**STRATEGIA NETHERLANDS, INTERNATIONAL MANAGEMENT ORGANIZATION**

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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.

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

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

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.

4. Explain briefly why a Water Safety Plan is necessary

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

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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

Due to rapid population growth and urbanisation most governments are on pressure to improve or sustain the performance in water utilities. As well laid in United Nations Sustainable development goals, goal 6, governments are tasked to ensure that there is equal access to clean water and sanitation for all. But it importance to note that most governments , especially in developing countries don’t have the sufficient financial resources to carryout big investments that are required for water supply project.

Public- private partnership has therefore, been seen by most governments, as the best tool to improve on public infrastructural assets and services. This is in line with goal 17 of sustainable development goal that recognises the importance of public-private partnerships as a tool to response to the ever growing demands for clean water supply.

In water sector, a public-private partnership, according to Olivia Jensen (2015) is broadly defined as an arrangement / a contract in which a private entity, either operates a water utility and assets or own a water utility/ assets for some given period of time. The arrangement takes different forms such as;

The management arrangement where a private entity carries out the operation, maintenance and management of the water assets and services and workforce at a fee linked to performance

The second agreement is aftermage where the entire service including the financial risk for operation and maintenance is transferred to the private entity.

Lease contract is where the private entity takes the commercial risk and gets the remuneration from the user’s fee after paying the lease fee.

The last form of agreement is concession, where the private partner assumes the overall responsibility of maintenance, operation, management and collection as well as the required capital investment for expansion.

The above agreements are based models such as Build –and –Transfer model, Build-operate- and transfer model, Build-own-operate-and transfer model, Build-Lease –and Transfer Model, Rehabilitate- operate and transfer model, among others.

There should always be regular review of the general partnership between the public entity and the private entity, to handle unforeseen risks. Regular reviews and monitoring from the government side is key, and the assessment can be based on the following areas.

Population served by the private investor-owned which is quantified by access to water and sewage services, especially by the poor: The overall goal of a public-private partnership is always to fill the gap in service delivery. Therefore the success of the partnership can be assessed by looking at the proportion of population and the distance they take to access water. So if a great number of people can access water so easily within a very short distance and time, then the partnership can be concluded as a successful one, but if a great number of people can’t still access water easily then one would conclude that there is no impact of such a partnership, because everything is believed to be the same just as during public operation.

Quality of services provided is one of the measures to assess the success. One of the goals of a public-private partnership is to improve quality of water supply. This can be in terms of water tastes, constant water supply and treatment. So improved quality means a success and low quality means a failure.

Affordability: If the cost of water needed is less than 5% of the household’s income, the better and hence a success on the side of a private entity, but if during the partnership the cost of water needed has increased instead, then the partnership is a failure.

The ability to recover the general cost: The goal of a private entity is to maximize profit, and therefore, a successful partnership is that one that gives opportunity to both parties to recover the cost incurred in providing water.

Minimization of water loses; labor productivity and operating costs help in assessing the success of a public-private partnership. A successful partnership is that one that operates efficiently with minimal loses. But it is important to note that the investment is funded by tax-payers money, hence there should be a balance in efficient investment and reaching the poor with better services and tariffs

Comparison and records, from different geographical locations is one of the means to assess the success of a public-private partnership. This is always achieved by state visits in different countries, where some technical staffs from water sector and tasked to visit the most successful countries and learn on the don’t and dos as per the partnership.

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

Water emergencies are sudden, unexpected and sudden hazardous incidents that cause mild or server disruption in water supply, and they always need immediate response.

Water emergencies occur when there are pipe bursts; the treatment plant is tempered with and may be the damage in major infrastructure and distribution, among others.

There are several causes of water emergencies, some of which are natural while the others are man-made/ caused by human actions, as indicted below.

Drought is one of the natural causes of water emergencies: Drought occurs when there is a great of complete reduction in precipitation over a given period of time. The absence of rain reduces water flow; rivers lakes and dams disappear or reduce. Wells may dry up during drought. The affected area becomes dried due to reduction in ground water. This affects plant growth that leads to scarcity in food, hence malnutrition. Absence or limited supply of clean and safe water may force other people to share water sources with animals, increasing the risks of contamination and diseases.

Floods: It is a sudden and abnormal rise in the water level, making river and streams to overflow. During flooding, waters destroy infrastructures, buildings, agriculture and roads. Floods cut of water supply systems, by breaking main pipes, other distribution pipes, and water system in buildings, causing a standstill in water supply- Emergencies. Shallow wells in the areas with high-water table and springs in the hillside are always destroyed by floods. Wells nears rivers are always contaminated and filled up the sand washed by the floods. Flash floods kill animals, human beings and destroy toilets, latrines and sewage systems, hence causing bacterial contaminations by faeces and other pollutants washed by flash floods and eventually diseases outbreaks such as cholera.

Earthquakes: Earthquakes usually cause major infrastructural damages to water system facilities, including water sources/ treatment plants, distribution lines, storage and reservoir facilities, to pump houses. Besides, when earthquake have destroyed roads and water plants, responding to water and other emergencies becomes very difficult. All these may result into loss of life. Destruction during earthquake leads to widespread of chemical contamination of drinking, as a result of chemical spillage from manufacturing plants and warehouses. This can be evidenced by the recent 6.9 magnitude earthquake that struck Indonesia on 5 of August 2018, where more than 460 people were confirmed dead. Homes, mosques, churches and business premises were leveled down.

Still more, below are the human-caused actions that lead to water emergencies

Terrorism: Terrorism is one of the global threats. There are so many potential terror threats to drinking water and the entire water system; these include chemical, biological/ radiological contaminations and physical threats that destroy infrastructural and computer systems. All these incidents cause emergencies and sever disease outbreaks, causing loss of people.

Construction accidents in most cases cause water emergencies. In Uganda, due to road constructions in some part of Kampala city led to water agencies for approximately 3 days, in 2016. Water pipes were accidently damaged by an excavator, and due to slow response, water system was shut down for days. Poor construction of sewage systems and drainage channels may cause backflow that ends up contaminating drinking water, and when such incidents occur, water system may be shut down, for some times, hence causing an emergency.

System neglects and often called; “deferred maintenance” is one of the causes of water emergencies. Some water utilities take long to and assess and repair water pipe, facilities; due to prolong negligence some systems end up failing completely, causing serious emergencies.

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

Water emergency needs a collaborative effort, from government officials, community members and leader, Non-Governmental Organisations, depending on the severity of the emergency.

Whenever there are water emergencies, people who suffer most are the vulnerable persons such as the elderly, women and children, people living with HIV/ and AIDS and the poor households. It is therefore, very important to have emergencies options/ responses to contain or improve the situations.

Below are the possible options that can be used to supply safe water during emergency

Before coming out with the alternative option, for water supply few things have to be considered;

The nature and the damages caused by the event, the total number of people potentially affected the capacity of the local person and the government department, in term of resources and finally the alternative water sources.

Early in the life of emergency, while the displaced persons continue to arrive in the large number, and in poor health status, water supply may be inadequate and therefore there is need to have rapid response plan to reduce the risks of epidemics.

If the emergency has been caused by war, or heavy floods, where people are always displaced, the affected population should be located to areas with adequate ground water supply. In such areas the only task now is to draw water and carry out simple water treatment both at the household before consumption.

Drawing from nearby rivers or lakes can be considered to be one of the best options during water emergency. In a displaced camp with more than 3000 people, big tankers have to be improvised to transport water from rivers or lakes. But this option requires maximum water treatment before being distributed to the displaced persons.

Regulating or rationing water consumption. Regulating water consumption, between the ranges of 0.5 to 5 gallon of water per a person per day will help to contain the emergency, as relevant stakeholders try to get permanent solution.

Within the internally displaced camp, tanks can be constructed and operated by a team of seven technical people and an engineer. The raw water is brought and dosed by aluminum sulphate coagulant to flocculate and settle for some hours six in a big tank. Then a solution of calcium hypochlorite is used to chlorinate the water. The process continues by sending the residual chloride of about 0.5 mg per litre to the distribution system using PVC pipes laid above the ground surface. This process can produce more than 180000 litres of clean water per day, serving more than 8000 people in a day.

Use of mobile water tankers has proved very reliable in Juba-South Sudan. Whenever there is water emergency some part of the city, private licensed water tankers collect water from river Nile which actually passes near the city centre. The water then is sold to the areas with water emergency. Most people use this water for bathing, washing, and cooking.

Point of use treatment is one of the best options. During water emergencies, households should be provided water disinfection tables and be advised to thoroughly disinfect or treat water before consumption. Other simple methods of water treatment are boiling, filtration using clean cloth.

Other agencies can intervene by supplying bottled or packed safety water for drinking; otherwise consumption of poor-quality water will end up causing waterborne disease such as cholera and typhoid. However, this option is very expensive and not sustainable to use

Use, of temporary water sources, and treatment plants such as dairies, soft drinks bottling plants, breweries and swimming pools to contain the situation. Example in 1991 after earthquake broke all the water mains, in Atlantic and Coasta Rica Soft Drinks bottling companies agreed to divert all their processed water to help the victims.

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

A sanitary inspection of an abstraction point is an on-site inspection and evaluation done by the qualified and experienced individuals, in assessing all conditions, devices and practises at all water surroundings that may pose actual or potential danger to the health and well-being of the consumer. Most of things are just observed during sanitary inspection, therefore providing a direct method of identifying the hazards and the actual and potential causes. And since they are tangible and observable, it provides a basis for analytical risk assessment.

Conclusively Sanitary inspection provides very importance information about immediate and on-going hazards associated with water supply even in the absence of microbiological and chemical evidence of contamination.

Besides, inspection of an abstraction point for a period of long years provides a long-term perspectives and assistance in identification and minimization of risks caused by progressive contamination of abstraction point and the general supply.

Since Sanitary inspection is a survey of all water surroundings to identify possible health hazards and the source of pollutions as a means of safeguarding the consumers. The surrounding community members should always be mobilized in advance, before the exercise. The local community members around the water point are very importance, because have background information about different activities may be part of the contamination.

They local community members are equally very importance during formulation of resolutions and key recommendations.

For the inspection report to be authentic, local community members invited must sign, since they will also be tasked to act on the key recommendations agreed above.

Sanitary inspection of river abstraction point should be a routine exercise to monitor the sanitary conditions.

Sanitary inspection should also be done when a new water source is being developed to assess the water quality and also for future reference.

Still at the abstraction point, sanitary inspection should be when contamination has been suspected, since this will disclose the potential hazards and the cause.

Is it also importance to conduct sanitary inspection when there are water-illness epidemics, in order to get their real causes.

1. What would you take with you?

Conducting sanitary inspection needs thorough preparation; therefore, there are key things to carry along.

One of the first things to carry along is the population data of the community and the surrounding areas near an abstraction point. The population data is very importance because it gives inspection team background information in terms of practices, weather and others that will be incorporated in the survey report.

The second thing is the summaries from the past studies, just in case there were some inspections conducted. This is very good, for comparison in terms of water quality and recommendations, and as well as follow up.

Another most important thing to carry is the sanitary inspection form or checklist that will be used as the guiding tool during the inspection. This form should be designed to match the local circumstances and easy for the inspection team to use, and should also be understood by the recipient authorities.

The next one is the sanitary inspection report form that will be used during the inspection and general recommendations/ remedial actions. It is always advisable to carry many copies of the sanitary inspection report form, because where recommendations demand immediate actions, all the stakeholders such as the community members, health department and the water utility, must remain with a copy always to be referring to while implementing their specific roles.

1. Explain four things you will be looking for during your inspection.

To look for the sources of water pollution, and contamination: This can be confirmed by looking at if there is any human habitation, animal farm or even crop production around the abstraction point. In most cases because human faeces, fertilizer are easily washed, into the river by, whenever the catchment area experiences some rain, human settlement and activities around the river has been seen as the one of the sources of water pollution.

Second thing is check whether there is risk of mudslides around entire catchment area; whether it is not prone to landslide or mudflow. The purpose of sanitary inspection to avoid further and potential contamination of water at all stages of water supply. Therefore, key area of focus during inspection is to make sure the catchment area is compact and able to resist any form of running water, which always causes contamination

To look whether the abstraction point is fenced and devices are well installed. When the abstraction point is not always fenced animals and other intruders can easily access and contaminate water supply. It is very importance to note this during inspection, such that actions can be applied to fence or improve on all the conditions around the area.

The fourth is look if there are water filters and if the water system is always controlled or uncontrolled. In case there is no filter, in-depth analysis can be carried out whether the water system needs sand or gravel filters as a means to produce high quality water.

4. Explain briefly why a Water Safety Plan is necessary

Water safety approach came up in 2004, as evidenced by the World Health Organisation third edition publication on guidelines for drinking water quality1

Water safety plan is a comprehensive plan to ensure that the safety of drinking water, through risk assessment and management processes that consider all the points of water supply from catchment to consumers. It involves the thorough risk assessments of each section of supply chain, and the implementation of all the management processes and procedures to mitigate the risks that will be caused by the identified hazards.

Water safety plan has got components in order for it to be successful

It requires team of expert if the full information water supply system from the catchment area to the final consumers is generated. This team should involves senior persons, technical and local people who have actual knowledge about what takes place on the ground

Description of water supply is a very vital component while planning for water safety

Identification of hazards and hazardous events as well as prioritization

Identifying the monitoring system for each control measure and preparing the management procedures. Also there is need to prepare the verification, developing the supporting programs and documenting all above.

Therefore, a water safety plan is necessary because it prevents and manages all the risks and hazards before they contaminate the drinking water. This is possible by taking into the account all precautionary ensures and standards at all points of water supply system.

It’s through water safety plan that the some factors that may cause incidents and emergencies that disrupt the continuous supply of water are eliminated.

Specifically water safety plan is necessary as per the following;

Water safety plan is necessary in giving full information about the water supply system. Clear information about the water supply system from catchment area to the final consumers, allows hazards and risks to be identified. And this information will always be reviewed and updated from time to time.

Water safety plan is necessary in detailed and systematic prioritization hazards and risks. Risk assessment can be carried out to assess the severity of the hazards and risks by multiplying using the matrix

Water safety plan is necessary in identifying the control measures needed for each identified risks Example around wells and springs, information about rainfall percolating the groundwater will help to apply preventive measures such as restriction on the use of fertilizers around the water source. Through regular checks, the amount of chlorine in stocks out can be established and when to restock will be well recorded.

Water safety plan is necessary to develop and improve the water supply system. The detailed information at all water supply stages can be used to improve all the systems or a specific action that should be applied to reduce the identified hazards example the provision of chlorine dosing system for disinfection of water supply

Water safety plan is necessary for monitoring system for each control measure. Well recorded data will always help to establish the amount of chlorine in the stock against the amount actually used. This can be done through thorough operating monitoring example to confirm that control measures are really working to protect water supply at key steps along the water supply chain.

Verification monitoring which is part and parcel of water safety plan is necessary in confirming that all the water quality standards are being met and up to date. Verification monitoring also checks that all the standards are being implemented and that consumers are satisfied

Water safety plan is necessary in providing document management instructions. Through water safety plan, operational and maintenance step-by-step instructions are well prepared for easily and follow and future reference. Example how to clean the spring box, how to ratio the chlorine dosing etc

Water safety plan is necessary in planning for future training areas both within the operating staff and the general consumers. Such training are caretaker training and the consumer education and awareness, including water storage and handling at household level.

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

It is the responsibility of the water utility to always provide potable and adequate quantity of water from a water treatment facility to the final consumer. This supply has to be reliable and at the same time available all the time 24/ 7.

But the water facility is always faced with so many challenges; the major challenge has always been lack of effective regular maintenance. Lack of proper maintenance has always resulted into deteriorated sewers, overflows, hydraulic overloads at treatment plant, health and other environmental problems.

Therefore, water utility needs maintenance. And according to, Bupe .G. Mwanza and Charles Mbohwa (2016). Maintenance is the engineering decision, and associated actions, necessary and sufficient for optimization of specified equipment capacity to perform specified level rated to rate, quality and responsiveness.

At a water utility, there are always two types of maintenances; there is preventive/ proactive and breakdown/ corrective maintenances.

Preventive maintenance involves regular checks that everything is working properly, while breakdown is carried out if the equipment breaks down or after the emergency.

Therefore the best maintenance at the water utility is the preventive form, since it is a programmed, and systematic to maintenance the activities. It covers the following key elements; planning and scheduling, systematic mapping, computerized maintenance programme, record management, assets inventory and management, spare parts management, cost and budget control and training program.

At the water utility, preventive maintenance better due to the followings.

It’s cost effective: preventive maintenance is always planned a head of time and this makes repairs cost effective both in long and short term because the work is always done with proper materials, during the normal working hours and under preferred working conditions. Unlike in breakdown maintenance, where sometimes, repairing a pipe breaks is done in the middle of the night in a freezing rain, and with wrong materials.

Preventive maintenance maintains reliability of equipment and utility as designed: reliability is a critical component of water utility. Water utility is always designed to run for 24/7 in 365 days per year. Therefore, if maintenance is not planned a head of time, any breakdown, impairs the designed water system of running constant. Preventive maintenance is the only key to reliability in the water system.

Maintain investment value and community trust: The major goal of water’s manager is to always accomplish the investment value, since water unity is always a major asset in the community. If the system maintenance is not always planned a head of time (preventive) and it breaks down af water manager always loses the trust from the community in regard to managing the only community asset.

Preventive maintenance is a platform for a good budget and resource mobilisation. Accurate and constant data updates from the regular system checks, gives time to get adequate resources, compared to breakdown, where resources are always hurriedly handled.

Capital improvement program can be identified and budgeted for. Due to frequent checks of all the water system, management can always plan on acquisition of better improved equipment or expansion strategies, since there is not pressure which is common with break down maintenance.

Human resource and material can be used effectively. The goal of managing a water utility is always to minimize on the cost of labor and material. In fact, managing human and other resources, effectively, while delivering the high quality service to the consumers is possible under preventive maintenance. Under Preventive maintenance engages water staffs almost all the time, hence their labor is not wasted, unlike breakdown maintenance where staffs are only engage when water system breaks down.

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