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16/ENG03/005

CIVIL ENGINEERING

WATER RESOURCES MANAGEMENT

ASSIGNMENT

CVE505

SUBMITTED TO

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**Question**

1. Briefly describe how a productive borehole can be sited and developed in fractured basement complex regions?
2. What are the disadvantage of large dam projects?
3. [What are the effects of water pollution on the environment?](https://www.researchgate.net/post/What_are_the_effects_of_water_pollution_on_the_environment)
4. What is a suitable approach to decontaminate river water, such as the Ureje River in Ado-Ekiti, which gets polluted daily by domestic and agricultural effluent?

**Answers**

1. Fractured basement complex are good sources for potable water in many part of the world. However, sitting of highly productive boreholes in these rock units remains a challenging and expensive task because fracture development at regional scale is both heterogeneous and anisotropic (Manda et al., 2006).

There are various methods & processes to creating a productive borehole such as;

* **Vertical Electrical Resistivity** **Sounding** in identifying the localized aquiferous zones before siting boreholes.
* **Electrical resistivity method** has been used extensively in groundwater investigation especially in the basement complex terrains
* Detail and extensive geophysical studies are prerequisite for citing borehole locations.
* Proper completion should be ensured in areas prone to caving and other formation problems
* Air drilling should be avoided in areas with thick and loose overburden, right mixture of drilling mud should be applied to secure the hole wall while flushing should be continuous throughout drilling in such formation.
* Casing should be done immediately and such holes should be lined and properly grouted.
* Timers should be installed on low yield wells and regulated/programmed for 5 minutes flow and 10 minutes recharge.
* The productive wells should be properly maintained and monitored for optimal performance.

1. Some of the**disadvantages** are**:**

* Building a dam is very expensive, the government needs to ensure that strict guidelines are followed and a very high standard is maintained.
* They must operate for many years in order to become profitable enough to compensate for the high building cost.
* People residing in villages and towns in the nearby area, where there are chances of flooding, have to be relocated. They lose their businesses and farms.
* Sometimes people are removed forcibly to set up hydro-power plant and it poses a serious ethical concern.
* The building of large dams can cause serious changes to the earth’s surface and lead to geological damage. It can trigger frequent earthquakes, however, modern planning and design of dams have reduced the possibility of occurrence of certain disasters.

1. Major water pollutants include the following:

* **Raw sewage:** The World Health Organization estimates that 2 billion people do not have access to basic sanitation, and even when they do, it is extremely common for raw sewage to be spilled directly into the sea or another water source.
* **Nutrients**: These are nitrogen-rich products such as fertilizers that get washed into the sea or are absorbed and get into the aquifer.
* **Wastewater**: This contaminant comes in many forms including chemicals released by factories, washing machine water filled with detergents, and rain runoff from highways.
* **Plastics:** A [major pollutant](https://www.ecomena.org/save-world-from-plastic-pollution/) that does not dissolve in water. Everything from drinking bottles to clothing is made from plastic, and it is not biodegradable. One [plastic bottle](https://www.ecomena.org/plastic-water-bottles/) can last for 450 years in the ocean.

Major effects on the environment include:

* Aquatic animals are harmed by plastics every day. They get entangled in plastic and lose limbs or are strangled.
* The environment is also severely affected by nutrient pollution. Nitrogen causes algae in the water to multiply at astounding rates, and the algae, in turn, absorbs all of the oxygen in the water, causing mass kill-offs of marine life.
* In Africa, dirty water acts as a breeding ground for mosquitoes, causing malaria and encephalitis. Over $7 million a year is spent on healthcare to treat waterborne illnesses. Entire developing countries are suffering, with many unfit to work or go to school due to illness.

1. STEPS TO TAKE TO DECONTAMINATE RIVER WATER

* The first step to have database of contaminants coming into the river and fate of these contaminants.
* The effluent from industries should be first treated in the industrial premises and later reused in useful purposes. If so there would be no need for disposal into river. This way pollutant decontamination in the river would be reduced.
* The effluent from domestic and commercial establishments should be treated in the same way and the treated water should be reused for useful purposes. This way we can save fresh water storage and solve the waste water disposal into the river.
* Most critical part is the treatment of common septic sewage, which should be fully treated and the liquid as well as sludge management scheme should be developed.