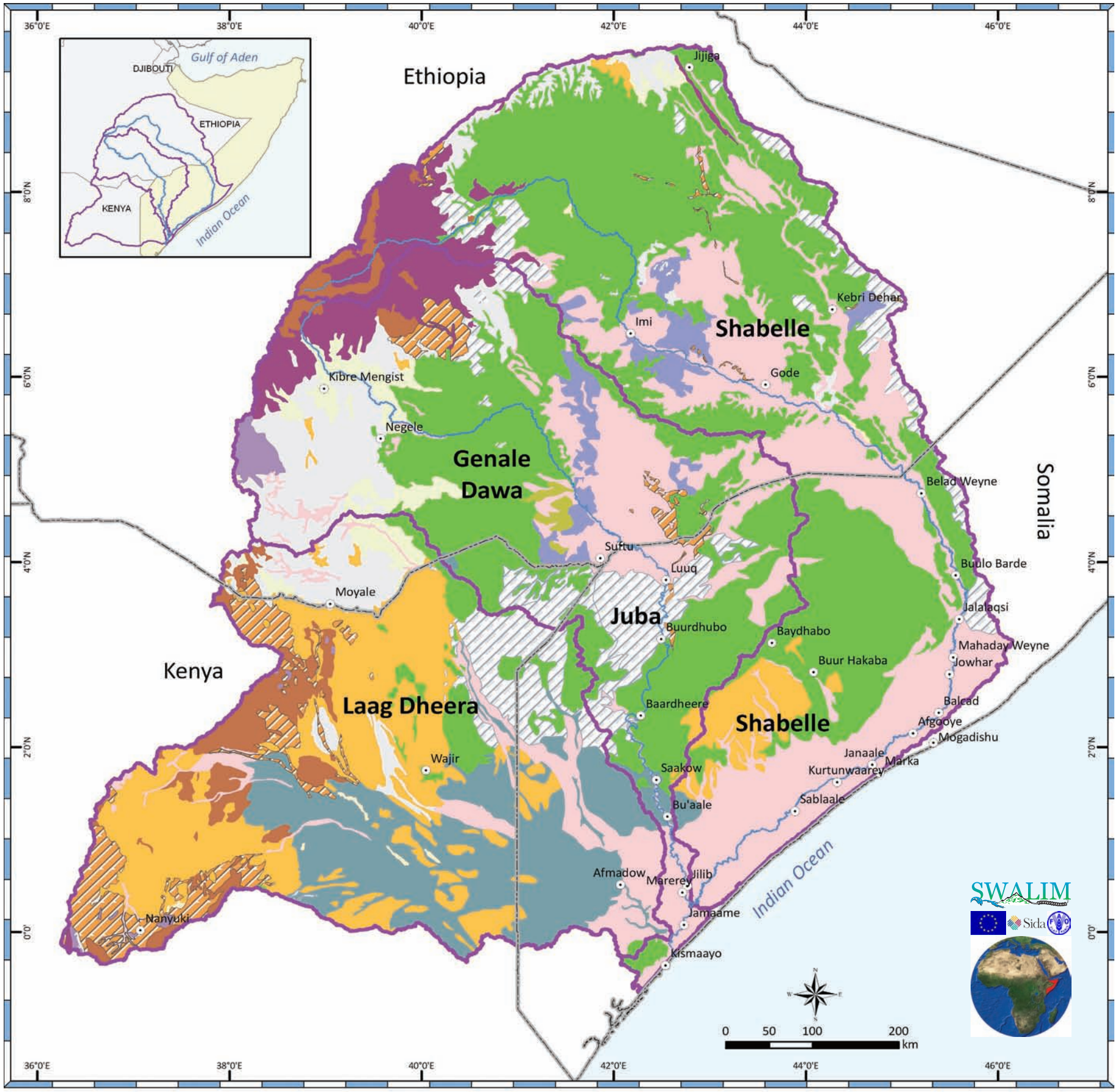
Lithology of the Juba and Shabelle basins
Cilmi dhagaxeedka galalka Wabiyada Juba iyo Shabeelle



Lithology

- Acid rocks (>63% of silica, i.e. granites, granodiorites, rhyolites, etc)
- Basic and ultrabasic rocks (< 52% of silica, i.e. basalts, gabbro, dolerite)
- Undifferentiated basic and ultrabasic rocks
- Undifferentiated volcanic rocks
- Pyroclastic rocks
- Undifferentiated metamorphic rocks
- Unconsolidated rocks and sediments
- Clastic rocks (conglomareates, gravels, sands)
- Evaporitic rocks and sediments (i.e. gypsum, trona, etc)
- Siltstone, Sandstones, Shales, and Marls
- Limestone
- Unknown
- Major towns
- River
- National boundary
- Catchment boundary

Data source: Geology from FAO SOTER; catchment boundaries and drainage network elaborated by USGS for SWALIM from SRTM 30m; administrative datafrom UNDP
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Produced by: FAO Somalia Water and Land Information Management –SWALIM- project. Contact: enquires@faoswalim.org
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Geology and landscapes of the Juba and Shabelle basins

The evolution of the Juba and Shabelle watersheds is intimately linked to the development of the Great Rift Valley, as they occupy most of its eastern flank. The uplift of the Ethiopian highlands and the deposition of thick volcanic and sedimentary rock formations have determined the geological setting in which the two river basins have evolved.

Rocks of different origin and nature outcrop along their watershed. In the upper Ethiopian highlands, mainly igneous and metamorphic rocks build up most of the mountains, plateaus and hills. Moving downstream, an extensive cover of sedimentary rock dominates the basins in their Ethiopian, Kenyan and Somali regions. The only notable exception is in the area of the Buur Hills, an 'island' of metamorphic and igneous basement rocks in the lower part of the basins. These hills also define the lower part of the watershed divide between the Juba and Shabelle basins.

Isolated but still significant for their extent and their implications on water quality (both surface and groundwater) are the gypsiferous deposits that outcrop in the middle part of the basins, straddling the Ethiopia-Somalia border, particularly in the Shabelle basin. These outcrops are highly weathered and eroded, producing quite a lot of loose sediments, mainly during the dry season. As soon as the wet season arrives, the first rains wash away the loose crusts on the topsoil, made up mainly of salts and gypsum, and convey them to the rivers' waters, increasing significantly their salinity during this period of the year. Other isolated spots of high salinity are also found scattered across the basins, reflecting the existence of other gypsiferous soils and rocks underground.

Morphologically, the basins can be distinguished into three zones that roughly correspond to their geological makeup: The upper zone, characterized by high elevations, steep slopes and rugged morphology, whose mountain peaks and high plateaus trap the moisture of the monsoon winds and transform it into generous rainfall. This upper area is the origin of most of the erosive processes that scour the volcanic and metamorphic rocks. In this zone the drainage is well defined and made up of several steep tributaries joining the main channel. Especially during the rainy season their fast-flowing water carries a lot of sediment. The mid zone is characterized by lower elevations and by the presence of frequent hills and sometimes deep gorges, especially in the Juba catchment. In this part, the main rivers start to form their typical confined valleys, with high relief on both sides of the valleys and difficult access to the rivers themselves. In this area, mainly transport processes act on the landscape, transferring the deposits from the upper zone downstream. In the lower zone, the valleys widen to several tens of kilometres at some points, with smooth morphology and very limited relief and slope. In this zone the main processes acting on the landscape are of transport and deposition, especially during the frequent floods that affect this region. It is also in this zone that the Shabelle River acquires it's peculiar morphology that sees the river bed higher than the surrounding floodplain (hanging or elevated river, as it is called in the technical terms), similar to other major rivers in the world, such as the Mississippi River, the Yellow River and the Po River. This is a typical feature of rivers carrying a lot of sediment and whose flow is not strong enough to keep it in suspension - sediment is constantly deposited throughout the river course, which builds up the river bed and banks and elevates the river. Another typical feature of the Shabelle River is that after following the nearly straight and narrow valley of the upper and mid zones, it then enters the lower zone, where the slope is gentler, giving rise to several avulsion patterns and paleo-channels that are clearly visible from the air. Downstream of Balcad, the river bends abruptly almost 90 degrees towards south-west, and then it continues its course for hundreds of kilometres. In this tract the river runs parallel to the coast, confined in the alluvial plain by the huge dune system that separates it from the coast.

The Shabelle River joins the Juba River only during exceptional floods; otherwise it peters out into a marshy area well upstream.

Joolojiga iyo muqaal- dhuleedka galalka Jubba iyo Shabeelle

Isbedelka marxaladaha biyorogyada Jubba iyo Shabeelle waxay si qotodheer ugu xirantahay koritaanka dilaaca dooxada weyne (Great Rift Valley) maadaama laga helo aaggiisa berigga. Kor u kaca dhulka jooga sare ee buuralayda Itoobiya iyo dhegitaan qarada culus ee fulkaaniga (volcanic) iyo samaysanka dhaxayada dagay (sedmentary rocks) ayaa saameyn ku leh sifaalaha dhagaxyada ee marka dambe labada wabi ku abuurmaan una tadawuraan.

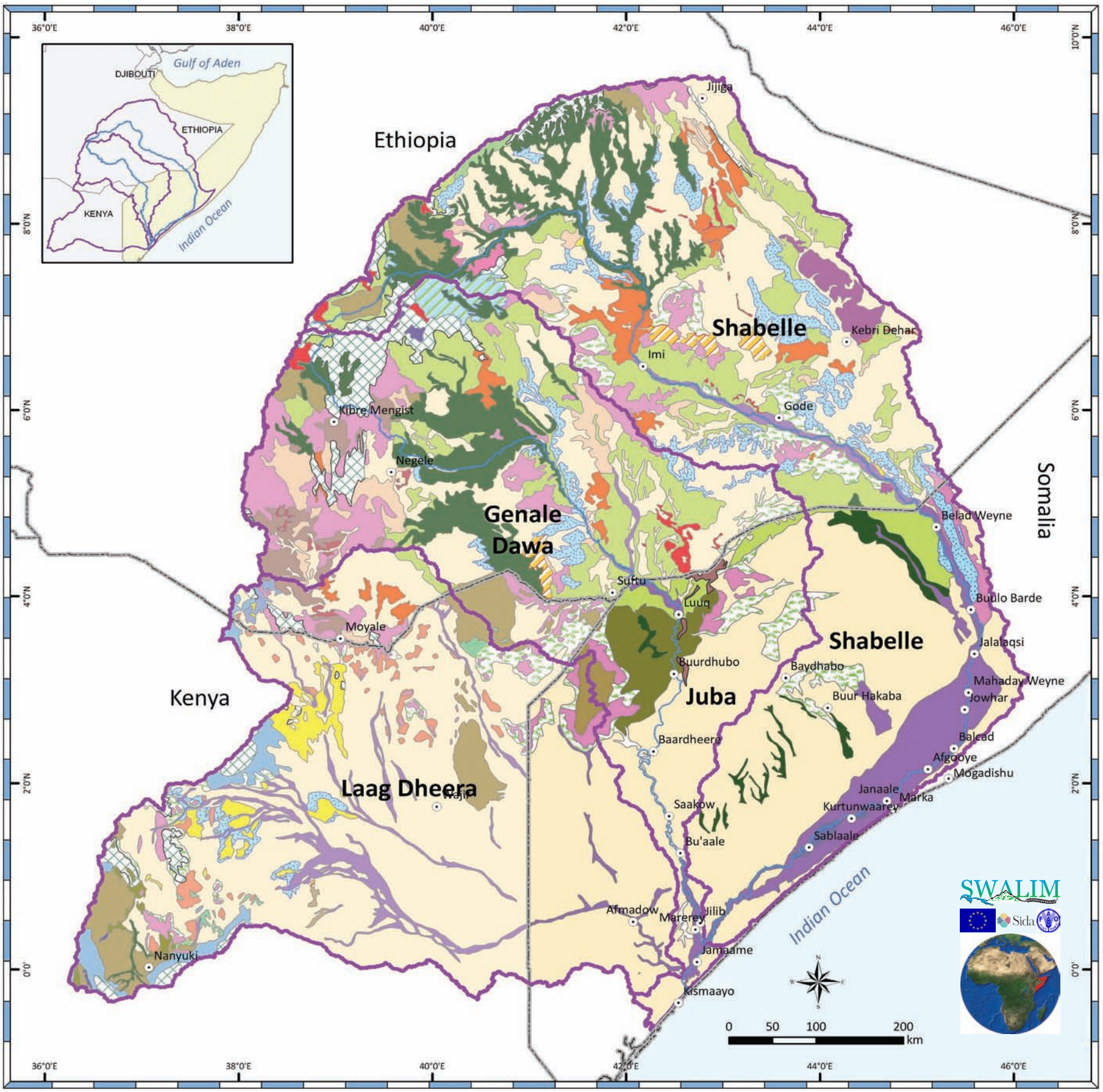
Dhagaxyada ku kala gedisan dhica abuuritaanka iyo dabiicadda dibad u soo baxa ayaa ku dheraran biyoroggooda. Dhulka jooga sare ee buuraleyda Itoobiya badanaaba dhagaxaanta Igneous iyo metamorphic waxay sameeyaan buuralayda, ooggada (plateau) iyo lafaha (hills). Haddii aad u socotid xagga hoose dhulalka godan sida Itoobiya , Kenya iyo qayb ka mid ah Soomaaliya waxa laga helaa dibad baxa dhagaxyada daga (sedimentary) oo baahsan. Marka laga reebo - qaybta hoose ee dhulalka godan - waxay ka samaysan yihiin buuro yar yar oo ah "jasiirad" dhagaxaan metamorphic iyo igneous gogolan oo ay ku wareegsan yihiin dhagaxaanta degta (sedimentary). Lafahaas ama buurahaas yar yar waxay qeexayaan qaybta hoose ee gowga (gebiga) biyo-dhaca kala qaybiyaan dhulalka godan (galalka) ee Juba iyo Shabeelle.

Si gooni gooni waxaa jira dibad bax ka kooban didib (gypsiferous), laakiin mug iyo saameyn ku leh tayada biyaha (biyaha ooggada sare iyo kuwa dhulka hoostiisaba), oo laga helo qaybta dhexe ee dhulalka godan (galalka), ku dhawaadka gudbka xuduuda Itoobiya iyo Soomaliya, khaastan dhulka godan (galka) ee Shabeelle. Dhagaxaanta soo dibad baxay mid aad iyo aad ayey u riigmeen oo u hallabeen (isku bedeleen) isla markaana waxay sameeyeen carro dhig fur furan, badanaaba xilligga qalalan. Degdeg marka xilligga qoyaanku yimaado, roobka ugu hooreeyaa ee curta waxa uu mayraa oo kaxeeyaa lakabka sare ee kala tagtagsan ee dhulka siiba ooggada sare carrada taas oo ka kooban milix iyo didib, waxayna u gudbiyaan biyaha wabiga ayagoo kor u qaada milixdooda waqtigaan oo kale sanadka gudihiisa. Waxa kale oo jira baro baro milix leh oo gooni gooni ah kuna filiqsan dhammaan dhulalka godan, taas oo muujinaysa in ay jiraan ciido kale oo didib ah iyo dhagaxyo ku jira dhulka guntiisa hoose. Qaab dhismeedka dhulalka godan waxa loo kala sooci karaa saddex seere (soone), laga bilaabo qaybta sare ilaa qaybta hoose taas oo muujinaysa qaybta asalka Joolojiga ay ka soo jeedo.

Seeraha sare wuxuu leedahay sifaalahan sida joog sare, jan jeer sare iyo qaab dhismeed kala sareeya oo leh fiiq buureed sare iyo oogo sare taas halkaan ku celisa qoyaanka hawada dabaylaha oo bedesha roobab mahiigaan ah. Seerahaan sare waa meesha asal ahaan uu ka yimaado falgalka ciidhallowga iyo qaawinta dhagaxyada fulkaaniga iyo metamorfikada. Seerahaan gudihiisa biyomareenku aad ayuu u qeexan yahay wuxuuna ka kooban yahay dhowr togag hoobad ah oo ah ilaha biyahu uga yimaadaan biyomareenka ugu ahmiyadda badan. Laagahan waxay ku soo rogmada biyo qulqulaya gaar ahaan xilli roobaadka, waxay sitaan walaxo ciid ah (sediment) oo biyaha ku laban. Seeraha dhexe, wuxuu leedahay sifaale ah jog hoose iyo buuro soo noqnoqda oo mar marna qarar qoto-dhaadheer ah gaar ahaan xagga wabiga Juba. Qaybtan, wabiyada muhiimka ah ayaa ka soo bilaabma kuwaas oo ku dhammaada dooxooyin ku leh labada dhinac buuro joog sare leh oo ay ku adag tahay wabiyada laftood in ay ka gudbaan. Goobtaan, falgal daad-qaadiseed ayaa ku dhacay muuqaal-dhuleedka qaybta sare oo wax ka soo qaaday dhigayna qaybta hoose. Goobta hoose waxay leedahay sifaale ah dooxooyin balaaran (dhowr kun oo kilo mitir oo balaar ah) iyo qaab dhismeed siman iyo kala sarayn iyo buuro xadidan oo jan jeer leh. Goobtan, hawl-socodyada muhiimka ah ee la falgalaya qaab dhismeedka dhulka waa qaadid iyo dhigid, gaar ahaan inta ay jiraan fatahaadaha soo noqnoqda oo gobolkan saameeya. Sidoo kale goobtaan gudaheeda wabiga Shabeelle wuxuu kala soo baxay qaab dhismeed yaabka leh oo ah in lagu arko wabiga salkiisa hoose oo ka sareeya agagaarka dhulka fatahaada ee gosha (daldalan ama wabi sare u qaadan, sida loogu yeero afka farsamada). Sida, tusaale ahaan, qaybo ka mid ah wabiyada caalamka sida Mississipi ee dalka Maraykanka, wabiga hurdiga (Jaallo) ee Shiiinaha iyo wabiga Po ee Talyaaniga iyo qaar kale. Tani waa sifaalaha u gaarka ah wabiyada xambaarsan walaxaha fariista oo badan oo ku qasan biyaha sida Shabeelle, taasina ma keeni karto in ay biyuhu si fudud u racaan dooxa, sidaas awgeed waxay abuurayaan kor u kac salka wabiga iyo gebiyadiisa, markaana wabigu kor u kaco. Sifaale kale oo u gaar ah wabiga Shabeelle waa asaga ku dhawaadaa inuu ku koobnaado dooxada laga soo bilaabo xagga sare ilaa Mahadday Weyne korkeeda, qaybtaan ka dib wuxuu galaa meel janjeerku aad uga yar yahay xagga sare ee wabigu ka yimaado, waxaana uu sameeyey dhowr hannaan oo kala bax ah iyo laagyo fac weyne (paleo-channels), taas oo si cad uga muuqata xagga hawda sare. Xagga ka biyoshubka hoose ee Balcad, wabiga markiiba wuxuu leexdaa ku dhawaad 90 digrii dhinaca koonfur galbeed, dabadeed wabigu wuxuu ku sii soconayaa jid boqolaal kilomitir ah. Intaan oo dhan Wabigu waxuu bar bar socodaa xeebta asagoo dhexmaraya dhulka leh carrada daad-keentayda wuxuuna la xad noqonayaa bacaadka xeebta.

Wabiga Shabeelle wuxuu ku darsamaa Juba, meel u dhaw Kamsuuma, marka fataahad ay jirto oo kaliye, haddii kale biyihiisu waxay ku lumaan dhulka biyo fariisiga Balley.

Landscapes of the Juba and Shabelle basins
Muuqaal- dhuleedka galalka Juba iyo Shabeelle



Landscape

- Mountain, major scarps
- Mountain/plateaus
- Hills, minor scarps
- Hills/valleys
- Hills/bad lands
- Mountain footridges
- Footslopes
- Footslopes/hills
- Footslopes/plains
- Footslopes/piedmont plains
- Plateaus
- Plateaus/hills
- Plateaus/uplands
- Uplands
- Piedmont plains
- Piedmont plains/plateaus
- Plains
- Flood plain
- Valleys
- Valley bottom/hills
- Lateral valley
- Complex Landform

- Major towns
- Rivers
- National boundary
- Catchment boundary

Data source: Topographic map original scale 1:500,000, Russian edition; catchment boundaries and drainage network elaborated by USGS for SWALIM from SRTM 30m; administrative data from UNDP
Map Reference: RIVAT-LANDSCAPE_20091203-A3-400dpi-01
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