

Climate of the Juba and Shabelle basins

Like the rest of Somalia, the climate of the Juba and Shabelle River basins is arid to semi arid and is determined by the northward and southward movement of the Inter-Tropical Convergence Zone (ITCZ) across the Equator. In most areas of Somalia this results in two rainfall seasons - the *Gu* as the ITCZ passes northwards and the *Dayr* as it moves southwards. In between the two rainy seasons there are two dry seasons, the *Jiilaal* and the *Xagaa*.

The climate of the two basins in this document has been described using the most recent consistent available data, which has been extracted from the FAO global climate database for the period between 1963 -1990. However, the database is missing information for some periods from some stations. In such cases missing data was interpolated to improve the analysis.

There is a significant spatial variation in rainfall of the catchment areas of the two basins as seen on the mean annual rainfall map on page 13. The Juba and Shabelle upper catchments within the Ethiopian highlands receive rains in the range of 1 300 - 1 800 mm/year. The middle catchment, areas around the Somalia and Ethiopia border, being in the leeward side of the highlands, receive less rain (e.g. 271 mm/year in Luuq and 330 mm/year in Belad Weyne). There is a significant increase in annual rainfall moving towards the coast (e.g. 500 - 700 mm/year within the Baydhabo plateau, 700 - 800 mm/year in Jamaame and 584 mm/year in Afgooye). Orographic and coastal influences lead to a high variation in rainfall in the region.

There are four distinct seasons and as a general statement the following comments pertain to these seasons:

- i) *Jiilaal* – December to March. The north-east monsoon is in dominance and conditions are dry and relatively hot.
- ii) *Gu* – April to June. This is considered as the main rainy season.
- iii) *Xagaa* - July to September. The south-west monsoon dominates bringing relatively cool conditions, with showers along the coast but dry inland.
- iv) *Dayr* – October to November. This is a short rainy season with less rainfall than the *Gu* season.

The *Gu* season is the major rainy season (more than 50% of the annual rain) and dominates over the *Dayr* in quantity and reliability. Therefore it is considered the primary cropping season. The amount of rainfall during the two rainy seasons is also seen to be correlated with elevation in both Juba and Shabelle basins. The variability of rainfall from one year to the other is pronounced and is a matter of prime concern for water utilization. The reliability of available water influences agricultural productivity as well as the design of water resources systems. Rainfall variation is quite high in the case of Juba and Shabelle River basins.

Potential evapotranspiration (PET) in the Juba and Shabelle basins ranges from about 1 500 – 2 000 mm/year as seen on the mean annual PET map on page 14. PET increases as one moves inland to upstream areas of the basins (e.g. from Sablaale to Belad Weyne and Kismaayo to Luuq, respectively). Highest monthly PET values are observed in March and September. The mean annual PET is generally greater than the annual rainfall all over Somalia. There is therefore a water balance deficit. However, on a monthly basis some areas within Juba and Shabelle basins and in the vicinity have surplus water balance e.g. Mareerey, Balcad and Jowhar in the months of May and November as seen on the long term mean (LTM) monthly graphs at selected stations within the Juba and Shabelle basins in Somalia on page 12.

The mean air temperatures are generally high in the Juba and Shabelle River basins. The LTM annual temperature for the Juba basin ranges from 29 - 30 °C while that of the Shabelle basin ranges from 26 - 28 °C in the upper reaches and 29 - 30 °C. December to March are the hottest months of the year while July and August are the coolest months. Average maximum monthly temperatures reach as high as 41 °C in March around Luuq along the Juba River and 35 °C within the Shabelle basin. The LTM annual temperature is shown on the map on page 15.

Cimilada galalka Juba iyo Shabeelle

Sida Soomaaliya inteeda kale, cimilada galalka wabiyada Juba iyo Shabeelle waa engayg ilaa yar-engeyg waxayna ka dhalataa dhaqdhaqaaq ka jira xagga Waqooyi iyo koofur goobta kulanka bartamaha trobikaalka (Inter-Tropical Convergence Zone (ITCZ)) oo ah gudbana Dhulbaraha. Dhulka Soomaaliya intiisa badan waxay u keenta labo xilli roobaad – Gu oo ah marka ITCZ ay u kacdo xagga waqooyi iyo Dayrta oo ah marka ay u kacdo xagga koofureed. Ladaba xilli roobaad waxaa ku kala dhex jira labada xilli oo engeyg ah, Jiilaal iyo Xagaa.

Cimilada labada gal ee ka tirsan qoraalkaan waa la sheegay ayadoo la adeegsanayo xogta ugu waqti dhaw oo la helikaro, taasoo lagala soo baxay xogta caalamiga ah oo FAO uruurisay muddadii u dhaxaysay 1963 iyo 1990. Hase ahaatee, waxaa jira in xogta saldhigyada qaarkeed ay maqan tahay waqtiyada qaar. Markaas oo kale xogta maqan waa lagala soo dhexbaxaa middaan si loo hagaajiyo baarista.

Waxaa jira kala duwanaansho macne leh oo bedka degaanka roobaabku ku dhacaan ee dhulka biyoqabatinka labda gal ku taxaluqa sida lagu arki karo khariidadda roobabka sanadlaha ee ku taal bogga 13. Biyoqabatinnada sare ee Juba iyo Shabeelle oo ku yaal buuraleyda sare ee Itoobiya waxay helaan roob u dhexeeya 1 300 ilaa 1 800mm/sanadkiiba. Qaybta dhulka biyoqabatinka dhexe oo ku wareegsan xadka Soomaaliya iyo Itoobiya, maadaama ay xigto dhanka dabayshu u sii marto buuraleyda, waxay heshaa roob ka yar (qiyaas 271 mm/sanad dhanka Luuq ama 330 mm/sanad xagga Baladweyne). Waxaa dhaca kororka roobabka sanadle markii loo kaco xagga badda (tusaale 500-700 mm/sanadkiiba gudaha dhulka kor ku kacsan ee Baydhabo, 700-800 mm/sanadkiiba gudaha Jamaame iyo 584 mm/sanadkiiba gudaha Afgooye). Saamaynata buuraleyda iyo midda badeedba waxay isbedbedel xoog leh ku keenyaan roobka gobolka.

Waxaa jira afar xilli oo kala soocan, si guudna xilliyada waxaa loo falaqeyyaa sida soo socda:

- i) *Jiilaal* – Disheembar ilaa Marso. Dabaysha Waqooyi-bari (monsoon) ayaa qaalib ah xaaladuna waa engeyg hadana ilaa-heerna waa kulayl.
- ii) *Gu* - Abriile ilaa Juunyo. Xalligaan waxaa loo yaqaan waqti roobaad ka ugu muhiisan
- iii) *Xagaa* – Luulyo ilaa Seteembar. Dabaylaha koofur-galbeed ayaa qaalib ah waxayna keentaa xaalad ilaa- xad qabow, waxaana weheliya roob xagaayo oo ka da'a xeebta, laakiin dhulka guduhu waa engeyg.
- iv) *Dayr* – Oktoobar ilaa Nofeembar. Xilligaan roobab ka yar kuwa xilliga Guga ayaa da'a.

Guga waa xilli roobaadka ugu muhiimsan (in ka badan 50% roob sanadlaha) waana ka saamayn weyn yahay xilliga Dayrta xagga tirada iyo isku-halaynta. Sidaas darteed waxaa loo aqoonsan yahay inuu yahay xilli beereedya kan muhiimsan. Ibedelka Qadarka roobabka da'a inta lagu jiro labada xilli roobaad waxaa sidoo kale la arkayaa inay waafaqayaan joogga galalka labada wabi Juba iyo Shabeelle. Isbedelka roobabka sanad ka sanad aad ayey u muuqataa waxaana arrinta kowaad ee laga walwalo marka ay timaado ka manaafacaadsiga biyaha. Isbedelka roobabku waa ku badan yahay dhulka galalka Juba iyo Shabeelle.

Uumibaxa dhicikara (PET) gudaha galalka Juba iyo Shabeelle wuxuu dhexeeyaa qiyaas 1500 ilaa 2000 mm/sanadkiiba sida lagu arki karo khariidadda celceliska sanadla ee PET oo ku taal bogga 14. Uumibaxa dhicikara (PET) wuu kordhayaa marka loo dhaqaaqo dhulka gudaha u durugsan meelaha dhanka sare ee galalka (tusaale laga bilaabo Sablaale ilaa Baladweyne iyo Kismaayo ilaa Luuq, mid mid ahaan). Qiimiga (tirada) uumibaxa bille (bil waliba) ugu sarreeya waxaa la arkaa bilaha bilaha Maarso iyo Sebteembar. Qiimiga uumibaxa sanadle guud ahaan wuxuu ka badan yahay roobka sanadlaha ee Soomaaliya oo dhan. Sidaas darteed waxaa jira hoosudhac ah isu dheelitirka biyaha. Si kastaba ha ahaate, si billaha ku salaysan ayaa meelaha qaar (degmooyinka) ku yaal galalka Juba iyo Shabeelle iyo agagaarhoodu waxay leeyihiin wax ka dheeri ah iskudheelitir biyoodka, tusaale, sida lagu arki karo Jaantuuska celceliska billaha waqtiga

The relative humidity (RH) in the reaches of the Juba and Shabelle Rivers is higher than in other places within the country and the annual mean values range from 70% to 80%. It also increases moving from more continental locations (upstream) to the coastal areas (downstream) of the two rivers. For instance RH along the Shabelle in Belad Weyne and Bur Hakaba, inland and upstream areas are lower than the ones in Balcad and Afgooye, which are in the downstream areas of Shabelle River. Similarly along the Juba River, Luuq (upstream) has lower RH than Kismaayo, located on the coast, almost at the mouth of the Juba River.

Wind speeds generally range from 1.8 - 24.4 km/hr on average within the Juba and Shabelle River basins in Somalia. The values however do vary greatly within the year from season to season. On average the lowest values of wind speed occur in the months of April and November, coinciding with the peaks of the two rainy seasons, Gu and Dayr, respectively.

Note: For more detailed analysis and reference list, consult the SWALIM water reports series.

Long term average (1963 to 1990) monthly rainfall and PET graphs for selected stations within the Juba and Shabelle basins in Somalia

Jaantuuska celceliska waqtiga dheer (1963-1990) ee roobabka billaha ah iyo uumibaxa dhici-kara ee saldhigyo la doortay oo ku yaal gudaha galalka wabiyada Juba iyo Shabeelle ee Soomaaliya.

dheer (LTM) ee Mareerey iyo Balcad iyo Jowhar waqtiga bilaha Maajo iyo Nofeembar oo laga xushay saldhigyada ku yaal galalka Juba iyo Shabeelle gudaha Soomaaliya ee muuqaalka hoose.

Celceliska kulbeegga hawada guud ahaan waa sareeyaa gudaha gobolka galalka Juba iyo Shabeelle.. Celceliska waqtiga dheer (LTM) ee kulbeega sanadlaha ee galka Juba wuxuu u dhexeeyaa 29 - 30 °C halka galka ay dhaxayso Shabeelle 26 - 28 °C, dhanka sare hadana 29 - 30 °C bilaha Dishember iyo Maarso oo ah bilaha ugu kulul sanadka, halka Luulyo iyo Agoosto ay yihiin bilaha ug qabow. celceliska kulbeegga ugu sarreeya wuxuu gaaraa ilaa meel sare sida 41 °C Maarso gudaheeda agagaaraha Luuq ee jiidda Wabi Juba iyo 35 °C gudaha galka Wabi Shabelle . Celceliska waqtiga dheer (LTM) ee kulbeegga sanadlaha waxaa lagu tusinayaa kharriddada bogga 15.

Isbedelka qoyaanka kaliilka (RH) ee afaafka sare ee galalka wabiyada Juba iyo Shabeelle waa ka sarreeyaa meelaha kale ee gudaha dalka hadana qiimaha celceliska sanadlaha wuxuu u dhexeeyaa 70% - 80%. Sidoo kale waa kordhayaa markasta oo laga soo dhaqaaqo meelaha degaanka biyoshubka sare oo loo soo kaco dhanka biyoshubka hoose ee labada wabi. Tusaale isbedelada qoyaan kaliileedka (RH) jiidda Shabeelle ee gudaha Balad weyne iyo Buurhakaba dhulka gudaha iyo meelaha biyoshubka sare way ka hooseeyaan kuwa gudaha Balcad iyo Afgooye, kuwasoo oo ku yaal dhanka hoose ee biyoshubka Wabiga Shabeelle. Sidoo kale jiidda Wabi Juba, Luuq (biyoshubka sare) waxay leedahay isbedelada qoyaan kaliileed (RH) ka hooseeya kan kismaayo oo ku taal xeebta, ku dhawaadka afka Wabi Juba.

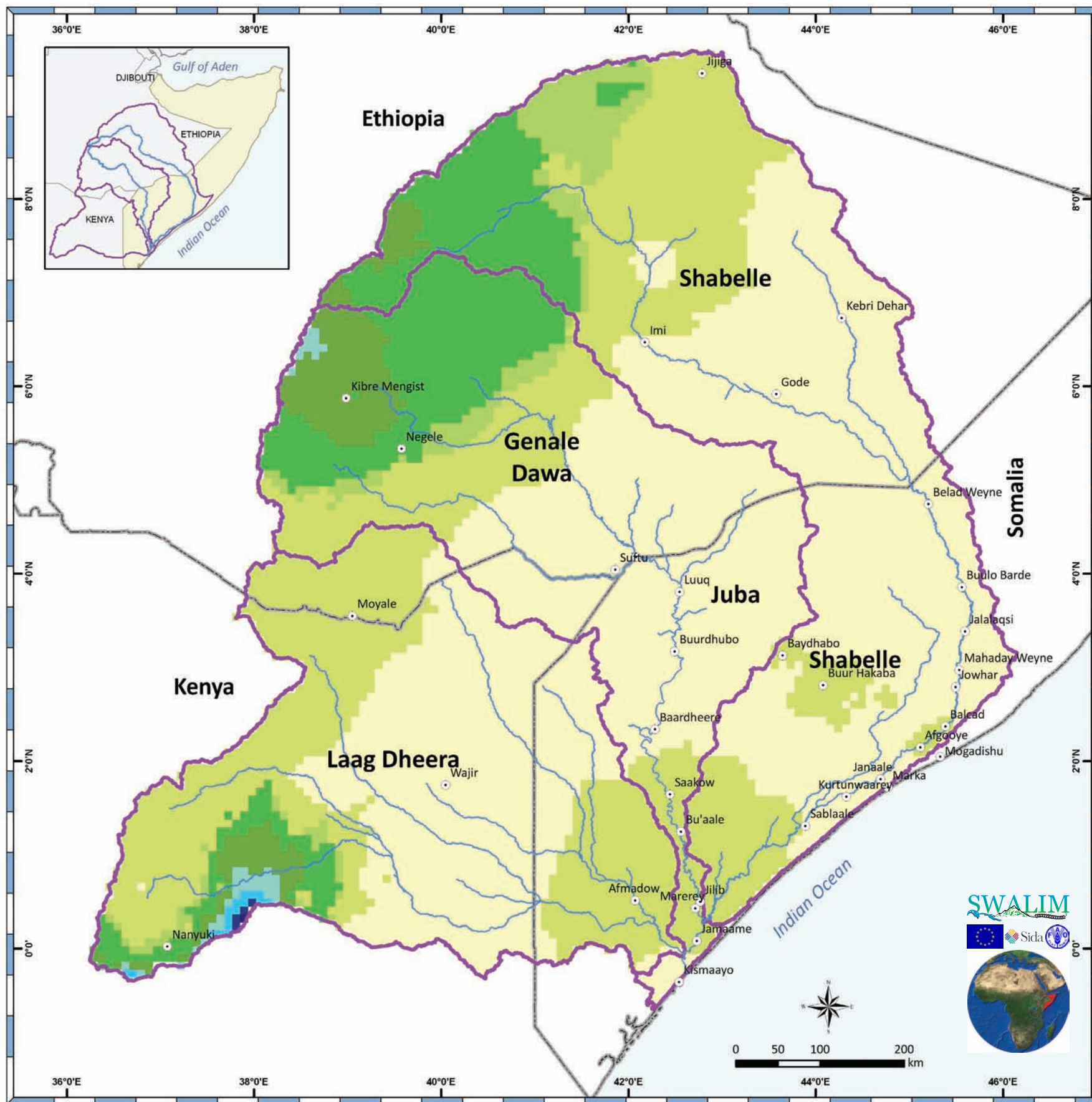
Orodka dabaysha guud ahaan wuxuu u dhexeeya 1.8-24.4 km/saacaddii marka celceliska la eego gudaha galalka wabiyada Juba iyo Shabeelle ee Soomaaliya. Hase ahaate qiimeyooqow aad si aad weyn ayey isubedeleyaan sanadka gudihiisa xilli ka xilli. Celcelis ahaan qiimaha ugu hooseeya ee oroka dabaysha wuxuu dhacaa bilaha Abriille iyo Nofeembar, oo ku aadan bartamaha labada xilli roobaadyo, oo kala ah Gu iyo Dayr.

La soco: Faahfaahin baaris dheeraad ah iyo tixda buugag raad-raac, ka daalaco buugaagta warbinta taxanaha ah ee SWALIM.

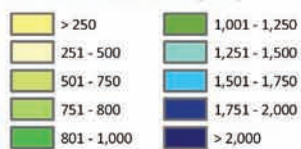


Rainfall of the Juba and Shabelle basins

Roobabka galalka Juba iyo Shabeelle



Mean annual rainfall (mm)

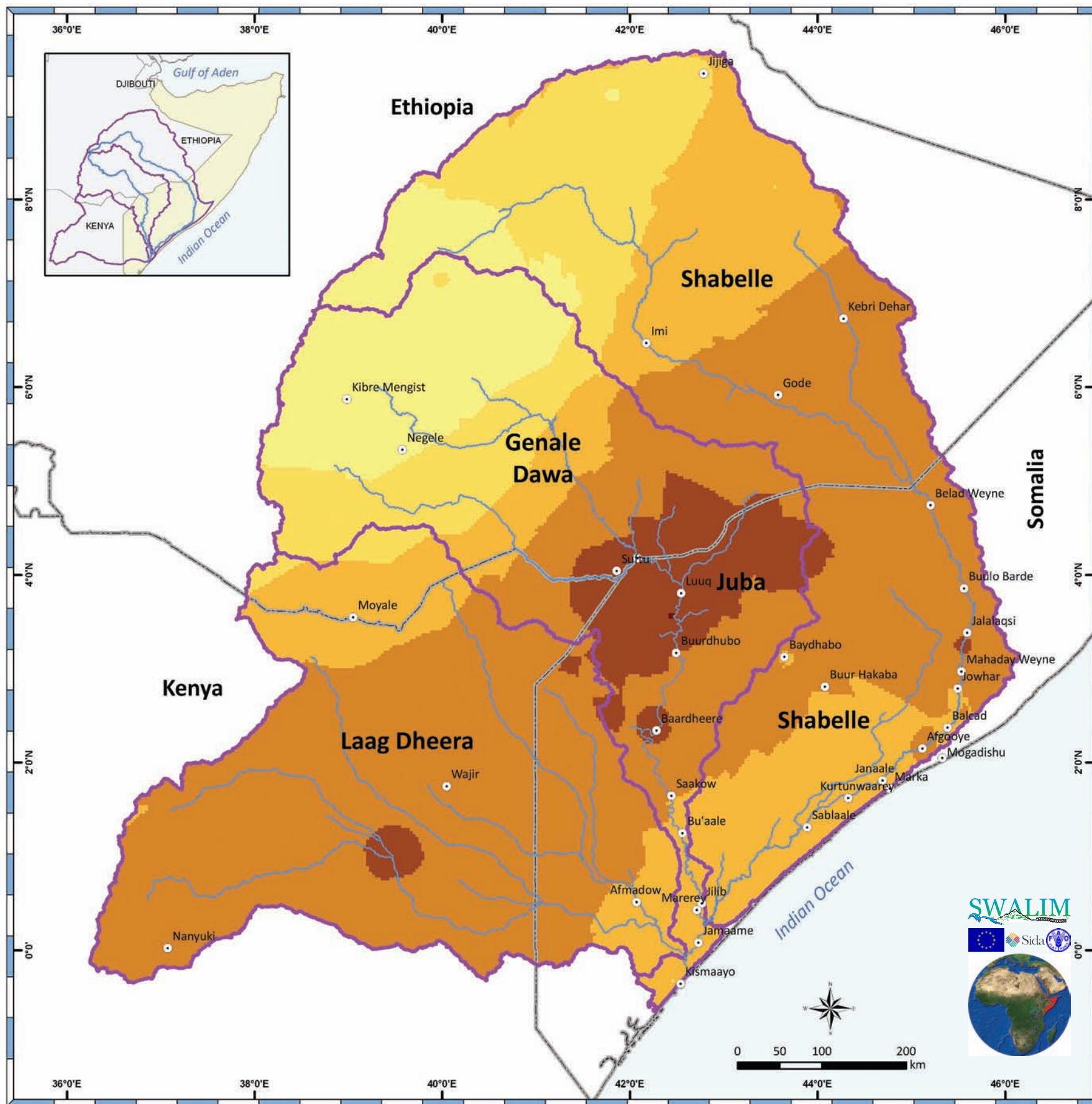


- Major towns
- River
- National boundary
- Catchment boundary

Data source: Climate data elaborated by SWALIM; catchment boundaries and drainage network derived by USGS for SWALIM from NASA-SRTM 30m; administrative data from UNDP
Map Reference: RIVAT-ANNUAL-TOT-P-20100106-A3-400dpi-01
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The boundaries and names on this map do not imply official endorsement or acceptance by the United Nations

Potential evapotranspiration of the Juba and Shabelle basins

Uumbaxa ka dhicikara galalka Juba iyo shabeelle



Data source: Climate data elaborated by SWALIM; catchment boundaries and drainage network derived by USGS for SWALIM from NASA-SRTM 30m; administrative data from UNDP
 Map Reference: RIVAT-ANNUAL-TOT-PET-20100106-A3-450dpi-01
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Temperature of the Juba and Shabelle basins

Kulbeegga galalka Juba iyo Shabeelle

