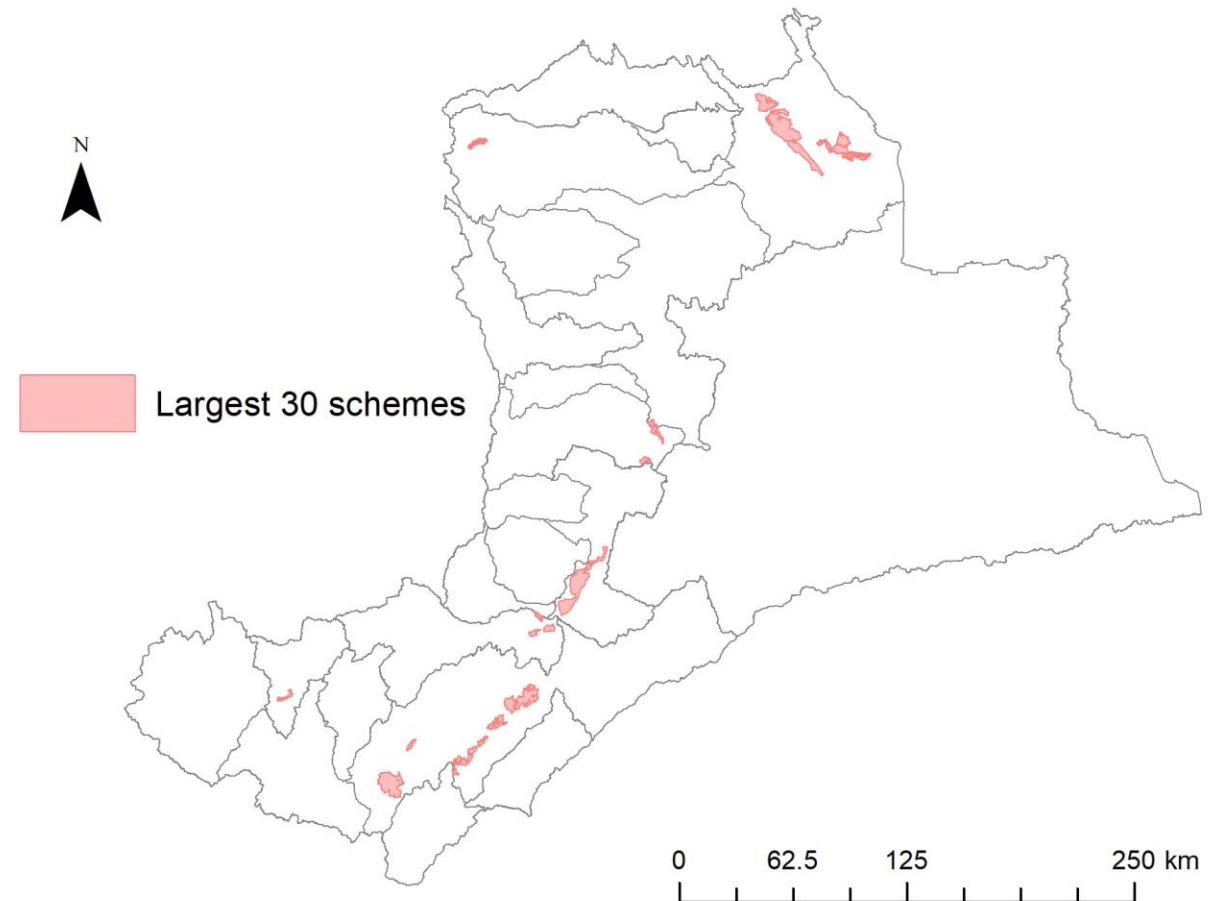
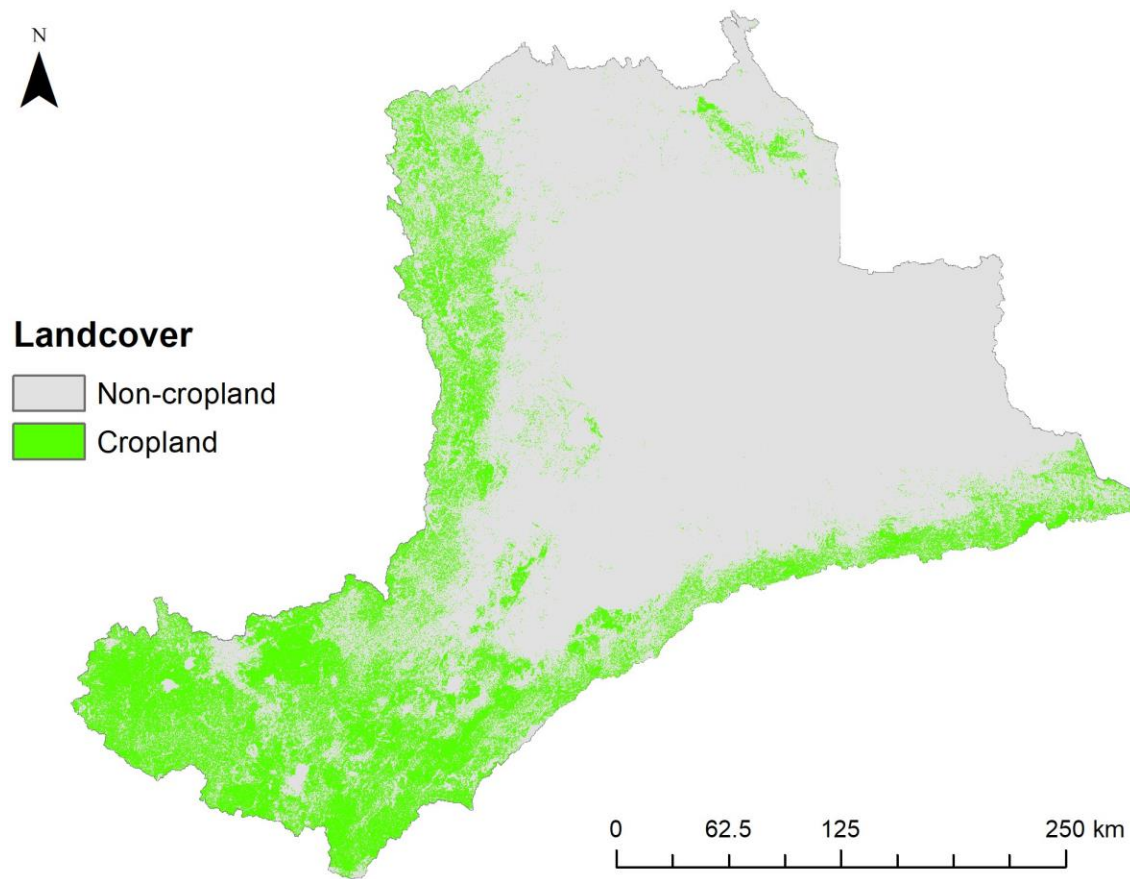


- The Budyko model is an empirical representation of a river basin's long-term water and energy balance under **steady state** conditions.
- Mean evapotranspiration (\overline{ET}) of a catchment is a function of the available energy ($\overline{ET_o}$), and available water (\bar{P}).
- Thus, considering available energy and water, it is possible to determine 'excess' ET using the Budyko model and thereby identify any additional water input i.e., **blue water**.

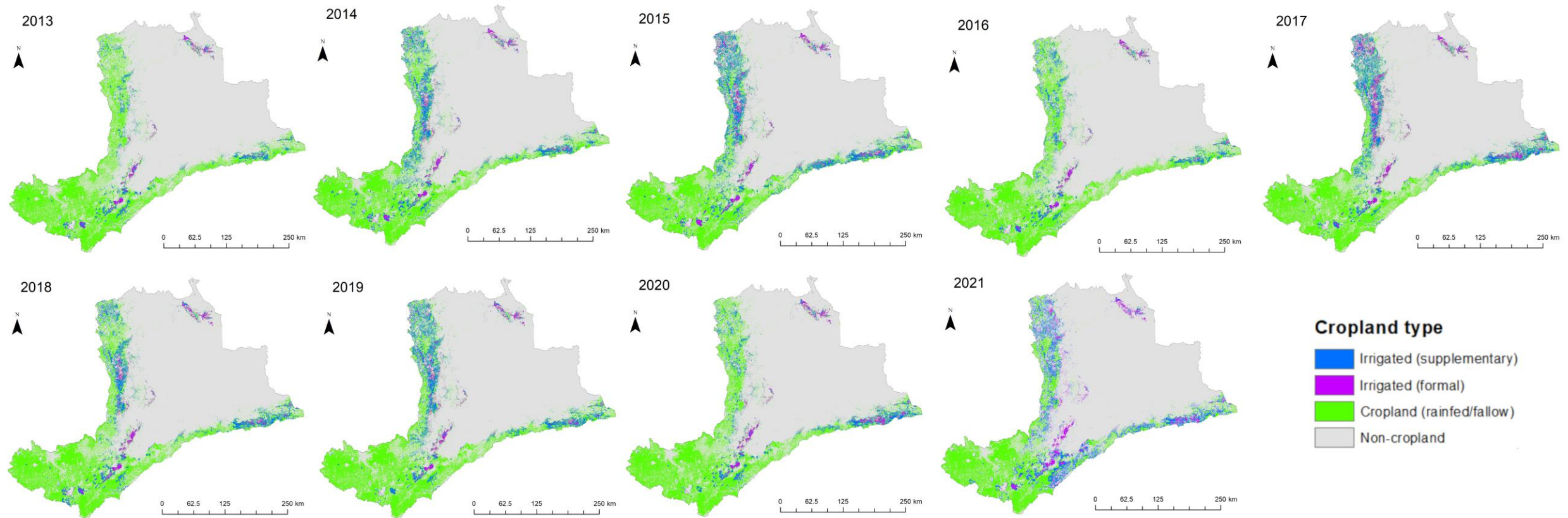
$$\frac{E}{P} = \left[\frac{E_p}{P} \tanh\left(\frac{P}{E_p}\right) \left(1 - \exp\left(-\frac{E_p}{P}\right)\right) \right]^{1/2}$$



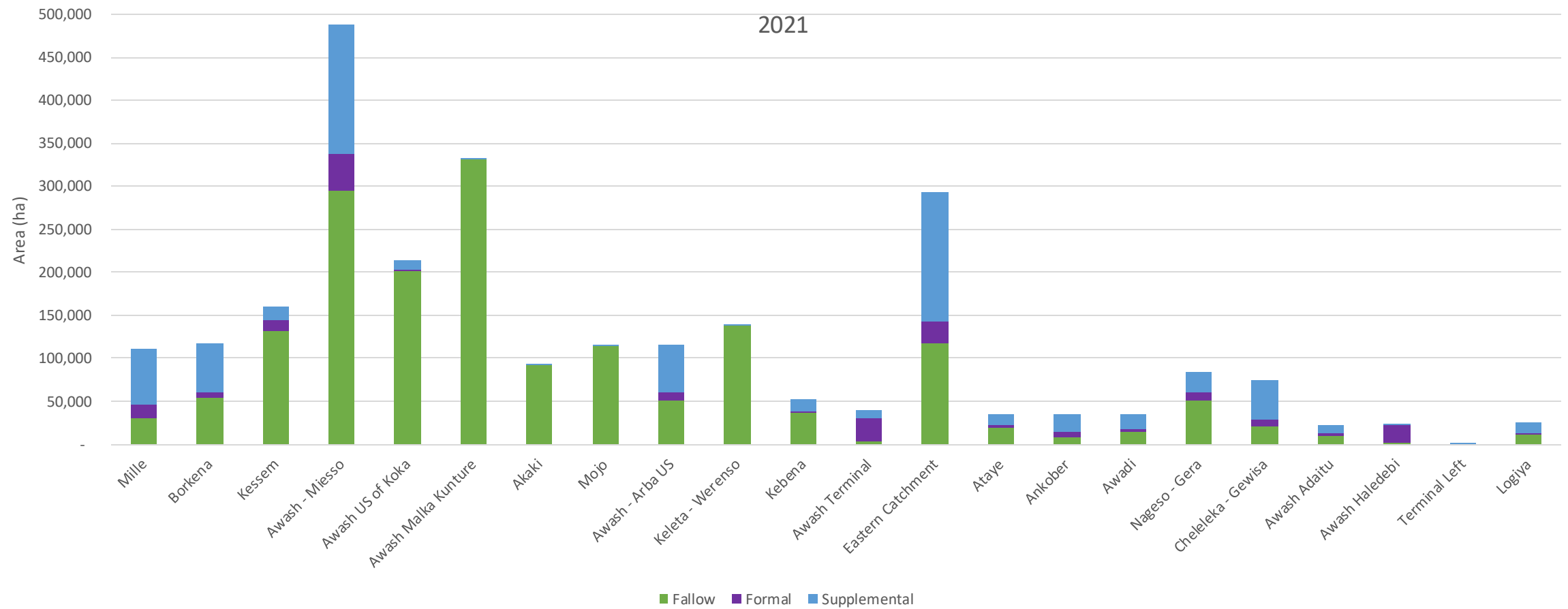
Cropland class and irrigation schemes >10ha



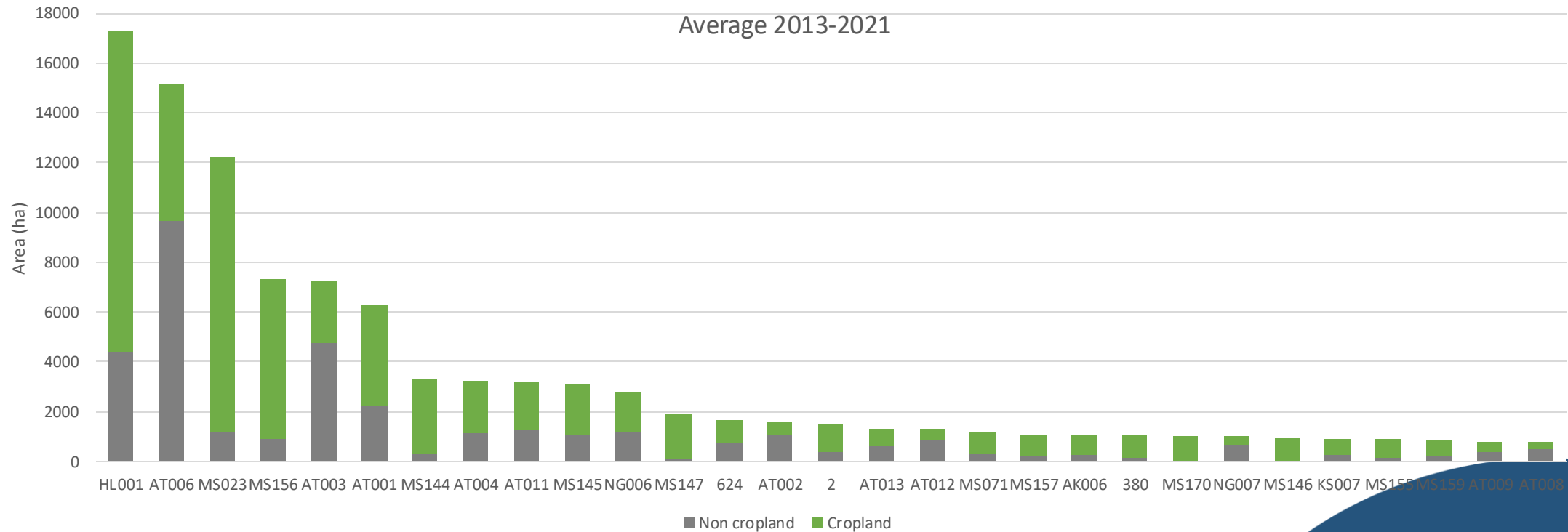
Irrigated area- 2013-2021



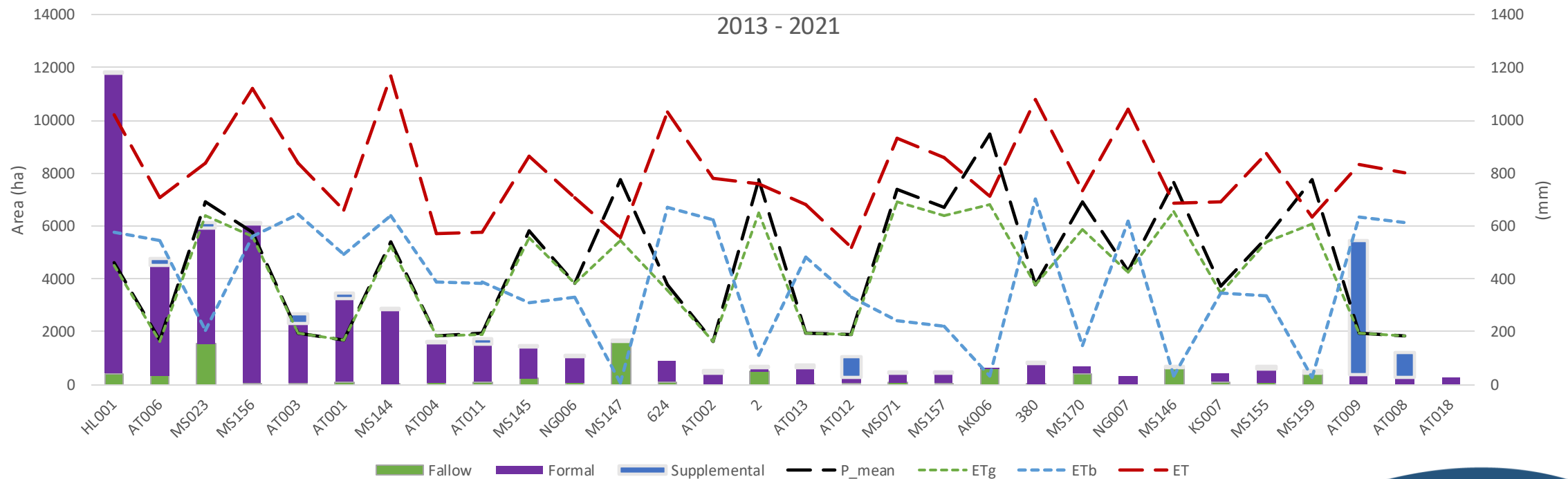
Cropland type per basin



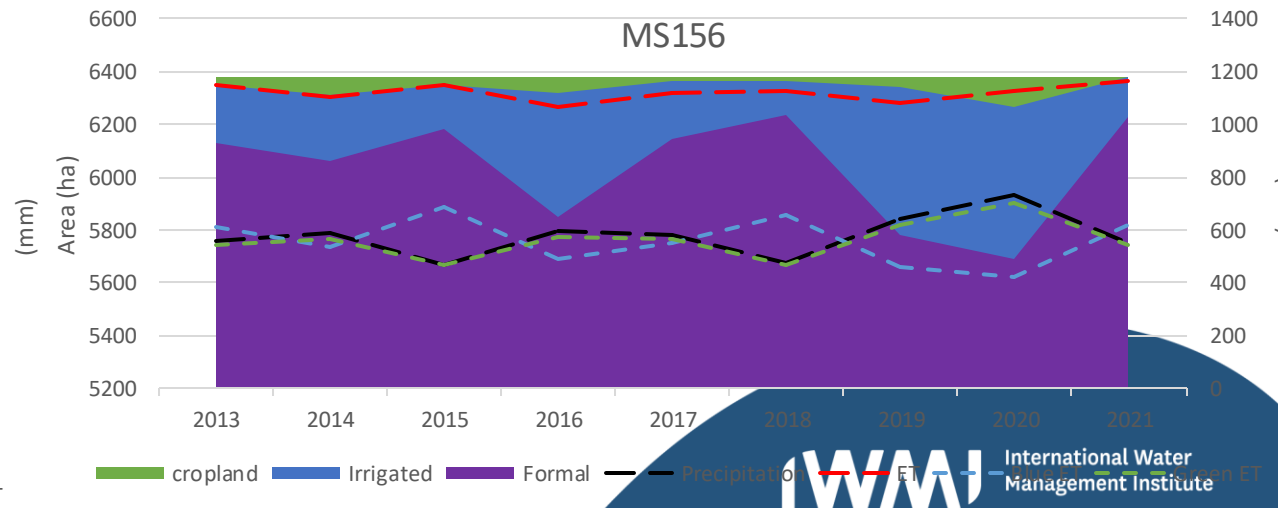
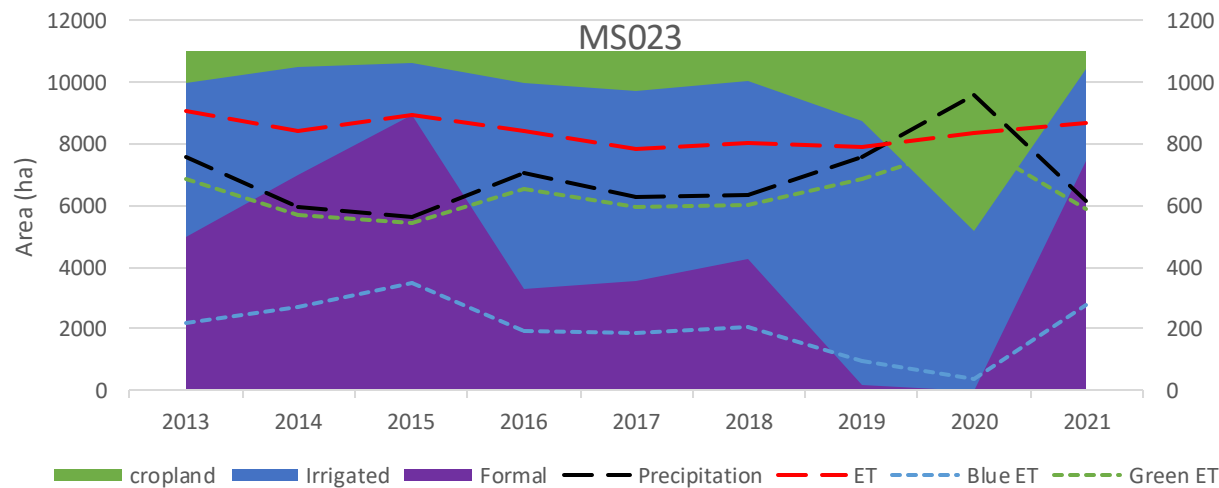
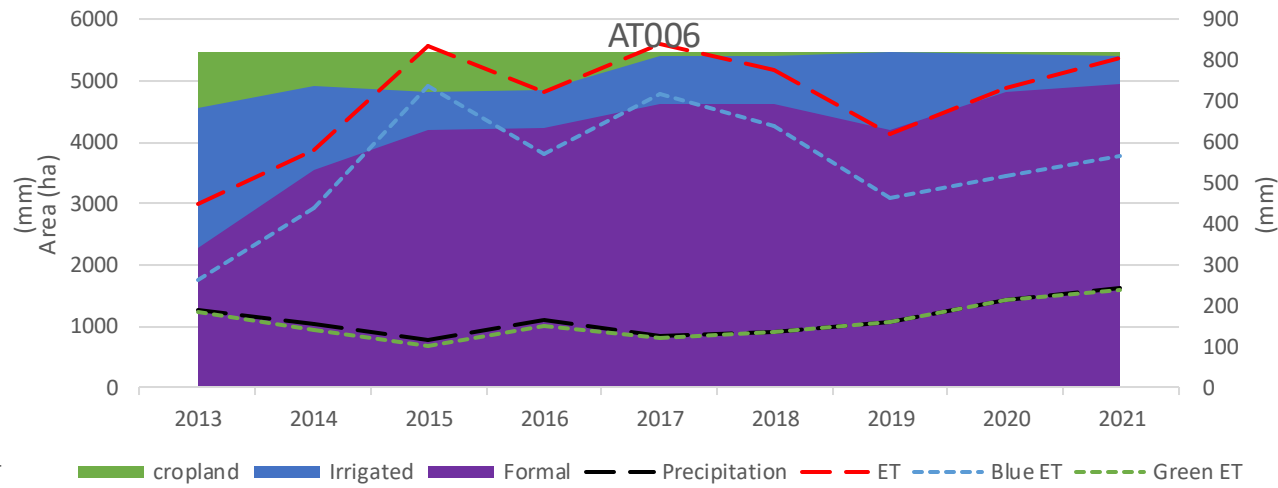
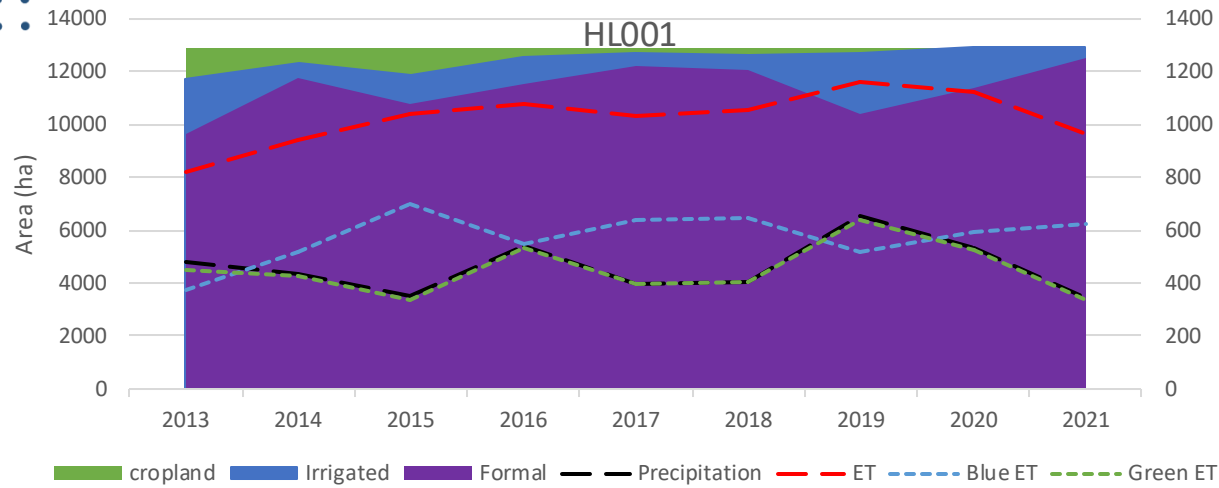
Cropland and non-cropland area in 30 largest schemes



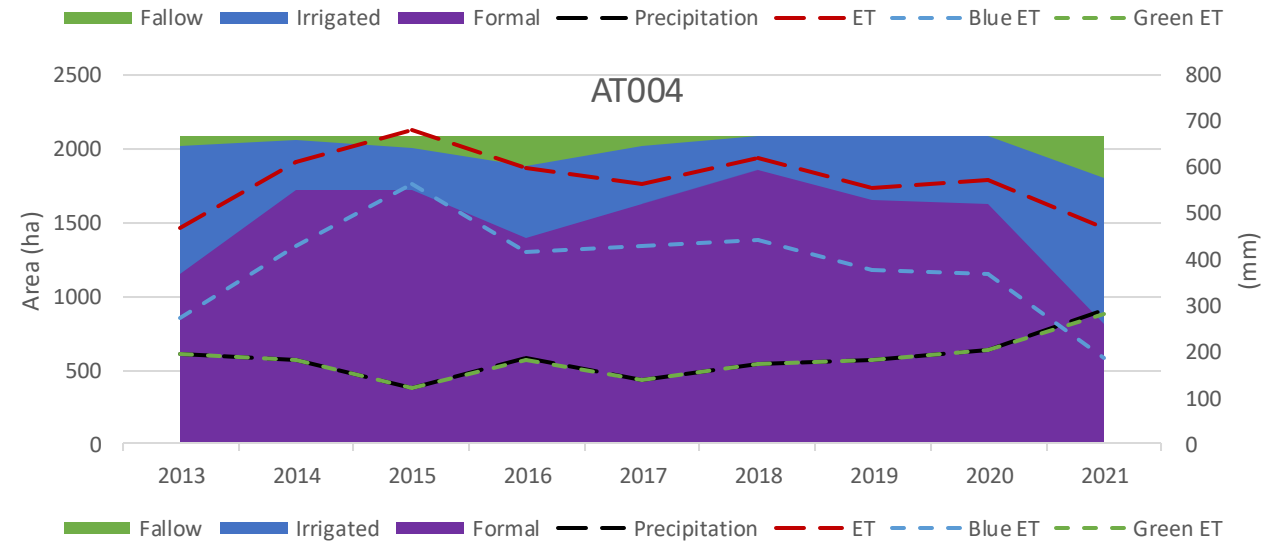
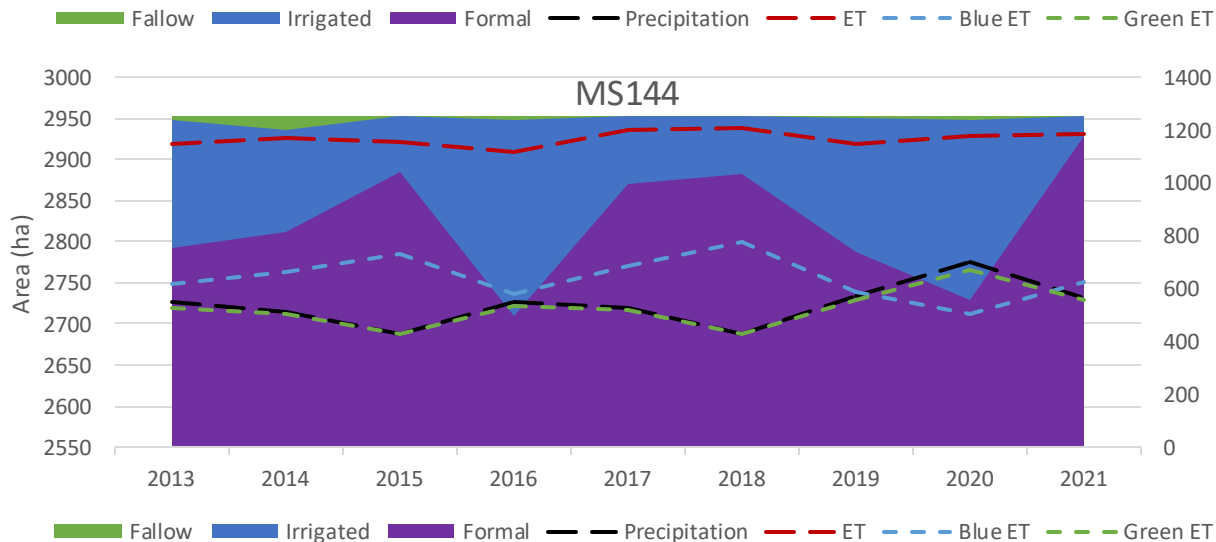
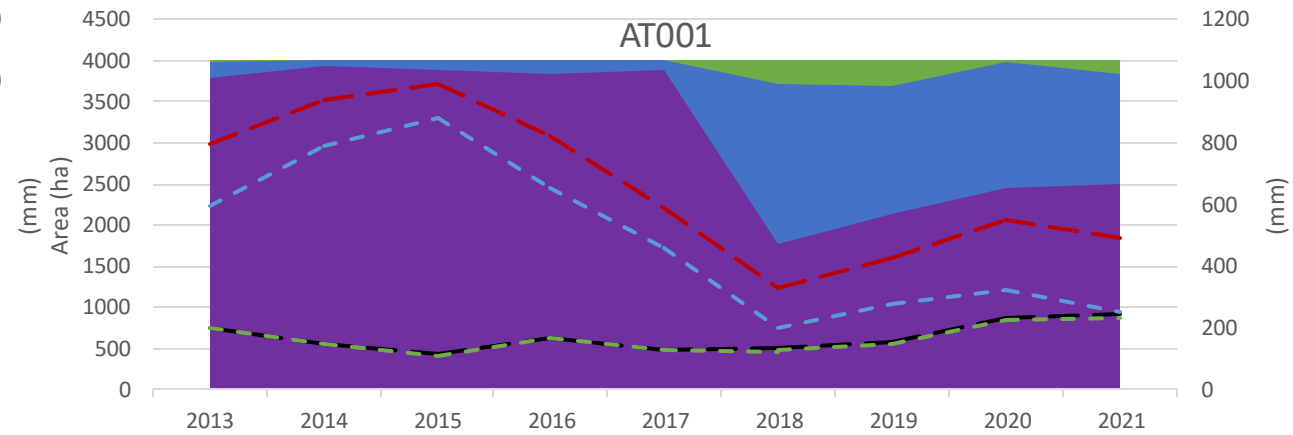
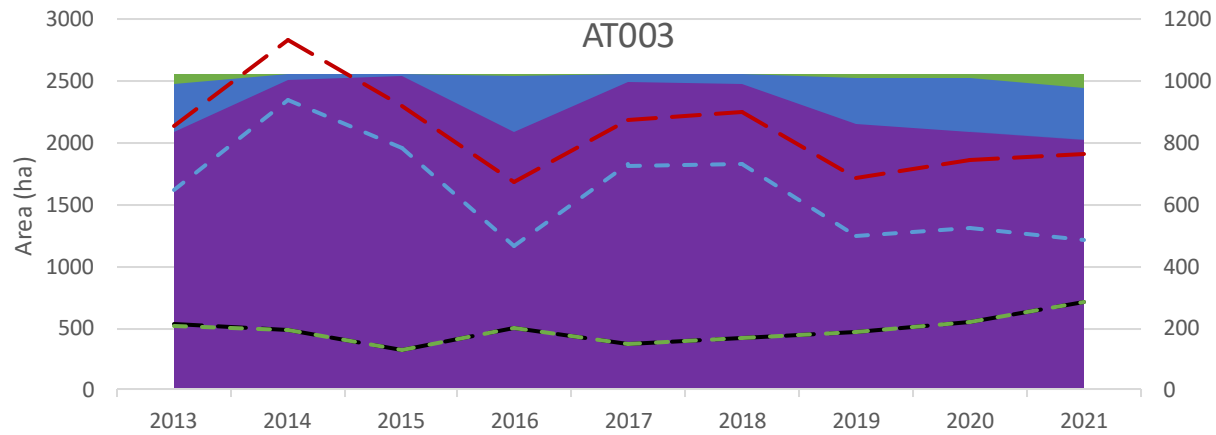
Average cropland type and water use in 30 largest schemes in 2013-2021



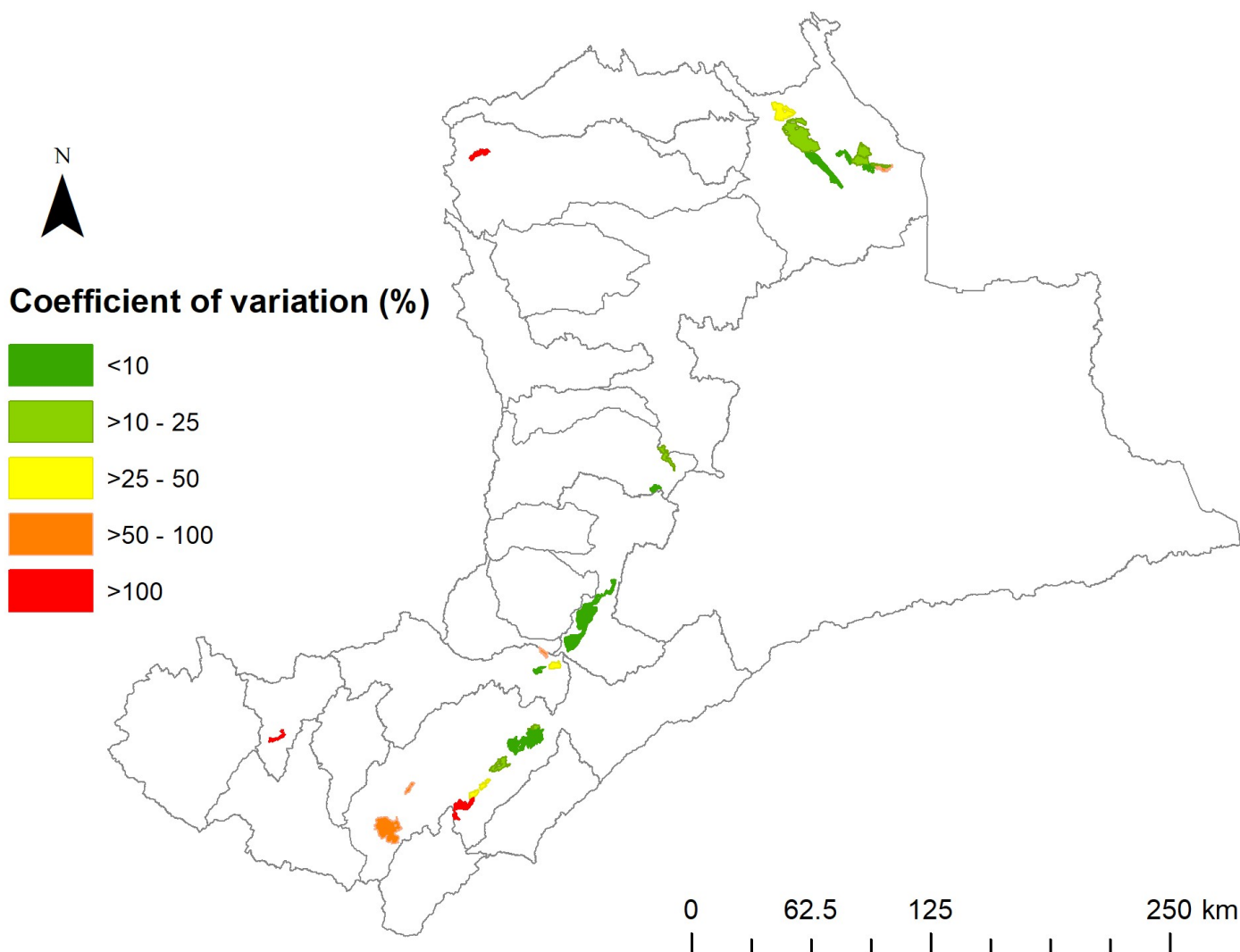
Trend in water use in largest 4 schemes (1st -4th)



Trend in water use in largest 8 schemes (5th -8th)



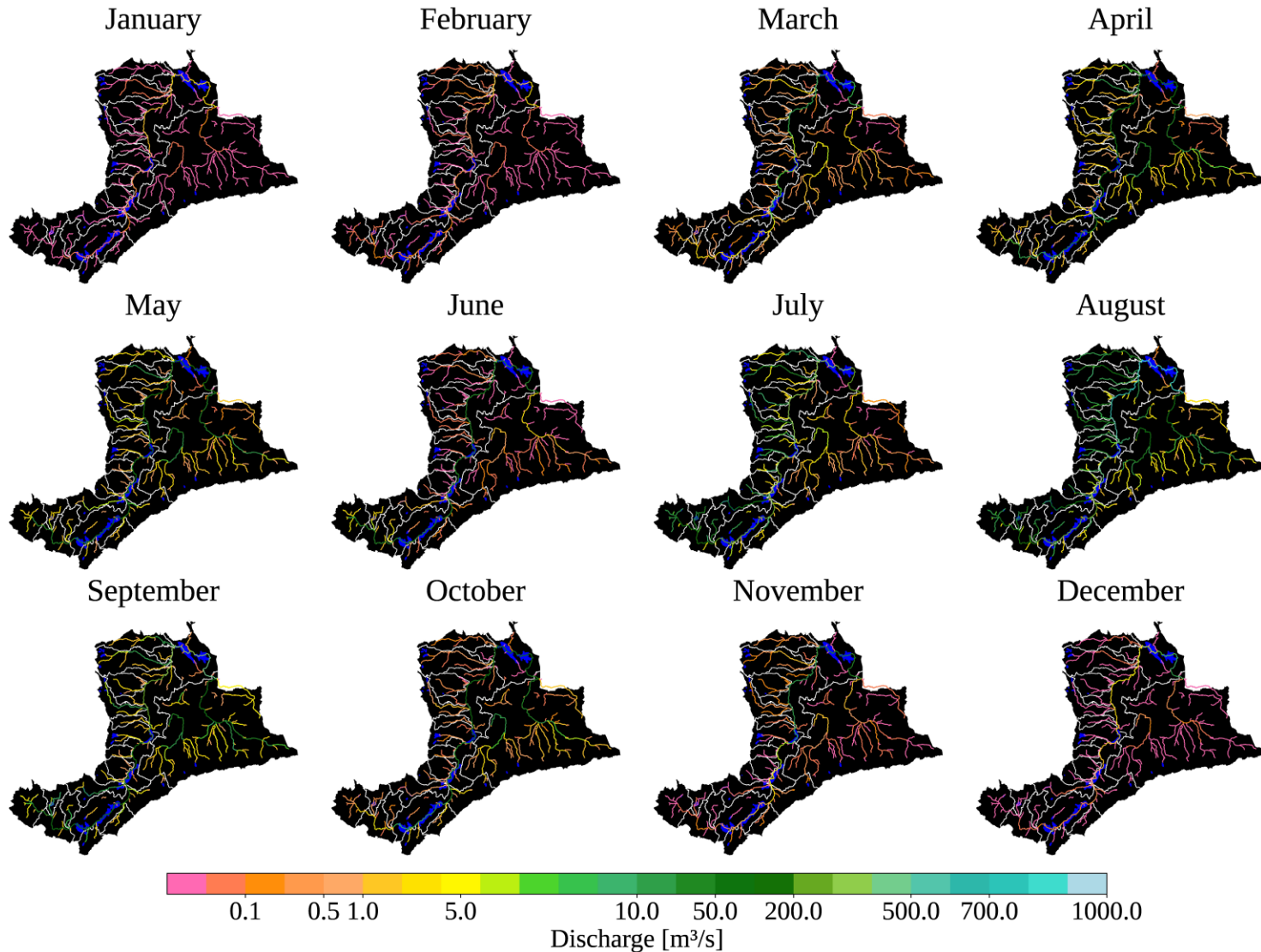
Variability in formal irrigated area in largest 30 schemes



ID	Coeff of variation (%)
HL001	7.8
AT006	18.6
MS023	66.0
MS156	3.2
AT003	9.2
AT001	27.1
MS144	2.5
AT004	20.7
AT011	17.3
MS145	14.9
NG006	23.1
MS147	282.8
624	33.6
AT002	21.5
2	126.1
AT013	8.6
AT012	67.6
MS071	33.4
MS157	47.9
AK006	163.9
380	9.9
MS170	81.4
NG007	8.4
MS146	282.8
KS007	71.1
MS155	14.7
MS159	282.8
AT009	8.2
AT008	7.4
AT018	19.9

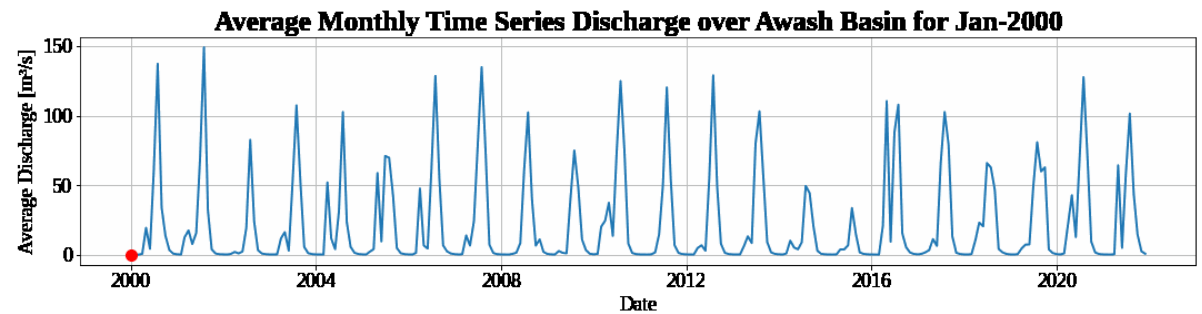
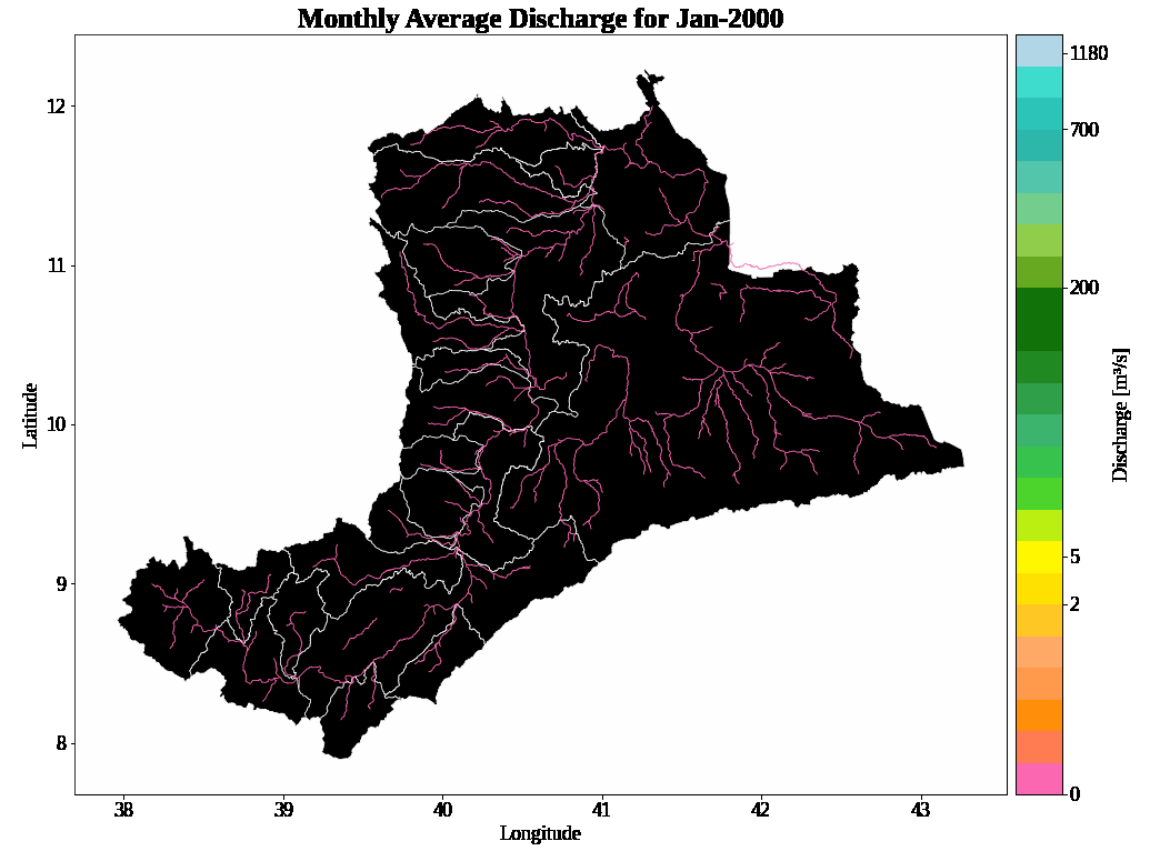
Monthly climatology of discharge in the Awash Basin

Monthly Climatology of Discharge (2000-2021)



- ☐ Low surface water availability for irrigation in the Months of November-February
- ☐ Moderate surface water availability for irrigation in the Months of March - June
- ☐ High surface water availability for irrigation in the Months of July - October

Monthly Average flow animation for Awash Basin between 2000-2021

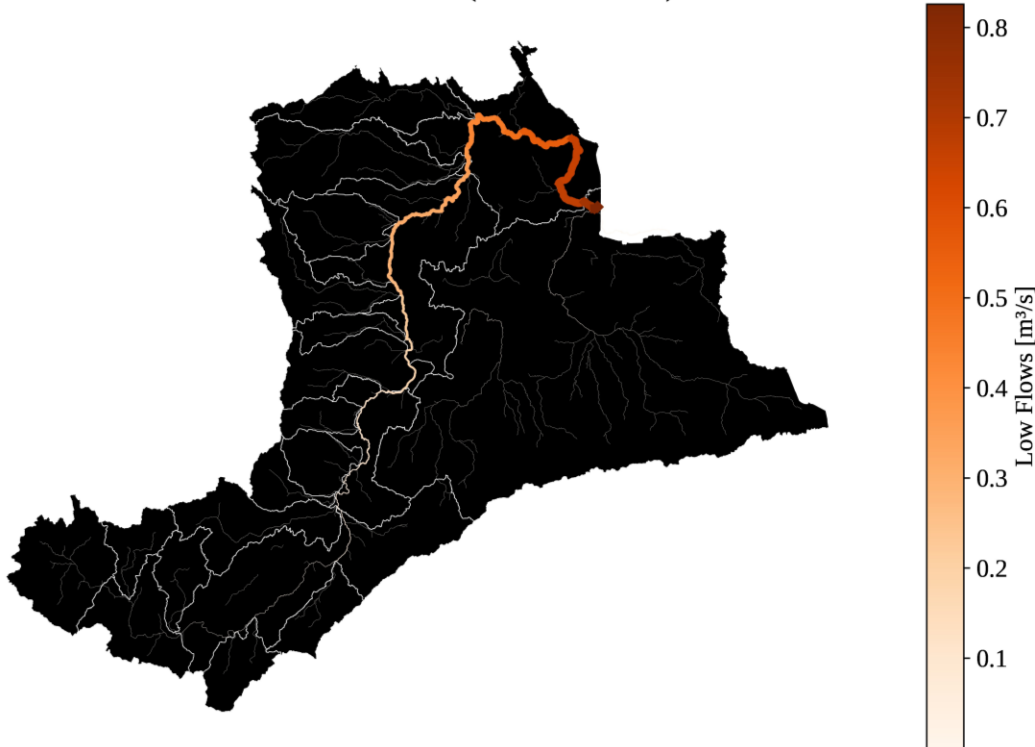


Low and high flow profile of the Awash Basin

❑ **Low Flows** ~ average of streamflow values that are less than the 5th percentile of the time series from 2000 to 2021.

- *This implies identifying the streamflow values in the lower 5% for each river segment across the entire time series and then averaging these values.*

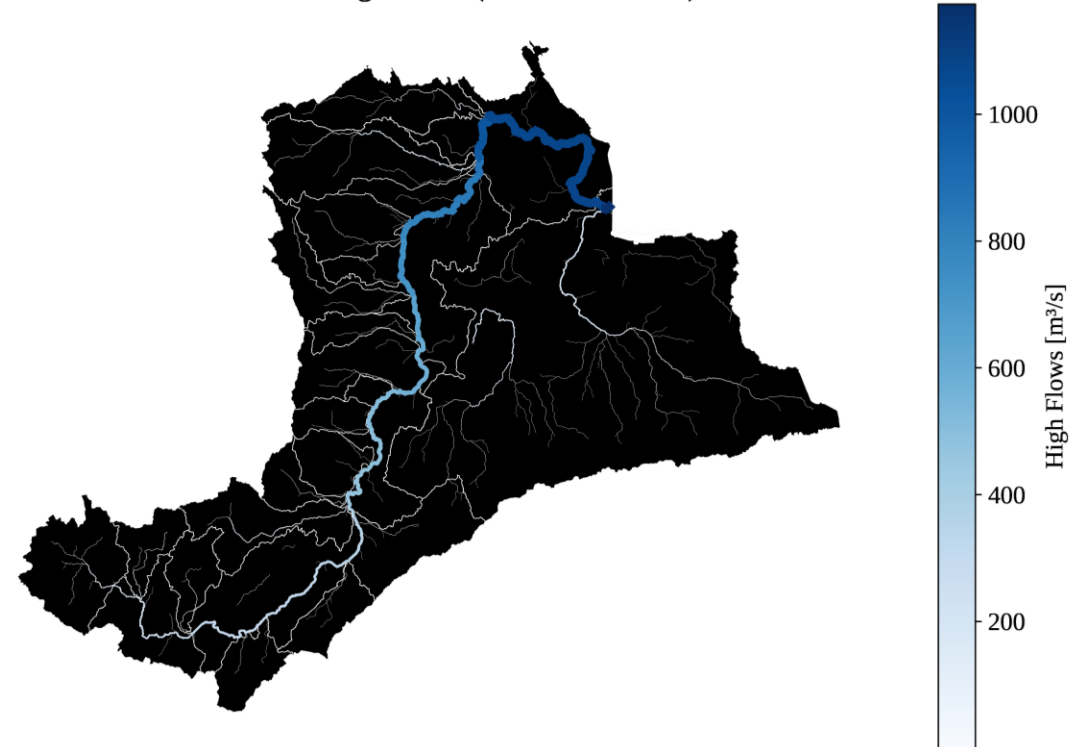
Awash Basin Low Flows (< 5th Percentile)



❑ **High Flows** ~ Calculated as the average of streamflow values that are higher than the 95th percentile of the time series from 2000 to 2021.

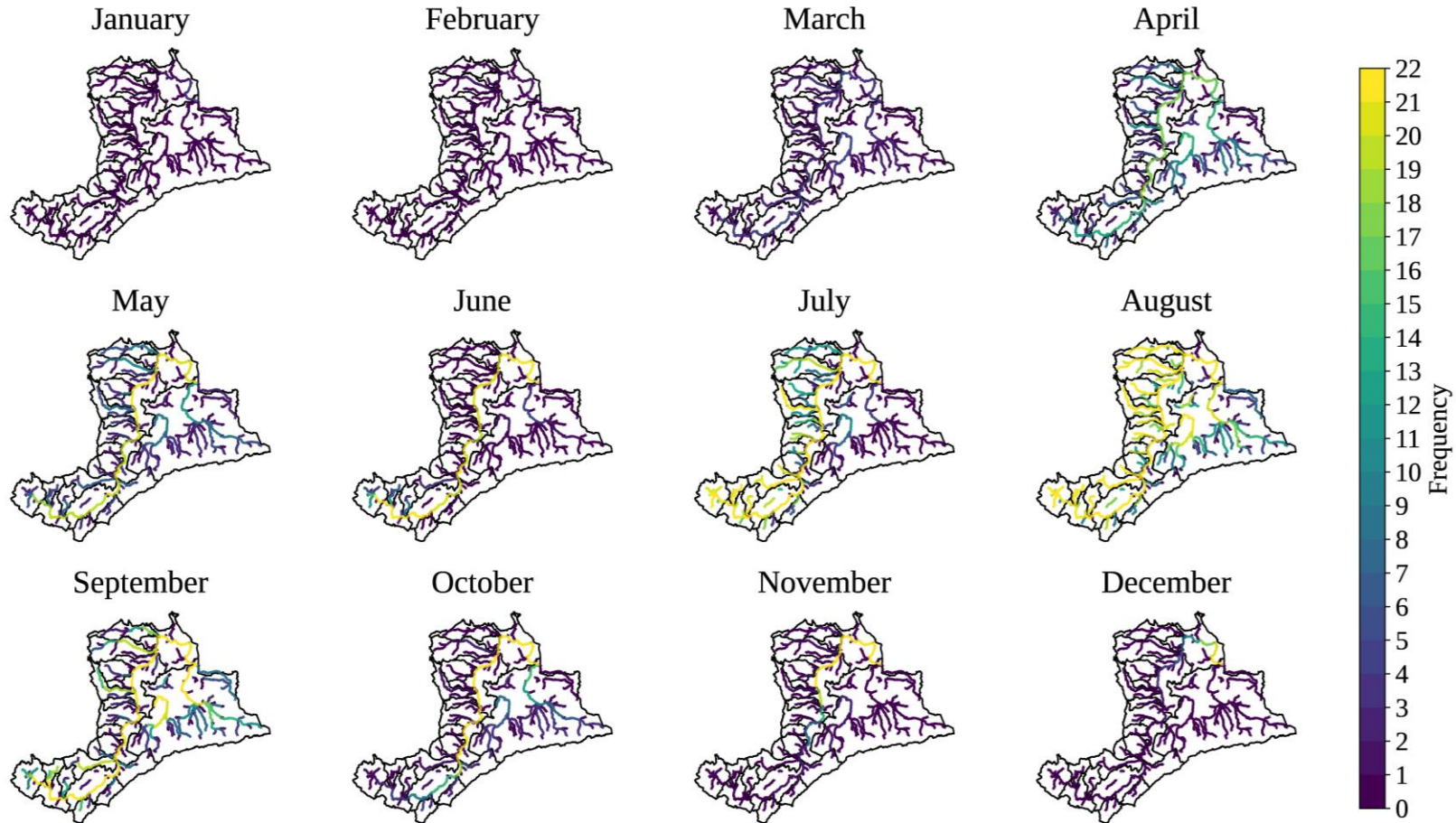
- *This means identifying the streamflow values in the top 5% for each river segment across the time series and averaging these values.*

Awash Basin High Flows (> 95th Percentile)



Monthly frequency of river segment meeting 5m³/s threshold

Monthly Frequency of Meeting 5 m³/s Threshold (2000-2021)



Credits

Funding Support:



Model Development:



Food and Agriculture
Organization of the
United Nations