**Name: Kuyu Michael Pidi**

**Course: Post Graduate Diploma in Water, Sanitation and Hygiene (PGD in WASH)**

**Year: 2019-2020**

**Admission number: ACPM/PGD/138/2019**

**Assignment Model: Three (3)**

**1.** Water is one of the most vital natural resources for all life on Earth. The availability and quality of water always have played an important part in determining not only where people can live, but also their quality of life. Even though there always has been plenty of fresh water on Earth, water has not always been available when and where it is needed, nor is it always of suitable quality for all uses. Water must be considered as a finite resource that has limits and boundaries to its availability and suitability for use (Pelman,1998) <http://webcache.googleusercontent.com/>

**Non-domestic uses of water**

**Power generation**: The rivers for example river Nile, play an important role in generating hydroelectricity. Moving water has energy to turn turbine then electric power is produced which bust the economy as power is a resource for development (International hydropower association,2018) Bujagali alone generates 255MW <https://www.hydropower.org/country-profiles/uganda>

**Irrigation:** Non-domestic water can be used for mass sprinkler irrigation purposes. For example, irrigation of rice farmland in Brazil. The rice is produced on large and median farmland on two ecosystems as upland and lowland rice. In the sprinkler irrigation, pressurized water is pumped and sprayed to the farm by a 360 degrees rotating tap at a high post to the farm.(Santo antonio,2014)<https://www.researchgate.net/>

**Industrial use**: when you examine Coca-Cola factory in Uganda, water is used in the production of these soft drinks to be used as ingredients, cooling and washing the factory in general. Production cycle starts with sugar, fruit juices, flavors and concentrate base. The water used in the production process is subjected to special treatments that ensure the microbiological safety and the correct concentration of naturally dissolved salts, in compliance with specific compositional and sensory characteristics (Coca-cola HBC Italia) <https://it.coca-colahellenic.com>

**Aquaculture**: Water use for aquaculture is water associated with raising creatures that live in water such as finfish and shellfish for the purpose of food, restoration, conservation or sport. This occurs under controlled feeding, sanitation and harvesting procedures primarily in ponds, cages, net pens and closed recirculation tanks (National Aquaculture center, Arkansas US 2018) <https://www.usgs.gov/special-topic/>

**Recreational:** Recreational activities includes swimming, physical activity, exercise and pleasure for fun. Water based recreational activities have long been recognized as having a positive influence on health and well-being. However, water meant for recreation has to kept safe as it might be a source of infection (WHO,2003) <https://www.who.int/features/2003/>

Mining: Large amount of water is use in mining, in South Sudan, gold mining is not yet mechanizes but work become still during the dry season as water becomes little. This the evidence that mining take large volume of water to facilitate sieving and washing mud from the minerals (Paramount Chief,n.d)

**2.** The human body is made of 60%water and the brain 75% water and our blood is 83%.the human being continually looses water over the day through urine, sweat and in our breath. Its being noted that the human body can last for weeks without food but only days without water. These makes water important to human body in the following. 2016)<https://www.mybeautyandgo.co.uk>

* Water carries nutrients and oxygen to all parts of the body; water carries nutrients and oxygen to all parts of the body. Reaching your daily water intake will improve your circulation and have a positive impact on your overall health
* Regulates body temperature; our body loses water through sweat during physical activity and in hot environments. It is most important to stay hydrated to maintain body temperature. The loss of sweat through the body keeps the body cool but your body temperature will rise if you don’t replenish the water you lose.
* Cushions joints; water consumption helps lubricate and cushion your joints, spinal cord and tissues. This help you enjoy physical activity and lessen discomfort caused by conditions like arthritis.
* Convert food into energy; drinking water before, during and after a meal will help your body break down the food you eat more easily. This will help you digest food more effectively and get the rest out of the meals.
* Easy absorption of nutrients; in addition to helping with food breakdown, water also helps dissolve vitamins, minerals and other nutrients from your food. It then delivers these vitamin components to the rest of your body for use. (Natalie,2019) <https://www.healthline.com/health>
* Removes wastes from the body; the human body uses water to sweat, urinate, and have bowel movements. Sweat regulates body temperature when you are exercising or in a warm temperature. You need water to replenish the lost fluid from sweat.

**3**. Waterborne diseases are the diseases where the infectious agent reaches a new host by drinking contaminated or dirty water contaminated by human or animal feces. Examples of these diseases are cholera and other serious illness such as Guinea worm disease, typhoid and dysentery (WHO,2015) <https://www.who.int/gho/publications/mdgs-sdgs_>

**Vulnerable groups**

**Low income household**: the low-income household is vulnerable to waterborne diseases compared to high income household in the sense that they social standard is poor, they can not afford adequate safe and clean water. Most low-income household stay in the rural, therefore will end taking contaminated water if the government is unable to provide clean and safe water. The government should take upper hands to improve water supply and sanitation for all supplemented by awareness and hygiene education to all community of low income-households.

**Household with many children**: To eliminate waterborne diseases, you must take safe and clean water; many children means high cost per capita per child. If the demand is high and note that water is a basic need for life, these household will risk taking contaminated water hence vulnerable to waterborne diseases. To mitigate waterborne disease in household with many children, use of toilet and good maintenance is a key filtered or boiled water should be used by the children.

**Older people**: food can be contaminated by water containing infectious agent from human or animals’ feces. An older person does not border to check this hence will be infected by waterborne diseases. To prevent infection older persons, need to be cared by a care taker well educated and has a knowledge of hygiene promotion.

**Children:** Children are more prone to enteric infection. The more prevalence of infections to children results to malnutrition; this will lead to stunting. To avoid this in children, they should breast feed for the first six months and hygiene of the care taker, or the mother must be maintained. Crawling children shall be in a clean hard surface environment so that helminths are minimized.

**Women:** They are most involved in issues of water. They spent most of their time in collection, food preparation. Due to the much time engage in water activities, they are at risk of infections from contaminated sources, especially in the rural setting. More awareness and hygiene education by WASH actors must be improve as a strategy for all and women should be the targeted.

**Disable people**: Consider people who moved on wheel chairs, access and usability of sanitary facilities by them put them at risk. Unless high hygiene is kept in these facilities, infections are high where protections component is not included in the planning.

**People with longer illness (HIV**): These people have low immunity weaken by the disease. Diarrhea cases infect them mostly and they use a lot of water. These patients always have chronic diarrhea, cholera like diseases and transient diarrhea. The disease or these implications can be reduced by health education and proper operation and maintenance of WASH facilities.

**4.** A spring occur when water pressure causes a natural flow of ground water onto the earth’s surface. As rain water enters or recharges the aquifer, pressure is placed on the water already present. This pressure moves water through the cracks and tunnels within the aquifer, and this water flows out naturally to the surface as a spring (<http://www.srwmd.state.fl.us/56/What-is-a-Spring>)

If the community uses a spring as drinking water source, the below are my recommendations as a measure to mitigate pollution and contamination.

* The water source is fully enclosed or protected (capped) and no surface water can run directly into it.
* People do not step into the water while collecting it.
* Latrines are located as far away as possible from the water source and preferably not on higher ground. If there are community concerns about this, expert advice should be sought.
* Solid waste pits, animal excreta and other pollution sources ae located as far as possible from the water source.
* There is no stagnant water within 5 meters of the water source.
* Avoid open defecation around the spring
* Use latrine properly
* Keeps animals away from the spring

(Wateraid.org, ND)

* Dig a ditch above the spring to prevent surface water from eroding the backfill area and contaminating the spring.
* Cover the collection area with a concrete to avoid direct entrance of pollutants
* There should be a regular cleaning of the drain
* Water from the spring should not be allowed to form pools to prevent mosquito breeding
* No economic activity should take place at the spring catchment.

**5.** Water pollution is the contamination of water bodies (like oceans, seas, lakes, rivers, aquifers, and groundwater) usually caused due to human activities. Water pollution is any change in physical, chemical or biological properties of water that will have a detrimental consequence of any living organism.

A pollutant is a substance that when introduced to the environment (land and water) causes undesired effects, like health threats or adversely affects the usefulness of a resource (water)

**Pollutants from Residential Area**

* Sewage from septic tank
* Pet droppings

**Pollutants from metal plating plant**

* Arsenic
* Cadmium

**Pollutants from Agricultural activities**

* Pesticide leaching
* Organic matter

**Pollutants from an uncontrolled landfill site**

* Leachates
* Decomposed organic matter

**Pollutants from Urban surface water run-off**

* Solids
* Petroleum hydrocarbons

**References**

<https://www.toppr.com/guides/biology/natural-resources/> Water and water pollution

<https://www.conserve-energy-future.com/causes-effects-solutions-of> Landfills

<https://www.bottledwater.org/content/water> Roles of water in the human body

<https://www.cmpethiopia.org/page/2052> Vulnerable groups of people to WASH diseases

<https://extension.psu.edu/spring-development-and-protection> Spring development and protection