Climate Patterns and Hydro-climatic Scenarios in the Upper Blue Nile Basin

Demissie, S.S.¹, McCartney M.¹, Awulachew, S.B.², Gebru, B.K.³

¹ International Water Management Institute, Addis Ababa, Ethiopia
² Africa Climate Policy Centre, UNECA, Addis Ababa, Ethiopia
³ Bahir Dar University, Bahir Dar, Ethiopia
Climate Drivers

- Global climate drivers (teleconnections, SST)
- Local climate drivers (Orography, monsoon)
- Rainfall regimes
Climate Drivers …

Correlation between station monthly rainfall and gridded reanalysis MSLP
Climate Projections

GCM Projections:

• Coarse spatial resolution
• High uncertainties in surface (regional/local) climate variables
• Less uncertainties in large-scale atmospheric circulation and moisture fields

Climate downscaling for impact assessments

Improve sub-grid climate processes, drivers & feedbacks
RegCM3 - Rainfall Scenarios

2030s – 1990s

2090s – 1990s
RegCM3 - Temperature Scenarios

2030s – 1990s

2090s – 1990s
Flow Scenarios

% Change of Annual Flow

- Tana
- NorthGojam
- Beshilo
- Weleka
- Jemma
- SouthGojam
- Muger
- Guder
- Finch
- Didessa
- Anger
- Wonbera
- Dabus
- Belles
- Dinder
- Rahad

2030s-1990s
2090s-1990s
Conclusions

• The relative dominance of global and local climate drivers varies with season, altitude and location within the basin

• The complex nature of the East African climate requires comprehensive and dynamic downscaling approach

• The reliability and suitability of global climate datasets should be checked before applying for climate impact and vulnerability assessment

• The future plausible hydro-climatic scenarios in the UBN basin exhibits greater spatial variability; wet parts of the basin get wetter and dry parts get drier.

• Climate adaptation measures should consider the spatial signals of climate and flow scenarios
Thank you!

s.seyoum@cgiar.org

IWMI – East Africa and Nile Basin