



DIPLOMA IN WASH

ASSIGNMENT 4



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1. Explain what municipal solid waste (MSW) means.

‘Municipal solid waste, also called garbage or trash, is nonhazardous refuse generated by households, institutions, industries, agriculture, and sewage. It is made up of waste, compostable, and recyclable materials, with the municipality overseeing its disposal. Typically, this refuse is collected, separated and sent to either a landfill or a municipal recycling center for processing. In some cases, what is defined by a community as municipal solid waste will vary by jurisdiction’ (RESOURCE CENTER POWERED BY BUSCH SYSTEMS (2016, June) *What is Municipal Solid waste (MSW)*, Retrieved from <https://www.buschsystems.com/resource-center/knowledgeBase/glossary/what-is-municipal-solid-waste-msw>)

Municipal solid waste management (MSWM) denotes to the gathering, assortment, transmission, handling, recycling, resource recovery and disposal of solid waste in urban areas. The primary goal of MSWM is to protect the health of the urban population, particularly that of low income groups who suffer most from poor waste management. MSWM also aims to promote environmental conditions by controlling pollution (including water, air, soil and cross media pollution) and ensuring the sustainability of ecosystems in the urban region. It supports urban economic development by providing demanded waste management services and ensuring the efficient use and conservation of valuable materials and resources (Diploma in WASH, Module 4, Retrieved from <file:///C:/Users/sbalouch/Desktop/Diploma%20in%20WASH%20Module%204%20Notes.pdf>)

2. Explain the importance of the following MSW properties in solid waste management or treatment.

The character of urban waste differs between developing and industrialized countries, and between larger and smaller towns.

Municipal Solid Waste (MSW) is complex junk consisting of various materials with different properties. Some of the components are stable while others degrade as a result of biological and chemical processes. Leachate resulting from this is hazardous pollutant to the soil and ground water underlying. Leaching of this leachate and heavy metals into the soil leads to the

contamination of both soil and groundwater. Municipal solid waste disposal on land has become one of the challenges in landfill engineering design (Rakesh Kumar Pandey & R.P. Tiwari (2015, Jan-Feb), *Characterization & Geotechnical Properties of Municipal Waste*, IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE), e_ISSN:2278-1684-1684, P-ISSN:2320-334X, Volume 12, Issue 1 Ver.II, P15-21. Retrieved from <http://www.iosrjournals.org/iosr-jmce/papers/vol12-issue1/Version-2/C012121521.pdf>).

It is of critical importance to separate all kind of municipal waste based on their characteristics to handle or treat it. Failure to do so will put all the efforts of effective municipal solid waste management into vein. Some key technical considerations may include following enquiries;

1. How may operational integration and coherence of technical systems be achieved in spite of the diverse local collection needs, variety of actors and decision makers, and incremental development of facilities and equipment?
2. How can reliable estimates of the life-cycle costs of alternative equipment and facilities are obtained which take account of operating costs, maintenance requirements, down-time, etc.?
3. What system characteristics are required to facilitate private and community involvement in waste management?
4. What technical equipment and procedures are required for optimal separation of hazardous wastes at the source?
5. What constitutes an “appropriate” landfill design for low-income countries?

(Diploma in WASH, Module 4, Retrieved from <file:///C:/Users/sbalouch/Desktop/Diploma%20in%20WASH%20Module%204%20Notes.pdf>)

3. Outline the advantages and disadvantages of source separation of MSW

Advantages:

1. Mixed wastes from municipalities are often landfilled. Left to degrade naturally in landfill sites, organic wastes from households and municipalities have very high methane production potential thus have a negative impact on the environment (Teodorita al Seadi, Nia Owen, Hanna Hellstorm & Ho Kang (2013), IAE BIOENERGY, *Source Separation of MSW, An overview of the source separation and separate collection of the digestible*

fraction of household waste, and other simi wastes from municipalities, aimed to be used as feedback for anaerobic digestion in biogas plants. Retrieved from http://task37.ieabioenergy.com/files/daten-redaktion/download/Technical%20Brochures/source_separation_web.pdf)

2. Organic waste can be used for potential soil enriching nutrients
3. Trade and recycling of inorganic wastes, economic potential
4. Minimizing the hazards from chemical and toxic waste
5. Separation of organic waste which is suitable for anaerobic digestion (AD) to generate bio-gas. Wood and other lignin containing waste materials are typical examples of organic wastes that are not suitable for AD
6. Separating waste at the source directly supports material recovery by producing a more homogenous and higher value stream which is easier to recover. Conversely, *contaminated* or mixed waste streams have lower value because they are more difficult, and thus, costlier, to separate (WASTE AUTHORITY (2014, Jan), *Source Separation of Waste*, Position Statement. Retrieved from https://www.wasteauthority.wa.gov.au/media/files/documents/Source_Separation_of_Waste_2014.pdf)

Disadvantages:

1. May lead to occupational hazards if not dealt properly
2. Involves cost to source separate and treat the source separated solid waste (requires technology, human power and maintenance and operation cost)
3. Mixed Waste pose more environmental hazardous (can mix with water and soil)

4. Discuss the challenges faced in disease surveillance.

Public health surveillance is 'the on-going, systematic collection, analysis, interpretation and dissemination of health data (disease occurrence and disease potential) to help guide efficient and effective public health decision making and action' (Buehler et al. 2004). Surveillance

forms the backbone of the health care system and is an essential indicator of the performance of service provision. Several challenges are in place to the surveillance system

1. Individual country capabilities to conduct surveillance vary and range from good to practically none (Nsubuga et al. 2010b)
2. The majority of the surveillance efforts in low- and middle-income countries (where most disease-specific challenges emerge) are limited to humans, when over 60% of the emerging diseases detected between 1940 and 2004 were caused by zoonotic pathogens (Jones et al. 2008)
3. Surveillance systems in low- and middle-income countries tend to adopt passive approaches to conducting regular surveillance. Given the limited resources, this may be pragmatic, but a lack of co-ordination between the national and sub-national levels often delays both case and outbreak detection, defeating the very purpose of conducting regular surveillance (Todd 2006).
4. Other unresolved issues in the surveillance efforts in low- and middle-income countries include weak health infrastructures; use of obsolete methods and concepts to operate surveillance systems; dearth of human, technical and financial resources; alongside unco-ordinated policies at different levels of the systems (Hitchcock et al. 2007).

(Revatki K Phalky, Shelby Yamamoto, Pardip Awate & Michael Marx (2013, Dec), *challenges with the Implementation of an Integrated Disease Surveillance and Response System: systematic review of the lessons learned*, Oxford Academic, Health Policy & Planning: The Journal on Health Policy & Systems Research. Retrieved from: <https://academic.oup.com/heapol/article/30/1/131/564023>)

5. Explain 5 diseases that can be prevented by observing proper sanitation.

The purpose of WASH interventions is to improve the health of a population through putting efforts to reduce the risk of transmission of infection. All WASH related infections can have either direct or indirect transmission routes.

‘A pathogen with direct transmission route can infect a susceptible person or animal immediately after leaving the host. The pathogen does not need to develop in the environment, in an intermediate host, or in a vector. In faecal pathogens these are the non-latent infectious agents.

5 preventable diseases with improved sanitation practices

- 1. Schistosomiasis.** After excretion, the pathogen infects a freshwater snail, in which it develops and multiplies. The snail releases the pathogens into the water, and people are infected when these pathogens penetrate skin which is in direct contact with infected freshwater.
- 2. Leptospirosis:** The main reservoir of leptospirosis is normally rats, though many other animals can potentially transmit the infection. The pathogen leaves the animal host through urine. People are usually infected through direct skin contact with water, moist soil, or vegetation contaminated with urine from infected animals. Other ways of transmission are direct contact with body tissues of infected animals or ingesting food contaminated with urine. Transmission from person to person is rare
- 3. Soil-transmitted helminths:** These worms leave the body through faeces as eggs or larvae. After excretion, they have to develop in soil. They can be further divided based on how the pathogen enters the human body.
- 4. Beef/pig tapeworm infection:** The pathogens leave the person through faeces. The excreted eggs then have to be ingested by either cattle or pigs. Once the pathogen is

ingested by the animal, it will develop in the body of the cow or pig. The infections are food-borne and people become infected when they eat undercooked beef or pork containing the pathogen. People are the only hosts to the infection. A dangerous complication called cysticercosis is possible when people ingest the eggs of the pig tapeworm. The pathogen will form cysts throughout the person 's body. Transmission of this infection is like faecal-oral infections.

5. **Guinea-worm:** In this infection the pathogen, a large worm, creates a blister on the person 's skin, which erupts when it comes into contact with water, releasing the worm 's larvae. These larvae then infect a copepod (Cyclops), in which it develops. The disease is water-borne. People become infected by drinking water containing Cyclops, and is the only host to this infection.

References

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