Fecal Waste Management (FWM) in Moshi Municipality, Tanzania

Policies, regulations and guidelines

The Prime Minister's Office - Regional Administration and Local Government (PMO-RALG), as the leading body for Local Government Authorities (LGAs) with grassroots extensions, is responsible for Fecal Waste Management (FWM). The Local Government (Urban Authorities) Act defines the role of LGAs regarding excreta management (including safe disposal), whereas treatment of wastewater (WW) is set out as the responsibility of Moshi Urban Water Supply and Sanitation Authority (MUWASA). On the other hand, availability of a containment facility is laid out as a household responsibility in the Public Health Act (PHA). LGAs are additionally responsible for enforcement of the usage of proper sanitation technologies and of emptying methods, including regular latrine inspections by environmental health officers (EHOs) and handing out fines for full and unemptied latrines, illegal emptying and improper disposal of wastewater. However, liquid waste management is hardly included in the by-laws of LGAs, the focus of which is solid waste. Policy guidelines and regulations for facilitating the pit emptying business are absent. For instance, emptying service providers are neither registered by MUWASA or Moshi Municipal Council. They just register for a business license at Moshi Municipal Council and register with the Surface and Marine Transport Regulation Authority (SUMATRA) for transportation requirements. These registrations are not necessarily regulating and not specific to their service quality and sensitivity.

National and local level regulating authorities

The Moshi Municipal council makes the local government administration in Moshi urban area of the Kilimanjaro Region. They are responsible for enforcement of regulations for the use of appropriate containment technologies and the emptying of onsite sanitation technologies including health promotion. Two departments of the municipal council play an active role in fecal waste management (FWM). These are the department for environmental management, and the department for public health. In addition, the department of education oversees sanitation of school facilities. However, as concerns FWM, the mandate of these departments is not very clear, with an apparent overlap. The Public Health Act (2009) guides a health officer to exercise jurisdiction on sanitation, while at the same time, the Environmental Management Act (2004)-with the view to prevent pollution- empowers an environmental officer to exercise the jurisdiction on FWM.

In 2010, the Ministry of Health (MoH) devised a standard toilet inspection register book. Ward officers use this when inspecting household and commercial latrine facilities on a monthly and quarterly basis, and submitting relevant reports to a municipal health officer. Through available documentation, Moshi Municipal Council scores access to improved sanitation at about 98%. However, consistent inspection and reporting has failed because of low manpower against large wards with high population. A ward normally has only one officer, assisted by street health committees, to execute all required tasks. Unfortunately, street health committees work on voluntary basis- which is not an attractive arrangement to many.

To increase access to improved toilets, Moshi Municipal Council recently trained local artisans on construction of improved toilets, insisting on building permits for the same. Anyone who wants to construct a house in the Municipality has to apply for a permit first alongside the building's blueprint clearly depicting sanitation facilities, which are assessed and approved by municipal officials.

Funding and budgeting

Moshi's municipal government depends on own revenues, national government, and donor funds to execute daily activities in sanitation promotion and inspection. Among the activities performed at a ward to street level include supervision and inspection of the latrine facilities, sanitation and hygiene promotions through a method known as ''*uchefushaji*", census and monitoring of the development of sanitation in the community. However, service delivery is impended by a meager budget. The Municipality rarely allocates a budget for

sanitation due to the notion that most of the budget has to be covered by the National Sanitation Campaign (NSC) fund. However, the 16-28 million TZS that Moshi receives annually from the NSC is not sufficient. To compound the issue, local government allocates much of the budget to solid waste management.

Schools have a separate budget under the Ministry of Education and Vocational Training (MoEVT) known as the School Water Sanitation and Hygiene (SWASH) program, and at municipality level the council has a SWASH coordinator. The budget allocated for both water supply and sanitation is about 20,000 TZS[1] for each school per year- which cannot cater for water bills, sanitation and hygiene for a school. There are many instances of a school running with no water because of a failure to pay water bills.

On-site sanitation fecal waste management

Vacuum trucks collect fecal sludge from households in Moshi Municipality, and neighboring districts such as Rombo and Mwanga, for customers using onsite sanitation system such as septic tanks, cesspits and pit latrines. Tanker operators come in contact with customers through phone calls. Customers usually acquire their numbers which are written on the tankers, or as distributed in fliers.

Both MUWASA and private operators provide emptying service, with MUWASA having only one vehicle while private operators have five vehicles - making a total of six vacuum trucks in Moshi Municipality. To operate the emptying business, one registers by paying TZS 15,000 for one tanker at the municipal council and TZS 75,500 annual operating fees, as well as TZS 240,000 for an insurance cover. The government income tax is calculated from 18% of the total profit usually estimated at the beginning of the year agreed between the business proponent and Tanzania Revenue Authority (TRA). In addition, a tanker has to pay a daily parking fee of TZS 500 in public parking lots. The Municipality has not allocated special parking lots for tankers.

Emptying of fecal sludge from ablution blocks is offered at a cost of TZS 70,000 per trip by a MUWASA vacuum truck, and TZS 80,000 by private operators within Moshi municipality and as high as TZS 120,000 in peri-urban areas. However, the emptying charges occasionally elevates to as high as TZS 300,000 when servicing far distances such as the nearby district urban centers like Rombo and Mwanga districts. Emptying services are lucrative in urban areas where the geology is composed of hard rock structure. This forces households to dig shallow pits, enabling low ground infiltration.

Operators experience business peak during rainfall seasons and low business during the dry seasons. During the wet season, they have to empty up to six trips per week and two trips per week during the dry season. The whole emptying exercise takes a maximum of 1hour to 1hour and 30minutes within the municipality. It takes approximately 20 minutes to reach a treatment facility for disposal from anywhere within the Municipality.

The whole municipality has only one disposal facility owned by MUWASA, which operates from 8.00am to 5.00pm. Most of the operators claim this operation time as set by MUWASA is not friendly to business timings as customers prefer to have emptying done very early in the morning or very late in the evening. Sometimes operators are forced to stay with fecal sludge in their tanks for extended periods, waiting for the MUWASA facility's availability for disposal. This is dangerous because unknowingly opening the emptying valve results in the contents contaminating the environment, and unfortunately, these tankers usually secure night parking in the streets. In addition, fecal waste is corrosive, and damages tanks if it is contained in the tankers longer than intended.

Operation and Maintenance (O&M) challenges

Vacuum trucks have special tanks with thick wall of about 8mm made from galvanized steel. It is extremely difficult to have a replacement when a tank is damaged. There is no workshop in Tanzania with a capacity of manufacturing such tanks. In East-Africa, only the Republic of Uganda have local workshops for manufacturing such tanks but of small wall thickness of about 5mm maximum. One of the tanks at the workshops in Uganda was 10,000 liters and 5mm thick, and cost about TZS 11 million. However, with such thickness it is venerable to shrinking at high pressure.

1 1USD=2,302 TZSs

Pump machines are in varieties of 32, 43, 54, 62 and 100 (horse powers) with capacities able to empty pits at distances of 15, 35, 50, 60, 80 and 100 meters away respectively. One truck has two pumps, with one to suck sludge from pits and the other to empty at the disposal sites. Vacuum truck owners have not experienced any problem or limitation to pit depth within their service area, therefore, they were not aware of the maximum pit depth a pump can suck. However, they have had experiences where remoteness of pits is occasioned by narrow street paths, or backyards with no access. There are frequent incidences of pump damages caused by solid waste in pits, or when they are forced to pump from a long distance. Permanently damaged pumps are replaced at high costs. A brand new pump cost about 20,000 US dollars (about 46 million Tanzanian shillings).

Some trucks are not able to empty the entire contents during emptying. Most of the tanks are configured with a flat bottom, which does not allow enough drainage of the content especially settled solids. The residual sludge accumulates for at least a month in a tank before it is washed. In addition, truck operators lack an allocated place for washing the tanks.

General FWM challenges

1. Poor regulation of private operators providing pit emptying services.
2. Lack of public policies to ground on-site sanitation service delivery.
3. No enforcement or penalties for violation of requirement to seek building permits, leading to large-scale non-compliance.
4. Inadequate labor force at ward level. A single ward health officer has to conduct house to house inspection, and volunteer street health committee members aren't motivated or conversant with tasks.
5. The budget allocation for FWM and sanitation at a municipal level is meagre for effective service delivery.
6. Operating vacuum trucks is highly challenging given the limited access to mainly mechanical spare parts for replacement when needed. There are few spare part dealers for most of the vehicle brands they own.
7. There is a serious problem in accessing durable hose pipes in the country; most of the hose pipes on the market are frequently damaged.
8. High emptying costs at MUWASA waste stabilization ponds. Private vacuum trucks empty at MUWASA ponds at cost of TZS 17,000 per trip which to them is considered very high as compared to all of the emptying costs anywhere in the country.
9. Presence of trash/solid waste in household pits affect emptying time, and damages the emptying equipment. For instance, truck operators have regular repair of pumps because of trash choking the hose pipes during emptying.
10. The operation time set by MUWASA is not friendly to business operation times, therefore truck operators end-up missing work during prime business time (in the morning and evening).
11. Most of the tankers are bought when they are old. Additionally, they operate on rough roads and narrow paths which leads to frequent damages. Consequently, the tanker drivers are frequently in confrontation with traffic policies.
12. Some areas such as Njoro, Pasua and Zambia Street are not accessible making it difficult to access the houses for desludging.
13. Moshi municipal council is expanding but the sewer network is not expanding proportionally with the growing population.
14. Lack of knowledge and stigma on the use of fecal sludge for production of fertilizer and other products
15. Lack of common understanding on sanitation and hygiene aspects such as improved toilets, cleanliness, proper use, and operation and maintenance of toilets.
16. Inadequate supply of cleaning equipment in schools for sanitation and hygiene infrastructure which may lead to self-contamination of pupils.

Recommendations for policy and practice

1. Policy instruments should be used to establish priorities, procedures and rules. These should take the form of regulations, economic measures, information programs and assignment of roles and responsibility for service provision.
2. Regulations are needed to facilitate the growth of the FWM private businesses by formalizing them, and creating a supportive environment within which they can operate. FWM service providers need to be registered, licensed for operation, and monitored for compliance to environmental discharge guidelines.
3. Formulate tariffs based on the volume of sludge emptied, the number of trips trucks need to empty a septic tank, or the distance that trucks need to travel to dispose of the waste.
4. In order to improve the budget line for sanitation, consider proportional distribution of the annual budget, much of which has been allocated to solid waste management activities in the past.
5. Increase public health labor force at a ward or street level, or introduce lucrative incentives to volunteering health committees at a street level.
6. Explore public private partnership (PPP) towards improving sustainable pit emptying services which are on high demand, but with few service providers resulting in high charges.
7. Support to the urban poor communities in the form of soft loans, or subsidizing the construction materials of improved toilets in order to reduce inequalities in access to improved sanitation
8. Strong initiatives are needed in conducting awareness campaign to the community to ensure common understanding on sanitation, hygiene and their health benefits, as well as on the reuse of fecal sludge.
9. Formulate the sanitation and hygiene guidelines to guide the construction of improved toilets in the community at household level.
10. Expand service infrastructure such as sewerage and water supply coverage proportional to the expansion of the Moshi population.
11. Strengthen collaboration, education and monitoring to ensure sustainable sanitation and hygiene.
12. Involve different stakeholders in the design and implementation of different FWM projects so that each stakeholder can understand their individual role.
13. Include sanitation infrastructure in the Municipal Master Plan, and develop the infrastructure in peri-urban areas.
14. Extend the sewer network, and work to reduce connection costs to the main sewer grid to facilitate coverage for more households in Moshi.

Contributors

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About the African Population and Health Research Center (APHRC)

The African Population and Health Research Center is the continent's premier research institution and think tank, generating evidence to drive policy action to improve the health and wellbeing of African people. The Center partnered with Ardhi University, Tanzania, on the Evidence-informed advocacy for fecal waste management project research.

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