*South Sudan*

*Lakes States –Rumbek*

*Mott McDonald (Water for Lakes project)*

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*Assignment 4*

1. **List and briefly describe the measures by which the success or otherwise of a public–private partnership providing water supply services can be assessed.**

**Answer**

Public–private partnerships

In the major towns and cities, the water is supplied by water utilities (also known as Town Water Supply Enterprises) but **public–private partnerships** (PPPs) can be helpful. A public–private partnership is any collaboration between public bodies, such as a municipality or even the government, and private companies. The belief is that private companies are more efficient and better run than bureaucratic public bodies, and the management skills and financial acumen that they bring will create better value for money for customers. The incentive for the private companies is the profit that can be generated.

Assessing the performance of a PPP

The performance of a PPP (and indeed a public water utility) can be assessed through the following parameters (Athena Infonomics, 2012):

* *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?
* *Minimization 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?

These parameters can be used to evaluate whether a PPP is beneficial, with data from before the partnership’s creation being compared with data after the PPP has been running for, say, a year.

1. **Give six possible causes of water emergencies, three due to natural causes and three due to humans.**

Answers

There are several different types of emergency that can affect water supply and some of these are described in the sections that follow.

A **drought** occurs when there is a deficiency in precipitation over an extended period of time, resulting in a water shortage. You are probably familiar with the consequences of a drought. The lack of rain means that the water flow in rivers is reduced, lakes and pools shrink in size or may dry up, groundwater and soil moisture are depleted, and crops are damaged. Prolonged drought can lead to a major national and regional food insecurity crisis. Domestic animals might also die.

During a shortage of fresh water during a drought, people may be forced to use unprotected water supplies. Furthermore, people and animals may use the same water source, which increases the risk of contamination of that particular water source. This leads to increased exposure to waterborne diseases (such as diarrhea and dysentery) and water-washed diseases (such as trachoma).

**Flooding** is an abnormal rise in the water level and may result in overflowing of streams or rivers. Flood waters can destroy infrastructure, including houses, roads and water supply systems, as well as agricultural crops, which ultimately causes a shortage of food supplies in the country. Besides the destruction of property, people and animals may be killed, especially when **flash floods** occur. (A flash flood happens when rain falls so fast that the underlying ground cannot drain the water away fast enough and rivers overflow their banks. Roads can then become like rivers and if there is a lot of water it can flood buildings and carry cars away.)

Floods can cause widespread bacterial contamination of wells and surface water sources with faecal matter washed from the ground surface or from flooded latrines and sewers, resulting in the outbreak of disease. For example, cholera commonly occurs after flooding.

**Earthquake**

An earthquake can cause serious damage to infrastructure on and in the ground. Pipes and treatment plants will be destroyed by a high-magnitude earthquake and the communication systems (such as road and rail networks) often become non-functional, making the delivery of emergency water supplies difficult. Destruction during an earthquake can also cause chemical spillage at manufacturing plants and warehouses, which can lead to widespread chemical contamination of drinking water.

**Events caused by human intervention**

It is possible that a deliberate attempt could be made to poison a water supply as an act of terrorism, but it is far more likely that human causes of water emergencies will be due to accident and neglect. There can be instances where the water supplied will be unfit for human consumption as a result of an accident.

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

**Answer**

Treatment options for water emergencies

The purpose of water treatment in emergency situations is the same as it is in any circumstance, which is to remove all types of contaminants present in the water and to improve the quality to a level safe for human consumption. The difference in emergency situations is that the normal structures and processes are not available.

In acute emergency situations where speed of providing water for people is paramount, the main options for water supply are distribution of safe water to people through the use of 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.

There are main processes of household water treatment and theses are an examples of the methods that could be used.

The main 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.

**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?

**Answer**

Taking, Checking and recording chlorine residuals on the spot, and sampling from sites showing low levels (such as 0.1 mg l–1 free chlorine) for bacteriological analysis

Sampling data

1. Zone map, including town/village
2. Sampling site
3. Chlorine
4. Nature of sample (treated or untreated)
5. Time of sampling
6. Source
7. Sampling data
8. Sampled by (organization)
9. **Explain four things you will be looking for during your inspection**.

**Answer**

Checklist for inspection of an abstraction point at a river

1. Is there any human habitation upstream, polluting the source? Yes/No
2. Are there any farm animals upstream, polluting the source? Yes/No
3. Is there any crop production or industrial pollution upstream? Yes/No
4. Is there a risk of landslide or mudflow (caused by deforestation) in the catchment area? Yes/No
5. Is the intake installation unfenced? Yes/No
6. Is the intake unscreened? Yes/No
7. Does the abstraction point lack a device such as a dam so that water flows into the box at 8? Yes/No
8. Does the system require a sand or gravel filter because the water is silt-laden and can affect water treatment? Yes/No
9. If there is a filter, is it functioning badly? Yes/No
10. Is the flow uncontrolled? Yes/No

Total number of ‘Yes’ answers = contamination risk score:

9–10 = very high

6–8 = high

3–5 = intermediate

0–2 = low.

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. **Explain briefly why a Water Safety Plan is necessary**

Answer

A **Water Safety Plan** is a plan to ensure the safety of drinking water through a risk assessment and management process that considers all the points in water supply from the catchment to the consumer. It is a means of preventing and managing threats to a drinking water supply system, before anything goes wrong, taking into account all the stages of the supply process from the water catchment to the consumer.

A Water Safety Plan considers all the stages in the supply of water, and therefore it involves:

* management of the catchment to prevent contamination of the source water
* removal or elimination of contaminants during treatment of the water
* Prevention of contamination of the water after treatment (during distribution, storage and handling).

Water Safety Plans put the emphasis on controlling risks where they are likely to arise, rather than having a treatment plant deal with cases of contamination after they have occurred. Preventing a problem from occurring is much better than having it occur and then trying to minimize its impact.

While the primary focus in a Water Safety Plan is on the direct dangers facing safe water quality (such as the possibility of chemical or microbial contamination), the Plan has to be more wide-reaching, considering aspects such as potential for flood damage; the sufficiency of the source water and alternative supplies; availability and reliability of power supplies; the quality of treatment chemicals; the availability of trained staff; security; and the reliability of communication systems.

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

Answer

The two types of maintenance are preventive maintenance and breakdown maintenance.

Preventive maintenance involves regular checks that everything is working properly. While 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.

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