

UTILIZATION OF GROUNDWATER RESOURCES

by

Fatuma Chikawe
Tumbi Secondary School
Kibaha Coast Region
Tanzania

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SUSTAINABLE USE of GROUNDWATER RESOURCES

Introduction

It refers to the water in hydrosphere below the ground surface and also called phreatic water or subterranean water. Ground water is the water which is found in the zone of saturation (Aquifer or zone of saturation).

Water gets into the ground through open spaces called Pores or Voids water infiltrates down through the pores of the rock, groundwater may occur in sandstone, limestone and chalk. These rocks when saturated can release water easily into boreholes while formations like clay may contain water but does not release water easily.

Groundwater passes through faults or joints which are secondary voids to form groundwater. However in formations like sands, gravel groundwater occurs in primary spaces.

When water enters the ground it reaches a point where it can not percolate any further due to the presence of impermeable rocks.

The top or upper limit (upper level) of the zone of saturation is called water table. This level varies seasonally with the amount of percolation the highest level nearer to the surface reached during the rain season is called temporary seasonal intermittent water table. While the level which is reached during the dry season and is permanently saturated is called permanent water table.

Zone of intermittent saturation is the zone that gets saturated during the wet season and goes dry during the dry season. It is situated below the zone of non-saturation. When a well or borehole is sunk to this zone it tends to be seasonal as well.

Zone of permanent saturation is the zone which is always saturated with water. It does not go dry and extends deep below the ground surface.

Springs

Water that flows out of the ground is known as a spring. Sometimes a spring or a line of springs develops where the water – table meets the ground surface, there are several ways by which springs may develop.

Groundwater enters the rocks via the joints and springs often occur where the water – table meets the surface thus forming a spring.

When a dyke acts as a dam, it cuts across a layer of permeable rock then the water on the up – slope side of the dyke is impounded. This causes the water table to rise and springs develop where the water table meets the surface.

When a chalk or limestone escarpments overlie impermeable rocks. A line of springs that usually occur at the bottom of the scarp slope where the water table meets the surface.

When gently sloping layers of permeable rock alternate with layers of impermeable rocks rain falling on the exposed ends of the permeable rocks infiltrates down the sloping bedding planes and emerges as springs.

When a permeable rock lies on top of an impermeable rock, the level of the water table rises after heavy rainfall and drops during periods of drought. A spring may develop along the lines where the water table meets the surface.

If a borehole is sunk in the ground to below the water table, water seeps out of the rocks and into the well or borehole.

The well or borehole which sunk into the aquifer will always contain water but those that are sunk above the aquifer often go dry in the periods of drought because the water is no longer available. If a well does not reach the water table it will be dry.

Confined aquifer consists of a layer of permeable rock lying between semi impermeable and permeable formations such that the whole forms a shallow syncline with one or both ends of the permeable layer exposed on the surface. Rain water enters the permeable layer at its exposed ends. This layer becomes the wet parts of the Sahara desert and parts of Western Australia. When this happens a pool of water occurs and this is called an oasis.

Uses of groundwater are as follows;

Groundwater may be used for irrigation purpose, because of that people can plant a lot of crops for their own benefit. And because of water, stimulate the development of agriculture near by the groundwater. However, apart from stimulating development of agriculture because of water in irrigation system supporting crops production for that reason it increases income in family level and for any nation.

Groundwater is used in domestic purpose such as cleaning, drinking and so on. For the case of our health people use water in safe way especially for drinking because man needs a lot of water in the body in order to move his daily life

without any problems. People use clean safe water so as to avoid catching up diseases. For the case of cleaning people use water in order to keep our environment clean especially remove waste by using water in the house or outside the houses and or in streets. Water can keep our environment in good looking condition.

Groundwater can be use in industries. For example dilute and purification of chemical water stimulates development in industries since water is used for cooling of machines processing and cleaning or purification. Because of using groundwater in industries maybe cleaning cotton before of producing clothes this can cause to come out good and quality product because water is available in industries. If we can produce good and quality clothes it increase income in industries employees and nation.

Hot groundwater can be a source of geothermal electric power production like in olkaria in Kenya.

Groundwater may also be used for watering animals. Aurtesian wells and springs are used for watering animals as the one in Arkansas North America.

Groundwater can also be used as the source of medicine. Some hot springs contains minerals especially salt as the one mined on the foothills of Homa bay and Nyamira in Kenya. There is sulphur hot spring in Tanga (kiomoni village) useful for treatment of skin diseases.

Groundwater is also used for keeping some lakes and some parts of the ocean fresh. For example Lake Naivasha has an underground seepage to the Indian Ocean which makes ocean water around the area fresh.

Recommendations

Firstly, people should avoid dumping of wastes unnecessarily on the ground. People should be educated on how to avoid unnecessary dumping of wastes in the ground in order to conserve our water and to keep it in long period.

Secondly, the waste should be recycled for example plastic material can be used to make pillows, iron material can be sent to the steel rolling industry like the one found in Tanga or to the cottage industries like Juakali in Kenya for the sake of making other useful materials like stoves.

Thirdly, Farmers should be encouraged to use organic manure rather than industrial fertilizers which tend to have adverse effects on the groundwater and the soil at large.

Fourth, the septic tanks and latrines should be located properly. They should be very far from the wells. For that case we can conserve groundwater for the benefit of ourselves and nation.

Fifth, strict policies should be formulated governing the dumping of the wastes. The policy should largely focus on the recycling of the wastes and treating there, which have to be dumped in the ground.

Sixth, the wastes to be dumped in the ground should be treated first so as to under them harmless to the organisms like human being and crops.

Seventh, acidity in the ground can be reduced by using lime so that plants growth can take place effectively. For the case of that intensive care should be taken on the oil tanks, other containers and pipes so as to avoid leaking.

Eighth, people should be educated on how to handle the resources as well as their wastes. This can lead to the reduction of underground pollution for that case mining activities should be controlled.

Nineth also the dumping places should be located properly that is far from water resources. Every one must be a security of others for that way we can stop bad behaviour of destroy ground water.

Conclusion

Groundwater is the most abundant liquid fresh water available on the planet earth. Groundwater is our life because no water no life can exist. Groundwater improves the family life since it is used for production of food, cooking, drinking, washing provide cash in the family like in Dar es Salaam where people are selling water so as to get money. Also groundwater is a natural huge reservoir more than rivers and lakes

Keeping groundwater free from pollution is keeping the world free from thirsty.

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MOTIVATION STATEMENT;

The reason I chose this topic is because I want to show the people the importance of groundwater to the general public and how to use it sustainably.

Tumbi Secondary School
P.O. Box 30324
Kibaha Coastal Region
Tanzania

Date of birth: 1st June 1989

Place of Birth: Kibaha Tanzania

Name: FATUMA CHIKAWE