

Water Resources Engineering CVE 505 ASSIGNMENT.

1. How productive borehole can be sited and developed in fractured basement complex regions:

Borehole productivity decreases with depth; however, a deeper borehole could be more productive if it reached a geological structure in subsurface that is favourable to groundwater flow.

Granted, borehole depth is determined by the users' necessity and construction contract; the latter usually prevails over possible productivity gains as the depth is increased to make profit. In agreement, the deeper the well, the lower the productivity. For this reason, there are defined maximum depth that a well must reach in order to obtain satisfactory productivity in fractured basement complex regions.

Productive boreholes can be sited through several methods.

- i. Electrical resistivity survey using 2D Dipole-Dipole subsurface imaging and 1D Vertical Electrical Sounding.
- ii. Integrated and electrical resistivity survey using magnetic profiling and 1D/2D electrical imaging techniques.

Finally, these boreholes can be developed by considering the drilling depths, weathering depth and electrical resistivity data.

2. The disadvantage of large dam projects.

- i. Large dam projects contributes to displacement of people, wildlife and aquatic animals.
- ii. These dams can cause large scale flooding if they fail.
- iii. It impacts the groundwater table adversely.

As riverbeds deepens, lower groundwater table will occur along the river making it hard for plant roots to reach the water. Also, homes around the dams have to dig deeper wells.

- iv. Construction of large dams are expensive investment.
- v. These dams require constant maintenance.

3. Effects of water pollution on the environment:

i. Contamination of the food chain.

Fishing in polluted waters and use of waste water for livestock farming and agriculture can introduce toxins into foods which are harmful to our health.

ii. Lack of potable water.

iii. Water-borne disease.

iv. Destruction of aquatic biodiversity.

v. Increased mortality especially in infants.

4. A suitable approach to decontaminate a river:

i. Dredging of the contaminated sludge from the river bed

ii. Handling it to the river banks for treatment

iii. Establishing sludge cleaning processes.

iv. Converting it to useful soil

v. If required, extracting precious material out of the sludge

v. Treating the contaminating sources and return clean water to the river.