



Standard Operating Procedures for Occupational Health and Safety

About SNV

SNV is a not-for-profit international development organisation that makes a lasting difference in the lives of people living in poverty by helping them raise incomes and access basic services. We focus on three sectors and have a long-term, local presence in over 25 countries in Asia, Africa, and Latin America. Our team of more than 1,300 staff is the backbone of SNV.

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Cover photo: FSM service providers removing household faecal sludge in Surkhet by Raju Shrestha

Photos ©SNV

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Abbreviations

BCC	Behaviour change communications
FS	Faecal sludge
FSM	Faecal sludge management
NGO	Non-governmental organisation
O&M	Operation and maintenance
PPE	Personal protective equipment
SOP	Standard Operating Procedure
WUSC	Water Users and Sanitation Committee

Definition of terms

- **Faecal sludge** is excreta from an on-site sanitation technology (like a pit latrine or septic tank) that may also contain used water, anal cleansing materials, and solid waste.
- **Faecal Sludge Management** is the process by which faecal sludge is contained, collected, transported and treated, before being safely disposed of or reused.
- **Sanitation Workers** refers to those employed in sanitation management, usually performing cleanliness, maintenance, or other operational tasks within the sanitation service chain.
- **Occupational Safety** covers how hazards and injuries are prevented in the workplace.
- **Occupational Health** is the means by which a company can protect workers' physical and mental health in the workplace.
- **Guidelines** refer to Occupational Safety and Health Guidelines.
- **Hazard** is any potential damage, harm or adverse health effects to something or someone.
- **Risk** is the probability of a person being harmed if exposed to a hazard.

1 Introduction

Emerging towns and rural municipalities in Nepal typically lack a sewerage network and instead depend on on-site sanitation systems (pits and holding or septic tanks) for the disposal of faecal sludge. Sanitation workers are needed across the sanitation chain from cleaning public toilets, emptying pits and tanks, as well as operating treatment plants, and reusing sludge. Safe sanitation practices are essential for safeguarding the health and well-being of populations and minimising environmental damage. The faecal sludge (FS) management problems in these urban settings lie in the lack of knowledge in handling FS, low demand for faecal sludge management (FSM) and a lack of a professionalised sanitation workforce. Those in the formal and informal sector often work without a safety protocol even though they are in direct contact with faeces and their associated pathogens and toxic gases, resulting in adverse health effects. As the victims of discrimination, regarded as 'untouchable', sanitation workers' rights are often overlooked. Occupational health and safety of manual emptiers remain a major concern.

A baseline survey performed for SNV's WASH SDG programme in Nepalgunj, Chandranath, Birendranagar, and Khadak found that 24% of respondents had entered the pit themselves in order to empty it - either by hand or by mechanical means. Very few respondents (3%) only used mechanical emptiers. Furthermore, only 4% of sanitation workers reported observing all safety measures. Therefore, the majority of workers have no access to personal protective equipment (PPE) and are exposed to a working environment full of risks and hazards that could result in infection, injury, or death.

Source: SNV WASH SDG programme midterm report 2021

Why read this document?

Occupational health and safety guidelines must be put in place to protect the welfare of sanitation workers. This guideline aims to raise awareness of the importance of a safe and healthy working environment for all sanitation workers. Addressing different workplace hazards, the standard operating procedures (SOPs) offer appropriate measures to control and minimise the risks. Specifically, the objectives are:

- to indicate the hazards and risks associated with faecal sludge management;
- to enhance knowledge of healthy and safe practices and procedures for sanitation workers in order to create a workplace environment in which risks are mitigated;
- to promote institutional accountability on occupational health and safety in FSM; and
- to provide guidance on gender and inclusion mainstreaming in FSM businesses.

Scope of these SOPs

These SOPs cover on-site sanitation facilities and areas served by such facilities. The guidance is systematically segmented according to the sanitation chain throughout the

document i.e., pit emptying, transport, treatment, disposal/reuse. The guidance does not extend to network or conventional sewerage systems. The guidance is for manual pit/tank emptiers and professionalised mechanical pit/tanks. A comparison is shown in the table below.

	Manual emptiers	Mechanical emptiers
Emptying equipment	Use shovels and buckets or portable, manually operated pumps like the Gulper or the MAPET or manual diaphragm pump	A vacuum or other pump with a hose that is lowered into the pit to suck the sludge up and out into the storage tank
Transport	Human or animal power (cart, wheelbarrow, rickshaw etc.) or tuk-tuk, motorised tricycle, or public transport to travel to and from jobs along with their equipment	Mechanical transport tankers or motorised vehicles usually with a storage tank
Disposal	Mostly on-site by digging pits/trenches in the ground or illegally disposed of in open space or water bodies or storm drains or sewers	Mostly transported to the designated site(s) for treatment and disposal
Treatment	Use of chemical treatment/disinfection e.g., lime or covering the pits/trenches with soil after it is filled with sludge	Technologies such as drying beds are used in treatment plants
Reuse		As a soil conditioner or for irrigation

These SOPs should be considered a working document and will be updated once it has been validated and endorsed through implementation.

Target audience

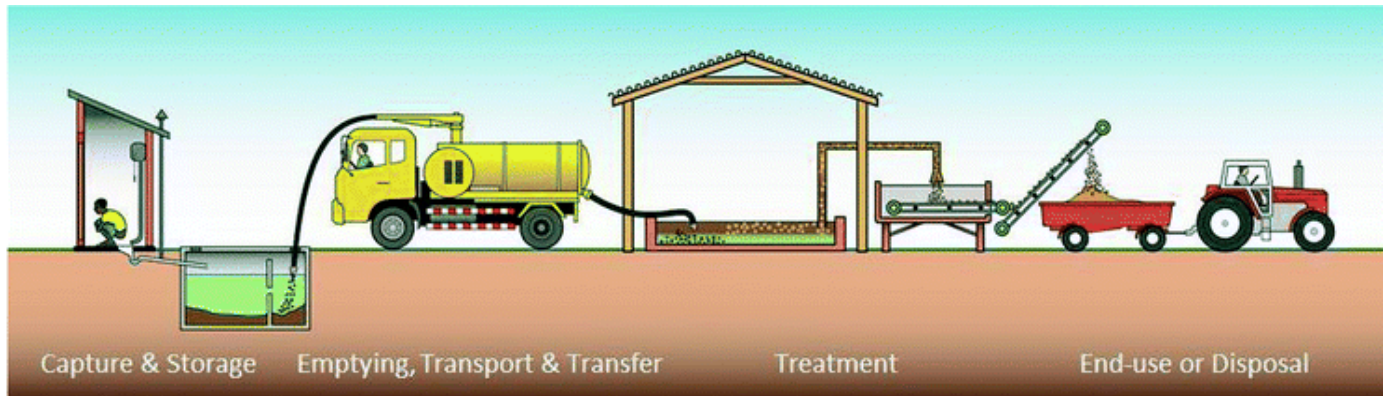
SNV has prepared these SOPs to support its work under the WASH SDG programme. The guidance has been shared with partners, including local government representatives, in the programme area and validated by them. These SOPs might also be useful for a wider audience, including:

- municipality or private service providers;
- non-governmental organisations (NGOs) and social organisations;
- service recipients;
- sanitation workers;
- planners and those responsible for implementation within the sanitation and health sectors; and
- those responsible for the development, implementation and monitoring of sanitation services.

2 Health and safety responsibilities across the sanitation chain

Duties of sanitation workers can include:

- toilet cleaning;
- emptying pits and septic tanks;
- cleaning sewers and maintenance holes;
- handling faecal sludge; and
- working at sewage and faecal waste treatment and disposal sites.

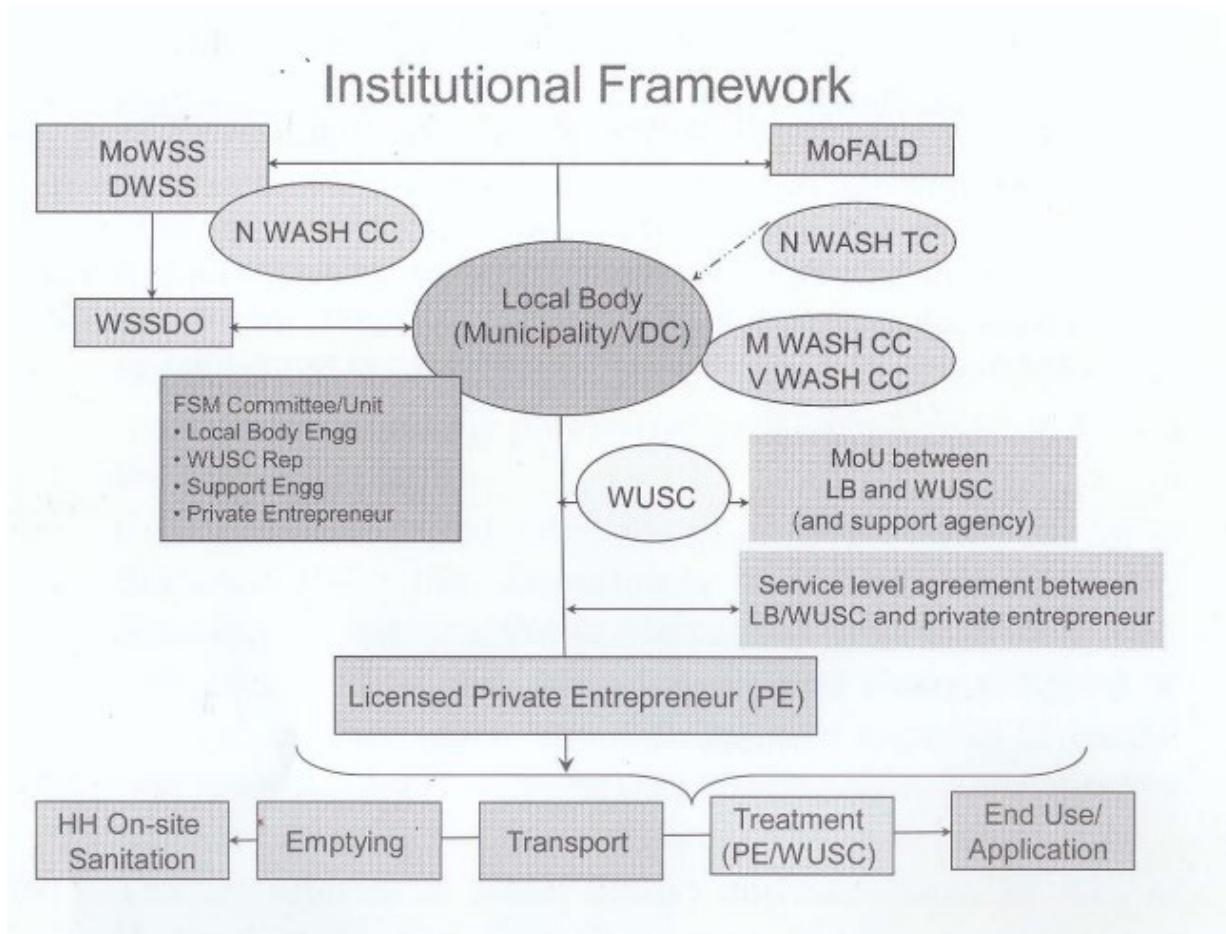


Source: <https://pubs.rsc.org/en/content/articlehtml/2016/ew/c5ew00255a>

The following institutions have been identified as playing effective roles in the overall planning, development, implementation, practice, and monitoring and evaluation of FSM:

- Department of Water Supply and Sewerage, Ministry of Water Supply and Sanitation
- Ministry of Local Development and Federal Affairs
- Ministry of Population and Environment
- Department of Agriculture, Ministry of Agriculture
- Local bodies
- Water Users and Sanitation Committees (WUSCs)
- Private entrepreneurs
- International NGOs
- Development partners

The institutional set-up for FSM is shown below:



Source: https://www.fsmttoolbox.com/assets/pdf/6_nepal_FSM_Regulatory_Framework_2017.pdf

Key stakeholders' specific roles and responsibilities are set out in the Ministry of Water Supply and Sanitation (2017) Institutional and Regulatory Framework for Faecal Sludge Management in Urban Areas of Nepal, as shown in the table below.

Stakeholder	Policy and guidelines	Coordination	Collection & transport	Treatment	Disposal and use	Regulation	Capacity building	Monitoring
Ministry of Water Supply and Sanitation	X	X				X	X	X

Ministry of Federal Affairs and General Administration								
Ministry of Population and Environment	X	X				X	X	X
Municipality/ Village Development Committee /utility	X	X	X	X	X	X	X	X
WUSCs		X	X	X	X		X	X
Private sector/entrepreneurs			X	X	X			
Research / academics							X	X
Development partners/International NGOs							X	

Source: https://www.fsmttoolbox.com/assets/pdf/6_nepal_FSM_Regulatory_Framework_2017.pdf

The institutional roles and responsibilities are based on the New Constitution of Nepal (2015), Water Policy Act, SDP, Total Sanitation Guidelines, National Master Plan on Hygiene and Sanitation (2011) and Local Self Government Act (1999), which guides the roles and responsibilities of actors. The use of protective equipment and working environment safety is covered within the provisional industrial safety section of the Labour Act 2074, Section 12. The primary responsibility for FSM lies with the local bodies (municipalities). Additionally, the roles and responsibilities of all potential stakeholders are defined in the Institutional and Regulatory Framework for Faecal Sludge Management in Urban Areas of Nepal (April 2017).

3 Hazard identification

The risks faced by sanitation workers cannot be underestimated and are found in many forms.

Type of risk	Factors	
Biological	<ul style="list-style-type: none"> Viruses and bacteria, parasites, protozoa Animals (including insects) Decaying organic matter 	Adverse effects can range from skin irritation, attacks of breathlessness, chest tightness and wheezing, infection of skin or eyes
Chemical	<ul style="list-style-type: none"> Confined space in septic tanks, pits, and maintenance holes without natural ventilation leads to build-up of toxic gases or oxygen-deficient atmospheres 	Extended work in confined spaces pose a serious risk to employees e.g., eye and skin irritation, headaches, fever, asthma, dizziness, fatigue, and respiratory disorders
Physical	<ul style="list-style-type: none"> Heights Insufficient lighting Sharp objects such as discarded hypodermic needles, glass, metals, and stones Rubbish like sanitary towels, condoms, plastic etc. 	<p>Accidents due to slick or slippery surfaces, particularly while climbing ladders</p> <p>Small openings obstructing entry or exit of equipment</p> <p>Falling objects</p> <p>Cuts, scratches, or penetrating wounds that become infected</p>
Psychological	<ul style="list-style-type: none"> Emotional/mental stress Low status in society 	<p>Stress, shame, discrimination</p> <p>Sense of inferiority/ low self-esteem</p>

The working environment of sanitation workers can be life-threatening at various points of the sanitation service chain. The table below assesses the work performed by sanitation workers at each stage of the chain and the associated hazards.

Sanitation chain	Work performed by sanitation workers	Types of hazards	Safety measures
Containment	Cleaning toilets in households, public toilets, and institutions	Chemical Physical	Safety gear and PPE Hygiene measures

	(schools and health care facilities)	Psychological Biological	
Emptying	Manual pit or toilet emptying	Biological	Safety gear and PPE
	Mechanical emptying	Chemical	Hygiene measures
		Physical	Contingency measures
		Psychological	
Transport /Conveyance	Manual transport	Chemical	Safety gear and PPE
	Mechanical tankers	Psychological	Hygiene measures
		Biological	Contingency measures
Treatment	Liquid and solid sludge handling at sewage treatment plants	Chemical	Safety gear and PPE
			Hygiene measures
			Contingency measures
Disposal	Manual disposal	Biological	Safety gear and PPE
	Mechanical disposal		Hygiene measures
Safe reuse	Packaging of cakes	Biological	PPE and safety gear
	Mixing in soil		Hygiene measures
	Storing in rooms		

4 Safety measures

Sanitation workers must follow measures on worksites to mitigate exposure to all noted hazards - biological, chemical, and physical - and ensure occupational health and safety for all. Safety measures surrounding the emptying of pits and tanks include fencing the area to prevent public access, the provision of PPE such as boots, gloves and facemasks for workers, spillages cleaned immediately, hands washed with soap and water, and vehicles closed securely. These issues are discussed in turn below.

A. Pit/septic tank emptying

Manual emptiers	Mechanical emptiers
<ul style="list-style-type: none"> ▪ The pit should be allowed to vent for a while before anyone begins work. Venting lets harmful gases (like methane, ammonia, and sulphur dioxide) escape and fresh air enter. ▪ Assess risks when entering confined spaces with cramped exit and entry points. ▪ Depth of sludge accumulation should be measured before entering. Ladders should be used as required. ▪ Clean the surrounding pit properly to remove residual sludge splashes while emptying. ▪ Fence the area before commencing emptying. 	<ul style="list-style-type: none"> ▪ Ensure availability of water for mixing as well as for hygiene purposes. ▪ Maintain the mechanical equipment and suction pipe regularly to avoid problems during the emptying process. ▪ All piping, valves and connections should be accessible for cleaning. ▪ Clean the surrounding pit properly to remove residual sludge splashes while emptying. ▪ Fence the area before commencing emptying.

B. Conveyance/transportation

Manual emptiers	Mechanical emptiers
<ul style="list-style-type: none"> Disinfect tools used before transport. Avoid using public transport with FSM equipment. 	<ul style="list-style-type: none"> Use a leak-proof tank with a locking mechanism strong enough to withstand a collision with a vehicle or building. Regularly inspect the vehicle to ensure its fitness to stop leaking from the tank during transportation. Trucks should be equipped with a first aid kit, gas detection lamp, fire extinguisher, and disinfectant and spill control equipment. Schedule transportation hours early in the morning to avoid traffic jams or evenings if street lighting is present. Assess roads for accessibility, avoiding potholes.

C. Safe disposal

Manual emptiers	Mechanical emptiers
<ul style="list-style-type: none"> Do not dispose of faecal sludge in rivers, streams, farmland, and privately owned land. If disposal sites (e.g., pits and trenches) are used on-site – the bottom of the disposal site should be at least 2 metres above the highest annual groundwater level. 	<ul style="list-style-type: none"> Dispose of faecal sludge in designated places or treatment centres as recommended by the municipality. Do not dispose of FSM at unapproved sites i.e., open spaces, water bodies, drains and sewers. The approved disposal sites must have identified boundaries and limited entrance points. All entries and departures should be formally recorded and kept at these points.

D. Treatment

Manual emptiers	Mechanical emptiers
<ul style="list-style-type: none"> Lime and other cotreatments are often used to treat the sludge and prevent flies and pests. Workers handling lime and/or other chemicals must be trained and wear proper protective equipment 	<ul style="list-style-type: none"> Wear full PPE, including a mask if performing lab tests. Ensure pumps are in full working order and chemical supplies are available. Face shields should be worn when changing chlorine containers.









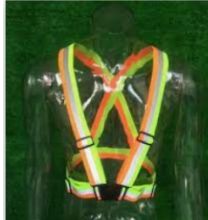
- as lime can cause irritation and burns to skin/eyes and lungs if inhaled.
 - Ensure the ventilation system is functioning properly when working with sludge.
 - Use windproof shields or walls or avoid working in windy weather to prevent cross-contamination.
-

E. Product reuse

- Workers must wear full PPE as dried sludge still contains pathogens.
- Workers must use shovels and other appropriate tools when handling the waste product.
- Equipment should be colour coded to indicate its use. Colour coded equipment ensures items are not mixed up and avoids safety hazards.
- Monitor material originating from treatment facilities. Before applying biosolids, ensure they are properly stabilised to avoid unacceptable growth or cross-contamination.
- Reclaimed wastewater should be spread when the area is least populated. Post notices to inform the population that reclaimed wastewater is in use. Display warning messages against drinking reclaimed wastewater.

5 Personal protective equipment

At each stage of the sanitation service chain, sanitation workers must have access to and wear personal protective and safety equipment. The basic set of PPE for all sanitation workers includes rubber gloves, face masks, boots, and overalls/aprons.

Personal Protective Equipment	Risk addressed
 Helmet/Hard Hat	Head injury due to falls/slips or falling of any objects.
 Safety Goggles	Eye protection against dust, chemical, and wastewater exposure.
 Breathing safety device/mask	Inhaling dust particles, odours, droplets of wastewater and sludge while emptying and cleaning pits or sewers.
 Boots	Prevents feet from making contact with wastewater, sludge, dangerous chemicals, bacteria, metals, or stones.
 Gloves	Rubber protects hands from chemicals, waste, and sludge.
 Overalls	Protects the body from contamination with chemicals, bacteria, sludge or wastewater.
 Respiratory equipment/Hose mask	Protects from dangerous concentrations of dust, vapour, gases, or insufficient oxygen. A mask or visor might also protect against splashes.
 Earplugs and ear pads	Prevents wastewater droplets entering ears.
 Safety harness	Prevents falls. There should be two people holding the rope who can pull the worker out if gases overcome them or if the pit walls collapse.

6 Hygiene measures

All sanitation workers should take the following hygiene measures before, during, and after handling faecal sludge:

- Wear full PPE.
- Do not eat, drink, or smoke while emptying, desludging, and sludge handling.
- Avoid hand-to-mouth contact during work or by wiping the face with contaminated hands or gloves, or by licking splashes from the skin. Frequently wash hands with soap.
- Maintain other hygiene measures such as bathing after work and changing clothes between work and returning home. Disinfect work clothes with a chlorine solution (if bleaching powder is used 16 gm in 100 litres of water). If possible, do not take contaminated clothing home for washing.
- Clean contaminated equipment on site. Disinfect the tools used for emptying and transport, and only use them for this activity. Safely store the tools, so people do not touch them or use them for another purpose.
- Clean the working area in case any faecal sludge may have spilt.

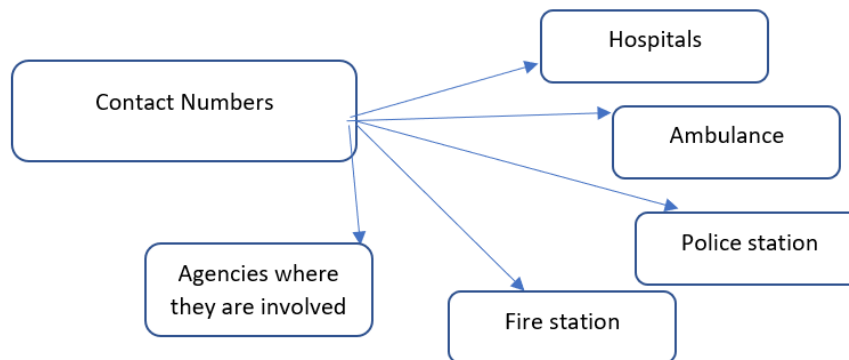
7 Contingency measures

Sanitation workers are exposed to the risk of accidents during work. Accidents frequently occur due to slippery surfaces, particularly while climbing or descending ladders.

Manual emptiers	Mechanical emptiers
<p>Manual pit emptiers should avoid working solo. Working in pairs enables someone to raise the alarm in an emergency.</p>	<p>Employed workers should:</p> <ul style="list-style-type: none"> Report any damage to equipment or unsafe working conditions to the line manager. Receive training on a contingency plan in case of an accident. Employers should keep a log of workplace accidents and emergencies.

A. Emergency contact numbers

In case of emergency, workers must have the contact numbers of the local hospital, fire station, ambulance, and police station stored in their mobile phones.



B. First aid kits

All workers should carry a first aid kit to clean and cover exposed wounds with a sterile waterproof dressing. At a minimum, the kit might include disinfectant, scissors, bandages, anti-allergy medicine and paracetamol.

8 Recommendations

Interventions are required to improve the working conditions and opportunities for sanitation workers in the FSM business. The following are key recommendations to improve conditions for sanitation workers. These recommendations designate the responsibilities of different stakeholders, including service recipients, NGOs/social organisations, and local governments (municipalities).

Federal, provincial, local government, municipality

- Provide leadership and adequate funding to initiate behavioural change around sanitation practices (including policy and strategy formulation/ amendment). Include FSM in urban planning, for instance, by allocating land with access roads for new treatment plants. Form a safety committee.
- Develop a database with full details of FSM businesses (mechanical and manual). Issue licenses for FSM businesses for the collection and transportation of faecal sludge.
- Provide municipal-level oversight and enforcement of laws, operational guidance, codes of practice, and SOPs, including for emptying, transportation, and treatment of faecal sludge; operation and maintenance (O&M) of faecal sludge treatment plant; disposal of effluent from faecal sludge treatment facilities, quality control/ standardisation of treated products/by-products produced at faecal sludge treatment facilities.
- Make sure that the manual emptier (traditional pit emptier/cleaner) communities are integrated into mechanised FSM services through proper training and support, without adversely affecting their income. And take steps to improve their social status.

Employers (private, public, local government)

- Monitor and mitigate potential risks in the working environment. Incorporate gender into risk assessments to understand the gender dynamics of risk exposure.
- Train sanitation workers regularly on occupational health and safety procedures. Develop behaviour change communications (BCC) materials for this.
- Make PPE, clothing and footwear available for staff that are designed to fit well (especially for female staff). All team members should check the condition of their equipment and PPE and replace as necessary. Introduce award scheme or individual rewards for best practice in using PPE by sanitation workers in celebration of national/international days (World Day of Safety and Health at Work, World Environment Day).
- Introduce identity cards for sanitation workers across the municipalities (mechanical and manual) and develop a code of conduct.
- Ensure equal work opportunities for all genders and facilitate working conditions favourable for all genders, with equal pay for equal work. Ensure menstrual hygiene facilities for female workers on office premises, including a toilet with menstrual hygiene provision for female workers; sanitary pads or cloths available for use; and facility for handwashing with soap and water.
- Provide annual medical check-ups and vaccinations including tetanus, typhoid, and Hepatitis B. Provide treatment for helminth infection to sanitation workers and their

families to stop the cycle of transmission and reduce helminths in faecal sludge. Ask staff to seek medical advice if there are persistent chest symptoms or a flu-like illness.

- Provide all sanitation workers with emergency contact information, including telephone numbers. Provide fully equipped first aid kits and an appointed first aider
- Ensure complaint handling mechanisms are in place and functional. Give high priority to complaints related to sexual harassment and gender-based violence by sanitation workers at the user interface and in the workplace.
- Maintain a database of households where emptying services are provided with a probable emptying frequency of these facilities for efficient and timely emptying of all on-site sanitation facilities.

User interface

- Do not put rubbish such as glass, medical waste or sharp objects in the pit or tank. These are significant health and safety risks to the people emptying the on-site sanitation technologies and treating the sludge. Faecal sludge mixed with garbage can be impossible to empty using motorised equipment.
- Organise for the pit or tank to be mechanically emptied every three to four years.
- Be present for the duration of the emptying service.
- If the FS is disposed of in a pit or trench on-site, make sure it is in a designated area out of the reach of children and covered with soil.

Civil society, research and learning organisations, media

- Raise user awareness on emptying septic tank/pits in partnership with local government through print, electronic, and social & mass media.
- Ensure sanitation workers are fully trained about the safe use and management of PPE and promote PPE use among sanitation workers.
- Promote the association of informal and formal sanitation workers.
- Develop innovative models for safe FSM.
- Develop capacity building and training initiatives on FSM.
- Fill knowledge gaps on FSM and facilitate sharing of knowledge/information.
- Facilitate partnership among key stakeholders, including the private sector.

9 Conclusion

The essential public service carried out by sanitation workers is often ignored and undervalued. Sanitation workers are frequently exposed to health and safety risks from an unpleasant working environment and often lack sufficient PPE. There is a lack of knowledge surrounding the extent of these risks. Workers are left unaware of health and safety issues and receive no training. Employers have a specific responsibility to protect workers. Government has the responsibility to create an enabling environment for the health and safety of sanitation workers. Social organisations have a role in advocating for workers' rights and protection. Sustainable improvements in the conditions of sanitation workers are only possible if all stakeholders take responsibility for problems and act collaboratively.

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Operation & Maintenance Manual for Integrated Solid Waste and Faecal Sludge Treatment Plant of Birendranagar Municipality/SNV/Innosolt

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