SUPPLEMENTARY MATERIAL

Dynamics and impact of *Eucalyptus* plantations on water availability in a monsoon climate in a watershed in the Ethiopian Highlands

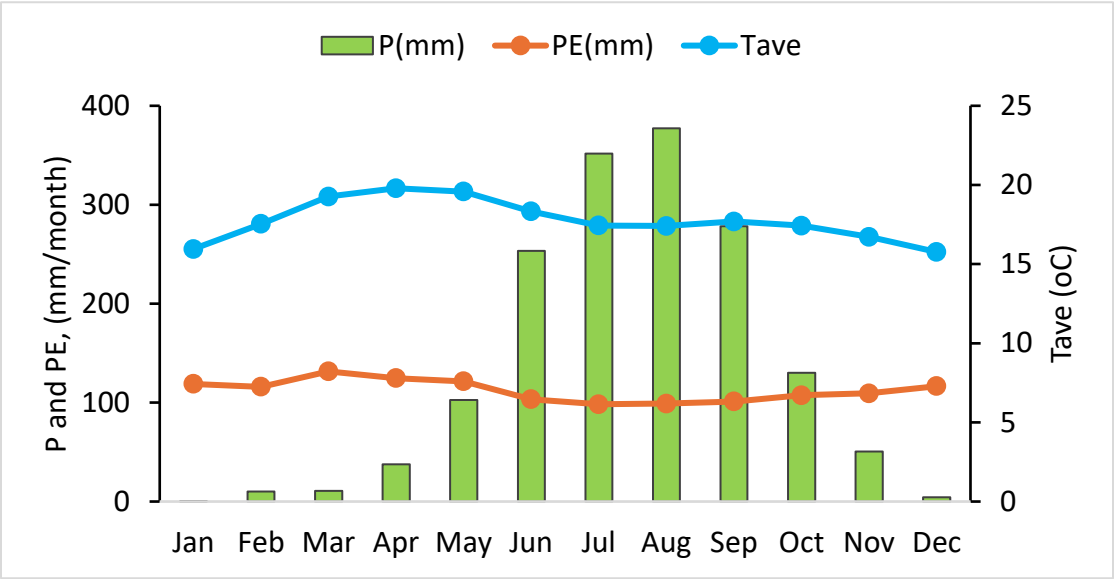


Figure S1. Long-term mean monthly precipitation (P), potential evaporation (PE), and average temperature (Tave) in Amen watershed.

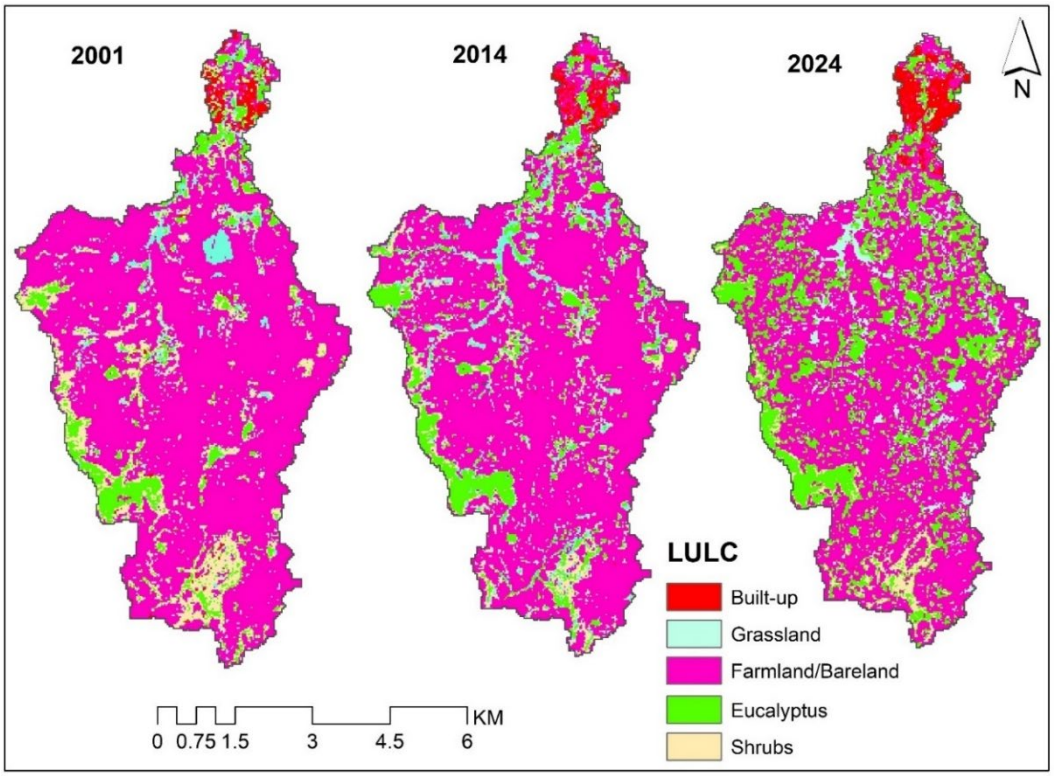


Figure S2: Temporal and spatial changes in land use and land cover in the study watershed from 2001 to 2024.

Base flow duration curve analysis.

As indicated in Figure A3, an analysis of flow duration curves was conducted to evaluate the potential impact of Eucalyptus expansion on streamflow. The analysis revealed a clear difference between 2002-2009 and 2015-2018. Notably, significant differences were observed during high-flow events. However, under lower flow conditions (greater than 90% exceedance probability), the flow duration curves (FDCs) suggest that eucalyptus may be reaching its minimum impact.

The observed reduction in base flow values after 2015 coincides temporally with the expansion of Eucalyptus plantations within the watershed. This temporal correlation suggests a possible link between the increased water uptake by Eucalyptus trees and a decline in streamflow, potentially impacting the overall hydrological balance of the Amen watershed.

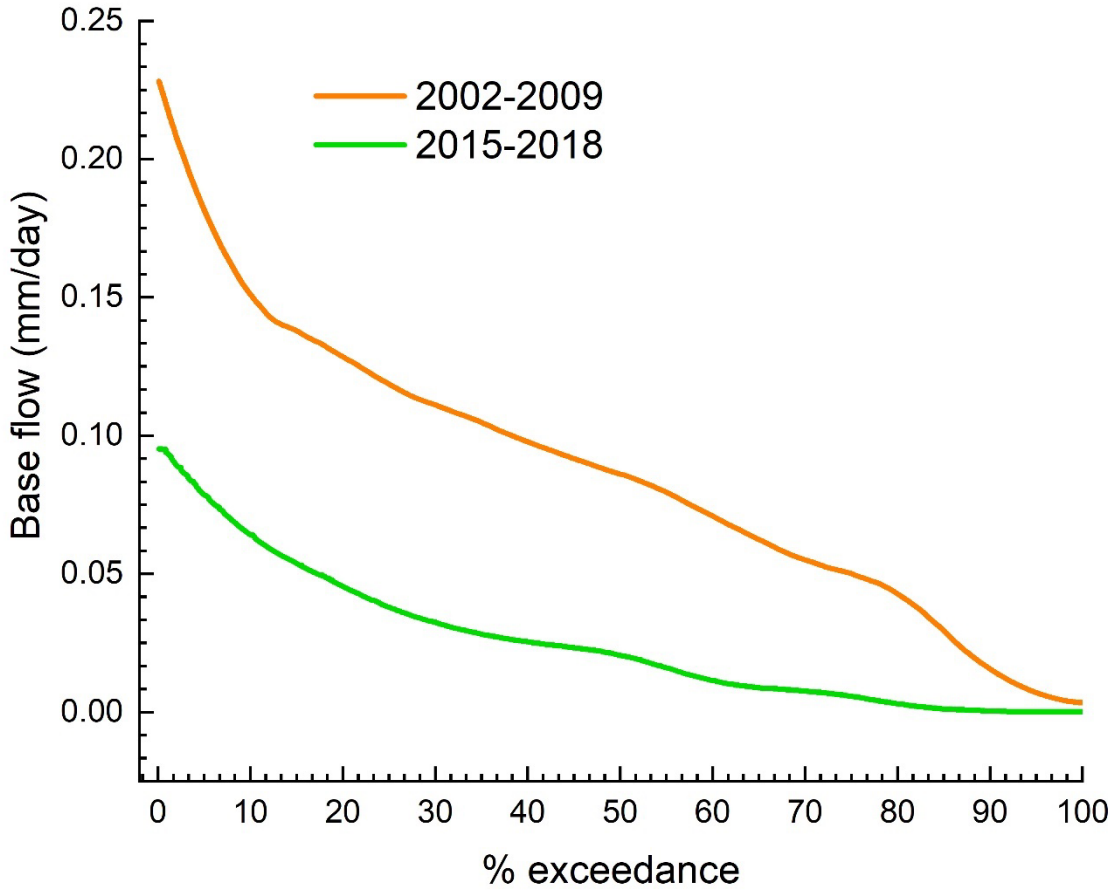


Figure S3. The base flow duration curve for the period from January 1 to April 30 for the Amen watershed for the two periods that the discharge data were available: 2002-2009 and 2015-2019.

Actual evapotranspiration:

The remote sensing for Water Productivity WaPOR, package of the FAO was selected for calculating the actual evaporation. Versions V2 and V3 were used. Version 2 covered the period from 2009 to 2024, and Version 3 had a better resolution of 100m for the period of 2018 to 2024. Linear regression was established for the same periods of data availability from 2018 to 2024.

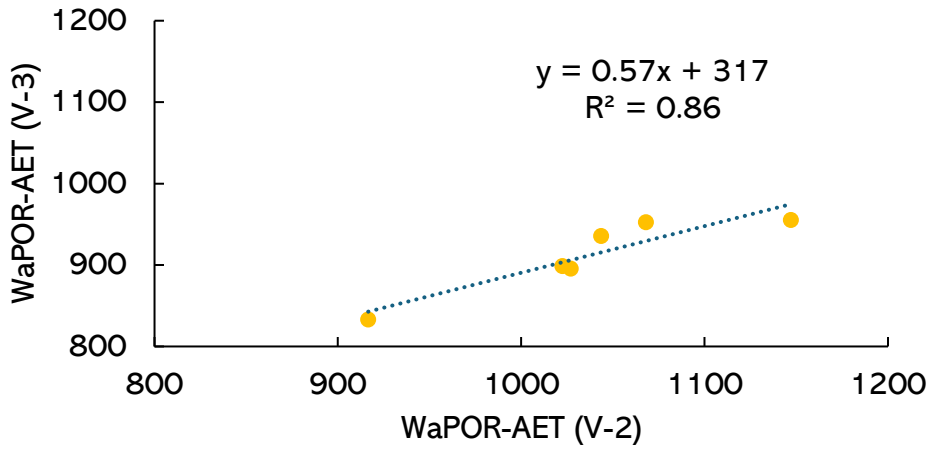


Figure S4. The regression analysis between WaPOR products of actual evapotranspiration (AET) version 2 and 3 from 2018 onwards.