**PGD002**

**Post Graduate Diploma in Water Hygiene and Sanitation**

**Assignment Module 5**

**Submitted**

**by**

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**Question #1**: Paul, a resident in the outskirts of your town, consults you about building a latrine in the compound of his house. He is an open-minded man who is keen to improve life for his family. He has a wife and three young children, and his elderly mother also lives with them. He doesn’t have a tap in his house and gets water from a nearby well. The area has heavy soil and the rock below is impermeable.

(a) Which types of latrine are possible choices for him?

(b) Which types of latrine would you recommend, and why?

(c) What other advice would you give him about the location, design and construction of the latrine?

**Answer #1:**

1. Paul cannot install a water carriage system because he does not have a piped water supply; therefore, he has to install a pit latrine of some sort. The possible choices are a single pit latrine, a pit latrine with slab, a VIP latrine with slab, a double pit latrine or one of the ecosan systems, namely an Arborloo or a Fossa Alterna.
2. You should not recommend a pit latrine without a slab because this does not provide adequate sanitation. The VIP latrine is preferable to a simple latrine, but an ecosan system would be better because this would produce a useful product as well as protecting the health of the family and the environment. You would need to ask Paul about his attitude to using an ecological sanitation system and whether he would be willing to make use of the composted waste material. He is a farmer so he may be able to use it on his fields and he is open-minded so this system may be attractive to him. If he was reluctant to dig out the compost you could recommend the Arborloo system because that does not require handling; the tree is planted on top of the filled pit.
3. You should advise him to consider the location of the pit. It must be at least 15 metres away from his well and preferably a greater distance. It must also be at a lower level according to the slope of the land. He should also consider the wind direction and place the latrine downwind and at a convenient distance from the house. He would need to consider the design of the squat hole to ensure it is safe for his children and comfortable for his elderly mother. You could advise him about possible materials to be used for the superstructure and recommend what is available locally. You should also advise him to install a handwashing facility next to the latrine.

**Question #2:**  Nancy is a laboratory technician. She is analysing a sample of wastewater collected from a pipe that discharges effluent into a river.

1. Name two tests Nancy could perform to assess the physical characteristics of the effluent.
2. As part of the analysis she also does a BOD test on the sample and gets an unusually high result. What does the high BOD tell her about the wastewater? What effect could it have on the river?

**Answer #2:**

1. To assess the physical characteristics, Nancy could perform a suspended solids test. She could also measure the temperature of the sample and assess the odour. There is a possibility and high chance of temperature change within a short time, measurement should be taken at the point of origin.
2. A high BOD test result would tell Nancy that there was a lot of organic matter in the sample. If this was discharged into the river it would remove oxygen from the water, which would harm fish and other organisms living in the river.

**Question #3:** What is the purpose of the report of a rapid assessment and who should receive copies of the report? Explain the contents of Rapid Assessment Report

**Answer #3:**

The purpose of the report is to summarise the results from the assessment and indicate how well its aims have been achieved. After permission from the funders has been obtained, it should be sent to all those who had an interest in its findings. Apart from the funders, recipients could include:

1. the local administration
2. community representatives
3. the local Health Extension Workers team
4. any non-governmental organisations (NGOs) or funding organisations who might be willing to finance or support a follow-on programme
5. any local WASH programmes.

Rapid assessment of urban sanitation and waste management is the process of collecting information from households and institutions to get a quick overview of the situation in an urban community. The results can then be used to identify the areas that need to be improved and suggestions of possible solutions. The assessment involves observations of the community and discussions and meetings with target households and other community members. Some examples of the type of question that could be asked are:

1. How many households and schools have sanitary facilities (including handwashing provision) and how are these facilities being used?
2. How convenient are the facilities? Do they provide the necessary access and privacy and preserve dignity?
3. What is the current level of sanitation and waste management knowledge among the community?

**Question #4:** Explain five ways in which urbanisation creates challenges for effective sanitation and solid waste management (SWM).

**Answer #4:**

Waste collection, storage and transport are essential elements of any SWM system and can be major challenges in cities (Kumar et.al, 2017). As a result, sanitation and waste management can cause problems in any community, regardless of its size. In urban areas, where people live close together these problems can have a much greater effect on people’s health and on their surroundings. According to Hussein *et.al.* (2018), disposal of solid wastes is a stinging and widespread problem in both urban and rural areas in many developed and developing countries. Municipal solid waste (MSW) collection and disposal is one of the major problems of urban environment in most countries worldwide today. MSW management solutions must be financially sustainable, technically feasible, socially, legally acceptable and environment-tally friendly. Solid waste management issue is the biggest challenge to the authorities of both small and large cities. Therefore, the main challenges from urbanisation are caused by:

1. **Environmental challenges**

Urbanisation can have a major effect on the environment in the following areas. Challenges emerging from rural-urban interaction include in such a way that urban centres are usually surrounded by rural communities and the two areas depend on each other to supply many of their needs. Urban areas depend on the rural areas to provide food, fuel and construction materials. In return, the rural community depends on urban areas to supply employment, commercial products, advanced healthcare provision, education and equipment, machinery, and other industrial outputs. Having said this, problems may arise when there is a large temporary influx of people from the rural to the urban areas. Examples include: the increased demand for sanitation facilities in the area around a city market; the manure generated by animals that are brought for sale or used for transport; the congestion caused by the number of people and animals using the roads.

1. **Challenges emerging from the urban situation**

Even without the influxes from rural areas, urban centres are congested and crowded. They have often grown without any planning, so the problems arising from the lack of sanitation, waste management and the other infrastructure mentioned above are present. Urban growth also means that there is an increase in the area of land covered with concrete and other hard surfaces. When rainwater falls on soil it will usually soak in. When it falls on concrete it runs off the surface and can cause flooding if the rainfall is heavy. Hence, Urban development reduces the ability of the ground to absorb rainwater. In urban areas a high proportion of the ground is paved, which prevents the absorption of rainwater. Also, unplanned developments usually lack the drainage ditches or channels necessary to carry away surface waters. These two factors combine to create an increased risk of flooding and the outbreak of waterborne disease that can follow floods. According to Kumar et.al (2017), properly engineered waste disposal protects public health and preserves key environmental resources such as ground water, surface water, soil fertility and air quality. Therefore, this challenge could be solved accordingly.

1. **Challenges from industrial discharges**

Most industries in developing countries discharge untreated or partially treated liquid wastes to sewers, where these are available, or to rivers, streams or ditches. Industries also release waste gases that may contain harmful substances and produce solid wastes that may contain hazardous materials (such as poisons, strong acids, infectious material, etc. that can cause harm to humans because of their properties). As a result, unregulated industries can harm human health and the environment in many ways.

1. **Challenges from transport**

The use of a large number of often badly maintained petrol- and diesel-fueled cars, lorries and buses cause additional health problems. The exhaust gases from these vehicles contain fine particles, partly burned fuel and acidic substances that make breathing difficult and cause irritation of the lungs. While this is a problem for all people, it is much worse for the old, the very young and the ill, especially those with heart problems or who suffers from asthma.

1. **Challenges to society**

Increasing urbanisation puts pressures on society as a whole as well as on the environment. People who migrate to cities may become unemployed and then need to be provided for. This puts pressure on welfare provision and on the charities that provide assistance to the hungry and the homeless. Even people who have jobs find it difficult to find somewhere to live and may develop illegal unplanned settlements that affect the planning and service provision of the government sectors. These settlements also add to the city’s sanitation and waste problems.

The urban population requires daily supplies of food, fuel and other goods which can put pressure on the infrastructure needed to deliver and sell these goods. Once goods reach the end of their lives, they become waste, increasing the pressure on the waste collection and treatment systems. To avoid such problems and find a sustainable solution, proper and participatory planning is required. Experience from Cambodia shown that, Cities Development Initiative for Asia (CDIA, 2010) provided technical assistance to the Battambang municipality in the preparation of the “Urban Environmental Infrastructure Improvement Project.” The Pre- Feasibility Study (PFS) recommended, among others, feasible solutions to issues concerning waste recycling, composting and disposal. Such a lesson learned processes need to be replicated elsewhere.

**Question #5:**

How do good sanitation and waste management practices bring a positive effect to urban inhabitants? Give examples for effects on:

a) health

b) education

c) economic conditions

d) the environment

**Answer #5:**

**Effects on health:** Good sanitation and waste management help to keep people separate from potential sources of pathogens. They reduce the risk of contaminating water supplies with pathogens and discourage the transmission of disease.

**Effects on education:** Healthy children have fewer days off school through illness. When they are at school, healthy children learn better than sick children. Providing good sanitation facilities encourages children to attend school, particularly girls during their menstrual periods.

**Effects on economic conditions:** The health benefits promoted by good sanitation and waste make for a more productive community. Less money is spent on healthcare and people lose fewer days off work through caring for the sick.

**Effects on the environment:** Good sanitation and waste management means that there will be less faeces and waste deposited in public places and less pollution of the water and soil.

**References**

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