**STRATEGIA NETHERLANDS**

**SCHOOL OF PUBLIC HEALTH**

**COURSE: POSTGRADUATE DIPLOMA IN WATER SANITATION & HYGINE**

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**UNIT : WASH ASIGNMENT 4**

Assignment

1. Measures by which the success or otherwise of a public–private partnership providing water supply services can be assessed following the

Accessibility: What proportion of the population have access to water? Is the distance to the water point less than 1 km or 30 minutes’ walking time? Pickering and Davis (2012), using survey data from 26 sub-Saharan countries, found that the further away a water

source was, the less water was used; when the distance was more than 30 minutes away, households collected less water than was necessary for basic needs.

Affordability: Is the cost of the water needed less than 5% of the household’s income?

Cost recovery: Is the cost of providing the water being recouped?

Minimisation of non-revenue water: Is this reduced to no more than most 15%?

Water quality: Is there adherence to national standards?

Operational efficiency: What is the quantity of water supplied per capita? What is the duration of water supply in hours per day.

2. Give six possible causes of water emergencies, three dues to natural causes and three dues to humans.

Three Causes of water emergencies due to natural causes:

a). Drought: Very severe droughts can lead to high usage of the existing water resources with absolutely no recharge due to lack of rains, leading to very severe water scarcity.

b). Earthquakes: An earthquake can destroy water supply system components such as distribution pipe network, treatment plants causing disconnection of the entire system, as a result water scarcity can be realised.

c). Floods: Heavy floods that can cause contamination of water in the reservoirs and distribution network leading to highly contaminated water in the system can cause emergencies. Floods may also lead to destruction of the water supply system as well.

Three causes of water emergencies due to human activities includes:

a). Vandalism of water supply system: At times components of water supply system such as distribution pipe network and flow control valves may get vandalised by people. As a result, the system my completely fail to operate or operate inefficiently thus causing water supply emergency.

b). Contamination of water: Human error at the water supply treatment works or just people with bad intentions disposing poisonous substances in the reservoirs or along the distribution system.

c). War or inter clan conflicts in developing countries: War and inter clan conflicts can cause very serious water supply emergencies, where sophisticated weapons are used, the system can get seriously damaged. For inter-clan conflicts, the community can be moved into IDPs or refugee camps, thus exposing them to serious water supply emergencies.

A disease outbreak is the occurrence of cases of disease greater in number than would normally be expected in a defined community, geographical area or season. A waterborne disease outbreak is therefore another type of emergency situation. It might be caused by one of the natural disasters described in the last section, or due to human error, or indeed both. The greatest risk of waterborne outbreaks is pollution of water sources by faecal pathogens. This might occur due to inadequate sanitation, poor hygiene or lack of protection of water sources.

Cholera, caused by Vibrio cholerae, is a disease that is frequently associated with disasters and emergencies, where the breakdown of normal procedures and the collapse of infrastructure create conditions that lead to faecal contamination of water. This was the situation on the island of Haiti following the earthquake there in 2010.

People affected by emergencies

Catastrophic emergencies like floods and earthquakes will affect everyone, but the poor and vulnerable will always be at a disadvantage. In many situations, the people most likely to be severely affected are internally displaced people and refugees. In situations of war and conflict people naturally want to escape and so they move in large numbers away from the conflict zone. The places they arrive at frequently have no infrastructure and very limited resources

b. What are the options for safe water supply during a water emergency

During an acute emergency situation where speed of providing water for people is paramount, the main options for water supply are distribution of safe water to people using water tankers and/or plastic bottles. The other option is to give the water consumers the means of treating water for themselves to render it safe.

Other emergency water treatment processes are sedimentation or filtration, both of which remove solids, and disinfection to kill pathogens. Some examples of filtration methods are cloth filtration, sand filtration, and ceramic filtration. For disinfection methods you could have said boiling, solar disinfection, and chemical disinfection using products such as Wuha Agar, Bishan Gari, Aquatabs and P&G Purifier of Water.

If it is not possible to filter the water, and if the water treatment chemicals mentioned above are not available, then the water should be kept in a container to settle any solids and then decanted out. The decanted water should then be boiled.

For the longer-term needs of displaced people and refugees, the population should, if possible, be in an area where there is adequate groundwater. This type of water normally requires minimal treatment before consumption – usually just disinfection, in order to keep the water safe from microbial contamination. Failing this, surface water from rivers or lakes can be used, but these waters will require a greater degree of treatment, since the level of suspended solids in them is likely to be high. Disinfection will again be needed.

3. You are about to set off to conduct a sanitary inspection of an abstraction point at a river.

1. What would you take with you?
2. Explain four things you will be looking for during your inspection.

i). Is there any human habitation upstream, polluting the source?

ii). Are there any farm animals upstream, polluting the source?

iii). Is there any crop production or industrial pollution upstream?

iv). Is there a risk of landslide or mudflow (caused by deforestation) in the catchment area?

v). Is the intake installation unfenced to see possibility of people and animals accessing the water that may cause contamination?

vi). Is the intake unscreened, screening sieves off floating objects from the water?

vii). Does the abstraction point lack a device such as a dam so that water flows into the box at 8?

viii). Does the system require a sand or gravel filter because the water is silt-laden and can affect water treatment?

ix). If there is a filter, is it functioning badly?

x). Is the flow uncontrolled?

4. Explain briefly why a Water Safety Plan is necessary

Unsafe drinking-water, poor sanitation and lack of hygiene continue to be significant causes of disease in both developing and developed nations, resulting in millions of deaths each year, mainly among children under five (Prüss-Üstün et al 2008). Much of this disease burden is preventable. It is estimated that almost one-tenth of the global disease burden could be avoided by improving water, sanitation and hygiene. Poor drinking-water quality is a significant contributing factor to this burden and outbreaks have shown that the conventional approach of monitoring end product water is not sufficient to guarantee safe drinking water. Notification comes too late, test results are not timely enough to prevent consumption of unsafe water and enough information is not provided to identify the source of contamination (when, why and where it occurred). Recognizing these limitations, the World Health Organization recommends the adoption of the Water Safety Plan (WSP) approach as the most effective way of ensuring the safety of drinking-water.

5. Distinguish between the two types of maintenance at a water utility and give reasons why one of them is Better

The two types of maintenance are preventive maintenance and breakdown maintenance. Preventive maintenance involves regular checks that everything is working properly. Breakdown maintenance is needed if equipment breaks down. Preventive maintenance is the better approach because it avoids any break in supply and is usually cheaper.

Knowing about the costs of running a water treatment works is a very important part of management. Like any organization, sound financial management is a key responsibility for the utility. Costs include initial funding to construct the plant and buy the necessary equipment for the treatment processes. Recurring costs include the cost of the staff, power, consumables such as chemicals, and spare parts, repairs and replacement machinery required for maintenance of the plant. In Study Session 6 you also read about the assets of a water supply system and the need for an asset register.

Name three items you would expect to see included in the asset register of a water utility.

You could have answered with any of the items you would expect to see at a water treatment plant or in other parts of the water supply system. This could include the river intakes, surface water reservoirs, boreholes, all the associated pipework and pumps, process units, buildings (offices, plant rooms, etc.), office equipment (computers, office furniture, etc.), laboratories and analytical equipment, vehicles, pumping stations, water mains, and more!

Looking after all the assets is an important responsibility for water utilities; this is known as asset management. Asset management is the systematic process of deploying, operating, maintaining and upgrading facilities cost-effectively, and at the same time providing the best possible service to users. Asset management also ensures that financial resources are available to repair and replace equipment when necessary.