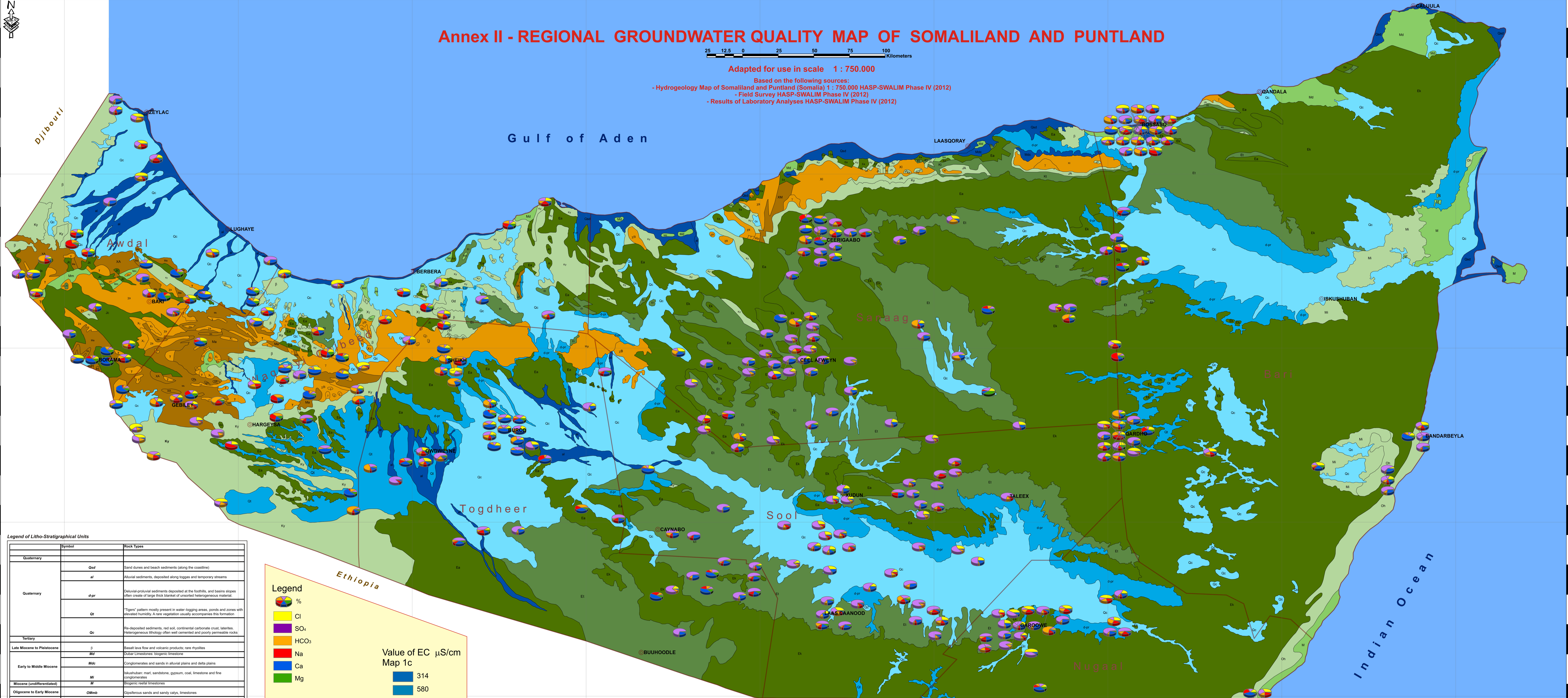


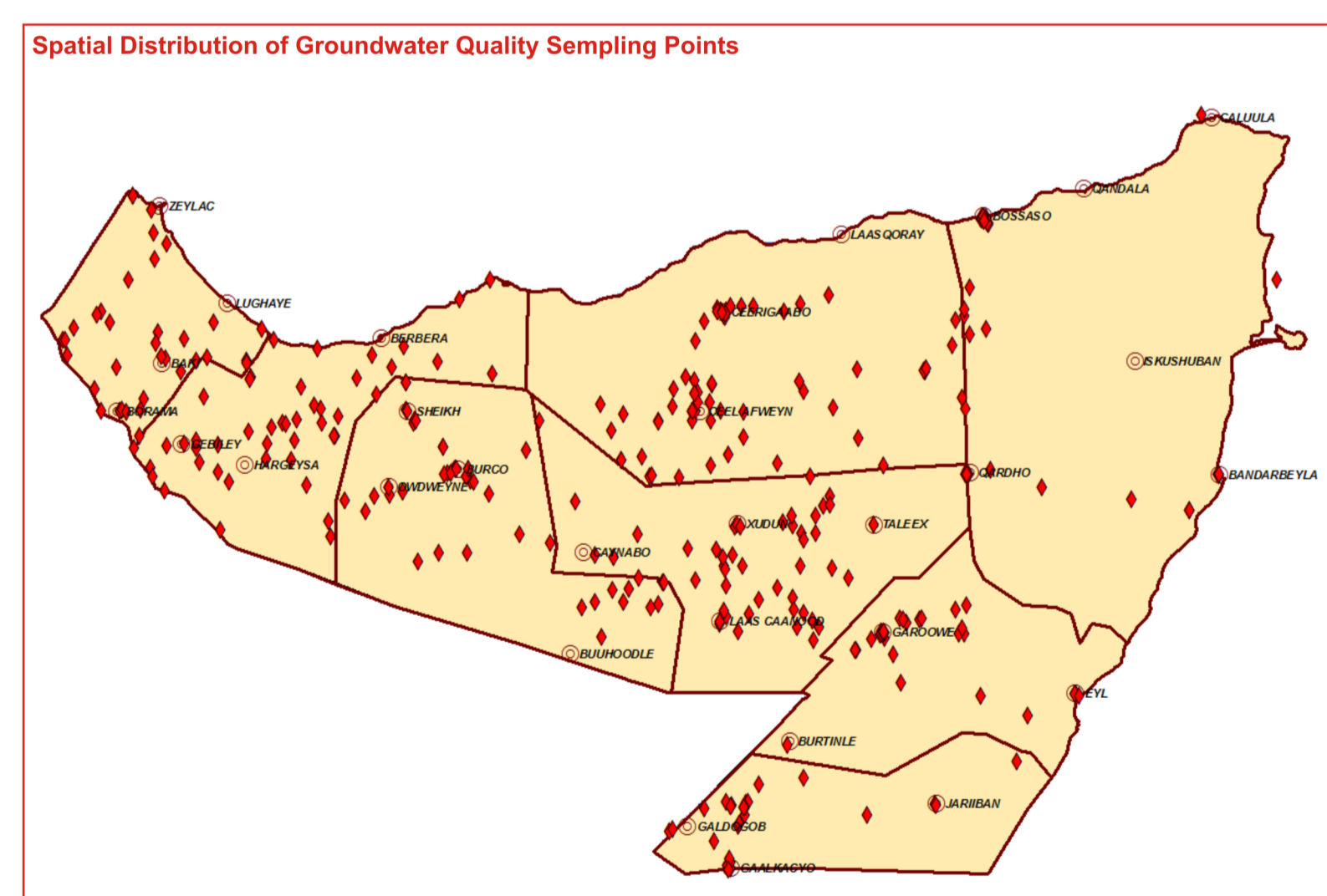
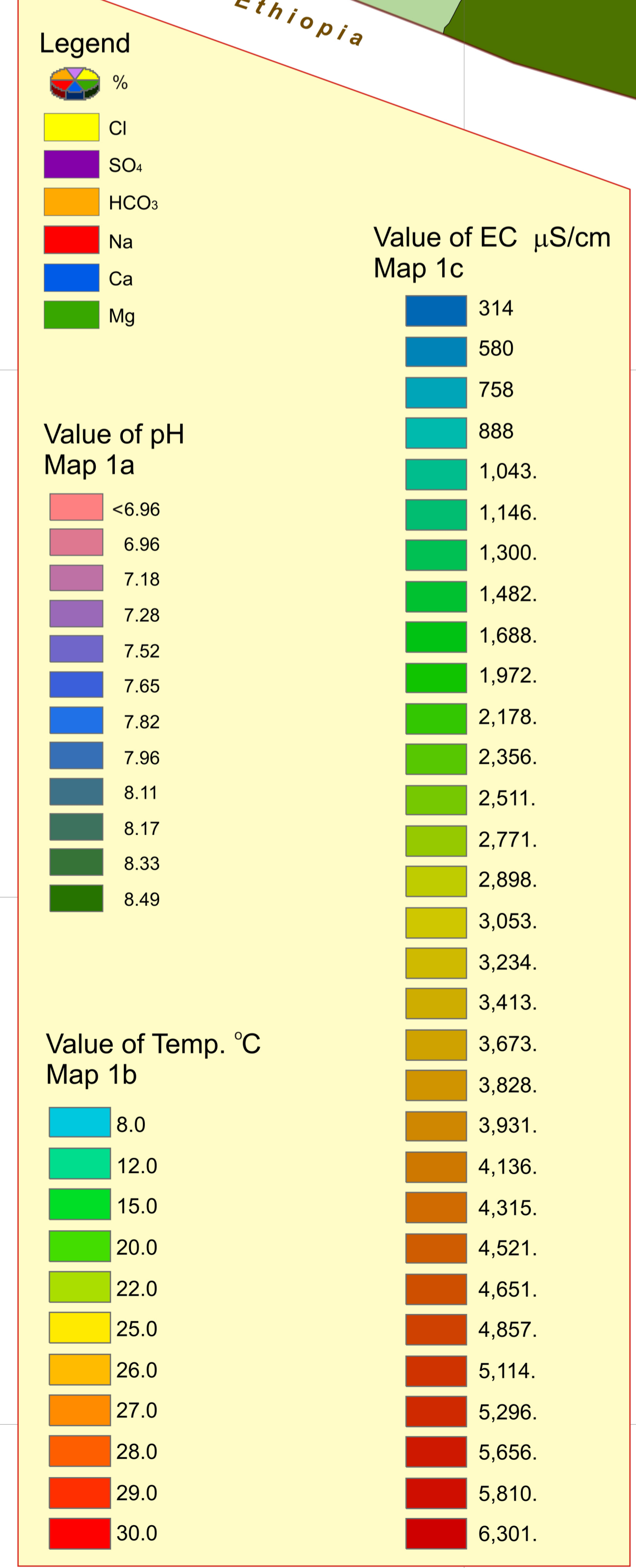
# Annex II - REGIONAL GROUNDWATER QUALITY MAP OF SOMALILAND AND PUNTLAND

Adapted for use in scale 1 : 750.000  
 Based on the following sources:  
 - Hydrogeology Map of Somaliland and Puntland (Somalia) 1 : 750.000 HASP-SWALIM Phase IV (2012)  
 - Field Survey HASP-SWALIM Phase IV (2012)  
 - Results of Laboratory Analyses HASP-SWALIM Phase IV (2012)



### Legend of Litho-Stratigraphical Units

Age	Symbol	Rock Types
Quaternary	Qd	Sand dunes and beach sediments (along the coastline)
	al	Alluvial sediments, deposited along loggias and temporary streams
	dsp	Deluvial/proluvial sediments deposited at the foothills, and basin slopes often create of large thick blanket of unsorted heterogeneous material.
	Qf	"Tiger" pattern mostly present in water-logging areas, ponds and zones with elevated humidity. A rare vegetation usually accompanies this formation.
Tertiary	Qc	Re-deposited sediments, red soil, continental carbonate crust, laterites. Heterogeneous lithology often well cemented and poorly permeable rocks
	Qs	Shale sections, siltstones, sandstones, conglomerates, gypsum, limestone
Late Miocene to Pliocene	ll	Shale, fine flow and volcanic products, rare rhyolites
	llz	Other Limestones, biogenic limestone
Early to Middle Miocene	Mdc	Conglomerates and sands in alluvial plains and delta plains
	Ml	Mudshale, marl, sandstone, gypsum, coal, limestone and fire conglomerates
Miocene (undifferentiated)	M	Biogenic reefal limestones
	OMdc	Oligiferous sands and sandy calcs, limestones
Oligocene to Early Miocene	Oh	Marly and biogenic limestones, calcarenites and sandstones
	Od	Shale sections, siltstones, sandstones, conglomerates, gypsum, limestone
Middle to Late Eocene	Eh	Ka'kar (Karkar) limestones: nodular nummulitic limestones and marl intercalations with a rich shallow-marine fauna.
	Et	Ta'ab (Taleex) evaporites: anhydrites, gypsum, dolomites, cherty limestones and shales
Early to Middle Eocene	Ea	Aurad: limestones, limestones with corals and intercalations of marl and shales
	Ky	Yessima (Nubian) sandstones: Continental facies - variegated quartzose sandstones and siltstones, mainly fluvial. Near Coerigaabo marine calcareous intercalations.
Aptian-Campanian	Kl	Tapu Form: Shallow-water limestones with corals, rudists and orbitolites, marls, local with ammonites, fossiliferous continental sandstones and conglomerates with rare coal seams
	Jc	Shallow water limestones separated by dark, grey marls and shales underlain by fluvial quartzose sandstones
Early Jurassic to Kimmeridgian	JA	Aji Meadow Group: limestones, marlstones, dolomites, pebbly sandstones, clays and rare gypsum
	Kv	Medium to coarse grained, siltstones in Nugaal Valley nonconformably overlain by a few tens of meters of Yessima sandstones
Proterozoic	X	Granites, massive to foliated granitoids
	XI	Inda Ad Complex: low grade metasediments, with interbedded pillow metabasites
Late Proterozoic	XII	Moydi Complex: gneiss metasediments, with interbedded pillow metabasites
	XIII	Abdukkadi Complex: metabasites, with andes and basic metabasites
Basement Complex (Proterozoic)	XIV	Quartzite and migmatites
	XV	Gneisses and related rocks
Basement Complex (Proterozoic)	XVI	Basalts and/or amphibole schists
	XVII	Quartz-feldspar schists and quartz-rich gneisses
Basement Complex (Proterozoic)	XVIII	Migmatites rich in amphibole and marble intercalations
	XIX	Qalin Baxar Complex: Migmatites rich in leucosomes and granitoid patches, minor pegmatites including local granule rocks



Map is created under supervision of:  
 Mr. Zoltan Balint, Chief Technical Advisor and Mr. Hussein Gaden, Water Coordinator, FAO UN, SWALIM, Office Nairobi, Kenya  
 Prof. Dr. Zoran Stevanović, Team Leader Hydrogeology, UJAG & Dr. Saba Milanović, International Hydrogeologist Expert, IJGE, Belgrade, Serbia  
 Completion and Finalization by:  
 Dr. Saba Milanović, IJGE, Belgrade, Serbia  
 HASP Team:  
 Zoltan Balint, Hussein Gaden, Zoran Stevanović, Saba Milanović, Brenislav Trnec, Isaac Marobhe, Simon Melchior, Flavien Muthusi, Masae Shale, James Ngichohi  
 Map description: Map is created in ArcGIS 10.0 software.  
 Map is a part of [HASP/SWALIM](#) regional Data Base with all attributes

