**STRATEGIA NETHERLANDS, INTERNATIONAL MANAGEMENT ORGANIZATION**

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**Final exam**

Final Exam

1. Diarrhea among children under 5 is common in many rural villages. What environmental factors or practices may cause diarrhea in young children? Explain three ways to prevent it

Diarrhea is defined as passing of loose or watery stools at three times per day, or more frequently than normal for an individual World Health organization (2017).

Diarrhea is the second leading cause of death under five years, and it causes an annual mortality of 760000 children.

Diarrhea creates indirect and direct costs on the family income, including absenteeism from workplace; family income is spent on drug, accommodation and other hospital costs.

In Uganda, diarrhea is commonly caused by the following environment factors and practices as seen below.

Mother’s lifestyle has for many cases cause diarrhea in children. Uganda being an agricultural economy, most women works so hard in the garden to earn a living. In some community, mothers work from morning until the evening. It should be know that heavy work make them to sweat a lot, and yet many of them breastfeed their babies without cleaning themselves, since they are in the gardens working. This means that their children will be breastfeeding the contaminated breast milk, and hence diarrhea. In Uganda, some communities including Karamojong take un boiled cow milk and yet their containers are always dirty, hence their children are always suffering from diarrhea

Poor working environment indirectly also causes diarrhea in children under five years. In my recent research work, more than five women had young babies less than two years of age. These kids were eating dirt, while other mothers were breastfeeding under unbearable conditions, while other kids who were put at the roadside while their mothers work were eating dirty and rotten oranges. In fact most of them look malnourished, dehydrated and one could easily conclude that diarrhea was the leading problem.

Contaminated food; in Uganda still most families have house maids/ helpers or grandmothers to help taking care of other young children, while their mothers go for work. But research has shown that most housekeepers/ maids end up giving c cold food and milk to these young babies. In some families maids spend most of their time watching TV channels, making kids to serve cold food by themselves, therefore at the end of the day; they eat germs which end up causing diarrhea.

Another cause of diarrhea under five years is drinking contaminated water and this is very common in communities across Uganda. In northern part of Uganda, most people share drinking water sources with cows, while some draw their drinking water from unprotected wells, which get contaminated when it rains. When children the contaminated water, and with their immunity, they end up getting diarrhea.

Unsafe drinking water storage facilities and unhygienic handling of water cause diarrhea in children less than five years. Some households may draw water from the protected safe water sources, but because they have dirty jericans, pots, and cups while other send their young children to get water from the pots, yet their hands are dirty, they end up drinking contaminated water that cause diarrhea in them.

Poor water and sanitation practices are also causing diarrhea in children less than five years. Communities in greater Barr el ghazel, from the month of November to June the following year, there is either no rain or little rain and as due to water scarcity, most people think that washing hands after defecation is “wasting’’ water. Some women end up cooking cassava or greens without washing them. Even the few water vendors are usually selling unsafe/ contaminated water; water which have a very long period of time in the container. Some un trusted water vendors sell water that have been drawn from rivers or dams that are at the same time used for bathing or by domestic animals like cows. All these practices have always caused diarrhea in children less than five years according to federal ministry of health south Sudan (2019).

Lack of knowledge or cultural attachment to open defecation has in most cases increased the spread of diarrhea in less than five years. Some communities especially in South Sudan take open defecation as a sign of wealth and food abundance. Families with faeces around their homesteads are considered to be having food and healthy children because they eat enough food. While in some communities, having pit latrines at household level is insane, because no one is supposed to build nice house for ‘shits” hence faeces are always exposed. Therefore in such communities there are always high cases of diarrhea, because flies end up transferring germs from exposed feaces to food, and children eat the contaminated food.

These are few measures to prevent diarrhea;

Continuous health education about the effects of diarrhea; people should be made aware of the economic implication of malaria such the loss of income and time. This can be done under the community-led total sanitation messages through radio stations jingles, flyers. Message about washing hands in all five critical moments such as before preparing food, after defecation, after washing babies bottoms, before feeding the baby and eating food.

In community with little or limited water sources, government should come up and drill more boreholes and train more water users committee about the maintenance of those boreholes for it sustainability. This will help many households to begin treasuring hand washing and other good hygienic practices because will be having enough water.

Rotavirus vaccination has so far helped in Uganda, since 2018 when it was launched. While improved sanitation and hygiene have always been considered vital, but this vaccination will help to disrupt the rampant spread of diarrhea among children. Globally, according to the World Health Organization (2017) an estimated 450,000 children under five years of age die each year from vaccine preventable rotavirus infections. Diarrhea is among the top ten causes of morbidity in Uganda, with rotavirus being responsible for about 40% of all diarrheal cases.

1. Think about the possible types of pollution that could be produced from a health center.
   1. List the types of pollution that could be produced, giving one example of each type.

Pollution is the process of making land, air or nay parts of the environment dirty, not suitable for use. Pollution is when contaminants are introduced into natural environment that cause adverse change. Things as simple as light, sound and temperature can be considered pollutants when introduced artificially into an environment.

According to World health organization (2018) out of the total wastes generated by health care activities, 85% is general non hazardous and the remaining 15% are very hazardous that may be infectious, toxic and radioactive.

In line with that, health centre ends up causing the following pollutions

Health centre activities have always led to adverse water pollution. Disposal of untreated health care wastes in landfills can lead to the contamination of drinking, surface, and ground waters if those landfills are not properly constructed especially when solvents and reagents used for laboratory preparations, disinfectants, expired and unused drugs and heavy metals contained in medical devices including mercury in broken thermometers and batteries are realized carelessly.

Health centre activities are also part of air pollution .Although incineration has been widely practiced, but incinerating unsuitable materials containing or treated with chlorine can generate dioxins and furans.

Land pollution has also partly been generated from health centre. Incineration of heavy metals or materials with high metal content such as lead, mercury and cadmium) can lead to the spread of toxic metals in the environment.

* 1. Describe the two main approaches to pollution management. Outline the pollution management methods that could be used for the pollutants you have listed.

The two main approaches to pollution management are;

Pollution control approach; and under this approach wastes are regarded as undesirable by product of the production process that must be contained so that land, soil, water , air and other resources are not contaminated beyond the level that are deemed acceptable. Under this approach government has to establish standards for acceptable practices of waste generation, collection, transportation, and disposal while giving much attention to safe disposal through sanitary landfills, incineration and hazardous-waste treatment.

Pollution prevention approach focuses entirely on the use of process, practices, materials and energy that avoid or minimize the creation of pollutants and wastes at source.

Pollution has both indirect and direct impacts on the public health, therefore the following methods should be applied to control or prevention health centre from causing pollution.

Awareness creation on the risks associated with health care wastes and pollution.

Government should allocate more resources and develop strict policies on pollution creation and management.

Development of systems that promote practices that reduce waste generation

Strong systems should be adopted that easy waste segregation process.

1. Give three reasons for incorporating plans for M&E during the early stages of a project’s development.

Monitoring and evaluation plan is a guide that explains project goals, objectives and key elements. An M&E plan is a roadmap that helps to define, implement, track and improve a monitoring and evaluation strategy within a particular project or a group of projects; it states everything that needs to happen from the project planning phase until the project reaches its goal and creates the intended impact.

Monitoring and evaluation plan should be designed right in the beginning when the project interventions are being planned.

Planning M&E at the early stage of project interventions and helps to ensure that there is a robust system in place to monitor every little intervention and activity of the project and evaluate their success.

It also helps the project managers and other staff members associated with the project to get a clear picture of key objectives and ensure the project is on the right track.

It further helps to identify opportunities and barriers as a team in the planning stage with a focus on problem-solving and maximizing impact.

1. Explain four factors that are important when choosing a sanitation technology

Site environment factors including the conditions of surface water and soils are very key in sanitation technology. Choice of sanitation technologies, ground conditions, particularly groundwater level, soil permeability and stability, are important considerations.Some sanitation technologies, except those which can be built above the ground, are feasible when the ground water level is below one meter from the surface. Other options require permeable soil for soak away of effluent and others require stable ground for construction.

Community physical factors such as population/ settlements, access roads are very important. On-site systems such as pit latrines, and septic tanks require adequate space for the infiltration of waste discharged into them. These systems are not suitable for high density settlements, since high density poses danger in terms of wells for drinking water and sanitation facilities to be close together. Water seeping out of pit latrines which are bacterially and chemically contaminated will pollute the surrounding groundwater. Similarly some systems require methods for transporting waste from the place of defecation to another for waste treatment, and this is impossible in areas with narrow footpaths on land and wooden walkways on water supported by stilts.

Water availability is yet another factor. It is very hard to install flash toilets in areas where there is water scarcity.

Social and cultural factors are also vital in choosing sanitation systems. A well designed system may not be appropriate when social and cultural factors affecting sanitation and hygienic practices of the community members are not considered. For instance, technologies involving re-use of excreta are unfeasible in communities where sight or handling of waste is culturally and socially unacceptable. In the same way, dry technologies are inappropriate for communities which prefer water for toilet hygiene. In communities that require a high level of privacy, the design of communal facilities should provide for these requirements

1. Define Sustainability. Explain four factors that can be used to foster sustainability in WASH projects.

The term sustainability has a multidisciplinary use and meaning, described by many sources.

According to the United Nations world commission on environment and development, sustainability is the ability to meet the needs of the present without compromising the ability of future generation to meet their own needs. And over the years this definition has been expanded to include the perspectives of human needs and well-being and other non-economic variables such as education, health, clean air, water and the protection of natural beauty.

While according to international union for conservation nature, sustainability is the capacity to improve the quality of human life while living within the carrying capacity of the Earth’s supporting eco-systems.

The followings are factors that can foster sustainability in WASH projects.

Participatory planning is very crucial in sustainability example in south Sudan, some communities don’t need community-Led total sanitation projects such as latrine construction, hand washing, and therefore implementing such projects with prior meeting to seek for their opinions and interests won’t be viable and sustainable.

Political climate is yet another factor to be considered if WASH projects have to be sustainable. It was actually hard and not sustainable to implement or construct boreholes, water yards and tanks in some states Unity state, Western states in south Sudan where bombs were everywhere. Many water tanks were bombed down, while boreholes were abandoned in some deepest parts of the country, hence they all broke down.

Socially inclusive planning involving all categories of population : WASH facilities should be planned with all sectors of the community in mind, including the poor, elderly, disabled and children, otherwise more people from the few left out unattended to will complain, and hence they project may end up being rejected.

During construction or project implementation, location is yet another factor to look at. In Uganda, many boreholes and water yard have been vandalized on the ground instead of being constructed in the centre of their village, local leaders end up taking the project or constructed far away from the mutual agreed location.

Technology choice is yet another factor. Technologies used in providing WASH facilities should be easy for the community to understand, use and maintain. It is not sustainable to construct flash toilets in some communities in Eastern part of Uganda, and Western part of South Sudan, where communities use sticks and stones as anal cleaning materials, because the all system will fail within a day.

Human resource as another factor is very important for the WASH project sustainability. Construction water yard and boreholes require well trained, available pump mechanics for regular maintenance of these facilities, just in case they break down. Due to technical demands, most WASH projects employ external expatriates for implementing WASH projects, and this is risky in the local technicians are not trained and empowered to take over the projects.

Financial availability and utilization is a very important factor is WASH sustainability. Many hand pumps in South Sudan broke down because user’s fees were always diverted for personal gains, by some water user’s committee executives. This actually became a very big concern since most donors were not willing to finance more WASH project.

b. Giving reasons explain 5 conditions that will help in improving the water supply situation in your country.

Uganda has in the last two decades experienced economic growth and as a result many people have migrated from rural to urban settings, meeting water supply demands very difficult.

Therefore the following conditions will help to improve the status of water supply in Uganda

More funds should be allocated to the department of National water and Sewerage Corporation, to enable them, expand their water supply capacity, connecting more households/ units. Currently ministry of water and environment has been complaining of underfunding.

Reduction in bureaucracy to facilitate the spending of funds that allocated. In Uganda, requesting fund from the national treasury takes months, and this means it is still very hard to response to any water supply related emergencies.

Government should invest in human resource capacity development, and expertise at different levels to meet the latest demands in water supply. Most of these staff have never had refreshers training for almost 20 years.

Another condition that will help to improve the water supply situation in Uganda is better coordination between the different stakeholders. In Uganda there is lack of coordination between the water sector, telecommunication department and the road authority; because of this, water pipes are frequently damaged during activities such as laying down telephone and internet lines, and during road construction, leaving many customers in real need.

There should be better and simplified information management systems. Many people have suffered and yet refused to connect to water supply services, due to high illiteracy level, and failure to give early warning of requirements. Government should use all the local languages at the front desks/ customers care centres and in all the documents to cater the illiterates.

1. What are the key factors to be considered when planning a new landfill in small and medium-sized towns?

Landfill is always defined as an area of land set aside for the final disposal of solid waste. And in most cases the site is well managed to prevent people and animals from entering and the deposited waste is covered with soil to isolate it from the environment.

1. List at least four factors.

The following factors have to be considered when planning a new landfill in a small and medium town

Land is the first important factor and it should cater for the present and future population. An estimate of the required land that will be occupied by the waste has to be well calculated in regards to the total population. The land size should also cater for other spaces where the vehicles will park or pass while disposing the waste.

Another factor is the suitable distance/ location from the centre of the population. The site should be will located; not too far, not too close. If the site is too close, people may be affected or complain of the odour and again if the site is too far then there will be the need for anther transfer point and that means another vehicle or truck will be required to take the waste to the final disposal point/ land fill. Still on the location, land fill should not be close to the flowing water because leachate will leak from the land fill. Landfill should be so close to the wetland because if it rains running water may end up washing waste into the water or river.

The operational and management strategies have to be put in consideration; otherwise the whole systems will fail.

1. Explain how incineration differs from open burning

Open burning is the practice of waste management where different households burn their piled wastes in the open air and the remaining ash is buried or spread on the ground. This seems so easier for the householder than taking their waste to collection point or a landfill, but the smoke is an annoyance to the neighbours and can be a health hazard and should be discouraged unless it is the only option for dealing with the waste.

While Incineration, as opposed to open burning, is the combustion of waste material in an enclosed container with an air supply and ideally fitted with a chimney. The combustion process can be controlled to some extent so that less pollution is produced and a chimney helps to reduce the impact by sending product gases upwards into the atmosphere.

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.

A public–private partnership is any collaboration between public bodies, such as a municipality or even the government, and private companies. Most governments in the developing countries don’t have the financial capacity to cope up with ever increasing demands for water supply, due the rapid population, yet access to quality water supply is key variable in united nation SDG goals, and hence engaging private partners to fill the gaps has been seen as the viable strategy as defined byOliva Jensen (2015) 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.

And the arrangement takes series of forms as better noted down.

The management arrangement where a private partner is given the responsibilities to carry 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.

To be certain, the arrangement can be assessed based on the following grounds

Accessibility based on the proportion of the population who have access to water and the distance to the water point. Population served by the private investor-owned facilities are approved when many people especially the poor can access to water and sewage services,: 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.

The affordability based on the cost of water that is needed by households and the cost should be less than 5% of the household’s income. But beyond that the partnership is a failure.

Cost recovery is yet another basis of assessing the partnership. 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.

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.

Operational efficiency by looking at the quantity of water supplied per capita and the duration of water supply in hours per day and this can be done through comparison records, with other locations. 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. What are the possible interventions to manage the solid waste in an emergency situation? Explain at least three actions that could be taken.

Solid wastes are all the wastes arising from human and animal activities that are normally solid and are discarded as useless or unwanted by the person or organisation that produces the waste.

Human beings produce wastes of various types; for example, urine and faeces, wastes from washing and cooking, and solid wastes produced at home and in workplaces, schools, hospitals and other public buildings and this worst during an emergency situation. An emergency is a sudden and unforeseen event that calls for immediate measures to minimise its adverse consequences. Emergencies may force the population to move away from their homes to avoid the impacts. Emergency situations are often caused by disasters such as droughts, floods, earthquakes, disease outbreaks, wars and other conflicts. Therefore safe disposal of solid waste is critical for public health, especially during an emergency.

The followings are the few interventions to manage solid waste during the emergency

Clearing all the toxic materials and removing and opening up the drainage channels such that water can start flowing normal to avoid contamination. If the emergency has been is due to war, dead bodies including animals should be removed and onsite disposal system be established.

Another intervention involves an assessment to establish the amount of solid wastes that are generated on the daily basis and the current disposal system. This assessment will help to see if the disposal system is coping up with the emergency and to come up with possible actors that should take up the responsibility.

Involvement of local institutions such as schools, health centres among others. Building their capacity and funding, and rehabilitating their structure will help to meet the responsibilities.

Working with the communities is yet another intervention strategy. During the emergency potential users of waste management systems in displaced populations should be consulted before and during its design, construction and use. Giving the affected population tasks to do such as cleaning-up their areas, can help them to overcome their trauma. While employing them may help to empower them and hence making them responsible in solid waste management.

During emergency the affected communities should be provided with communal waste bins and this may be very useful for proper waste collection and to ease the regular collection of waste for final disposal.

Emergency access roads should be created since waste transportation depends on waste generation rates, issues of access, and the distance between collection and disposal points.

Existing waste infrastructure should be used. If it is lacking, a temporary solution may be communal disposal pits, or household pits if the space permits, but better and safer long-term solutions for final disposal should be found.

Recycling can be used to reduce the amount of waste for disposal and in some cases be a source of local income. Informal recycling is likely to occur naturally, even though formal recycling is often difficult in the early stages of an emergency due to the high level of organisation and manpower needed.

During emergency, open dumping should be avoided because of the health risks for people and animals. Burning of solid waste may be possible although it creates the problem of smoke and will not achieve a sufficiently high temperature unless a purpose-built incinerator is used.

Therefore during emergency the preferred disposal method is burial. If it is possible to do so, existing waste disposal sites should continue to be used. For temporary settlements, areas should be designated for burying waste and they should be well away from households and fenced off. If waste is to be buried on-site in either household or communal pits, it should be covered daily with a thin layer of earth to prevent it attracting vectors such as flies and rodents.

1. What are the most important questions you would need to address in a rapid assessment of an emergency?

A rapid assessment is conducted immediately after the onset of a disaster in order to locally assess the disaster-affected areas and the needs of disaster victims.This is separate from immediate life saving activities of the emergency search and rescue teams or disaster medical assistance teams Assessment is required to identify needs, damage and resources, so as to be able to respond appropriately and with maximum impact.

The following are the most questions to addressed

What happened is a very first to addressed; this helps to describe the nature of emergency. There are diverse ways of classifying emergency, by their origin, magnitude of the hazard, or manner. Generally the manner that it starts will also determines the speed at which the rapid assessment and response actions should be implemented.

Another key question to address is the location of that emergency. This is very important in identifying the geographical areas affected and the environmental conditions.

Who are affected or vulnerable to the emergency is another question. Through this question it is possible to find different levels of vulnerability within the affected population, generally in groups consisting of children, women, and seniors, who not only have a particular profile of needs, but are also make up an integrated focus of prioritized needs of the most vulnerable groups.

What is the impact of the emergency should also be assessed. This should look at the number of people affected and their demographic characteristic. At the core of rapid assessment, attention should be focused to human beings and the level of suffering caused by the disaster/ emergency.

Then the next question is why and how the intervention should be carried out. This should clearing define the objectives of the intervention

Finally, what is the country’s level of response, and it capacity to lead the emergency situation? This is very important to lobby for the international community assistance.

1. Filtration and disinfection are important water treatment processes.Briefly describe each of these processes and explain their role in making water safe to drink

Water treatment is the process of removing all the substances, being it biological, chemical or physical those are potentially harmful in water supply for human and domestic use.

Water treatment involves so many processes (from screening to supplementary treatment) including filtration and disinfection.

Filtration therefore is defined as a process where solids are separated from liquid. When the filters are full of trapped solids, clean water and air are pumped backwards up the filter to dislodge the trapped impurities and water carrying the dirt (backwashed) is pumped to sewerage system.

In water treatment, filtration helps to remove solids that could have not be separated out in the sedimentation tank.

Filtration therefore provides clean drinking water Filtration also meets the needs for of medical, pharmacological, chemical, and industrial applications for clean and potable water.

It reduces the concentration of contaminants such as suspended particles, parasites, bacteria, algae, virus and fungi.

Disinfection on the other hand refers to the application of a chemical agent to destroy or inhibit the growth of microorganisms in water. These chemical agents are known as disinfectants.

Disinfection eliminates any pathogenic micro-organisms. When chlorine is added to the water, it reacts with any pollutants present, including micro-organisms.

Disinfection cheap and simple to use because the chlorine stays in water for long throughout the distribution system, hence protecting the customers from any micro-organisms that might have entered in water before it reaches the customers.

1. List the five factors that make a water source ideal to use.

The water source is fully enclosed or capped and no surface water can run directly into it.

People do not step into the water while collecting it.

Latrines, solid waste pits, animal excreta and other sources of pollution are located as far away as possible from the water source and on ground lower in elevation than the water source.

There is no stagnant water within 5 metres of the water source.

The water collection buckets or hand pump at the source are kept clean.

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