SAND STORAGE DAMS EFFECTS ON GROUNDWATER RECHARGE IN WEST POKOT COUNTY, KENYA

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Fig. 1 above shows the location plan of the study area showing the location of West Pokot county in the Kenya map and population density of West Pokot County.
SUMMARY

• The report covers the West Pokot county which is part of Mozambique Mobile Belt in Kenya
• The geology of the area is characterized by metamorphic rocks of the Mozambique Mobile Belt system.
• Hydrogeology of the area is composed of two types of aquifers: 1- Deep aquifers and 2- Shallow aquifers.
• Surface water is minimal because the area is a semi-arid and receives rainfall of 900mm -1500mm per year and the surface water dams dries up.
• Groundwater from the river beds is the only alternative source of water for domestic use and for livestock during the dry seasons.
SUMMARY CONT’

• Alternative ways have to be used to increase groundwater recharge, by construction of sand storage dams in seasonal rivers to increase the water availability during the dry season. Sand storage dams are small (generally a few meters high) dams built in across the river bed behind which sand accumulates, enlarging the natural aquifer. The groundwater in the riverbed is obstructed by the dam and retained between the pores in the sand, making it available for people and animals during the dry season.

• Data generated in the report will be used as a basis in groundwater exploration.
West Pokot county has poor ground water potential because it is a semi-arid area.

There are only two permanent rivers in the county namely: Suam and muruny rivers.

The geology of the area is made up of metamorphic rocks of Mozambique Mobile Belt.

There are two types of aquifers namely:

- Shallow aquifers that are found in the weathered schists and gneisses
- Deep aquifers found in the fractured zones of schists and gneisses.

The boreholes that have been sunk in the area are usually near the dry river beds (seasonal rivers) and the yields are about 0.1-20 cubic metres.
PROBLEM STATEMENT

• West Pokot county is a semi arid and the alternative source of water is ground water.
• There is high rate of drilling boreholes that have low yields of about 0.1-20 cubic meters. Most of the boreholes dries during the dry seasons.
• Surface dams that have been constructed in the area usually dries up due to evaporation, leakages and the water is contaminated.
• The surface dams are also silted during rainy seasons.
• The surface dams are constructed along the road reserves where there are no deep aquifers and there is minimal ground water recharge.
JUSTIFICATION

• This study will help to increase the potential of ground water recharge by providing solutions of increasing the ground water recharge by constructing sand storage dams on the river beds.
• It will also provide guidelines on where to drill boreholes that is near the constructed sand dams.
• Guidelines will be provided on the ways of construction of the sand storage dams on the river beds where there is high potential of deep aquifers for recharge.
LITERATURE REVIEW

• Research of Hydrology of Sand Storage Dams. A case study in the Kiindu catchment, Kitui District, Kenya by L. Borst S.A. de Haas that have the same climate and geological features.

• A manual on monitoring the groundwater levels around a sand-storage dam, Kitui District, Proposal hydrologic study by, rima, G. A. J., Huijsmans, M. A., Sluijs, van der, N., Wiersma, T. E., June 2002,
PROJECT GOALS

• To increase the potential of ground water recharge in West Pokot County and also in other areas that have similar geology.
• Delineating areas that are suitable for drilling of boreholes.
• Reduction of costs of ground water exploitation.
• Reduction in water related infections caused by consuming contaminated water.
PROJECT OBJECTIVES

• To increase the ground water recharge in the study area.

• To develop solutions that address the perennial problems of exploiting the ground water resources in West Pokot County.
METHODOLOGY AND DATA SOURCES

• Research work on the ground water recharge in other areas that have similar climatic and geological settings will be used.

• Data on hydraulic properties, borehole yields, flow rates, lithological characteristics will be used.

• Sources of drilled borehole data from Ministry of Water, WARMA and other NGO’s like ACTED and ACF will be used.

• Hydological data from sand storage dams in the study area will be analyzed.
CONCLUSIONS AND RECOMMENDATIONS

• Potential ground water recharge areas will be mapped to help in choosing areas where sand storage dams can be constructed.

• To show the operation and advantages of sand storage dams, the filtering of water through the sand and the advantages over surface water storage dams.

• To delineate areas where boreholes can be explored in the study area.

• To reduce the risks of contamination and improve the quality of water and awareness of water pollution should be increased to the community as compared to surface dams.
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REFERENCES

• Hydro-geological Survey reports of West Pokot county by several hydro-geologists.
• Water Resources Assessment Project (WRAP) reports on water resources in West Pokot.
• Water Quality Analysis Reports on boreholes in Upper Turkwel from Water Resources Management Authority data bank (WRMA).
• Guideline for Managed Aquifer Recharge by Min. of Water and Irrigation
REFERENCES CONT

• Earth Water Ltd., 2003, Groundwater development study in Machakos, Makueni, Kitui and Mwingi Districts, Ministry of Water Resources Management and Development 1


• Nissen-Petersen, E., 2000, Water from sand rivers, a manual on site survey, design, construction and maintenance of seven types of water structures in riverbeds, Sida’s Regional Land Management Unit.