



Transcript: Module 2- Describe the sanitation system

Welcome to Module 2 of the sanitation safety planning methodology. My name is Sophie Boisson, and I will be your guide in this module called “Describe the sanitation system”. Here, we will be answering the following questions:

- How does the sanitation system work?
- Who is at risk?

In this module we will map the system, characterize the system flows, identify exposure groups, gather supporting information and confirm the system description. The objective is to generate a complete description of the sanitation system of the area identified in Module 1.

Let’s start with step 2.1 “map the system”. Here, we want to understand the source and path of the waste flows through the system. Each element of the sanitation chain needs to be considered from toilet, containment/storage/treatment, conveyance, treatment and end-use/disposal.

Chapter 3 of the 2018 WHO Guidelines provides a detailed description of safe sanitation systems. Sanitation systems are defined as a combination of technologies and services that, when linked and properly managed, can form a safe chain.

The steps are:

-Toilet: this is where excreta are captured. These may be dry or flush toilets, urinals and so on.

-Containment, storage and treatment: this is only relevant to non-sewered sanitation systems and refers to the container, usually located below ground level, to which the toilet is connected. For example, pits or septic tanks.

-Conveyance: is when wastewater or fecal sludge is moved from the containment technology to off-site treatment, end use or disposal. Waste can be moved via sewers or transported by trucks.

-Treatment: refers to the processes that change the physical, chemical and biological characteristics or composition of fecal sludge or wastewater so that its quality is fit for purpose for the intended next use or disposal. This includes technologies to treat wastewater and fecal sludge onsite and offsite.

-End-use or disposal: this is where the waste is ultimately discharged into the environment, either as an end product or reduced-risk material. An example is wastewater that is used for irrigation in agriculture.

The method chosen for mapping the system will depend on the scale and complexity of the sanitation system.

You may use a simple schematic showing how the waste is moving through each step of the sanitation chain. This slide shows an example with onsite sanitation.

Another method is to use a process flow diagram. Here you can see an urban wastewater system and an on-site septic system. A detailed geographic map may be more helpful for smaller-scale SSP.

You can choose the method that your team feels most comfortable with, or can use a combination of both methods.

Once your map is ready, you should establish the path of the different flows through the sanitation system.

Here is an example for onsite sanitation. All flows are marked in the map, you can see the fecal sludge collected from septic tanks and the liquid fraction that percolates from the septic tanks, among other waste fractions.



When available, you should record quantitative information, for example, this may include flow rates and the design capacity of each treatment element.

In step 2.2 we characterize the microbiological, physical and the chemical constituents of the system flows.

A hazard is a biological, chemical or physical constituent that can cause harm to human health.

- Biological hazards are microbial pathogens such as
 - Bacteria, parasitic protozoa and viruses
 - Helminths
 - Vector-borne pathogens.
- Chemical hazards are heavy metals in sludge or biosolids from industrial sources, herbicides and pesticides.
- Physical hazards are sharps, like needles, odors or physical injury to workers, like falling.

When characterizing system flows, the team should focus on what comes in and what goes out at each step of the chain. The team should also record how load quantity and concentration varies, for example during heavy rain or flooding.

Here you can see how the characterization was done for some of the waste fractions identified in our example.

Now let's move to Step 2.3. Here we identify and characterize the people who may be exposed to a particular hazard at each step of the chain. These are called exposure groups and are classified as:

- Sanitation system users who all people who use a toilet.
 - Workers who are person responsible for maintaining, cleaning, operating or emptying the sanitation technology.
 - Local community, which includes anyone who is living near the sanitation technology or farm, in which the material is used and may be affected.
 - Farmers are the persons who are using the sanitation products, such as untreated, partially or fully treated wastewater, biosolids or fecal sludge.
 - Consumers, who are the persons who consume products, like vegetables or fish, that are produced using sanitation products.
- And the
- Wider community, like lower lying communities who might be exposed to hazards.

To understand and describe the exposure groups you should ask: who are they? How many are there? What are they doing there? What are they exposed to? How often are they exposed to this? Tool 2.2 of your SSP manual can help you with this task.

In this example, you will notice the users, local communities, sanitation workers, wider community, consumers and farmers.

Now,
the step to identify and characterize the system flows only tells us about the potential health hazards. In step 2.4 we need to gather evidence of what the real health hazards are.



The Guidance Note 2.4 of the SSP manual includes example of data to be collated. These are:

-Regulatory requirements, such as:

- Relevant laws and by-laws;
- Effluent discharge regulations;
- Guidelines for climate change preparedness or disaster planning.

-Information related to system management and performance.

- Data related to earlier monitoring and surveillance;
- Epidemiological data.
- Types and amount of products produced

To obtain information on the presence of a specific disease or pathogen, a desktop review may be sufficient. Information may also be obtained from public health authorities, for example via routine health information system. Consultation of personnel working in health facilities within, or in proximity to, the study area may also be useful.

-Don't forget to collect information about demographics and land use patterns, such as:

- Land use pattern, population and special activities that may impact the sanitation system;
- Formal and informal settlements
- Specific considerations such as ethnicity, religion, migrant populations and disadvantaged groups.

-And finally, you should collect information about changes related to climate and seasonal conditions:

- Seasonal variation of use due to type of crops and harvest;
- Seasonal crop and harvest data
- Additional inflow areas during heavy rain and implications on treatment steps;
- Climate change projections.

In some cases, this information is not available. So, the Steering Committee needs to decide whether they need to collect new data, based on:

- What type of information is really needed?
- What data is available?
- What resources are available to collect new data?

Because step 2.1 to 2.4 are mainly a desk exercise, step 2.5 aims to conduct field visits to confirm that the system description is complete and accurate.

There are a number of methods to conduct field investigations such as sanitary inspections, transect walks, focus group discussions, key informant interviews and collection of samples for laboratory testing.

Great! So, we have now completed Module 2 of the SSP methodology: describe the sanitation system. You have learnt how to:

- Map the system
- Characterize the system flows
- Identify exposure groups
- Gather supporting information
- Confirm the system description

In the 2018 WHO Guidelines, you will find more information on pathogens in chapter 6. Also, check out module 2 of your SSP manual, especially guidance notes 2.5, 2.6 and 2.7 on compiling information on



biological, chemical and physical hazards, as well as guidance note 2.6 about compiling key climate information.

The next lecture will take you through Module 3: Identify hazardous events, assess existing control measures and exposure risks.

Thanks for watching! And happy SSP!