

**Course: Post Graduate Diploma in Water, Sanitation and Hygiene Promotion - Assignment number 6**

**Student Number: AIPMS/122/2018**

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1. Explain four examples of potential benefits and four examples of possible drawbacks from public–private partnerships in urban sanitation and waste management.
2. Briefly describe the main activities needed for planning improvements in sanitation and waste management in local institutions.
3. Composting is an example of waste recycling but it could also be described as an example of recovery from waste. Explain why this statement is true.
4. Imagine there is a local NGO working in the town you are assigned to that wants to develop a school WASH programme. While preparing the project documents, the delegates of the local NGO come to your office and ask you to support them. Describe the minimum requirements that you will advise them to include in the sanitation and hygiene part of their programme.
5. Giving examples explain three examples of ways of encouraging or supporting an ISWM approach
6. **Explain four examples of potential benefits and four examples of possible drawbacks from public–private partnerships in urban sanitation and waste management.**

**I Introduction**

One of the basic services that are currently receiving wide attention in the urban agenda of many developing countries is solid waste management (SWM) where new regulations and policies have been issued, urban infrastructure has been improved, commercialization and cooperation have been encouraged, and a framework for structuring the variety of approaches initiated. Considering these developments, an overview is necessary to analyze the current state as well as new opportunities and challenges regarding MSWM in developing countries with view to identify the suitable system and practices of SWM for developing countries.

**II. Background**

Solid waste management has been and will continue to be a major issue facing countries worldwide. There is increasing waste generation rates due to population growth, changing lifestyles of people, development and consumption of products with materials that are less bio degradable have led to the diverse challenges for MSWM in various cities of the world. This is because urbanization, rapid industrialization and rapid economic growth in these countries that has resulted in large increases in refuse output resulting in rapid depletion of landfill and poor performance of waste disposal systems that are used in these countries. Meanwhile, with limited resources, only basic technologies for treatment and disposal, and deficient enforcement of relevant regulations, serious problems remain for SWM in developing countries, especially in regard to safe disposal and recycling of MSW (ISWA and UNEP, 2002).Furthermore, this has been compounded by inappropriate waste handling, storage, collection and disposal practices pose environmental and public health risks. In densely populated urban centres for example, appropriate and safe solid waste management (SWM) is of utmost importance to create a healthy environment for the population (Madinah, 2016).

**III. Definition of Public – Private Partnership (PPP)**

Public – Private Partnership (PPP) is a tool of governance. All over the world many countries use this governance method to manage waste especially in the cities (Muneera, 2012).

New Public Management (NPM) and Governance New public management (NPM) can be define “as a body of managerial thought or as an ideological thought system based on ideas generated in the private sector and imported into the public sector” (Larbi, 1999, p.12). In general, public services are carried out by private sectors with structural, organizational and managerial changes. Palmer (2009) argues that NPM focuses on the management of public services carried out by the private sector with management changes. In this point of view, it is easy to link this to governance and PPP. The term PPP is simply defined as a tool of governance or management (Hodge and Greve 2005). Massoud & El-Fadel (2002) defined PPPs “as the transfer and control of a good or a service currently provided by the public sector, either in whole or in part, to the private sector”. Researchers noted that PPP is difficult to define because the term ‘PPPs’ is a broad term and includes many forms of partnerships. Most of the definitions reveal PPP as a co-operative scheme between the public and private sectors (Akintoye, Beck & Hardcastle, 2003). Jon Pierre (1997, p.31) has noted that “partnership obviously involves two or more actors, at least one of which is public”. Literature on definitions of PPP show there are some special features which includes (Muneera, 2012);

1. Partnership involves both public and private actors.

2. All participants are most important in a PPP.

3. There should be good relationships between actors.

4. In a PPP each of the participants brings something to the partnership.

5. Partnerships mean there is some responsibility for both sectors in outcomes or activities (Peters, 1998).

According to Klijn and Teisman (2000), PPP is an ambitious governance arrangement, which falls within the context of the intense changes in the role of the state (in Sedjari, 2004). Governance can be define as, “governance concerns performance of the government, including public and private sectors, global and local arrangements, formal structures, informal norms and practices, and spontaneous and intentional system of control” (Roy, 2006, p.5). Good governance is important to carry out public services with changes. UNCE (2008) argues that without good governance it is difficult to guaranteed the ‘effectiveness’ and ‘quality’ of public services. In economical viewpoint good governance in PPP should be effective (able to buy and deliver services in high quality with lower prices). Also PPP is a motivated governance arrangement and always fall into the intense changes the role of the state is currently experiencing (Klijn & Teisman, 2003). In general PPP is normally known as long term cooperative institutional arrangements between public and private sectors to achieve various purposes (Hodge and Greve 2005).

NPM basically discussed fundamental changes to the power relationships between the main players in the system of government and requires significant attitudinal changes on the part of bureaucrats (Samaratunge & Bennington, 2002). NPM tries to ensure better governance with less cost (UNCE, 2008). To deliver services in low cost, NPM emphasizes public managers roles’ in providing high quality services, identifies the importance of providing the human and technological resources which they need to achieve their goals (Samaratunge & Bennington, 2002). However without good governance it is very difficult to achieve goals. NPM theory states that, even if public services are delivered by the private sector, still government has a responsibility to guide them in addressing public issues (Miller & Dunn, no date). Normally public sectors have more responsibility to deliver public services to the citizens. Accordingly, the goal of the public sector, it is to deliver their services to the people. So NPM says public agencies should guide the private sector to achieve their goals (Ibid). However policies related to PPP are important to achieve the goals. Some governments carry out PPPs without PPP policies which create some problems in governance such as ill defined goals (UNECE, 2008). Studies show that it is very difficult to implement the PPP in many countries. The most important reason for this is, to deliver the PPP projects they have to improve institutions, processes and procedures (UNECE, 2008). If the countries do not build good governance in the PPP project, they may fail in their projects (Muneera, 2012).

It is important to share the resources when public or private sectors face problems or shortages in their resources. NPM theory says agencies can share their resources when they need (Miller & Dunn, no date). Even in PPP there are two most important aspects. First, PPP is cooperation between organizations and second aspect is sharing risks (Hodge and Greve 2005). Risk sharing is viewed as an important incentive for both the public and private sectors, since it is assumed that risk-sharing could benefit both actors (Ibid).

Important matter in service delivery is decision making. If the decision is taken by high level managers who are not familiar with the problem, that decision cannot be implemented or when they try to implement they will face some practical problems that people may not like or it may not be a suitable decision to solve the problem. NPM explain that it is important to increase the number of people or institutions in the decision making process (Miller & Dunn, no date). The local community is a very important participant in the decision making process because the people decide how the service should be delivered. When making decisions it is better to involve the actors who are affected by the problem for example in SWM, local authorities, environmental ministries and most importantly households. Therefore when taking decisions it is better to inform and/or not only the high level managers who work in the environmental office but also staff working in the local authorities and householders. Participation means all actors should take active part to manage the problem. Without enough participation it is difficult to handle the project successfully. Meantime UNECE (2008) set up good governance principles in PPP and it focuses on policy, capacity-building, legal framework, risk-sharing, procurement and put people and the environment first (Muneera, 2012).

UNECE (2008) states that there are some terms used in explaining partnership agreements. These include the following, Buy-Build-Operate (BBO), Build-Own-Operate (BOO), BuildOwn-Operate-Transfer (BOOT), Build-Operate-Transfer (BOT), Build-Lease-OperateTransfer (BLOT), Design-Build-Finance-Operate (DBFO), Finance Only, Operation & Maintenance Contract (O & M), Design-Build (DB) and Operation License (See annex 1 for more details). Some writers state these are the model of PPP. BOT and BOOT are the most common models in SWM but DBFO also emerge (Department of Economic Affairs, India, 2009). Under BOT contract, the private sector design, finances and constructs a new facility under long-term contract. During the term the private sector operates the facility after that ownership is again transferred to public sector (UNECE, 2008). BOOT means the government gives a permit to a private partner to finance, design, build and operate a facility for a specific period of time. At the end of the contract period the private sector transfers the ownership to the public sector (Ibid). In SWM, DBOFT model explains the private sector designs, finances and constructs a new facility under a long-term lease, and operates the facility during the leasing term. At the end of the lease term, the private partner transfers the new facility to the public sector (UNECE, 2008).

PPP is more related to New Public Management (NPM). NPM emphasizes more specific implementation approaches (Ewalt, 2001). Also NPM discusses particular types of management (Ibid). This means it talks about how to deliver public services with private sector cooperation (Muneera, 2012).

**IV. Arguments of PPP in SWM in developing countries**

In developing nations, PPP help to improve SWM services in several ways. These can be explained under sub headings:

**Finding 1:** Reduce the management cost

In general, developing nations allocate small budget for SWM and with this budget they can serve less than 50 percent of the urban dwellers. PPP help to reduce pressure on local government budget by investing private finance. Researchers noted that private participation saves between 30 to 50 percent of the local government budget (Zachary, 1996; Kamieniecki et al., 1999; Awortwi, 2004). PPP is an approach which reduces the cost of waste management and improves quality of service (Massoud et al, 2003). For example, in Indian studies about SWM revealed that PPP reduce the cost of waste management in Mumbai (Muneera, 2012).

Studies show that, after involvement of the private sector in SWM, the cost per ton of waste management decreased. For example in Mumbai, India cost per ton of waste management is Rs. 1797 (US$41) with PPP and its estimated cost per ton of waste management increased to Rs. 1908 (US$44) when only Municipal Corporation of Greater Mumbai (MCGM) managed the waste (Rathi, 2006). Rathi (2006) further states that MSW is managed successfully in Mumbai by several private sectors such as by Excel Industry (Rathi, 2006).

Private sector involvement helped to reduce the service costs by half in Latin American cities with higher labor and vehicle productivity (Levine & Coad, 2010). Moreover, there are several private sector organizations engaged in MSWM in Malaysia. Studies about Malaysia SWM show that the cost of services reduced by around 23 percent after the incorporation of the private sector (Levine & Coad, 2010).

**Finding 2: Improve the services and getting more benefits**

PPP helps to improve the service and try to get more benefits from the waste. Most of the time the private sector try to make compost from the garbage for sale to generate income while municipalities just preoccupy themselves with open dumping. Figure 3 shows benefits gained by Municipal Corporation of Greater Mumbai (MCGM) and private sector. Figure 3 undoubtedly reveals that the private sector gets more benefits from the waste. If the Municipal Government (MG) or private sector get more benefits from waste ( making compost or sanitary landfills), it helps to protect the environment as well as people’s health (Muneera, 2012).

**Finding 3: PPP helps to collect more waste**

After cooperation with the private sector, municipalities are able to collect more waste than before because the private sector invests more money and acquire improved technologies. For example, in Sri Lanka, Colombo Municipal Corporation (CMC) has cooperated with the Burns Environmental Technologies (Pvt.) Limited (BETL) for two sanitary districts and engaged with Abans Environmental Services (AES) to collect half of the waste in the city. CMC signed a contract with BETL for processing and final disposal for a period of 25 years. BETL is functioning with the modern composting plant and they manage approximately 800-900 tons of waste daily (Visvanathan & Tränkler, 2003 cited in NRI-Sri Lanka, 2003).

In Colombo, Sri Lanka, due to private sector participation in urban solid waste management (USWM), in 2000, 45 percent of the waste was removed by the public sector and 55 percent of the waste was removed by the private sector. Meantime, service areas have increased. However, studies reveal that before municipal or private (formal) sector engaged in household waste collection, the informal sector was involved in household waste collection. This means that waste collectors or buyers buy some reusable or recyclable things such as cardboard, paper, plastics, glass bottles from householders to get money. Normally women (mother and daughter) are the ones interested in selling such things to the buyers. Waste buyers go house to house to collect such waste. So researchers noted that, in overall waste management process, the informal waste collectors and recyclers plays an important role. But total the amount of waste collected by informal sector is unknown (Muneera, 2012).

In some countries, PPP help to fill the service delivery gaps availing more labor and vehicles. For example, in 1991 in the city of Dar es Salaam, Tanzania produced 1,400 tons of SW daily but the municipality was only able to collect 5 percent of the garbage, but after collaboration with the private sector, especially in 2005 and 2006 while the amount of waste generated increased to around 2,500 tons per day, the municipality managed to collect 48 percentage of the total waste. This study reveals that Tanzania’s waste management ability increased with the involvement of private companies in waste management (Kassim & Ali, 2006).

In general most of the time, municipalities cover only CBD (Central Business District). Researches show that PPP in SWM increase service coverage area in several cities. For example, in Accra, Ghana after involvement of the private sector approximately 25 percent of the collection increase was as a result of an increase in the coverage area (Ababio, 2010).

**Finding 4: Waste management methods mechanized**

Most of the municipalities are struggling to manage SW due to lack of equipment or machineries. Moreover, in many developing nations SWM is still totally a manual process. Due to these problems municipalities cannot collect the waste properly. If the process are manual, the management of SW takes too much time for (such as in collection and transportation). PPP help to mechanize the waste management process and increase the amount of waste removal. For example, Chennai and Mumbai which are main cities in India started the privatization of MSW collection several years ago. In 1999, after the Chennai Corporation issued a global tender for privatization of MSW in some regions, a French multinational, CES-ONYX company was given the waste removal contract for seven year period. Under this contract around 1,000 tons of waste is removed per day in Chennai and waste removable process is mechanized (Visvanathan & Tränkler, 2003 cited in NRI-India, 2003).

**Finding 5: Increase public awareness and participation**

Lack of environmental ethics and awareness would lead to unsuccessful implementation of the SWM plans (Visvanathan and Trankler (2003). So awareness about the problem or project is important for successful plans. In Bangladesh, waste management processes are successfully run by NGOs and CBOs in some parts of the country. In Bangladesh, one of the NGOs is involved in waste management with the help of UNDP and Lions Club in 1995. This NGO started public awareness programmes for waste separation. These awareness programmes increased the amount of waste collection by 2 tons per day. The number of householders’ participation also increased due to awareness programmes and the NGO gets small amounts of money from the residents for door-to-door collection (UNEP, 2009).

In Sri Lanka, Seth Sevana (NGO) carried out some awareness programmes in Moratuwa area. Seth Sevana encouraged 1,280 families in Moratuwa area to separate the waste at source. Due to this separation the NGO was able to establish small scale composting units and biogas generation, recycling of paper, and sharing of information within the network for the benefit of the community. For this project they get funds from Community Environmental Initiatives Facility (CEIF) (Visvanathan & Trankler, 2003).

**Finding 6: Increase the efficiency PPP in SWM increase the efficiency.**

It helps to save time and energy because the private sector has some technologies and equipment. For example, the SWM study in Nairobi shows that the Kenya Refuse Handlers Limited (KRHL), Domestic Refuse Disposal Services Limited (DRDSL), and Bins (Kenya) Limited have been licensed to clean the CBD and some residential areas especially in upper class residential areas. After involvement of these private companies MSW collection and disposal services worked more successfully and as result have enhanced the efficiency (Henry et al, 2006).

**Finding 7: More investment**

The public sector face problems of budget constraints to provide WM services. Even if they collect taxes from the people, still that money is not enough to provide good services. The private sector has the ability to invest more funds. This helps municipalities to improve service delivery to the people. Moreover, the private sector brings in new ideas, technologies and skills which help to improve the SWM services (The World Bank, 2011). Normally the private sector make of these investments with the view of getting a return on their investment. Due to this they get new ideas and new technologies even from other countries. Sometimes they try out technologies from other countries. The private sector can manage to invest in technologies, new ideas etcetera (Muneera, 2012).

**Finding 8: Make decision fast**

Generally poor coordination and delays in decision making causes delays in service delivery. Municipalities in developing countries usually face these problems. Commonly studies have revealed that the public sector take much more time to make decisions because permission has to be sought from managers who are working in the main office or central municipality or central government. But the private sector can quickly make decisions; they have the ability to manage the problem well and control costs and is creative in planning, approach and technologies (Muneera, 2012).

**Finding 9: Helps to protect the environment**

It is important to note that recycling and reusing things helps to protect the environment and ensure human health. Anyhow due to partnership with the government agencies either directly or indirectly the private sector has to work under public goals (Miller & Dunn, no date). The private sector’s recycling and reuse activities help to achieve public sector goals as well that is, the protection of public health and the environment are very important goals for the LGs (Muneera, 2012).

If countries collect the waste properly and if they reduce the amount of waste using technologies, this could certainly lead to improvements the protection of the environment. “The private sector can help to improved environmental protection by dedicating highly skilled personnel to ensure efficient operation and compliance with environmental requirements” (Ramanadham, 1991). Massoud et al (2003) state that in Greater Beirut Area (GBA), Lebanon PPP in SWM undoubtedly enhance the protection of environment (Muneera, 2012).

Risk sharing is viewed as an important incentive for both the public and private sectors, since it is assumed that risk-sharing could benefit both actors. The third prospect is that these types of cooperation can result in some new and better products or services that no single organization either the public or the private could produce better alone. Finally, it has been noted that in a PPP a partnership involves a longer term commitment which can continue for a number of years, such as 10 to 30 years (Khanom, 2010).

**V. Reasons for the failure of PPP in SWM in Developing Nations**

Most of the time the involvement of the private sector in SWM enhance the SWM services. However, the failure of PPP in developing countries is attributed to poor conditions (laws, lack of public participation etc). So it is important to look at why PPP in SWM fail in some developing nations (Muneera, 2012).

Public-private partnership can be the solution to the problems of coverage and inefficiency in SWM. Bennett (1998) argues that public-private participation is a good solution to the management of the environment. Some of the reasons for this may be public-private partnership give benefits to both the public and the private sectors in terms of dynamism, finance, knowledge of technologies, managerial efficiency, and entrepreneurial spirit combined with the social responsibility, environmental awareness, local knowledge and job generation concerns of the public sector (Ahmed & Ali, 2004). However, PPP need certain conditions to deliver services successfully. Without some of these important conditions (such as trusted environment, time, flexibility and legal acceptance) it is difficult to handle waste successfully. Sometimes PPP end negatively. Many reasons lead to this negative end (Muneera, 2012).

**Finding 1: The political culture of the country (interest of political parties)** or political will, bureaucracy and/or legal and institutional framework to build PPP are also determined to ensure the effectiveness of PPP (CBI, 2007). Bureaucracy is the main managerial support of the government to convert the policy into reality (Khanom, 2010). If some politician parties are not interested in PPP or if the countries’ laws do not encourage the PPP, then it is very difficult to achieve the private sector goals (Muneera, 2012).

**Finding 2: Some legal acceptance or trusted environment is needed to achieve the PPP goal**s (Ahmed & Ali, 2004, cited in Kolzow, 1994). Legal barriers such as rejecting to take legal action when need arises causes problems in PPP. For this flexibility is important. In Dar es salam, Tanzania government started SW collection services with only one contractor (Multinet Africa Company Limited). After few years the government registered more improvement in SW collection. To achieve this improvement the government took up certain responsibilities. This means that the Dar es salam city council started charging the SW generators an amount approved by the Dar es salam city council. In this case the municipalities charges their own amount determined by laws and this charge was arrived at after taking into account the city residents’ income level. Studies showed it was impossible to manage the waste successfully without this charge (Halla & Majani, 1999b).

**Finding 3: The private sector needs more money to handle waste.** When the private sector handles the waste, the people are more willing to pay for a good environment. However, MSW management is the responsibility of every inhabitant and waste is an unavoidable product from human activities. So if people need a good environment and healthy life they are willing to pay for SWM. For instance, in Nairobi, 47 percent of the city dwellers pay US$ 1.25 per month for good waste management services (Henry, 2006). But if people do not cooperate with the public sector then it is very difficult to manage the garbage well and the private sector cannot ensure the clean environment (Muneera, 2012).

**Finding 4: People’s participation is very important for better SWM**, most of the people in developing countries are not well educated and they are not aware about issues related to SW. In general most of them do not cooperate with the private sector to manage waste. Rathi (2006) states that those people in the communities who do not participate create problems for CBOs and NGOs. Kassim & Ali (2006) noted that people’s participation, awareness of the problem and satisfaction level of the service has an influence on service delivery. If there more non-participants in the society, managing waste becomes very difficult (Muneera, 2012).

**Finding 5: The private sector always tries to improve the services and get more profits.** So they try to find skilled labor for service delivery. But unfortunately many unskilled labors are engaged in SWM in developing world. So it has been found that private sector participation in SWM can decrease unemployment in the sector (Schübeler, 1996). Commonly it is known that skilled labor can work better than unskilled workers. However, to reduce the number of jobs negatively affects the people (Muneera, 2012).

**Findind 6: The projects must be carried out under good monitoring systems**. Otherwise it may lead to wrong way of doing things or utter failure of the projects. Ramamurthi (1999) states that PPP can produce good results in delivering public services but it is difficult to achieve good result without good monitoring and evaluation (Muneera, 2012).

**Finding 7: Competition, transparency and responsibility** are very important for efficiency and cost reduction of SWM (Massoud et al, 2003). If the private sector does not take more responsibility in the project, or if there is no competition and transparency, the private sector cannot run the project well. So it cannot be said that always PPP run successfully in all countries (Muneera, 2012).

**Finding 8: Weakness in laws and regulations** (it is commonly said that laws and regulations are weak in developing world) and inability to handle the problem is also one of the major issues to PPP (Ahmed & Ali, 2004). However, good monitoring practices should help to achieve the PPP goals. So at present it is accepted that PPP is one of the important approaches to deliver public services and it is appreciated by international, national and community level (Muneera, 2012).

**Finding 9: Due to careless or irresponsibility some opportunities become wasted in developing nations**. Commonly some donor agencies help developing nations to handle such problems. In general governments or municipalities in developing nations do not know how to get benefits from the earmarked money. For instance, in Sri Lanka in 1998, World Bank funded SWM Project. This project was to design and construct a fully engineered sanitary landfill and a 100 tonne per day pilot composting plant. This facility was designed to treat and dispose 1200 tonnes of waste per day. The land for the project was selected. An Environmental Impact Assessment was also carried out for the project and it also approved by the Central Environmental Authority. However, due to lack of political support the project was cancelled. Anyhow, the sanitary landfill which was to have been operational by 1999 never got underway. So the World Bank loan of US $ 12 million which was given for the construction of the sanitary landfill was withdrawn. Apparently this was the second time that a World Bank fund for solid waste management project for the Colombo area was cancelled (State of the environment, 2001).

1. **Briefly describe the main activities needed for planning improvements in sanitation and waste management in local institutions.**

To make improvements to the sanitation and waste management situation in any of the institutions requires careful planning. If you were involved in a scheme to make improvements to institutions, there are a number of planning activities that should be done in a stepwise manner. Some of the key activities are brieﬂy described below (Open University, 2018).

***Know the scope of your activity***

This requires the identification of institutions by type and number in your working area.

***Identify existing WASH-related problems***

A survey to assess the conditions and gather data on any existing problems should be undertaken. This is similar to the assessments you learned about in Study Session 3. It will provide baseline data that is useful for analysing any problems and setting priorities based on the local situation. An example checklist for a school is shown in Table 12.1 (Open University, 2018).

***Table 12.1 School safety form.***

|  |  |  |
| --- | --- | --- |
| No. | Question | Response |
| 1**.0   *General information*** | | |
| 1.1 | Date of inspection |  |
| 1.2 | Name of the institution |  |
| 1.3 | Number of students by sex | Male/female |
| 1.4 | Address |  |
| 1.5 | Ownership | Private/public |
| 1.6 | Level of school | 1st cycle/2nd cycle |
| **2.0   *School compound*** | | |
| 2.1 | Location of school, hazards such as noise, proximity to road |  |
| 2.2 | Compound sanitation: free from solid waste, flowing liquid waste | Yes/no – indicate the subject |
| **3.0   *Classroom*** | | |
| 3.1 | Window | Adequate/inadequate |
| 3.2 | Ventilation | Adequate/inadequate |
| 3.3 | Lighting | Adequate/inadequate |
| 3.4 | Condition of classroom and its floor |  |
| **4.0   *Water supply*** | | |
| 4.1 | Is water available in the school compound? | Yes/no |
| 4.2 | Source | Piped/well/spring/river/other |
| 4.3 | Supply of drinking water and handwashing facilities | Yes/no |
| 4.4 | Number of water taps |  |
| 4.5 | Cleanliness around the water point | Yes/no |
| **5.0   *Latrine provision*** | | |
| 5.1 | Is latrine available in the school compound? | Yes/no |
| 5.2 | Type of latrine | Pit latrine/VIP/other |
| 5.3 | Floor of latrine (washable slab) | Concrete slab/earth |
| 5.4 | Latrine available for: | Students/teachers |
| 5.5 | Separate latrines for male and female students | Yes/no |
| 5.6 | Latrine superstructure | Yes/no |
| 5.7 | Excreta seen around the latrine | Yes/no |
| 5.8 | Excreta inside the latrine | Yes/no |
| 5.9 | Can a student use the latrine in its current condition? | Yes/no |
| 5.10 | Doors that lock from the inside, not the outside | Yes/no |
| 5.11 | Number of latrine holes |  |
| 5.12 | Access to disabled children | Yes/no |
| 5.13 | Access to menstrual hygiene management | Yes/no |
| **6.0   *Solid waste management*** | | |
| 6.1 | Is there a refuse container in the compound? | Yes/no |
| 6.2 | Is there a refuse container in each classroom? | Yes/no |
| 6.3 | Is there a burial pit for refuse? | Yes/no |
| 6.4 | Is there an incinerator? | Yes/no |
| 6.5 | Is waste collected for disposal by a contractor? | Yes/no |
| **7.0   *Students’ personal hygiene (observe a few students)*** | | |
| 7.1 | Clothing | Intact/torn/clean/unclean |
| 7.2 | Hair | Clean/unclean |
| 7.3 | Face | Clean/unclean |
| 7.4 | Nits | Yes/no |
| 7.5 | Feet | Clean/unclean |
| 7.6 | Fingernails | Clean/unclean |
| 7.7 | Eyes | Clean/unclean |
| 7.8 | Lice | Yes/no |
| 7.9 | Teeth | Clean/unclean |
| 7.10 | Scabies | Yes/no |
| **8.0   *Handwashing facility*** | | |
| 8.1 | Basin |  |
| 8.2 | Source of running water for rinsing (tap, jug) | Tap/jug |
| 8.3 | Soap or ash | Yes/no |
| 8.4 | Soak pit to avoid standing water | Yes/no |
| **9.0   *Summary of main findings*** | | |
| **10.0  *Suggestions*** | | |

***Identify partners that you can work with***

It is useful to identify partners in order to work together and bring improvements from mutual efforts. Depending on the type of institution, partners are likely to be government offices such as the kebele administration, health office, education office, water utility, school administration, school parents’ committees, school WASH clubs, traditional leaders or police and court desks. It is also important to include authorities of religious and other local institutions/organisations (Open University, 2018).

***Identify and prioritise activities***

In collaboration with partners and in consultation with potential beneficiaries, proposed activities can be identified and then plans developed. There will need to be careful assessment of the resources required. Improving sanitation, waste management and hygiene so that they meet recommended requirements is challenging. For example, if a school has no latrine and the school head is advised to install latrines for students, they cannot do it immediately. They need time and a budget (Open University, 2018).

If for example the school has latrines but they are in poor condition (Figure 12.5) then improvements can be made more easily and require fewer resources. Other activities that may not require many resources include establishing WASH clubs, hygiene education for students, and periodically conducting personal hygiene inspections (Open University, 2018).



*Figure 12.5 A dirty school latrine cubicle and wash basin with a tap that is obviously not used.*

What improvements would you suggest for the school facilities shown in Figure 12.5?

The priorities would be to:

* introduce a daily cleaning schedule to keep cubicles and the surrounding area clean
* fit doors to the cubicles for privacy
* provide water in a by the basin jerrycan if piped water supply is not possible
* provide soap (Open University, 2018).

Design the plan of action

This will depend on the number and type of institution. The plan should indicate the list of activities, the timescale for implementation, the frequency for regular events like inspections, and who is responsible. It should also include appropriate follow-up activities after improvements have been made (Open University, 2018).

**Regular inspection and monitoring of facilities**

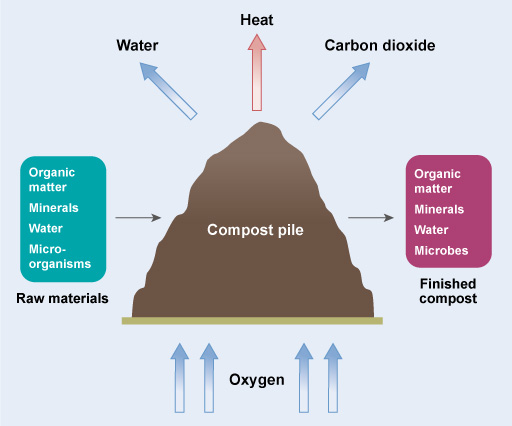
Inspection is a tool to identify problems, to design strategies for improvement and to monitor behaviour and the impacts of interventions. Regular visits are needed to each local public institution, at least once a year, using a checklist or a questionnaire that enables you to collect data on sanitation and waste management, similar to the checklist for schools in Table 12.1. If you are taking part in an inspection, you should inform the owners or people responsible for the institution that you want to visit them at a speciﬁed date and time. It is important to be transparent and genuine when inspecting to show that you want to help the institution to attain proper hygiene and not to criticise or penalise them. You should give advice to the owners for improvement. If you do find any violations of sanitary requirements that require enforcement, these should be reported to the kebele administrator (Open University, 2018).

**3. Composting is an example of waste recycling but it could also be described as an example of recovery from waste. Explain why this statement is true.**

**Introduction**

Composting is the process where biodegradable organic wastes (food and garden waste) are converted into compost in a natural biological process. Composting can be done by individual householders and community groups or on a commercial scale. On the larger scale, the waste from an entire town or city could be composted if sufficient land, labour and equipment is available. The benefits of composting are not only the reduction of waste, but also the production of compost which is a valuable soil improver. Soils treated with compost are better able to withstand droughts and are more fertile because plant nutrients are returned to the soil, which reduces the need for manufactured fertilisers. It is possible to add a certain amount of animal manure to residential waste for composting, which may help with other waste problems in the community and adds to the amount of useful soil improver that is made (Open University, 2018).

As an urban WASH worker I may be required to help individuals or communities set up and operate composting processes (Figure 8.4). The stages in the composting process are outlined below (Open University, 2018).

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***Figure 8.4  The composting process.***

1. *Separation of compostable materials*: It is important to begin with an uncontaminated input to the process. Nearly all organic wastes can be composted, but if a composting pile attracts rodents and other scavenging animals it may be better to exclude meat products and cooked food from the process and just collect garden waste and raw vegetable waste (Open University, 2018).
2. *Grinding or shredding*: To speed up the composting process it may be necessary to shred the raw waste before placing it in the compost pile. Shredding is normally required if a significant proportion of the waste has particles greater than about 50 mm. On a domestic scale this can be achieved simply by cutting up the waste into smaller pieces (Open University, 2018).
3. *Blending or proportioning of materials*: Composting works best with the right mixture of wastes so that the moisture content and the proportions of the chemical elements carbon and nitrogen are suitable. Generally, the ideal mix for composting is three parts (buckets, for example) of ‘brown’ waste (such as leaves, hay, straw, eggshells, shredded paper, card and woody material), with one part ‘green’ material (such as grass, food waste and animal manure). ‘Brown’ waste contains a higher proportion of carbon and ‘green’ waste, contains more nitrogen and has a higher moisture content. Thus the ratio of brown waste to green waste is 3:1 (Open University, 2018).
4. *Composting*: Composting is normally carried out in a pile. For larger scale composting processes, piles are in the shape of long rows of waste, normally with a triangular cross-section (Figure 8.5). The ideal pile is 1.5–2 m wide and about 1.5 m high. The length of the pile is determined by the space and the amount of waste available. On the domestic scale the pile will be much smaller, forming a rounded heap. The pile can be built up as waste becomes available, but it is important to have enough material present to allow the biological processes to take place reasonably quickly, so as a guide a domestic compost heap should be at least 1 cubic metre to start the process (Open University, 2018).



*Figure 8.5  Composting process: mixed waste is piled in long rows.*

Composting is an aerobic process, so the pile needs to be turned regularly to introduce air. This means dismantling it, mixing the waste to introduce air and then rebuilding the pile. The first turning-over of the heap should be done after two to three weeks and then every three weeks or so. The composting process will be complete within three to six months. The composting process generates heat, so it is normal to see steam coming out of the pile (Open University, 2018).

The process is complete once the pile no longer heats up after mixing and rebuilding. The final product should be brown and crumbly and look like a good soil. If it still contains identifiable items, the process is not complete (Open University, 2018).

**Recycling and composting in Ethiopia**

It is very difficult to assess how much of Ethiopia’s waste is recycled or composted. As explained above, much of the nation’s recycling is done by the informal sector and so information about it never enters the official statistics. Percentage recycling rates cannot be estimated because the total amount of waste produced is unknown. Much of the waste is never collected and disposal sites do not weigh the waste that does arrive there. Bjerkli (2005) quoted government figures for Addis Ababa which suggested that about 15% of the city’s waste was recyclable, but that the recycling rate was about 5%. Around 60% could have been used in compost production, but only 5% was composted. However, these figures should be viewed with caution because they depend on the reported quantities of waste and, as noted above, it is very difficult to obtain accurate data. In addition, some reusable and recyclable wastes such as metal scraps, old clothes and shoes are not considered as wastes in the first place. The actual recycling rates, if these materials were taken into account, would probably be higher (Open University, 2018).

**Energy recovery**

The fourth option in the waste hierarchy is recovery.**Recovery** is about finding other uses for wastes that enable some value to be extracted or recovered from them, usually by using them as a source of energy (Open University, 2018).

Recovering energy from waste on a large scale using an advanced incineration plant is a high-technology, high-cost option that is common in many developed countries. However, it needs a highly developed infrastructure (a reliable source of waste, good roads, a reliable waste collection service, a power distribution grid, etc.) and large amounts of waste. This technology is currently rarely used in low- and middle-income countries, but as cities develop there is great potential for energy-from-waste in the future in Ethiopia and many other countries (Scarlat et al., 2015).

**Biogas production**

In Study Session 5 you learned about the production of biogas from excreta by anaerobic digestion using the biogas latrine. The same technology can be used to treat food waste on its own or in combination with human excreta or animal manure (Open University, 2018).

Biogas recovery from organic waste (Figure 8.6) can be done at the kebele or household scale, where the biogas can be used for cooking and heating water. The sludge from the digester can be used as a fertiliser and soil improver. Another benefit of biogas production is the reduced use of fuel wood, which improves living conditions by reducing indoor air pollution. Additionally, biogas contributes to the reduction of greenhouse gases. The use of biogas as a cooking fuel will mainly benefit women because it will reduce their overall workload by providing energy for the household without requiring labour-intensive fuel collection (Open University, 2018).

**[](http://www.open.edu/openlearncreate/mod/oucontent/view.php?id=80574&amp;printable=1&extra=thumbnail_idm5092976)**

*Figure 8.6 A biogas instructional poster from the Biogas Pilot Program (BPP).*

Biogas production needs more equipment than composting, so it is more expensive to install. It also requires greater expertise than composting to operate and the equipment must be maintained. Small-scale biogas is well established in China and India, but this method is still relatively uncommon in Ethiopia (Rajendran et al., 2012).

To conclude this study session and provide an example of the various ways in which waste can be used, Box 8.1 describes the IGNIS programme, based in Addis Ababa. This programme included several pilot projects using many of the waste management options that you have been reading about (Open University, 2018).

**Box 8.1  The IGNIS programme**

The overall aim of IGNIS is to help people to generate income by recovering value from waste. This has involved the development and implementation of novel technologies and working to improve the social status and health of waste workers. Funding was provided by the German Federal Ministry of Education and Research, and the programme was run by a number of German and Ethiopian governmental agencies, academic institutions and non-governmental organisations (NGOs).

Some of the IGNIS projects include:

* Setting up a house-to-house collection of compostable waste and training people to make compost and to use it to grow vegetables.
* Collecting and composting waste from street markets and employing former street children and sex workers to collect the waste, as well as to make and sell the compost.
* Using the compost to fertilise and improve soil on deforested slopes around Addis Ababa which are prone to erosion. The land can then be planted with crops and brought back into use.
* Addressing the health issues (malnutrition and back problems) of the korales.
* Encouraging small-scale paper recycling factories.
* Supporting a women’s group in recycling charcoal dust and reconstituting it to make fuel briquettes.
* Installing pilot biogas plants that use food and kitchen waste to produce biogas for cooking.
* Making gloves from scraps of leather and textile wastes.

(IGNIS, 2012)

The IGNIS projects demonstrate that considering waste as a resource has many environmental, economic and social benefits. They also show how integrating different approaches to waste management can maximise the benefits (Open University, 2018).

**4. Imagine there is a local NGO working in the town you are assigned to that wants to develop a school WASH programme. While preparing the project documents, the delegates of the local NGO come to your office and ask you to support them. Describe the minimum requirements that you will advise them to include in the sanitation and hygiene part of their programme.**

**Introduction**

Poor school sanitation and waste management create many problems:

* Many school children, teachers and school administration staff are exposed to increased health risks.
* The children’s ability to learn may be affected by helminth infections which impair their physical and cognitive development. Diarrhoeal diseases and helminth infections force many school children to be absent from school.
* Girls are likely to be affected by lack of adequate facilities for menstrual hygiene which can contribute to them missing days at school or even to drop out.
* If school latrines are not accessible to girls and boys with disabilities, they may not eat or drink all day to avoid needing the latrine (Open University, 2018).

Conversely good sanitation and waste management in schools means that:

* The children are more able to integrate hygiene promotion into their daily lives and can be effective messengers and agents for change in their families and the wider community.
* The proper behaviours that children learn at school are skills that they are likely to maintain as adults and pass on to their own children (Open University, 2018).

**Provision of improved latrines**

The provision of improved latrines with attached urinals in schools is extremely important. Many of the design requirements are similar to those for domestic latrines that you learned about in Study Session 5. For example, latrines must be located a safe distance from water sources. The government guidance for schools includes the following additional requirements:

There should be separate latrine blocks for boys and girls that are located away from each other in the school compound. They should be near enough to the classrooms to be convenient for use but not so close that odour is a problem. The location, design and construction must provide privacy and security. Hedges can be used as screens between girls’ and boys’ latrine blocks. Latrines for male and female teachers must be separated as well (Open University, 2018).

**Latrines must be easy to clean, well maintained and agreeable to use.**

The number of squat holes (cubicles) should be proportional to the number of students and take account of any future increase in school population. The recommended ratio is at least one cubicle per 100 students. All schools, regardless of size, should have a minimum of two cubicles for girls and two for boys. Using appropriately designed urinals for boys and men can reduce the total number of cubicles required (Open University, 2018).

Facilities should be designed to be appropriate for the size of children in the school. For example, for young children door handles and wash basins need to be lower.

Each latrine block should have one cubicle that is accessible to students with disabilities including those who use a wheelchair (Figure 12.1). This should have additional space inside, handrails, a raised seat and an access ramp.

Handwashing facilities must be provided for boys and girls.

**Handwashing facilities**

Handwashing facilities need to be constructed very close to all latrines and urinal blocks for use by students and teachers. The minimum requirement is a basin, a way to pour or run water over the hands, and soap. In urban Ethiopia, there are many models for handwashing stations: water taps with basins or troughs (Figure 12.2); buckets of water; and tippy taps (Figure 12.3). Remember that soap should always be available (Open University, 2018).

The greywater that results from the handwashing must be drained to a soak away pit or septic tank (or sewer, if available). If there is enough space, it is possible to use greywater in a school garden to irrigate the vegetables (Open University, 2018).



*Figure 12.2  New school latrine block with handwashing facilities.*

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***Figure 12.3  Tippy taps are easily and cheaply made from an old plastic container and the plastic tube from a used pen.***

**Menstrual hygiene management**

Menstrual hygiene management (MHM) is the management of monthly menstrual periods by women and adolescent girls using a clean material to absorb or collect menstrual blood. It is essential that this material can be changed in privacy and as often as necessary for the duration of the menstrual period. MHM includes using soap and water for washing the body as required and having access to facilities to dispose of or wash used menstrual pads and towels (Open University, 2018).

In Ethiopia, as in many parts of the developing world, MHM is one of the critical challenges facing adolescent schoolgirls. Poor facilities for MHM in most schools of Ethiopia has been shown to cause worry and humiliation, contribute to monthly absenteeism and lead to poor performance (Sommer et al, 2013).

The following facilities should be provided for adequate MHM provision in schools:

* girls’ latrines should be in a separate location from boys’ latrines
* individual cubicles should be fitted with doors that close properly
* disposal facilities should be available for used disposable MHM products and washing facilities for reusable products
* handwashing facilities and soap should be provided adjacent to the latrines
* school offices should have MHM products available for emergency use (Open University, 2018).

**Provision of solid waste management facilities**

Schools should practise the 3 Rs of waste management. Since a large proportion of schools’ waste is paper, it may be possible to collect the paper for recycling by the paper industries. Ideally, each classroom should have separate bins for the waste that is collected for recycling and for the non-recyclable waste. Children should be encouraged to keep the classrooms and other areas clean and take pride in a clean and hygienic school environment. There should also be bins in teachers’ rooms and the playground. It is helpful to encourage a culture in schools that makes dropping litter unacceptable and helps children to develop the habit of putting waste in a bin (Open University, 2018).

If the school has its own waste disposal pit, this should be in an isolated area and fenced off to prevent access by the children. The waste should be covered with soil after placing it in the pit to reduce scavenging by rodents and birds. There could also be chemical wastes from school laboratories. These should be stored separately in a secure location for collection and disposal (the kebele authority or possibly a local hospital may be able to collect this waste) (Open University, 2018).

1. **Giving examples explain three examples of ways of encouraging or supporting an ISWM approach**

Integrated solid waste management refers to the strategic approach to sustainable management of solid wastes covering all sources and all aspects, covering generation, segregation, transfer, sorting, treatment, recovery and disposal in an integrated manner, with an emphasis on maximizing resource use efficiency (United Nations Environmental Programme, 2012).

**Integrated Solid Waste Management**(ISWM) can be defined in many ways but it is probably best to think of it as a way of using a combination of waste management techniques to treat the different types of waste in ways that are environmentally, financially and socially sustainable. ISWM should be based on the waste hierarchy and focus on using the 3 Rs while finding a suitable way of dealing with the remaining waste. It also depends on collaboration among all the organisations and individuals involved in waste management (Open University, 2018).

Van de Klundert and Anschütz (2001) explain that the ISWM concept is built upon four basic principles:

* **Equity:**the allocation of resources, services and opportunity to all segments of the population according to their needs. In waste management this means thateveryone has a right to be served by a waste management system that protects their health and the environment. Pollution travels and doesn’t respect kebele or area boundaries, so if one area is neglected, a much larger area can suffer.
* **Effectiveness**:the waste management methods used must meet the overall aims of any waste plan and meet the needs of the people. At the very least, effectiveness means that all the waste is collected and disposed of in a safe way. Once this has been achieved, higher-level aims such as maximising waste recycling and composting should be addressed. Again, a scheme is only effective if it covers the whole of the kebele, city or district.
* **Efficiency**: in general, efficiency means increasing output for a given input, or minimising input for a given output. An efficient waste management system is one that is equal and effective while making the best use of the resources available (staff effort, use of equipment and cost).
* **Sustainability**: for a project, programme or other activity to be sustainable it must be effective and last a long time. To achieve sustainability social, environmental and economic factors must be considered. Sustainability of the waste management system can be achieved if it is appropriate to the local conditions and can continue in the long term by using the human, financial and material resources available in the area. It should also be environmentally sustainable in that it minimises the use of non-renewable natural resources (such as oil) and doesn’t lead to long-term environmental problems that will be left for later generations to address (Open University, 2018).

**Benefits of ISWM**

Cleaner and safe neighborhoods

Higher resource use efficiency

Resource augmentation

Savings in waste management costs due to reduced levels of final waste for disposal

Better business opportunities and economic growth Local ownership & responsibilities / participation (United Nations Environmental Programme, 2012).

**The advantages of ISWM**

Introducing ISWM means adopting all of the beneficial practices that have been described in previous study sessions and ensuring that they all work together effectively. It has a number of advantages for the different sectors of society. Here are some examples:

1. *Reduction and reuse at source*– reducing waste at the source and reusing wastes means that less waste has to be collected. This lowers costs for residents, businesses and the local authority. Also, the pollution generated in transporting the waste and at the disposal site is reduced. Waste reduction and reuse means that there is less pollution from manufacturing and a reduced need to import goods. Finally, society benefits because people have the use of items that they may not otherwise be able to afford.
2. *Waste separation at source* – many ISWM schemes require householders and businesses to separate reusable and recyclable materials from the rest of the waste and sort them by type (Figure 11.2). This helps to make people more aware of what they throw away and means that the material separated for recycling is of a higher quality and has a higher selling price. In alternative schemes, where recyclable materials are extracted from mixed wastes at the transfer station, there is a greater health risk to those who do this work and also to those who work in the recycling industry.

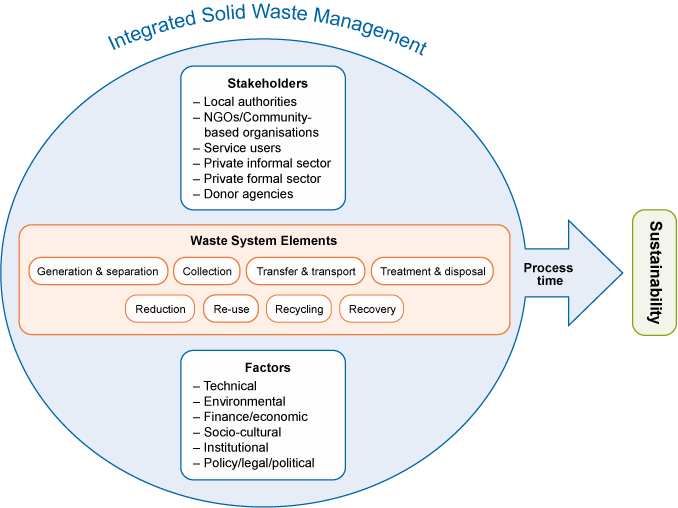


Figure 11.2 Separating wastes such as plastic bottles and containers at source increases opportunities to reuse or recycle.

1. *Recycling* – like reduction and reuse, recycling has benefits outside the waste management system. Recycling reduces the need to extract raw materials from the ground or to import them. Producing metals, glass and paper from waste materials rather than raw materials consumes far less energy. Also in common with reduction and reuse, recycling means less waste is sent to landfill, giving further reductions in pollution.
2. *Organic waste recovery* – composting organic waste is a form of recycling (see Study Session 9) and has similar benefits to other recycling processes. The amount of waste sent to landfill is reduced and the compost can be used locally to improve soils and the crops grown on them. Organic waste can also be used in anaerobic digesters to produce biogas for cooking and lighting (Open University, 2018).

**The components of ISWM**

An ISWM system is more than just the 3 Rs. It has three components: the waste system elements; the stakeholders; and the influencing factors. These three components are shown in Figure 11.3. The waste system elements are the stages in the waste management chain that have been discussed in previous study sessions. In ISWM, every stage in the chain should be guided by strategies to minimise the waste that reaches the disposal site, to protect the environment and where possible to generate income from waste. The stakeholders are the people and organisations involved and the influencing factors are other aspects that need to be considered when developing an ISWM system. Stakeholders and the influencing factors are described below (Open University, 2018).



*Figure 11.3  The integrated solid waste management model. (Adapted from Van de Klundert and Anschütz, 2001)*

**Encouraging ISWM**

In the previous sections, we have explained the many benefits that ISWM brings to a community. ISWM helps to safeguard public health, improve the environment and gives a better image to the city. Hence improving waste services is a priority for many stakeholders – the government, NGOs, health and environment ministries and city councils (Open University, 2018).

However, developing and implementing ISWM needs start-up capital and an on-going revenue scheme. It needs investment in equipment and in the training and development of skilled staff. ISWM also requires effort from all the stakeholders. Therefore, it is sometimes necessary to encourage people to develop and implement ISWM by providing incentives. These incentives may be financial benefits or the offer of some other sort of reward for adopting an ISWM approach (Open University, 2018).

It is at the local level where encouragement and incentives need to be provided. This is a task for national or local government and can take a number of forms. For example:

* National government could allow municipalities that perform well in terms of waste collection and treatment the flexibility to spend more of their budget on waste services if it can be shown to achieve savings in other areas.
* Where good practice in waste management has been demonstrated, special funds could be allocated to allow this practice to be extended within an area or replicated in other areas.
* Local authorities could reward best performing individuals, institutions or environment clubs through various mechanisms including media coverage and awards.
* Financial support could be given to environmental groups and small-scale private sector enterprises that engage in waste collection, composting and recycling. This support could be provided through the savings achieved by the municipality in its collection, transport and disposal costs (Open University, 2018).

Even when incentives are provided, attempts to improve the waste management system are not always successful as shown in the following case study. Read the case study and then answer the questions below (Open University, 2018).

**Reference**

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