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ASSESSMENT OF WATER RESOURCES OF SOMALIA

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Abstract - - Somalia, a nation with restricted freshwater supplies, is facing a water scarcity as a product of unbalanced seasonal rainfall across the country. There is a deficit of surface water in addition to groundwater depletion. The purpose of this study is to better understand the nation's water resources as well as rainfall patterns, as well as to describe the current water situation. Rainfall is scarce in some areas of the country, and it varies regionally and throughout time. According to prior analyses of the Juba and Shebelle rivers, the long-term average yearly flow flows at Luuq which catchment area is 166,000 kilometers squared and Jamaame which has 268,800 kilometers squared are 5.9 and 5.4 billion cubic meters, respectively. The Shabelle river produces yearly flows of 2.4 and 1.4 billion cubic meters at Beledweyne which has 207,000 km^2, as well as Awdhegle which has 280,000 kmThe yearly surface run ratio (runoff-coefficients) for Juba at Luq and Shebelle at Beledweyne are roughly 6.5 and 2.1 %, respectively. The river's yearly inflows drop as it travels downstream. Due to a shortage of conveyance from the Somali drainage regions, and also riverbank breaches, evaporation, and subsurface infiltration/recharge losses along the river, this has occurred. Despite the latter's larger catchment area, the flow in Juba is obviously higher than the flow in Shabelle.

Key Words: juba, Shebelle, semi-arid, arid.

1. INTRODUCTION

Somalia is a dry to semi-arid country with limited water resources. Only two stable rivers run through the area, both of which go south. All the other rivers are ephemeral, lasting just a few hours or days at most. Underground water is the only source of water for the majority of a territory, spanning rural and urban areas. However, in many parts of the country, Due to little rains and high subsurface levels, subsurface removal is complex and costly. Somalia covers 637,657 square kilometers and in 2021 Somalia is estimated to have a 1589 millions of people. Somalia's economy relies heavily on agriculture (Crops and cattle are the two mainstays of the economy).Because it is dependent on rainfall, water supply is vital to the economy. Somalia's rainfall is not only insufficient, with some locations obtaining below 100 mm annually, but it also varies greatly in terms of timing and location. It boasts Africa's longest sea, with both a Gulf of Aden towards the north and the Indian Ocean to the south. On the east side, you'll find the ocean. Kenya borders the country to the south, Ethiopia to the western, and Djibouti is placed in the northwest of the country.

1.1 Purpose of the study

This article's objectives are to examine Somalia's subsurface and surface freshwater resources, and also these Juba and Shebelle river watersheds' water resources, and to highlight important concerns and priority research areas.

To investigate and assess rainfall variations in five Somali cities.

A river watershed is typically regarded as a naturally form for freshwater resources design and administration because land and water resources are interconnected and form a unit. Using a key river (drainage) basin, the freshwater assets of Somalia are examined in this study.

1.2 Related research

Multiple past research as well as efforts at evaluating Somalia's freshwater resources can be considered essential. This section briefly discusses one of the most important literature evaluations.

Within the study Iodine Consumption in Somalia Is Extreme and Related to the Supplier of Home Drinking Waters, a rapid test was applied to 2345 people's data for iodized salt exposures in 2004 Overall salt iodination saturation was poor, at 7.7% {95% CI 3.2%, 17.4%}, and in which most existed was often insufficient with amounts of less than 15mg per kg. Just the scz exhibited signs of household water salt iodination, with6.7% and 5.4% of samples respectively enriched at 15 mg per kg.

December2006, An Urban freshwater System was assessed, the attainment of the Millennial Development Goals in

Somalia's urban drinking supply is being monitored. According to the survey, just around a third of the community members in Bossaso and fewer than a quarter of the people in Borama and Cerigabo have access to residential pipes. Only a small percentage of the Accelerated freshwater sources exceed the JMP's requirements, including 35 % in Bosaso, 23 % in Borama, and 0.02 % in Erigavo.

In Somalia, a method of organizing, designing, implementing, and reporting rains collecting had already being implemented. According to this data from SWALIM 2007, annual rainfall varies from 215 millimeters in the northeastern parts to around 550 millimeters in the south-central areas. Estimated convective heat is more above rainwater spanning the field, according to the country's water balance. Two other hydro-physical processes that limit freshwater availability are soil deterioration and basin siltation. H M Gadain, and A R Oduor,

North Somalia Drainage Basins Inventory, FAO-SWALIM, Nairobi, Kenya, Technical Report, P. W. Muchiri,2009.

No W-18, which described the five major watershed and their underlying water resources in detail.

Devin Franzen is a writer who lives in Los Angeles 2012, {Somalia, Factor 2} Irrigation as a response to water constraint and evolving water conservation methods in Somalia. The Potential Convective heat in Somalia is very large, spanning from 1,000 to 3,010 mm, according to this study, which highlights the relation among food produce and water limits. This results about a 200-mm deficiency, steadily diminishing the amount of attainable subsurface freshwater.

Mohamed Ibrahim sojede and Mohamed kulane from University of Somalia, Mogadishu. A survey from public views of the cleanliness of potable water was done. The goal of this research was to find out how inhabitants of Mogadishu perceived towards its cleanliness of their potable water. Scholars attempted to investigate the state of Mogadishu's water in order to determine what was poisoning it. The survey examined at a number of elements that affects individuals 's viewpoints of drinkable freshwater in Mogadishu. In this research, participants were invited to fill out questions through where they scored their opinions of the quality of water. The mass of participants which about 30.2% said that regional reservoirs' general freshwater purity was "Good," where other 28% stated as "Adequate or Normal."

2. METHODOLOGY

2.1 Study area

Somalia is a country in the Horn of Africa. The country's borders are formed by Ethiopia to the west, Djibouti to the northwest, the Gulf of Aden to the north, the Indian Ocean to the east, and Kenya to the southwest. Somalia has the longest coastline on the African continent. The majority of the topography is made up of plateaus, plains, and highlands. Hot weather dominates year-round, with monsoon winds and infrequent rainfall. According to UN estimates, Somalia's population will reach 15,893,222 people by the middle of 2020. About 65 percent of the population lives in rural areas. Pastoralists and agro-pastoralists make up the great bulk of the population. Agriculture is the second most common occupation among the population.

2.2 Research design

A river watershed is widely considered as a natural component for water resource distribution and administration since its water and land assets are interconnected and form a unit. It's also widely agreed that a river watershed's available water components should be managed utilizing an integrated water resources management approach (IWRM). Using key rivers (drains) systems, this study assesses Somalia's water resources. In Somalia, the following significant drains basins may be identified.

Name of the basin	Name in the research
1. Gulf of Aden basin	Berbera
2. Daror basin	Bosaso
3.Nugal basin/Togdher	Buro
4. Ogaaden basin	Garowe
5. Central Coastal basin	Mogadishu
6. Shabelle basin	Shabelle river
7. Juba basin	Juba river

Table -1: Five cities of the five basins.

2.3 Data availability and analysis

SWALIM's evaluation is centered on supplementary data from previous projects as well as its own study. The general approach was to evaluate each drainage basin's water and related resources. This research evaluates the history, current, and prospective condition of Somalia's water resources utilizing facts acquired from a variety of sources. It also highlighted and commented on previous study results. This was done through reviewing previous research and also analyzing, comparing, and presenting satellite data. The Gulf of Aden, Daror, and Nugal Drains watersheds all run in opposite directionsThe initial is towards south to north, from mountainous terrain to the shoreline of the Gulf of Aden.

4. FINDING AND DISCUSSIONS

Some dataset from this research was chosen for several places in Somalia to show the temporal and spatial changes in precipitation. The total amount of rainfall from various sites has a similar behavior or volume of precipitation documented from 2009 to 2017However, the quantity of mean rainfall in Mogadishu, the capital city, differs from all other regions. Suggesting that the capital city is Somalia's most rainy location and receives more rainfall than the other five cities in the research. The volume of rainfall in 2009, 2011 and 2016 is significantly higher than in previous years. In the left years, 2012 was the hottest.

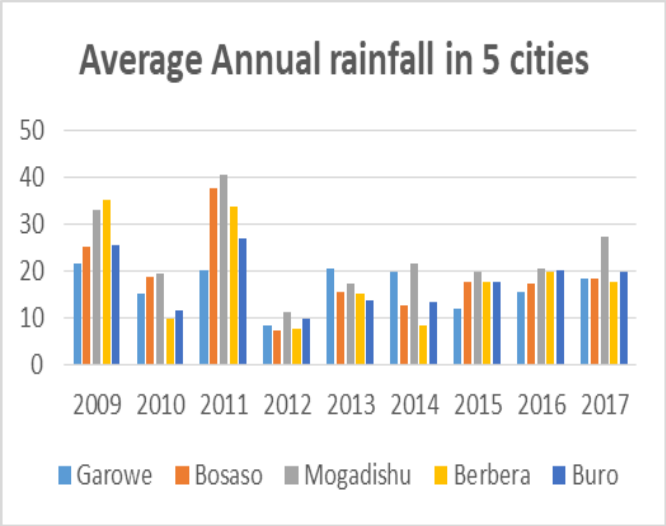

Chart -1: Average Annual rainfall of 5 Cities, (2009-2017).

3. CONCLUSIONS

In southern Somalia that is intersected by the two permanent waterways the finest hydrogeological circumstances for identifying subsurface water are along the major toggas in the floodplain sediments and deteriorated foundationsAlluvial moves start in the mountains of the Gulf of Aden, Darror, and Nugal Drainage basins and flow in two directions. The initial is through south to north, from mountainous terrain to the Gulf of Aden's shoreline. The other route is which passes through the Haud and Sool highlands, goes through north to south.

Aquifer is used by both countryside and urban communities to supply their domestic and animal water needs, and also for limited agriculture. Groundwater sources in Somalia include shallow wells (hand-dug), boreholes, springs, sub-surface dams, and infiltration galleries.

In the FAOSWALIM dataset, there are 193 sites of water in the 3 river watersheds (Juba, Shebelle and Lag Dera Bain)

	Juba Basin	Shabelle Basin	Lag Dera Basin
Borehole	31	4	2
Urban	13	1	1
Nomadic	3	0	1
Rural	4	0	1
Community owned	0	0	0
Dug well	24	97	4
Urban	2	3	1
Nomad	8	0	2
Rural	9	81	1
Community owned	0	57	0
Springs	16	3	2
Urban	1	0	0
Nomad	6	0	1
Rural	2	0	1
Community Owned	0	0	0
Total sources	71	104	8

Table -2: Water sources in three river basins (Juba, Shebelle and Lag Dera Basin) (source FAO Somalia)

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