Conclusion : The study highlights a critical issue in water demand and supply, with significant unmet demand during the modeling period. Addressing this challenge requires a comprehensive approach that prioritizes water sustainability, efficiency, and management. By doing so, we can ensure a more reliable and equitable water supply for future generations. The results further show s a significant difference between water demand and supply in the study area. The situation is likely to worsen in the coming years as shown in the outcomes section .

Recommandations and future considérations :

Exploration of other sources of water such as groundwater and rainfall harvesting can help to achieve sustainable rural water management in the study area. Also, further research on the impacts of climate change on water supply and demand should be implemented. Future studies can incorporate water quality into the model since farmers are cropping along the banks of the reservoir. Importantly, proper reservoir operations and management is a crucial measure adopted to achieve sustainable rural water management in the study area. This may Include, incorporation of efficient drip irrigation farming for early maturity crops. The reservoir should undergo general maintenance and all the canals should be gauged to improve efficient water delivery .

This project is implemented by Issah Mohammed Alhassan from the University for Development Studies, Tamale , Ghana

(Presentation of the utility.—Laboratory or University)

The University for Development Studies is located in the capital city of the Northern Region of Ghana. The institution was the first public university in Northern Ghana established under the PNDC Law in 1992 by the government of Ghana to provide quality higher education and promote research as well as blending the academia with that of that of the community for the total development of the North. The university currently operate a satellite multi campus system with 20 faculties and schools, 12 research institutes and centers and 249 academic programmes in 5 campuses.

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African Water and Sanitation Association

SMALL GRANTS FOR THE AFRICAN YOUNG WATER AND SANITATION PROFESSIONALS (AFYWSP)

30th July, 2024

Project Title: Application of Water Evaluation and Planning (WEAP) Model to Assess Water Demands In Reservoirs: A Case Study of Golinga Irrigation Scheme, Tamale

Background & Introduction: Water is essential in all aspects of life and it is globally recognized as a limited resource. Virtually, as water demand increases, its availability also declines accordingly (Boretti and Rosa, 2019). Increased water scarcity, which is already a problem in arid and semi-arid countries, is a concern for both sustainable food production and economic growth (Wada et al., 2016) .

Purpose and Objective : Rural communities in the northern region depends on water from small multi -purpose reservoirs for their households, livestock, and irrigation (Cerrados et al., 2005). This study worked to develop model, using a science-based approach for planning reservoir water resource, using Golinga Dam in the Tolon District as a case study. Therefore this research aimed to create scenarios and predict future water demand under different management and external driven factors, using the WEAP model. This information will contribute to water management strategies by policy makers whilst increasing food production, reducing poverty and improving rural livelihoods in the study area.

Summary of main achieved activities (including images):

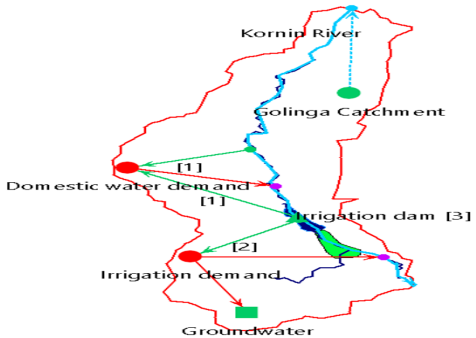
Observing community entry protocols with an irrigation farmer in the catchment and data collection

Summary of main achieved activities (continuation and conclusion)

Bathymetric survey of the water levels in the reservior (Dry season

and Rainy season)

Ground truthing survey on catchment characteristic (irrigable area, river flow, soil types) .



Outcomes:

Modelling was first assigned to the current accounts and reference scenario to depict the water system in its current state. In the reference scenario, water supply and demand are assumed to remain unaltered inheriting data from the current accounts. The total water demand and unmet demand from 2025-2040 in the reference scenario were 5.89 Mm^3 and 6.23 Mm^3 respectively. The results shows that there will be a big gap between water demand and supply in the catchment. The situation is likely to worsen in the future. To begin with the reference scenario, the sum of average monthly demand for the domestic site and irrigation site are 3.956 TCM (Thousand Cubic Meters) and 44.238 TCM respectively. The implication high population growth (HPG) revealed that there is a significant variation in unmet demand of 368 TCM in 2025 to 419 TCM in 2040. The water demand is projected to increase in future. The highest unmet demand among all the scenarios was observed in the simulation of high population growth (HPG), increased in irrigable area (IIA) and reduction in reservoir volume (RRV) scenarios altogether. These affects HPG, IIA and RRV scenarios resulted in the increase of annual unmet demand which ranges from 528 TCM in 2025 to 579 TCM in 2040. Water demand also rises when per capita water demand was increased from 22 l/c/d to 60 l/c/d and the results shows a significant rise in water demand from 390 TCM in 2025 to 455 TCM in 2040. The findings demonstrate that water demand will continue to increase in the coming years as a result of the influence of external driven factors such as growth in population, increased in irrigable lands and high per capita water demand .