Ethiopian TVET-System

Irrigation & Drainage Construction

Level II

Based on, March 2017G.C. Occupational Standard

Module Title: Apply Basic Water, Sanitation & Hygiene Practices

TTLM Code: EIS IDC2 TTLM 0920v2

This module includes the following Learning Guides

LG16: Follow sanitation and hygiene procedures and identify hazards

LG Code: EIS IDC2 M05 0920 LO1-16

LG17: Identify hazards

LG Code: EIS IDC2 M05 0920 LO2-17

LG18: Report any personal health issues

LG Code: EIS IDC2 M05 0920 LO3-18

LG19: Prevent food and other item contamination

LG Code: EIS IDC2 M05 0920 LO4-19

LG20: Prevent cross-contaminations by washing hands

LG Code: EIS IDC2 M05 0920 LO5-20

Instruction sheet	Learning Guide 16: Follow sanitation and hygiene procedures and identify hazards

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Accessing and following hygiene and sanitation procedure
- Identifying and reporting poor organization practices
- Identifying hygiene hazards that may affect the health & safety of customers and others
- Taking action to remove or minimize the hazards
- Reporting hygiene hazards promptly to appropriate person

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon completion of this Learning Guide, you will be able to**:

- Access and follow hygiene and sanitation procedure
- Identify and report poor organization practices
- Identify hygiene hazards that may affect the health & safety of customers and others
- Take action to remove or minimize the hazards
- Report hygiene hazards promptly to appropriate person

Learning Instructions:

- Read the specific objectives of this Learning Guide.
- Follow the instructions described below
- Read the information written in the “Information Sheets 1- 4”. Try to understand what are being discussed.
- Accomplish the “Self-checks 1,2, 3 and 4 ” in each information sheets on pages 32,36,39 and 55.
- Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
- If you earned a satisfactory evaluation proceed to “Operation sheets 1, and 2 on pages 58 and 59 and do the LAP Test on page 60”.

Information Sheet-1	Accessing and following hygiene and sanitation procedure

1.1. Introduction

In developing countries like Ethiopia, most of the diseases affecting the public are related to poor WASH services and practices. For Example, Trachoma is linked to inadequate face washing habit often caused by insufficient quantity of water. Diseases like diarrhea are caused by people ingesting (eating or drinking) bacteria or other infectious agents, frequently in contaminated water and/or food. The contribution of water technology professionals by promoting optimal WASH practice is vital to prevent WASH borne diseases and improve the health and related problems at household level.

1.2. Definitions of WASH

WASH is an abbreviation that stands for Water, Sanitation and Hygiene. Due to their interdependent nature, these three core issues are grouped together to represent a growing sector in Ethiopia. While each is separate field of work, each is dependent on the presence of the other. For example, without toilets, water sources become contaminated; without clean water, basic hygiene practices are not possible. Therefore, to improve the health status of people, there must be standard latrine utilization with proper hand washing facility, using soap/ash, that enable people to improve their hygienic practices. The absence of one of them can't able people to have optimal WASH practices and maintain improved health behavior.

1.3. Description of WASH components

The three component of WASH (Water, Sanitation and Hygiene) are further discuses below.

Figure 1: The three components of WASH at school level

1.3.1. Water

Sustainable access to safe, ample and wholesome water in human being is basic right. People need water for different purpose that include drinking, maintain personal hygiene, wash clothes and utensils, prepare food, clean home and the resident environment, etc. For all these services of water, there are different standards that are developed from the international to national level to maintain healthy and lead productive life.

A person without access to improved water sources has high chance of water related health problems. Communities' water sources should not be far from their homes, as it typically falls to women and girls to spend much of their time and energy fetching water and expose them to different hazards. Safety of drinking water is a growing concern in many parts of the country. Drinking water sources are increasingly under threat from contamination, which impacts on the health of children by causing diarrheal diseases that hinder their optimal growth and development, skin disorders, and different health problem. It largely affects the economic, environmental and social development of communities and nations.

1.3.2. Sanitation

The word sanitation comes from Greek word "Sanita" meaning "Clean". Sanitation is proper disposal of wastes (solid and/or liquid waste) to prevent humans from contact with wastes. As wastes are the sources of contaminants and pollutants, sanitation include promoting health through the prevention of wastes from water system, environment and housing, the control of vectors (living organisms that transmit diseases, known as vector borne diseases), to have a clean environment. It focuses on onsite management and proper disposal of waste produced by human activities. It is a comprehensive term that is more than just toilets which work together to form a hygienic working, and living environment.

There are different types of sanitation relating to particular situations, such as:

- **Basic sanitation**: Refers to the management of human faces at the household level. It means access to a toilet or latrine.
- **Onsite sanitation**: The collection and treatment of waste at the place where it is produced.
- **Food Hygiene**: Refers to the hygienic measures for ensuring food safety.

- **Housing Sanitation:** Refers to safeguarding the home environment (the dwelling and its immediate environment) from wastes.
- **Environmental Sanitation**: The control of environmental factors that form links in disease transmission. This category includes solid waste management, water and wastewater treatment, industrial waste treatment and noise and pollution control.
- **Ecological Sanitation**: The concept of recycling the nutrients from human and animal wastes to the environment.

1.3.3. Hygiene

The word hygiene comes from the Greek word “Hygiea”, meaning “goodness for health”, and it deals with personal and community health. Hygiene refers to behaviors that can improve cleanliness and lead to good health, such as frequent hand washing, face washing, hair, closings, tooth, anal, menstrual hygiene and bathing with soap and water.

Good hygiene practices reduce the incidence of diseases like pneumonia, trachoma, scabies, skin and eye infections and diarrhea-related diseases like cholera and dysentery. Washing hands with soap, ash, sand or any locally available detergents at critical times, like after going to the bathroom or before eating, preparing food can have a significant impact on people’s health. It is estimated that washing hands with soap and water could reduce diarrheal disease-associated deaths by up to 50%. A large percentage of food borne disease outbreaks are spread by unhygienic hands. Appropriate hand washing practices can reduce the risk of food borne illness and other infections.

1.4. Hygiene and sanitation procedures

Hygiene and sanitation procedures include:

- Personal hygiene
- Safe and hygienic handling of food and beverages
- Regular hand washing
- Correct food storage
- Suitable dress and personal protective equipment and clothing
- Avoidance of cross-contamination
- Hygienic cleaning practices to avoid cross-contamination
- Use of cleaning equipment, clothes and materials to avoid cross-contamination

- Safe handling and disposal of linen and laundry
- Appropriate handling and disposal of garbage
- Cleaning and sanitizing
- Procedures documented in the organization food safety program, covered by staff training programs and required by the national food safety code

Note that as the explanation of each above points and how hygiene and sanitation procedures and policy will be applied in detail described in the consecutive information sheet of this learning guide.

Self-checking -1	Written Test

PART I: Multiple Choice Question

Direction: Select the correct answer for the give choice and write you answer on the answer sheet .You have allowed 1 Minute for each question and each question have equal two points.

1. An abbreviation that stands for Water, Sanitation and Hygiene is?
   A. WASH
   B. Water
   C. Sanitation
   D. Hygiene
2. A proper disposal of wastes (solid and/or liquid waste) to prevent humans from contact with wastes is?
   A. WASH
   B. Water
   C. Sanitation
   D. Hygiene
3. One of the following deals with personal and community health.
   A. WASH
   B. Water
   C. Sanitation
   D. Hygiene
4. One of the following is not hygiene and sanitation procedures?
   A. Personal hygiene
   B. Regular hand washing
   C. Correct food storage
   D. Promote cross contamination

PART II: Matching Questions

Direction: Match the correct answer for column A from column B. Each Question has equal two points. You have allowed 1 Minute for each question and each question have equal two points.

Column A			Column B
1	Basic sanitation	A	and it deals with personal and community health
2	Onsite sanitation	B	Concept of recycling the nutrients from human and
3	Food Hygiene	C	Refers to safeguarding the home environment from
4	Environmental	D	Refers to the hygienic measures for ensuring food
5	Ecological Sanitation	E	The collection and treatment of waste at the place
		F	management of human faces at the household level

ANSWER SHEET

Name: _____ Date: _____

Answer for Multiple choice		Answer Matching Question	
Question	Answer	Question	Answer
1		6	
2		7	
3		8	
4		9	

Note: Satisfactory rating - 9 points and above **Unsatisfactory - below 9 points**

Information Sheet-2	Identifying and reporting poor organization practices

2.1. Poor organization practices

Poor organization practices may include but not limited:-

- Poor personal hygiene practices
- Poor food handling practices that may result in the contamination of food
- Poor cleaning practices that may result in cross-contamination of food and other items
- Practices inconsistent with the organization's food safety program
- Outdated practices not in keeping with current organization activities

2.3. Ethiopian WASH programs as Organizational Practice

2.2.1. Purpose of WASH

WASH is essential to meet the Millennium Development Goals related to environmental sustainability and health. Optimal WASH enhance medical treatment outcome in health facilities; maintain environmental conditions and increase productivity.

Optimal WASH practice prevents individuals from water born, water washed, water based and other water related diseases as behavioral and facilities get improved. Special emphasis is given to optimal wash practices to prevent children from diarrheal diseases, intestinal parasites, prevent trachoma, scabies, and other water washed problems. This will help to promote the health growth and development of children without any growth faltering. Pregnant and lactating mother benefit from optimal WASH practices as it prevents them from such kinds of diseases and unhealthy condition to improve the health of the child and the mother. It also boosts dignity and help to have healthy and happy life.

2.2.2. Improvements in Water supply and Sanitation

Improvements in water supply and sanitation in the last 20 years have helped to cut the incidence of diarrhea. In addition, optimal wash practice helps family to have healthy and joyful life as wash related diseases do not cost them for medical treatment. This help the economy of the family to be saved. In addition, the working age do not spend their time at hospital for WASH related diseases treatment. It also has benefits for the community as a marker of healthy community when their village is open defecation free and every individual practice optimal WASH behavior. Women feel proud of their hygienic practices help them to take part in any development aspect in the community as their male counterparts.

2.2.3. Aim and Goal of WASH Program

The aim of any WASH programme is to promote good personal and environmental sanitation in order to protect health and prevent diseases. An effective WASH programme relies on an exchange of information between the different WASH stakeholders in order to identify and apply key water, sanitation and hygiene problems and culturally appropriate and sustainable solutions. Ensuring the optimal use of all water supply and sanitation facilities and practicing safe hygiene will result in the greatest impact on public health.

The goal of water and sanitation projects in Ethiopia and throughout the world is to bring benefits to the lives of people by improving the supply of safe water and access to sanitation. Assessing the status of water and sanitation provision and measuring improvement requires a standardized set of definitions of the different types and levels of service. Figure 1 clarifies the terms and presents them as ladders of improvements in water and sanitation.

The idea of the ladder provides a useful measure of progress. Once you have gathered data, by using your knowledge of the sanitation and water supply ladders, you can identify where the majority of people are placed on the ladder. This will enable you, in collaboration with wash stakeholders, to come up with a plan to move the community members up the ladder.

Figure 2: Drinking Water and Sanitation ladder

(Sources: WHO/UNICEF JMP water supply and sanitation categories)

2.4. Challenges of WASH in Ethiopia

Even though, WASH services brings many benefits, the reality on the ground is that globally we are a long way from achieving these benefits for all people. Studies have shown that in many parts of the world, access to WASH services is still very low.

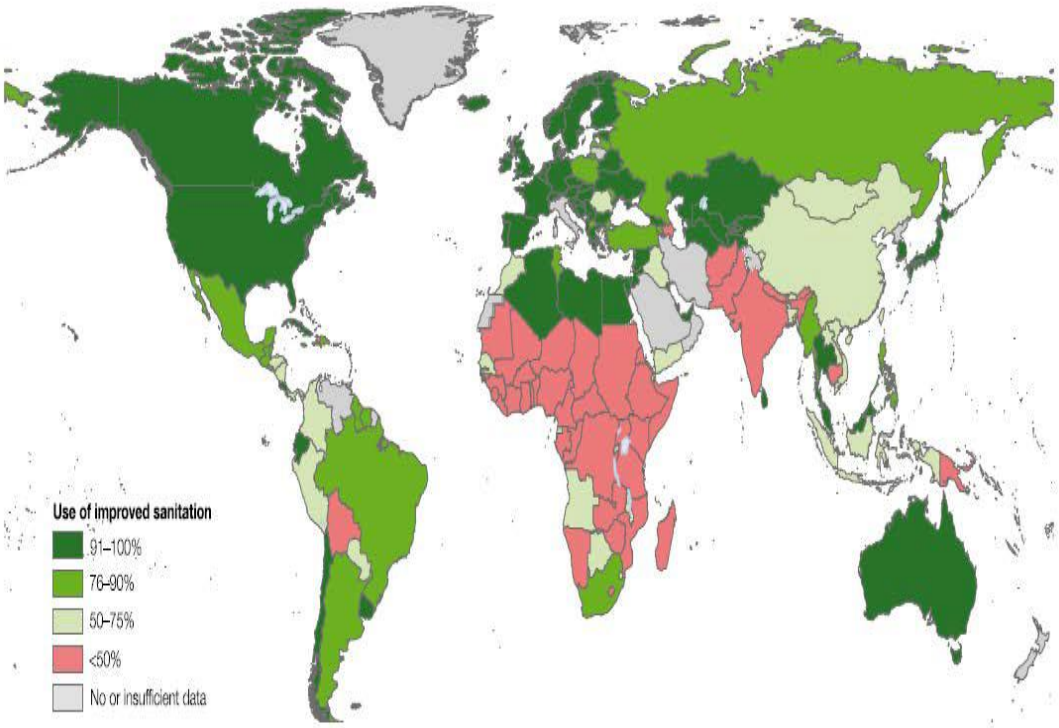

Figure 3: Percentage of population using improved sanitation facilities (GLAAS, 2010)

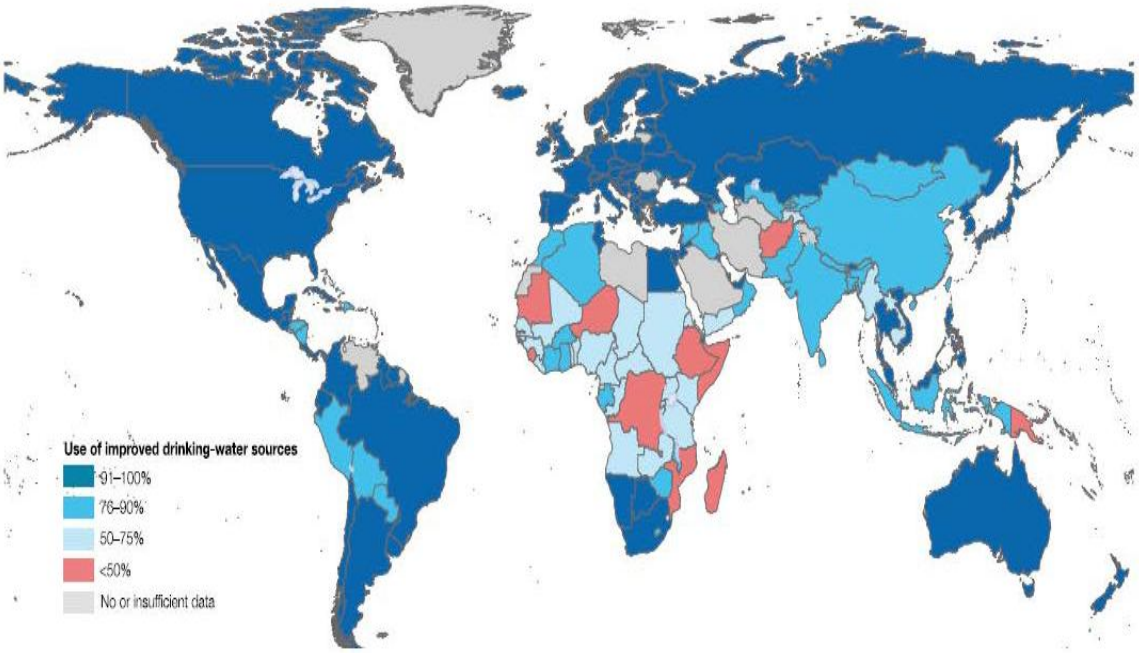

Figure 4 Percentage of population obtaining drinking water from an improved source (GLAAS, 2010)

One WASH National Programme document indicates that in Ethiopia about 37% of the population is still practicing open defecation (JMP, 2014a). In 1990 this figure was 92%, which indicates the significant change in the past 25 years but even with this improvement, the current situation is still appalling.

Some of the common challenges facing the WASH sector in Ethiopia are:

- The scale of the problem,
- The Problem needs huge investment of time and money to design and build new infrastructure.
- There have been a number of other problems with past projects that have reduced their effectiveness.
- These problems include:
  - Some projects have disregarded community participation. This meant the communities did not feel any sense of ownership of the service and failed to look after it.
  - Financial procedures were separate and different for each donor or aid organization, which was inefficient and time-consuming.
  - The need for collaboration between ministries, bureaus and offices on WASH has not been recognized in the past.
  - In many cases, projects were implemented only in selected locations which did not bring benefit to everyone.
  - The level of implementation to bring behavioral change is very limited despite the significant contribution of behavioral change practices to bring optimal wash practices.
  - Subsidy driven approach did not help to sustain some of the interventions in the open defecation free villages and kebeles.

In response to these many challenges, the Ethiopian government has developed the One WASH National Programme (OWNP). The OWNP is a consolidated national programme designed to improve WASH services for the Ethiopian people.

Self checking -2	Written Test

PART I: Multiple Choice Question

Direction: Select the correct answer for the give choice and write you answer on the answer sheet .You have allowed 1 Minute for each question and each question have equal two points.

1. One of the following is **not the common challenges** facing the WASH sector in Ethiopia are?
    A. The scale of the problem
    B. The Problem needs huge investment
    C. projects have disregarded community participation
    D. Equal distribution of WASH service throughout the country
2. One of the following is **not poor organization** practices may include but not limited:-
    A. Poor personal hygiene practices
    B. Poor food handling practices
    C. Poor cleaning and washing practices
    D. Poor practice for food safety program

ANSWER SHEET

Name: _____ Date: _____

Answer for Multiple choice		Answer Matching Question	
Question	Answer	Question	Answer
1		2	

Information Sheet-3	Identifying hygiene hazards that may affect the health &safety

3.1. Introduction

Hygiene and sanitation promote producing safe food. Food safety is achieved through the hygiene and sanitation procedures that we follow to ensure our food remains wholesome and as free from contamination as we can make it. Minimum standards of hygiene and sanitation are prescribed by law and must be followed.

3.2. Hygiene hazards

May include, but not limited to:

- Contaminated food
- Vermin
- Airborne dust
- Items such as linen, tea towels and towels that may be contaminated with human waste, such as blood and body secretions
- Dirty equipment and utensils
- Contaminated garbage
- Use of practices not in keeping with current organisation activities
- Colleagues without appropriate training or understanding of good hygiene practices, policies and procedures
- Equipment not working correctly, such as fridge and temperature probes

3.3. Sanitation and Hygiene Hazards

A hazard is the potential for harm (physical or mental). In practical terms, a hazard often is associated with a condition or activity that, if left uncontrolled, can result in an injury or illness. Identifying hazards and eliminating or controlling them as early as possible will help prevent injuries and illnesses.

- Chemical and biological hazards are agents that can make you sick. They can get into the body through the nose, mouth, or skin to cause harm.
- Chemical hazards are gases, vapors, liquids, fumes or dusts that can result in poisoning, lung disease, skin irritation, or damage to other parts of the body. Examples include cleaning products, asbestos, and pesticides.

Figure 5: Sources of chemical hazard in a household

- Biological hazards are living organisms that can cause infectious diseases and allergies. They include viruses, bacteria, and moulds. Biological hazards are commonly caused by poor sensation and Hygiene Practice.

Diarrhea is the common hazard or problem of poor sanitation and hygiene. Diarrhea is defined as the passage of three or more loose or liquid stools per day. Most diarrheal deaths are among children under the age of five and within low-income countries, the very poor suffer much more from diarrhea than others. While most diarrheal diseases associated with poor WASH tend to be endemic, some are epidemic in nature – notably, cholera and typhoid fever.

Cholera is an acute diarrheal disease that can kill within hours if left untreated, and it is a continual public health problem in many parts of the world. Researchers have estimated that every year there are roughly 1.4 million to 4.3 million cases, and 28,000 to 142,000 deaths per year worldwide. The majority of reported cholera cases and deaths occur in Africa. Furthermore, the continent suffers from explosive outbreaks that result in high levels of both morbidity and mortality.

Self-checking -3	Written Test

Direction: write short answer for the give question. You have allowed 3 Minute for each question and each question have equal 5 points. For your answer use the given answer sheet space.

1. What do you understand about hygiene hazards
2. Write three hygiene hazards
3. What is the difference between chemical and biological hazards

ANSWER SHEET

Name: _____ Date: _____

1----------

2----------

3.----------

Note: Satisfactory rating -7 points and above **Unsatisfactory – below7 points**

You can ask you trainer for the copy of the correct answers.

Information Sheet-4	Taking action to remove or minimize the hazards &safety

4.1. Common Intervention Methods

Sanitation and hygiene promotion are still the two most effective interventions for controlling endemic diarrhoea. An additional potentially critical intervention would be to improve food hygiene, which may prevent many diarrhoea deaths, especially in hot climates where food hygiene is difficult to maintain.

Figure 6 Improper waste management and disposal, example of poor sanitation (Photo Credit: Kefyalew Muleta)

With regard to cholera, although it is largely perceived to be a waterborne disease, person-to-person transmission, limited access to sanitation, an inadequate water supply and poor hygienic practices may contribute to the rapid progression of an epidemic.

4.2. Control Measures

The effect of interest here is the reduction in diarrheal disease as a result of improvements in WASH. It is not necessarily helpful to separate out the three WASH interventions, as they act upon interlinked transmission pathways, and often cannot be provided in isolation from each other.

4.3. The Hierarchy of Control Measures

The principle that some control measures are better than others is well established in health and safety management systems and legal systems across the world. The Hierarchy of Controls, an internationally established framework to prevent and control safety and health hazards by identifying effective interventions promoted by the international labour organization (ILO), holds that the most effective intervention is complete elimination of the hazard.

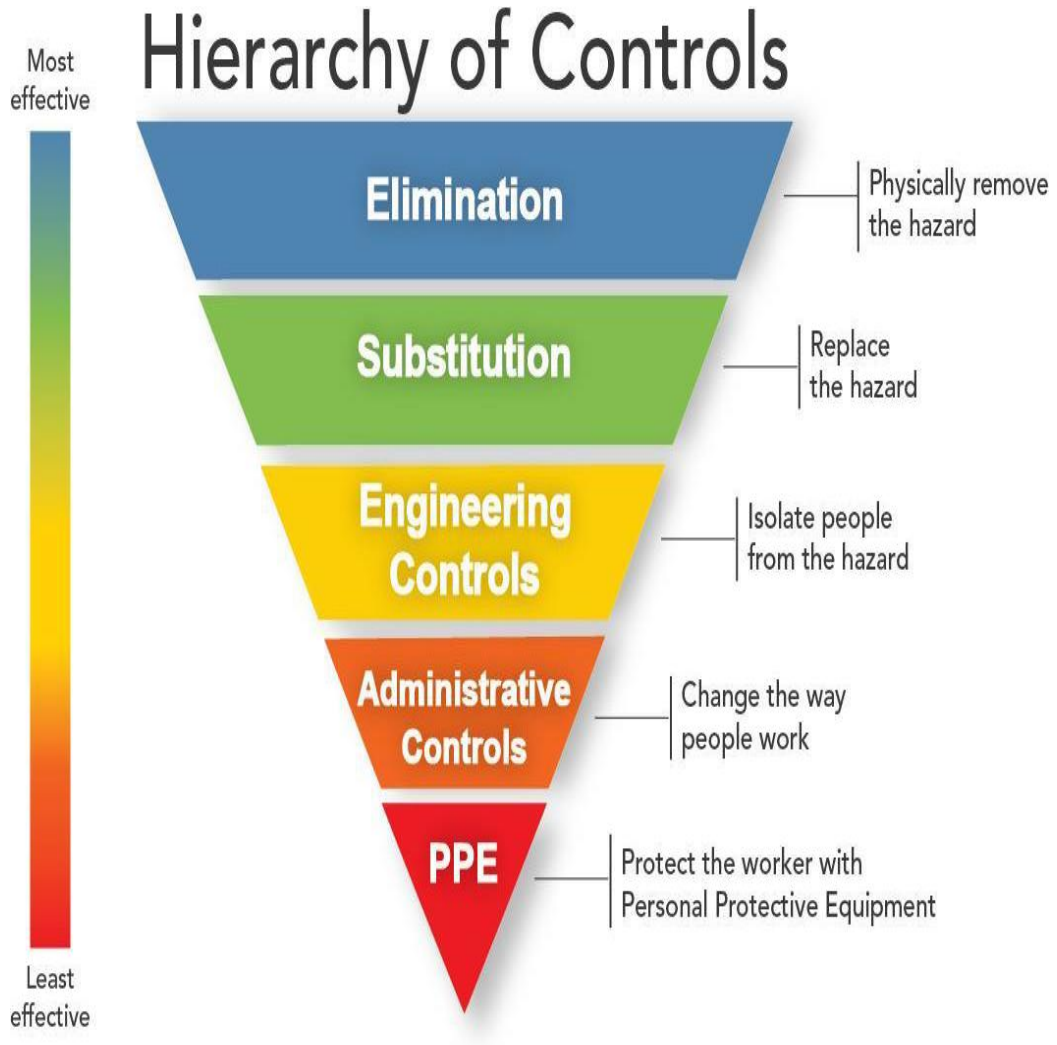

Figure 7: The hierarchy of control measures

The diagram on figure-9 above makes it clear that the best solution to a workplace safety or health problem is to remove the hazard altogether. Where that is not possible replacing the hazard with something which is less risky is preferred. Where that is not possible solutions which are engineered into the system and provide protection automatically to most workers are preferred.

The hierarchy of control measures contains six risk control measures, in order of priority:

1. Elimination or substitution of hazards
2. Tools, equipment, technology and engineering
3. Safe work methods
4. Hygiene and welfare
5. Personal protective equipment
6. Health/medical surveillance

Figure 8: some health hazards that you may find

The risk control measure of hygiene and welfare provides a distinct consideration for WASH in order to promote welfare in the workplace. In a risk assessment, stakeholders must evaluate and decide if their existing hygiene and welfare facilities prove sufficient to cope with the risks from the workplace hazards.

The following table provides some examples in broad categories, which may assist in the process of tailoring training tools with WASH principles.

Table 1: Intervention methods of hazards related to WASH

WASH hazard prevention/control method	Examples of interventions
Elimination	▸ Incorporate safe, adequate, and dignified WASH access in worksite design ▸ Design safe WASH access for people with disabilities
Substitution	▸ Eliminate/minimize the provision of nutrition-poor beverages and provide sources of safe drinking water
Engineering controls	▸ Water supply piped to premises ▸ Various high- and/or low-tech water purification technologies and devices ▸ Provide portable drinking water stations, water coolers, or water fountains ▸ Provide hands-free and continuous hydration systems for outdoor workers who are exposed to heat ▸ Improve and upgrade sanitation facilities (e.g. improved engineering in the construction of latrines)
Administrative controls	▸ Allocate rest breaks and arrange compensations not to discourage rest breaks ▸ Establish privacy rules/ mechanisms for bathrooms and toilets ▸ Provide hygiene awareness training and information for both supervisors and workers ▸ Institute housekeeping practices, including the cleaning and maintenance of sanitary facilities, cooking areas, welfare facilities, locker areas, and temporary worker housings.
Hygiene and Welfare	▸ Provide washing and sanitary facilities ▸ Store contaminated work clothing and personal protective equipment (PPE) in an appropriate place and do not allow workers to take them home ▸ Provide laundering facilities to clean contaminated work clothing ▸ Provide clean water
PPE and protective clothing	▸ Provide gloves, aprons, and other protective gear for improved hygiene ▸ Use separate clothes at work when there is an exposure transfer possibility between the workplace and the home

4.4. Eliminating Hazards

Considering safe and adequate WASH early at the workplace design stage is the most effective way to eliminate hazards. The design stage could plan WASH accessibility for people with physical disabilities, gender-specific sanitary facilities, privacy issues, and other.

"Administrative controls" refer to worksite policies and practices aimed at controlling WASH related hazards and exposures, like cleaning and storing PPE and protective clothing provide a barrier between a worker and pesticides. WASH principles are particularly relevant for the proper maintenance of PPE, as well as for effective decontamination after use to reduce the risk of hazardous exposures for workers, and for their families (in the form of "take-home exposures").

A WASH-focused hazard identification process during worksite walk-through inspections can use measures like the provision of safe drinking water, gender-specific toilets that can be used in privacy and dignity, hand-washing stations, sanitation facilities (e.g. showers, lockers for personal clothes), welfare facilities (kitchens,

cantinas, rest areas), as well as general tidiness of the work environment. It can also help detect less obvious organizational factors, like worksite WASH policies and practices, rest-room breaks, work hours, and compensation mechanisms that may shorten rest breaks (e.g. piece rate vs. hourly wages).

Self-checking -4	Written Test

Direction: write short answer for the give question. You have allowed 3 Minute for each question and each question have equal 5 points. For your answer use the given answer sheet space.

1. What is the use of sanitation and hygiene promotion
2. What action do you recommend in reduction of diarrhea
3. Write the components of the hierarchy of control measures
4. How do you minimize risk?

ANSWER SHEET

Name: _____ Date: _____

1----------

2----------

3.----------

4.----------

Note: Satisfactory rating 10 points and above points **Unsatisfactory – below10**

Information Sheet-5	Reporting hygiene hazards promptly to appropriate person &safety

5.1. Introduction

The direct use of water by people falls into three main categories: domestic uses, including drinking, washing and cooking; agricultural uses, principally irrigation; and industrial uses, in manufacturing processes and for energy generation. Increasing water demand leads to unsustainable use of water resources. Many areas with plentiful supplies can sustain this use, but in some countries the future may bring water shortages unless demand is managed. In practice, for Ethiopia, the problem of water supply is not so much about the volume of water that is available.

The productivity implications for households of not having an adequate supply of water for domestic uses (drinking, cooking, dishwashing, bathing, laundry, and cleaning) can fairly comfortably be separated into two general categories: the costs to households of water-related diseases, and the costs associated with the collection of water from a distant source. This chapter focuses on practices on water use with the management concerns.

5.2. Household water use

The most obvious uses of water for people are drinking, cooking, bathing, cleaning, and for some watering family food plots. This domestic water use, though crucial, is only a small part of the total.

Far more water is needed to produce food and fiber (cereals, fruits, meat, cotton) and maintain the natural environment. Providing six times more water now than a hundred years ago, an enormous task, has significant impacts on people and the environment.
The amounts for personal use (drinking, cooking, and bathing) are relatively small compared with other uses. And in developed countries the water fit to drink is mostly used to flush toilets, water lawns, and wash dishes, clothes, and cars.

In many Sub-Saharan countries, the average per capita use rates are undesirably low (10–20 liters per person a day) and need to be increased. In many larger cities of Asia and Latin America the total water produced by utilities is very high, from 200–600 liters

per person a day, but up to 70% is lost to leaks. Service is often undependable, and water quality is often unreliable.

5.3. Factor Affecting Water Use

- Climatic conditions
- Living Standards-economic status
- Industries
- Socio-demographic characteristics (size of the city, family size, sex, religion, habit of the people…)
- Quality of water: If water is aesthetically and medically safe, the consumption will increase as people will not resort to private wells, etc.
- Pressure in the distribution system.
- Efficiency of water works administration: Leaks in water mains and services; and unauthorized use of water can be kept to a minimum by surveys.
- Cost of water.
- Policy of metering and charging method: Water tax is charged in two different ways: on the basis of meter reading and on the basis of certain fixed monthly rate.

5.4. Internal and external water uses

5.4.1. Internal Water use (Domestic water demand)

This includes the water required in residential buildings for drinking, cooking, bathing, lawn sprinkling, gardening, sanitary purposes, etc. The amount of domestic water consumption per person varies according to the living standards of the consumers.

In most countries the residential demand constitutes 50 to 60% of the total demand. Domestic in-house consumption for average middle class properties having a kitchen, a bath facility and waterborne sanitation falls into a fairly narrow range of 120 – 160 lcd, irrespective of climate or country.

The quantities of water needed for domestic use may vary according to the climate, the sanitation facilities available, people's normal habits, their religious and cultural practices, the food they cook, the clothes they wear, and so on. Water consumption generally increases the nearer the water source is to the dwelling.

Table 2: Basic survival water needs

Basic survival water needs	
Survival needs: water intake (drinking and food)	2.5-3 liters per day
Basic hygiene practices	2-6 litres per day
Basic cooking needs	3-6 litres per day
Total Basic water needs	7.5-15 itres per day

5.4.2. External water use (Non domestic water demand)

Non domestic demands comprise:

- Commercial water demand includes that portion required by establishments such as hotels, shopping centers, service stations, movie houses, airports, etc. The commercial water demand may vary greatly depending on the type and number of establishments.
- Industrial water demand constitutes water consumptions by various industries like tanning, brewery, dairy, etc.
- The quantity of water required for commercial and industrial purposes can be related to such factors as number of employees, floor area of the establishment, or units produced.
- Institutional water demand: Hospitals, schools, universities, government offices, military establishments, etc.
- Agricultural water demand: use for crops, livestock, horticulture, greenhouses, dairies and farmlands.

Estimating industrial demand can be complex. The same industry in a different environment cause significantly different quantities of water per processed unit. This could be due to variations in production process, water use, water efficiency, water recycling and possibly tariff structure influence the specific usage by an industry.

Public water use: This is the quantity of water required for public utility purposes and includes water for public institutions like schools, watering of public parks, washing and sprinkling of roads, use of public fountains, clearing wastewater conveyance, etc.

Unaccounted system losses and leakage: This includes water lost or unaccounted for because of leaks in main and appurtenances, faulty meters, and unauthorized water connections. These and other components of non-legitimate use are categorized as:

Apparent losses: source and supply meter errors, unauthorized or unrecorded consumption, and

Real losses: leakage from transmission and distribution mains and service pipes upstream of consumers' meters, from valves, hydrants and washouts and leakage and overflows from the water utility's storage facilities.These losses should be taken in to account while estimating the total requirements. Losses and leakage may reach as high as 35% of the total consumption in the case of Addis Ababa.

Fire demand: The quantity of water required for fire protection should be easily available and kept always stored in storage reservoirs. Fire hydrants are usually fitted to the water mains and fire-fighting pumps are connected to these mains by the fire brigade personnel when a fire breaks out. Although the actual amount of water used for firefighting in a year is small, the rate of use is high. The following empirical equation may be used to estimate fire demand.

5.5. Variations in water consumption/use

Due to various factors there are great fluctuations in seasonal, daily and hourly water demands. Such factors include size of the city, climatic conditions, living standard, industrial and commercial activities, pressure in the distribution system, system of supply, cost of water, policy of metering and method of charging. The water demands used for the planning and design of water supply systems include annual average day demand, maximum day demand and peak hour demand.

- **Annual average day demand ($Q_{day\text{-}avg}$)** represents the average daily demand over a period of one year. For economical calculations and firefighting.
- **Maximum day demand ($Q_{day\text{-}max}$)** represents the amount of water required during the day of maximum consumption in a year. Important for water treatment plants and water storages.
- **Peak hour demand ($Q_{hr\text{-}max}$)** represents the amount of water required during the maximum hour in a given day. Important for design of distribution systems.

5.6. Potential hazards in house hold water uses

5.6.1. Hazard and risk

Hazards may occur or introduce throughout water system from catchment to consumer. Effective risk management therefore requires identification of all potential hazards, their sources. A hazard is any biological, chemical, physical or radiological agent that has the potential to cause harm.

A water resource, water supply or water use hazardous if their deterioration of quality due to the presence of contaminant or sustainability is impacted by factors that reduce the adequacy which increase the is a risk of the water use.Risk is the likelihood of identified hazards causing harm in exposed populations in a specified timeframe, including the magnitude of that harm and/or the consequences. Possible potential hazards events and assessments of risk. Types of potential hazards include Biological hazards, Chemical hazards and Physical hazards.

5.6.2. Biological hazards

These hazards include the presence of frank and opportunistic pathogens such as: Bacteria; Viruses; Protozoa; and Helminthes. Other, non-pathogenic organisms that influence the acceptability of drinking-water should also be considered. It is not necessary or practical to completely eliminate microorganisms from drinking-water supply systems. What is required is to keep numbers of pathogens below levels determined to represent an acceptable level of risk as outlined in the water quality targets. Pathogens in water supply systems generally infect via contamination from human or animal fecal material contaminating raw water or that finds its way into the water supply delivery system.

5.6.3. Chemical Hazards

A chemical hazard can be considered as any chemical agent that may compromise water safety or suitability Examples of chemical hazards that may occur in drinking-water supply systems include chemicals from watershed/ catchment (Nitrate, Arsenic Fluoride Pesticides), chemicals from reservoir storage (Algal toxins Cleaners Liner Chemicals Lubricants) and chemicals from water treatment processes (Flocculants pH adjusters Disinfection by products).

5.6.4. Physical hazards

Physical hazards may affect water safety by posing a direct risk to health (e.g. through choking), through reducing the effectiveness of treatment and in particular residual disinfectants or because consumers find the water unacceptable and use alternative, more contaminated water sources. The most common physical hazard in water is sediment within the water supply. Sediments and particulates can also include pipe materials, pipe liner materials, sloughed biofilms or iron and manganese films.

Suspended or re suspended sediments can contain toxic chemicals or can have pathogens attached and can co-transport other hazards.

5.7. Effective communication strategies

5.7.1. Communication strategies

A successful water use survey program needs effective communication and reporting of results to stakeholders. It is important to establish appropriate systems of reporting to all relevant bodies to support the development of effective remedial strategies.

5.7.2. Target Audiences

The target audiences for water use survey information will typically include: public health officials at local, regional and national levels; watersuppliers; local administrations; communities and water users; local, regional and national authorities responsible for development planning and investment.

As the community participation is a desirable, particularly for community and household drinking-water supplies since they are the primary beneficiaries of improved drinking-water supplies. Therefore, community members have a right to take part in decision-making that can be drawn upon for local knowledge and experience. They are the people who are likely to first notice problems in the drinking-water supply and therefore can provide an indication of when immediate remedial action is required.

Communication strategies should include: provision of summary information to consumers (e.g. through annual reports, meetings or the Internet); establishment and involvement of consumer associations at local, regional and national levels. It is important to ensure, the simple right of access to information to individuals and provide awareness on the quality or safety of the water supplied to them.

5.8. National and local government legislation

The relevant National, local & industry government legislation and regulations are;

- The Ethiopian Water Policy
- National Water Resources Management Policy
- National Hygiene and Sanitation Strategy and the Ethiopian Water Sector Strategy.
- The relevant formal agreements are the WASH Memorandum of Understanding (MoU)

- WASH Implementation Framework (WIF), both signed by Ministry of Health, Ministry of Water and Energy, Ministry of Education and the Ministry of Finance and Economic Development.

Self-checking -5	Written Test

Direction: write short answer for the give question. You have allowed 3 Minute for each question and each question have equal 5 points. For your answer use the given answer sheet space.

1. List the factors that affect water use in a household
2. List the types of internal and external water use
3. List the two strategies used to communicate and interact with community and consumers?
4. What are the two major communication strategies that are used in water use assessment?

ANSWER SHEET

Name: _____ Date: _____

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Note: Satisfactory rating 10 points and above **Unsatisfactory – below10 points**

Instruction sheet	Learning Guide 17: identify hazards

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Accessing and using hazard identification tools and template
- Using appropriate methods to identify actual or foreseeable hazards
- Keeping records of hazards are identified according to organization procedures

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon completion of this Learning Guide, you will be able to**:

- Access and use hazard identification tools and template
- use appropriate methods to identify actual or foreseeable hazards
- keep records of hazards are identified according to organization procedures

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below
3. Read the information written in the “Information Sheets 1- 4”. Try to understand what are being discussed.
4. Accomplish the “Self-checks 1,2, 3 and 4 ” in each information sheets on pages 32,36,39 and 55.
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If you earned a satisfactory evaluation proceed to “Operation sheets 1, and 2 on pages 58 and 59 and do the LAP Test on page 60”.

Information Sheet-1	Accessing and using hazard identification tools and template documents

1.1. Introduction

Hazard identification is the process of identifying hazards in water supply system sanitation and hygiene at house household and/or community level. In order to understand what hazard identification involves, it is first necessary understanding the nature of hazards in water supply systems.

Hazard identification process includes:

- Self-designed tools developed for the organization as part of an OHS management system tools and templates developed:
- By external consultancy services
- By industry associations for use by member businesses
- For public use and found within business management publications, including those developed by OHS regulatory authorities self-designed tools

1.2. Hazard Identification Methods and Procedure

1.2.1. Definition of Hazard Identification

Hazard identification includes:

- Physical hazards
- Chemical hazards (nitrate, arsenic, fluoride, pesticides, algal toxins, cleaners' liner chemicals lubricants, flocculants, ph. adjusters, disinfection byproducts, copper, lead, cleaners' petroleum, heavy metals, organic toxicants, herbicides, rodenticides, pesticides, impurities in treatment chemicals)
- Biological hazards (bacteria, viruses, protozoa, and helminthes)

The objectives hazard identifications to make sure sustainable, safe, and adequate water supply system is established and maintained; hygienic practices are the ways of life by using sanitation facilities so as to ensure the nutritional and health status of community/households. It is making the WASH facilities free from the hazards to improve health and productive community.

1.2.2. Methods of Hazard identification

There are a number of activities, which can be undertaken as an aid to identifying the hazards present in the community. These activities, which will assist in the hazard identification process, include:

- Walking through the community service area (such as toilet, schools, water points, religious area etc.);
- Take notes of 'people issue' or any special character. Example illness.
- Conducting household/ community area inspections; and/or
- Use checklists
- Analyzing available information from the local institutions like health facilities, religious facilities, etc.

There are several methods which are used to identify hazards, such methods include: -

1. Inspecting procedures
2. Conduct of site safety audits
3. Completion of a safety checklist
4. Observation of daily activities
5. Investigation of accidents and incidents
6. Review of injury or illness registers
7. Environmental monitoring of the workplace
8. Investigation of staff complaints or reports of safety concerns
9. Review of staff feedback via consultative processes such as meetings, surveys or suggestion box submissions.

In this level, the Inspecting procedure method of hazard identification has taken as an example and discussed as below.

1.3. Sanitary Inspection of Home

Good-quality water can be supplied by water utilities but there is potential for the water to become contaminated by the user through using unclean water vessels for collection of the water, and poor handling practice at home (for example, by not storing the water carefully, and using contaminated containers to take water from the storage vessel).As you know, water is said to be safe to drink when it is free from pathogens and from physical and chemical contaminants. This needs to apply right up to the point when the

water is drunk. Identifying and assessing the potential risks associated with the collection, storage and use of water is therefore a very important part of the inspection.

Figure 9: Water being collected at hand pump in rural Ethiopia (WHO, 1997)

If you were conducting a sanitary inspection, you would need to ask users or observe their practice on:

- How they collect the water and the types of vessel they use (for example, jerry cans, buckets or pots)
- How the vessels are handled and stored when not in use
- Whether the vessels are used for purposes other than water collection that may contaminate them
- Whether users know how to collect safe water and keep it safe
- How often the water container is washed using detergents?
- Whether the water is treated or disinfected after collection
- Hygiene practices of users (especially those of young children).

1.4. Appropriate methods

May include, but not limited to:

- Conduct of site safety audits
- Completion of a safety checklist
- Inspections of the workplace
- Observation of daily activities
- Investigation of accidents and incidents
- Review of injury or illness registers
- Environmental monitoring of the workplace
- Investigation of staff complaints or reports of safety concerns
- Review of staff feedback via consultative processes, such as meetings, surveys or suggestion box submissions

1.5. Stakeholder in Hazard Identification

1.5.1. Definition of Stakeholders

A stakeholder is defined as any individual, group or organization that has an interest in something. In this instance we are talking about the stakeholders with an interest in the provision of water, sanitation and hygiene in Ethiopia. Those stakeholders may be part of or associated with non-governmental and government organization.

The major four stakeholders of the government from national to woreda/community level with their role and responsibilities of sanitation and hygiene summary are given below:

- Ministry of Water, Electricity and Energy (MoWIE) – provide water supply and perform water testing
- Ministry of Health (MoH)- concerns sanitation, hygiene, water quality monitoring and WASH in health institutions.
- Ministry of Education (MoE)- WASH and health clubs in schools, support to Technical and Vocational Training Colleges and Health Science Colleges

- Ministry of Finance and Economic Development (MOFED)- public financial management, channeling government and donor funds, and financial management and reporting.

In addition to the above four GSH, there are several other government stakeholders that involved in water supply, sanitation and hygiene.

- Directorates of Women, Children and Youth Affairs
- Ministry of Federal Affairs
- Water Resources Development Fund
- Ministry of Urban Development, Housing and Construction development partner as one stakeholders consist of various types of organization and groups of people that contribute to address water, sanitation and hygiene problems.

There are three main types of non-governmental stakeholder: -

1. **Major stakeholders:** These are organizations that directly contribute funds to COWASH account (CWA) at federal level.
2. **Associated stakeholders:** These are organizations that provide funding for the construction of water supply, sanitation and hygiene facilities, technical assistance, supplies and other support.
3. **Collaborating stakeholders:** These are organizations that provide assistance to sanitation and healthy sector Programme other than construction of WASH facilities.

Development partner is a term that is widely used in the field of international development aid to describe any organization working in partnership with national and local government bodies. It does not have a precise definition – there are different types of partnership – but it is applied to organizations that provide development assistance in some form. The development partners include:

- Donors,
- Non-governmental organizations/civil society organizations,
- Non-governmental organization
- Civil society organization

- Development Assistance Group /Water Sector Working Group
- Private Sectors
- Community organizations

Self-checking -1	Written Test

Direction: write short answer for the give question. You have allowed 3 Minute for each question and each question have equal 5 points. For your answer use the given answer sheet space.

1. Write the three type of hazards
2. Write how you perform sanitary inspection at home
3. Write three points in which how you can identify hazards
4. What are appropriate methods in hazard identification
5. Write stakeholders involved in hazard identification
6. Write three development partnered evolved in hazard identification process

ANSWER SHEET

Name: _____ Date: _____

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Note: Satisfactory rating 7 points and above **Unsatisfactory – below7 points**

Information Sheet-2	Using appropriate methods to identify actual or foreseeable hazards &safety

2.1 Environmental Hazards and impact

Environmental risks and impacts may include:

- Impact of mismanagement of chemicals
- Impact of mismanagement of biological agents
- Detrimental impact on limited water resource
- Spillage
- Waste disposal
- Detrimental impact on urban and non-urban water catchment areas
- Detrimental impact on rivers, waterways and channels
- Unsatisfactory water and wastewater treatment processes
- Unsatisfactory trade waste treatment and disposal processes
- Poor construction processes

2.1.1 Direct Effects

An irrigation scheme draws water from groundwater, river or lake and distributes it over an irrigated area. Hydrological, or direct, effects of doing this include reduction in downstream river flow, increased evaporation in the irrigated area, increased level in the water table as groundwater recharge in the area is increased and flow increased in the irrigated area.

2.1.2 Indirect Effects

Indirect effects are those that have consequences that take longer to develop and may also be longer-lasting. The indirect effects of irrigation include the following:

- Water logging
- Soil Stalinization
- Ecological damage

- Socioeconomic impacts

2.2. Agents causing Water Quality Hazards/Contamination

There are different agents that affect the water quality, some of those are mentioned below:-

- **Natural contaminants:-**When it comes to discussing what factors affect water quality, natural contaminants are the ones which are completely outside our control. This includes contamination caused due to dried leaves, dead insects, bird droppings, animal feces reaching the natural sources of water.
- **Agricultural contaminants:-**These are the factors like agricultural runoffs, fertilizers, cleansers which reach the natural source of water and pollute it. Pesticides used on the crops also eventually seep down and contaminate the ground water.
- **Industrial contaminants:** The list of what factors affect water quality will be incomplete without mentioning about industrial wastes being dumped directly in rivers. There are various hazardous chemicals which also pollute the ground water by seeping in along with rain water.
- **Microbial contaminants:** These are the contaminants like bacteria, viruses, cysts which comfortably dwell in the old and rusty industrial pipes and when water travels through these pipes to reach your home, they get added to it. There are other contaminants like algae and traces of rust which also get added in similar manner.
- **Human added contaminants:** Though this may sound strange but yes we too knowingly/unknowingly pollute the water. One way is what water companies do - add chlorine in water to prevent microbes but this is how knowingly chlorine gets added to the water.

2.3. Pollution

Air pollution and the act of dumping waste into the water supply can have devastating effects on the quality of your water. Air pollution mixes with the water in the atmosphere and can come down in the form of polluted rain. When this gets into the water supply, it can create a dangerous situation. Waste dumped into the water directly has obvious negative effects. Commercial filtration systems work hard to clean up polluted water, but it is not a perfect system.Over the last several years, municipalities spent billions of

dollars replacing copper and iron pipes with safer conduits made of more durable materials.If your city or town still uses iron or copper pipes to move water underground, then that can create problems. Older iron and copper pipes begin to corrode and introduce potential toxins into your water.

In many cases, iron or copper pollution in drinking water makes the water a brownish color, or you will see flakes in the water as it comes out of your faucet. Contact your local health authority for the proper advice on how to deal with this kind of situation.

Figure 10.Rural communities fetching unsafe water for their consumptions

2.5. Water Pollution prevention and hazard minimization methods

The best way to prevent water pollution is to not throw trash and other harmful chemicals into our water supplies. Here are a few more ways you can prevent water pollution:

- Wash your car far away from any storm water drains
- Don’t throw trash, chemicals or solvents into sewer drains
- Inspect your septic tank system every 3-5 years
- Avoid using pesticides and fertilizers that can run off into water systems

- Sweep your driveway instead of hosing it down
- Always pump your waste-holding tanks on your boat
- Use non-toxic cleaning materials
- Clean up oil and other liquid spills with kitty litter and sweet them up
- Don’t wash paint brushes in the sink

Self-checking -2	Written Test

Direction: write short answer for the give question. You have allowed 3 Minute for each question and each question have equal 5 points. For your answer use the given answer sheet space.

1. How can agriculture affects water quality?
2. Mention some of the natural contaminants which affect the quality of water?
3. Which types of conduit pipes are recommended for water distribution system to minimize contamination of water?
4. If you are one of water user (consumer) in your town or village, how can you prevent the contamination of your water source?

ANSWER SHEET

Name: _____ Date: _____

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Note: Satisfactory rating 7 points and above **Unsatisfactory – below7 points**

You can ask you trainer for the copy of the correct answers.

Information Sheet-3	Keeping records of hazards are identified according to organization procedures

3.1. Recording and Reporting in Hazard Identification

Potential WASH should be monitored through the water system and periodic checkup should be planned and performed in to minimize the risks and take timely action. To do that the water cadre should document the conventional WASH system.

The recording of WASH hazards is classified as:

- Certain hazards that could potentially case catastrophe: once a day
- Hazards likely to happen: one per week
- Hazards that happen moderately: one per month
- Hazards unlikely to happen: one per year
- Rarely happening hazards: one every five years

Recoding these hazards do not address the safety and sustainability of the WASH system. It need to be reported in order to taking corrective action at all. Therefore, formal reporting system for the performed activities and additional support for further intervention should be communicated timely to the respective WASH government sector/stakeholder.

Self-checking -3	Written Test

Direction: write short answer for the give question. You have allowed 3 Minute for each question and each question have equal 5 points. For your answer use the given answer sheet space.

1. What is hazard identification?
2. List at least 3 hazard identification methods?
3. Describe some duties of sanitary technician in sanitation and hygiene hazard identification
4. List stakeholder that is involved in your resident hazard identification?

ANSWER SHEET

Name: _____ Date: _____

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Note: Satisfactory rating 10 points and above **Unsatisfactory – below10 points**

Instruction sheet	Learning Guide 18: Report any Personal healthy Issue

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Reporting any personal health issues
- Reporting incidents of food contamination that have resulted from the personal health issue

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon completion of this Learning Guide, you will be able to**:

- Report any personal health issues that are likely to cause a hygiene risk
- report incidents of food contamination that have resulted from the personal health issue

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 3 to 20.
3. Read the information written in the “Information Sheets 1”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
4. Accomplish the “Self-check at tje end of each information sheet before you proceed next information sheet.
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check by yourself).

Instruction sheet-1	Reporting & personal health issues

1.1. Introduction

Water utilities are responsible for putting fully treated water into the distribution system, but it can become contaminated after it has left the treatment works if not handled with care. The contamination can originate from several different sources, but it is obviously important to eliminate any introduction of fecal material for health reasons. The water sources used for supplying water were not always clean. Household water treatment can help improve water quality at the point of consumption, especially when drinking-water sources are distant, unreliable or unsafe.

However, household water treatment should be viewed primarily as a stop gap measure only; it does not replace the obligation of a service provider to provide access to safe drinking water. It is intended for people who have no access to improved drinking-water sources, for people with access to improved sources outside of their home or premises (i.e. when contamination can occur during transport and storage), for people with unreliable piped supplies who have to store water to bridge the gaps between deliveries, and for people in emergency situations.

1.2. Methods of safe household water collection

Households in urban areas that do not have a tap connection in their house or yard will probably collect water from a water point or kiosk. Even where there is a household connection, residents may sometimes need to use other sources, for example if there is a break in supply. In longer-term emergency situations, safe water may be delivered by tanker to residential areas for distribution to householders. In both of these instances, collection vessels such as those shown in Figure 6.1 will be used to carry water to the home.

Figure 11: commonly used water collection vessels

A water container has to be clean, and must not previously have been used to contain any toxic material (such as pesticides). Ideally, the mouth of the vessel should be narrow and it should have a lid. It should have handles so that it can be carried easily.

- Why is it better to have a container with a narrow opening?
- This reduces the chances of contamination because less of the water is exposed. Most importantly, people will not be able to put their hands into the water, which is one of the most likely sources of contamination.

1.3. Homemade water treatment methods

There are different methods of household water treatment that can be grouped under sedimentation, filtration and disinfection. These processes are essentially the same as the conventional water treatment techniques. The only difference is that in the household they are applied on a smaller scale.

1.3.1. Sedimentation

Sedimentation is the removal of suspended solids through the settling of particles. Just as in the water treatment works, if the water is turbid (muddy), then giving it time to settle (become calm) helps in sedimentation. This process can be assisted by adding a coagulant that encourages the formation of larger, heavier particles (flocculation) that then settle easily to the bottom of the container and make the water clear. At the household level, natural coagulants can be used such as the crushed, dry seeds of the **Moringa fruit**, shown in Figure below. Moringa fruit comes from Moringa trees, which grow in tropical countries.

Figure 12: Fruits of Moring Olifera

After the suspended particles have settled, the clear water at the top can be carefully poured into another container for further processing. The three-pot method is one method of sedimentation.

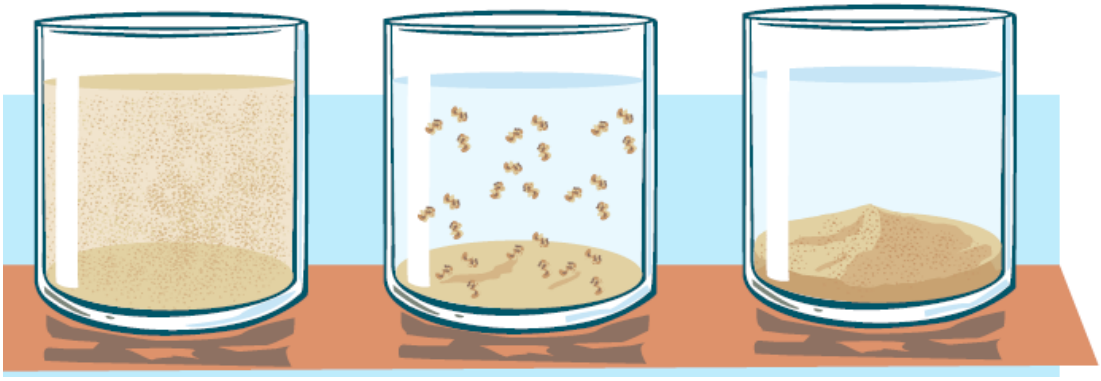

Figure 13: Sedimentation process

1.3.2. The three-pot method

The three-pot method (Figure below) is a means of reducing dirt and micro-organisms in water, by storing the water in a container, allowing the dirt to settle, and moving the cleaner water to different containers over time. Water in a container should be allowed to settle for a day before it is decanted into the next container. Only water from Pot 3 should be consumed. The three-pot system is low-cost, easy to use and is something people can do themselves. However, it does not totally remove disease causing micro-organisms, so some method of disinfection is still needed to remove the risk of disease completely.

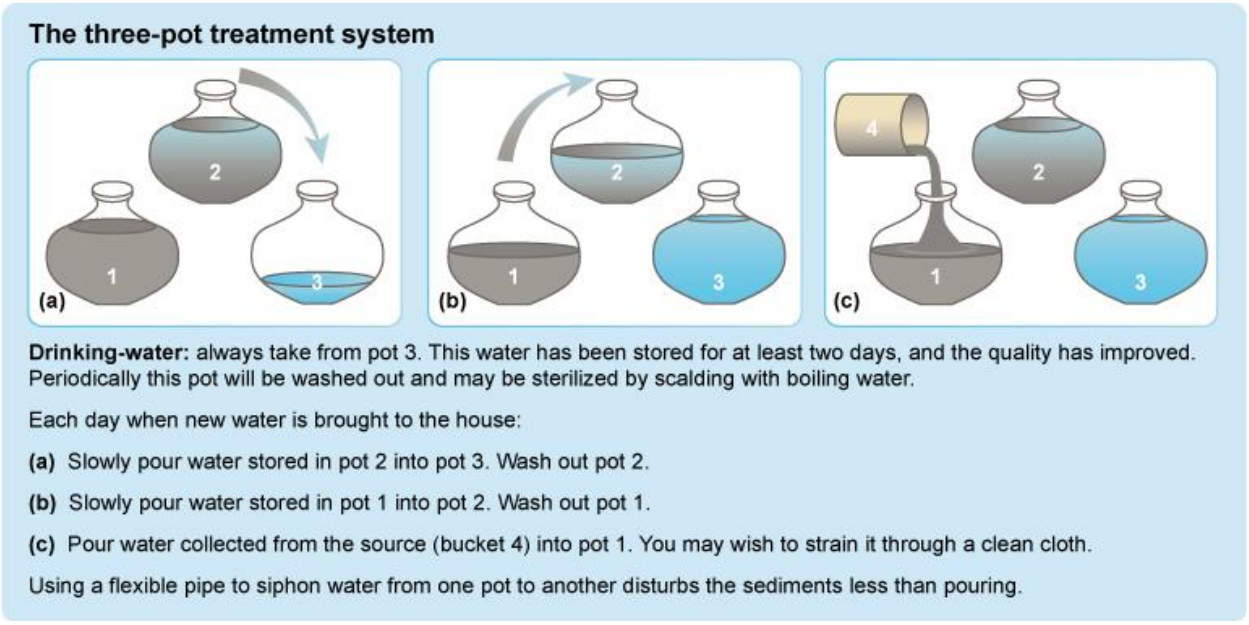

Figure 14: The three-pot water treatment system (IFRCRC, 2008)

1.3.3. Filtration

Filtration is another method of removing suspended particles and is also relatively easy. There are several different methods of filtration that can be used in the home.

A. Cloth filtration

Cloth filtration) is cheap, easy to carry out and a common water treatment technique. Pouring turbid water through a piece of fine, clean cotton cloth will remove larger contaminants and a certain amount of suspended solids. It is better to use a used, rather than new, piece of cloth. Once cloth has been washed several times, the gaps between the fibers it is made from are smaller and therefore better for trapping any solid matter.

Figure 15: Cloth Filtration

B. Household sand filtration

A household sand filter can usually be made from locally available and inexpensive materials like clay pots or barrels. They are simple and easy to use. One such system consists of a pot and a storage vessel (Figure below).

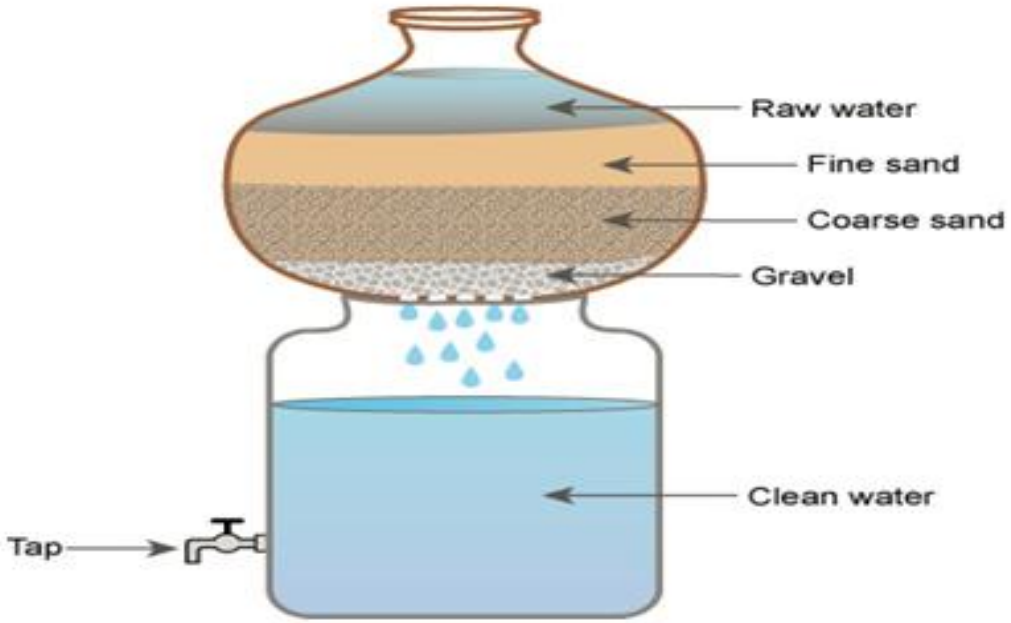

Figure 16: A household sand filter system, comprising a pot and a storage vessel

The details of the system are as follows:

1. The bottom of the pot is perforated (has tiny holes in it).
2. The pot contains layers of gravel (about 5 cm deep), coarse sand (about 5 cm deep) and fine sand (about 10 cm deep).
3. Water is poured in at the top and, as it passes through the layers, any particles within it are filtered out.
4. Clean water drips into the storage container.
5. The storage container should have a tap to enable the clean water to be drawn out easily and safely.
6. The sand and gravel should be changed when the rate of filtration starts to slow; at a minimum it should be changed every two to three months.

C. Ceramic filtration

For **ceramic filtration**, a water filter in the form of a ceramic pot can be made using clay, sawdust or rice husks, and a plastic bucket. The pot is made by mixing clay with the sawdust or rice husks, forming it into a flowerpot shape and then firing it in a kiln. The sawdust or rice husks burn away, leaving tiny pores in the ceramic through which water can be filtered. The small pore size of the ceramic material traps the particles and most micro-organisms.

To use the filter, the pot is inserted into a container so that its lip prevents it from slipping into the container (Figure below). The raw water is then poured into the ceramic pot. Cleaned water percolates out of the pot and is collected in the container below. A tap on the container allows water to be drawn out. The filter is cleaned by gently scrubbing the surface, and it is recommended that the filter be replaced every 1–2 years, as fine cracks not visible to the naked eye may have developed.

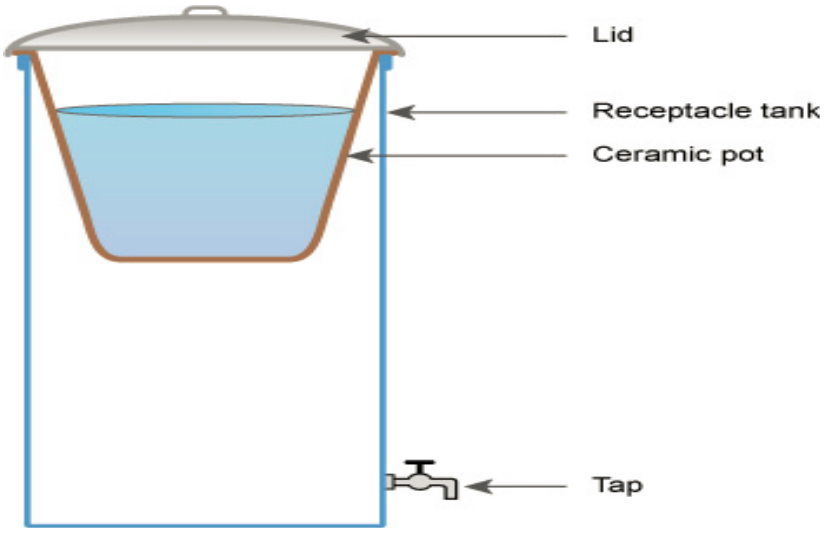

Figure 17-: Ceramic pot method of water filtration

D. Bio sand filters

Although they are not commonly used, bio sand filters are an effective and long lasting method of household water treatment. Bios and filters filter water through the sand AND the biological material that grows on the top of the filter. The filter is cleaned when it becomes clogged. Because the biological layer needs time to grow, the filter will not treat water properly when it is first put into use and after cleanings. Although these filters are simple to use, they require hands on training when they are distributed. Details on construction and maintenance of these filters can be found in Additional resources. If properly maintained, this filter can treat water for a long time

It can take a great deal of time to treat water, especially when the water is very dirty. There is no residual effect of disinfection, the clean water container must be covered to protect against contamination. These filters need regular maintenance and require more training and follow up.

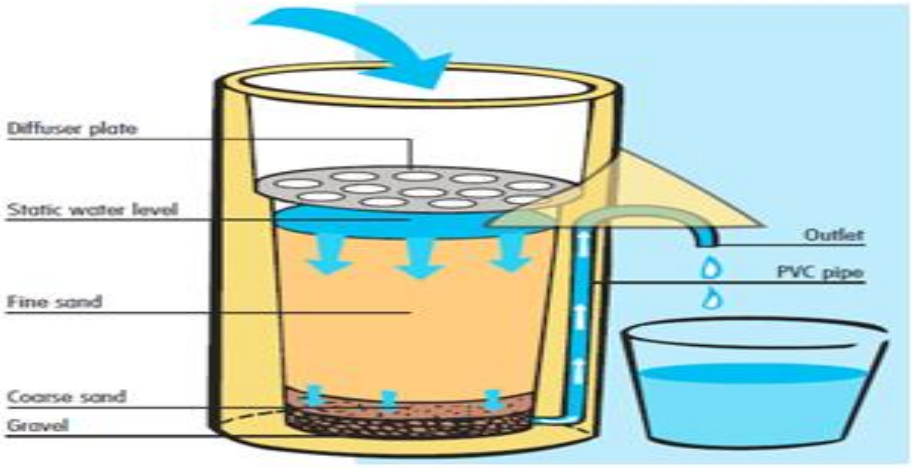

Figure 18: Typical bio sand filters

1.3.4. Disinfection

Disinfection is the final stage of water treatment in the home. All water treated using one or more of the previous steps will need to be disinfected to ensure that all pathogens are killed. The three common methods of disinfection are described below.

A. Boiling

Boiling drinking water is a simple way of killing pathogens and is suitable for use at household level. Boiling destroys pathogens such as bacteria and viruses, and any parasite ova (eggs) present in water. The water should be heated until large bubbles come continuously to the surface of the water (referred to as a 'rolling boil'), for at least 5 minutes. Boiling will make the water taste flat but this can be remedied by shaking the water in a clean bottle, or by adding a pinch of salt to one liter of water.

Figure 19: Boling one of the disaffection method

If the water is turbid with particles, it should be filtered before boiling. Water should be boiled, cooled and stored, all in the one container and consumed within 24 hours to prevent re-contamination.

Boiling is a traditional method of treating water. If done properly it can provide safe water to a population that has no alternatives. Boiling has positive and negative aspects.

- Boiling will kill all germs that cause disease
- Boiling water is something people can do themselves
- It takes one kilogram of firewood to boil one litre of water for one minute. Boiling should not be promoted in areas where wood is scarce and no other heating options are available.
- Boiling will not make water less cloudy.
- Boiling has no residual effect, so improper storage can lead to re-contamination. Boiled water should be stored safely and used within a few days. Boiling is only effective if the temperature is high enough. Water that is simply steaming has not been boiled.
- For boiling to work, water must be brought to a rolling, bubbling boil.

B. Solar disinfection (SODIS)

Solar disinfection, known as SODIS, is a water treatment method that uses ultraviolet (UV) radiation and high temperature from the sun to destroy micro-organisms in water. The technique requires only some clear plastic bottles (without labels) and sunlight (Figure below).

Figure 20: Plastic bottles full of water being laid out in the sun for disinfection

The steps to take for SODIS are shown in Figure below. In Step 5, the bottles are placed on a corrugatediron sheet (often used as roofing material) which is painted black so that it retains heat from the sun, speeding up the rate of heating of the water.

Figure 21: The procedures for solar disinfection of water (SODIS)

C. Chemical disinfection using chlorine

There are many chemicals capable of disinfecting water. These chemicals often vary in their effectiveness and safety. Chlorine is the common chemical disinfectant of choice and available in different phases and concentration

- Toxic to consumers if the dose is higher
- Chlorination by products can also result in cancer if organic matter is high (turbid)
- Consult the environmental health offices in your district if you want to apply chlorine for disinfection.

Chlorine solution, also known as sodium hypochlorite or bleach, is the most affordable and widely available chemical for household water treatment. Typically, the procedure is to add a capful of chlorine solution to water in a 20–25 litre storage container, then stir

and wait for 30 minutes. As you learned in Study Session 5, this period of time is referred to as the contact time. After this, the water can be used.

Chlorination is effective if the water is not turbid. If the water is turbid, micro-organisms can shelter within the particles and escape the effect of the chlorine. Solids should therefore first be removed by sedimentation or filtration. It is important that some residual chlorine remains in the water at the time it is used, so that it stays safe to drink. A minimum concentration of 0.5 mg l–1 is recommended; this will kill any organism that enters the water later.

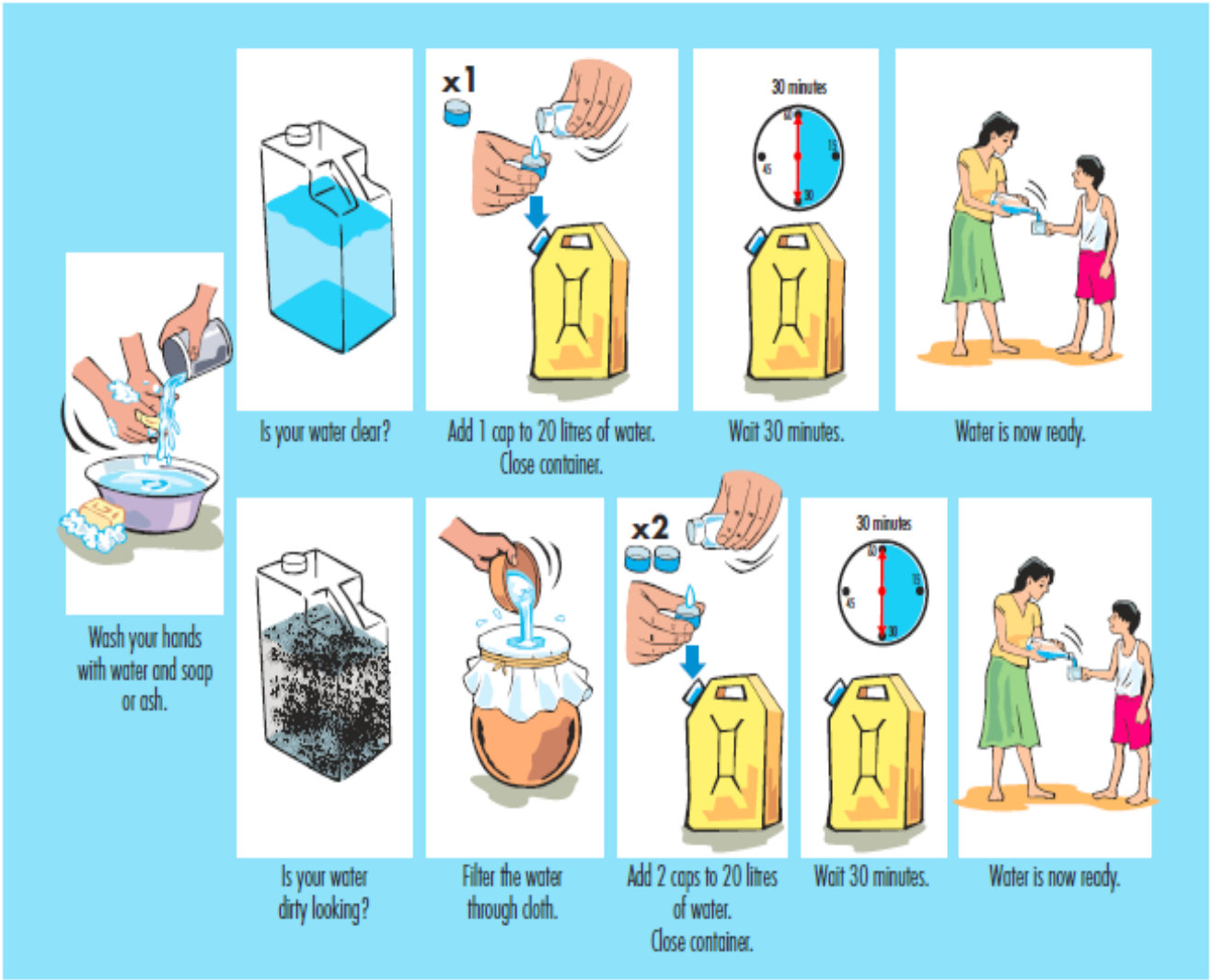

Figure 22: How to treat water with chlorine tablets

Care should always be taken when working with chemicals. Do not allow the chemicals to come into contact with the eyes. Chemicals should be stored out of reach from children in a dry place out of direct sunlight.

Chemical disinfection has positive and negative aspects

- These products are easy and safe to use.
- There is a residual effect of disinfection, which gives some protection against contamination after treatment.
- These products must be brought from outside the community; it is not something they can do with local resources.
- Chemical disinfection will not get rid of all germs that cause disease. Water should be strained prior to use of chemical disinfection in order to ensure all risks are eliminated.
- Chemical disinfection is not as efficient when used with dirty or cloudy water. If the water looks dirty or cloudy, use a double dose of chemical.
- Chemical disinfection, especially a double dose, can leave a taste that people do not like. This could cause them to stop treating water. The problem of chemical taste can be removed by using the correct amount of chemical and by shaking the water in a bottle to increase the air content.
- Talk to people about the product. Is it easy to use? How is the taste? A different product may be needed.

Leaving a container open and exposing it to heat (direct sunlight for example) will reduce the ability of the chemical to protect against contamination. Encourage people to keep water covered and out of direct sunlight whenever possible.

1.5. Household water treatment using commercial products

One example you may be familiar with is Wuha Agar, a commercial product available in Ethiopia for household water treatment. It is a chlorine-based solution used for disinfection, as described above. There are several others.

1.5.1. BishanGari Water Purifier

The BishanGari Water Purifier is a combined coagulant–flocculant–disinfectant powder mixture produced in Ethiopia for water treatment. Bashan Gari comes in a 2.5-g sachet, which is used to treat 20 liters of water. The sachet contains aluminum sulphate as coagulant and a flocculants for reducing turbidity, and calcium hypochlorite as a disinfectant to kill bacteria and viruses.

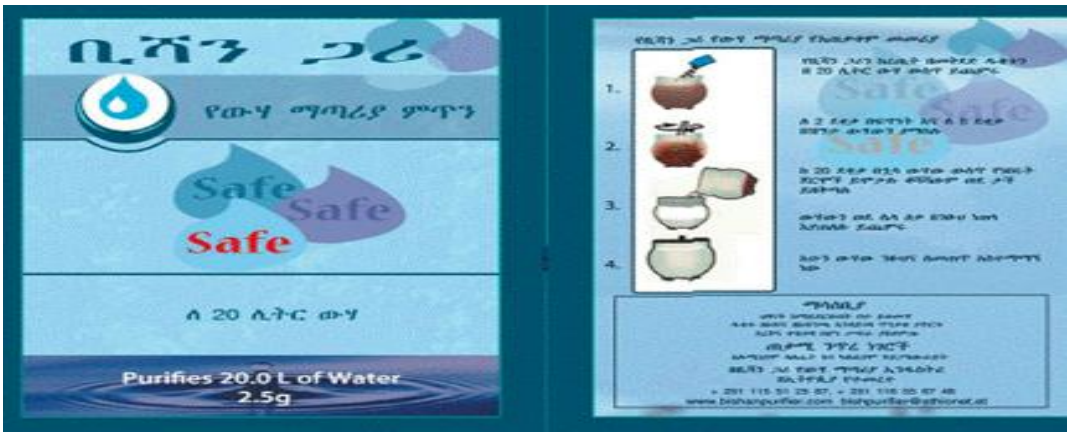

Figure 3 a BishanGari Sachet

1.5.2. Aquatabs

Aqua tabs are the brand name of a solid form of sodium dichloroisocyanurate (NaDCC), a disinfectant. The tablets (Figure below), which have to be imported, are easier than bleach to store, handle and transport. One tablet contains 67 mg of NaDCC and can treat 20 liter's of clear water. The tablet has to be dissolved in the water by vigorous mixing, and a contact time of 30 minutes is necessary. If the water is turbid, two tablets will be needed.

Figure 24: Aqua tabs for household water treatment

1.5.3.P&G Purifier of water

P&G Purifier of Water is the brand name of a combined coagulant, flocculant and disinfectant productproduced by Procter & Gamble (Figure below), which is imported into Ethiopia. The coagulant/flocculant is ferrous sulphate and the disinfectant is calcium hypochlorite. It can be used to treat raw source waters with a wide range of turbidity and

pathogen load. This water treatment chemical allows flocculation to take place and helps to remove Giardia and Cryptosporidium cysts that are resistant to chlorine disinfection. (A cyst is a dormant stage in the life cycle of some protozoa and bacteria that is resistant to adverse environmental conditions and therefore difficult to destroy.) P&G Purifier of Water comes in sachets and one sachet is needed to treat 10 litres of water.

Figure 25: P & G purifier of water

The procedure for using P&G Purifier of Water is illustrated in Figure below.

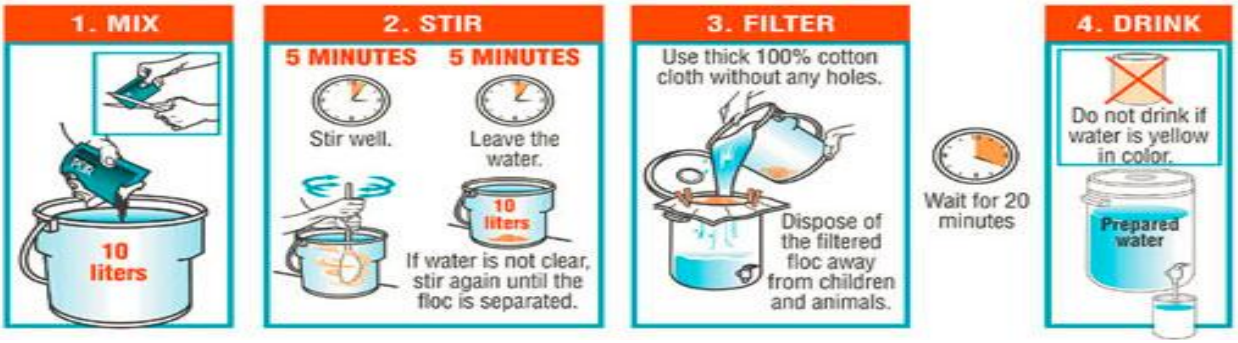

Figure 26: How to use P & G purifier of water

1.6. Household water storage

The principal health risk associated with household water storage is the ease of recontamination during transport and storage, particularly where the members of a family or community do not all follow good hygiene practice. Good hygienic measures include the following:

- careful storage of household water and regular cleaning of all household water-storage facilities;
- construction, proper use, and maintenance of latrines;

- regular hand-washing, especially after defecation and before eating or preparing food;
- Careful storage and preparation of food.

The most desirable specification for a water storage vessel for households is that it:

- has a capacity of between 10 and 25 liter's, is rectangular or cylindrical with a flat base and has one or more handles, for portability, stability and ease of storage
- is made of lightweight, oxidation-resistant plastic (so that it does not deteriorate with time), such as high-density polyethylene or polypropylene, for durability and shock resistance
- is opaque to prevent the growth of algae
- is fitted with a screw-cap opening that is wide enough to facilitate cleaning but small enough to discourage or prevent the introduction of hands or dipping utensils
- is fitted with a durable tap for dispensing water so that human contact with the stored water is impossible (Figure below)

Why is the recommended upper limit for the water storage vessel 25 litres?

- The weight of 25 litres of water is 25 kg. This is just about manageable for an adult to lift.

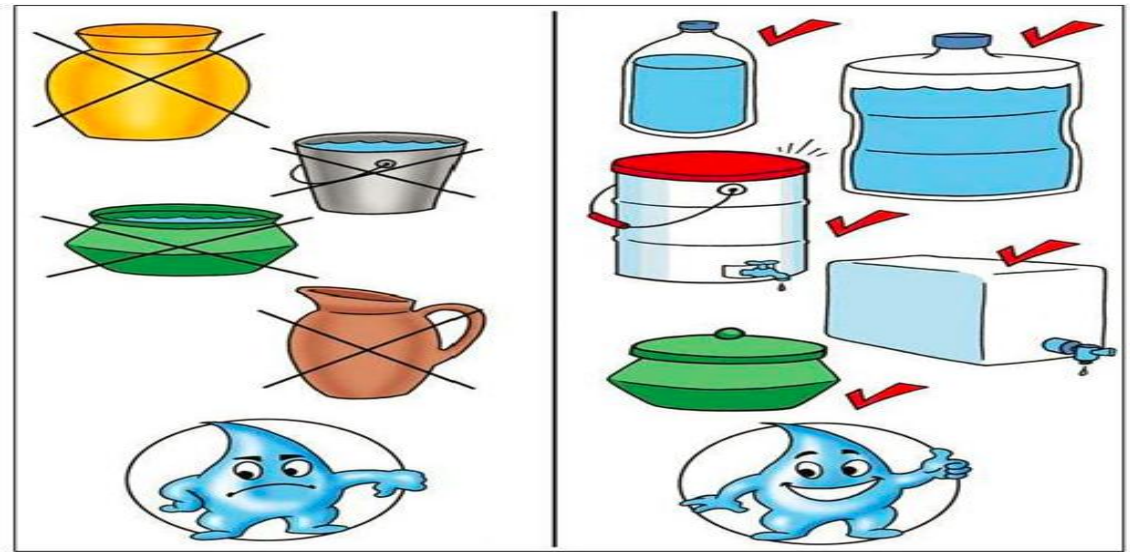

Figure 27: Containers for poor handling (left) and safe handling (right) of water

The most important elements of water storage can be summarized as follows:

- Use a clean water source or treat the water, either at home or in a storage tank.
- Store water in an earthenware or plastic container with a lid.
- Store the water container at a height that puts it beyond the reach of children and animals.
- Fit a tap to the container for drawing clean water in order to prevent contamination by dirty cups, ladles, or hands.
- Fit a tap to the container for drawing clean water in order to prevent contamination by dirty cups, ladles, or hands

Water that is clean from the supply or has been treated in the household needs to be protected from recontamination. The following precautions and considerations are important:

Location of storage vessel: The storage vessel should be placed above ground level to restrict access by children and animals. It should preferably be placed in a shaded position to keep the water cool, and should be accessible to users and for refilling.

Design of storage vessel: The storage vessel should be designed to reduce the risk of contamination: it should have a secure, tight-fitting lid, be robust enough to withstand rough handling without cracking, and be easy to lift from the ground and carry back to the storage point after filling. Stored water may be kept cool by using earthenware jars or pots; these allow some water to evaporate, which has a cooling effect. Containers should be easy to fill and clean, so that contact with hands is minimized.

Removal of water: It should be possible to remove water from the container hygienically, with no contact between hands and the water. Water is commonly withdrawn by means of a cup. This may be acceptable where the cup is not used for any other purpose, is cleaned regularly, and is stored where contamination cannot occur. However, as it is difficult to dip the cup into the water without also putting in the hands, the risk of contamination is still high. It is better to use a ladle that is stored permanently inside the container; this reduces the risk of contamination while the ladle is not in use. However, the ladle should be used only to transfer water to a cup or other vessel.

Substances such as petrol, diesel fuel, pesticides, and solvents should not be stored or used near water facilities (sources, catchments, storage tanks, etc.). Containers that have been used for the storage, transport, or handling of these substances should not subsequently be used to store water intended for human consumption, even after thorough cleaning.

1.7. Household water treatment technology selection criteria

There are several criteria that one should take into consideration when deciding which household water treatment technology is most suitable. Some of these include:

- **Effectiveness:** How well does the technology perform?
- **Appropriateness:** How well does the technology fit into people's daily lives?
- **Acceptability**: What will people think of the technology?
- **Cost**: What are the costs for the household?
- **Implementation**: What is required to get the technology into people's homes?

Effectiveness: Effectiveness is the ability of the technology to provide sufficient water quality and quantity. There should be enough safe drinking-water for a household to meet its basic needs. Criteria that show the technology's effectiveness include the following:

Water quality: Which microbiological, physical and chemical contaminants can be removed by the technology and how much?

Water quantity: How much water can be provided every day? And Is it sufficient to meet the household's daily needs?

Local water source: Will the technology be able to treat the specific microbiological, physical and chemical contaminants of the local water source? Will it treat water from different sources to the same level?

Appropriateness: Some technologies will be more suitable than others depending on the needs and conditions of the community. Answering the following criteria can help to match a technology with a particular community:

Local availability

- Can the technology be manufactured in or near the community using local materials and labor?
- Does the technology need import spare parts or consumables?

- Is it possible to buy spare parts or consumables locally?
- Is the supply chain reliable?

Time

- How long does it take for a household to treat enough water to meet their daily needs?
- Does it significantly add to the household's labour burden?

Operation and maintenance

- What are the household's responsibilities to operate and maintain the technology?
- Is it easy and convenient for women and children to use the technology?

Life span

- How long will the technology last before it needs to be fixed or replaced?

Acceptability: People's opinion about the technology will affect its widespread adoption and consistent use. It is difficult for many people to accept a new technology until they personally experience the benefits. People's acceptance of a technology is affected by the following criteria:

Taste, smell and color

- How will the treated water look, taste and smell?
- Needs and motivations?
- What benefits will the technology give to people?
- Will it provide convenience, health improvement, social status, time or money savings?

Cost: Most household water treatment options are not free. Successful cost recovery is an important part of the programme sustainability. The following costs need to be considered:

Capital costs

- Initial purchase of a durable product.
- Transportation.

Ongoing costs

- Continuing purchase of consumable products.
- Operation and maintenance.
- Potential repair and replacement parts

Willingness to pay and affordability

- Can households afford the full cost of the technology?
- Are households willing to pay for capital costs?
- Are households willing to pay for on-going operation and maintenance costs?
- How is technology impacted by household income fluctuations?
- Do durable or consumable items need to be subsidized?

Implementation costs

- Cost to run the programme (e.g. staff, office space).
- Cost to raise awareness in the community.
- Cost to educate people about how to use the technology.
- Cost to provide ongoing support for households.

Self-checking -1	Written Test

PART I: Multiple Choice Question

Direction: Select the correct answer for the give choice and write you answer on the answer sheet .You have allowed 1 Minute for each question and each question have equal two points.

1. The removal of suspended solids through the settling of particles.
   A. Sedimentation
   B. Filtration
   C. Disinfection
   D. coagulation
2. For which of the following house hold water treatment method you used moringa trees
   A. Sedimentation
   B. Filtration
   C. Disinfection
   D. coagulation
3. One of the following is not filtration water treatment method?
   A. Cloth filtration method
   B. Three pot method
   C. Bios filter method
   D. Disinfection method
4. One of the following destroys pathogens such as bacteria and viruses, and any parasite ova (eggs) present in water.
   A. Boiling
   B. Filtration
   C. Sedimentation
   D. Coagulation

5. One of the following is false about boiling?

   A. Boiling will kill all germs that cause disease

   B. Boiling water is something people can do themselves

   C. Boiling will not make water less cloudy

   D. Boiling has residual effect for consumers

6. One of the following is false about chemical disinfection

   A. Products are easy and safe to use

   B. There is a residual effect of disinfection

   C. water can be contaminated after treatment

   D. It will get rid of all germs that cause disease

7. One of the following different from the other

   A. Aluminum sulphate

   B. BishanGari Water Purifier

   C. Aquatabs

   D. P&G Purifier of water

ANSWER SHEET

Name: _____ Date: _____

Question	Answer	Question	Answer
1		4	
2		5	
3		6	

Note: Satisfactory rating - 2 points and above **Unsatisfactory - below 2 points**

You can ask you trainer for the copy of the correct answers.

Information sheet-2	Reporting incidents of food contamination that have resulted from the personal health issue

2.1. Health issues

May include, but not limited to:

- Food-borne diseases
- Airborne diseases
- Infectious diseases

2.2. Sanitation and Hygiene Policies

Policy is defined as the set of procedures, rules and allocation mechanisms that provides the basis for programmers and servicers. They set priorities and provides the frame work within which resource are allocated for the implementation. Polices are implemented through four types of instruments.

I. Law that provide the overall framework

II. Regulations Design strands, tariff, buildings, planning regulations and contract

III. Economic Incentives such as subsidies and finesse for poor practice, and

IV. Assignment of Rigs and Responsibility for institutions to develop and implement the programs

2.3. Sanitation and Hygiene Policies Goal and Strategies

Improving sanitation and hygiene is recognized by the Government of Ethiopia as an important precursor to poverty eradication. Although there is some variance in emphasis and approach, sector policies converge around overall environmental health goals which emphasize sanitation and hygiene promotion as key interventions to prevent disease, protect the environment and enhance socio-economic development.

Both the ministry of health (MoH) and ministry of water, irrigation and electricity resources (MoWIE) have sound sanitation components in their wider policies which converge in the goals:

- To protect and promote the health of the population and assure a friendly and healthy environment by controlling the environmental factors which

are the direct and indirect cause for the spread of environmental health-related disease

- To increase access to sustainable sanitation services and safe water supply.

Main strategy objectives in line with policies are:

2.3.1. Households

All households have access to and use a sanitary latrine. The resulting behavior aimed at is:

- ✓ Reduced incidence of diseases deriving from fecal contamination
- ✓ Reduced incidence of waterborne, washed, water related, and water based diseases

2.3.2. Institutions

Appropriate latrines with urinals and hand washing facilities with detergents are installed at schools, health posts, markets and public places.

2.3.4. Communal Latrines

Where space is limited in peri-urban and urban slum areas, appropriate communal latrines are made available under community or private sector management.

2.4. Liquid Waste Management

Effective liquid waste management systems are in place for promoting re-use and recycling. In particular, this covers organic matter, and exploring and promoting biogas or ecological sanitation options.

2.6. Safe Water

All drinking water supplies are routinely monitored for physical, chemical and bacterial pollutants and/or contaminants.

2.7. Sanitation and Hygiene Responsibilities

Primary responsibility for the different aspects of sanitation and hygiene promotion lies with the ministry of health (MoH) and the regional health bureaus, mainly health extension workers and other health professionals at community level.

Responsibility for facilitating complementary activities is allocated between ministries and bureaus as follows:

1. Water resources for water supply, water point drainage and waterborne sewerage
2. Rural development for overall rural community development and administration
3. Municipal and Urban Health Departments for urban on-site sanitation, hygiene promotion and solid waste management
4. Environmental Protection Agencies for environmental policy, strategy development and regulation
5. Education for school water sanitation and hygiene
6. Agriculture for biogas and ecological sanitation development.

2.8. Laws and Policies Affecting Sanitation and Hygiene

2.8.1. Policies

The key policies which include sanitation are:

- The Health Policy
- The Ethiopian Water Resources Management Policy
- The Draft Environmental Health Policy
- National Hygiene and Sanitation Strategy for Ethiopia
- One WASH National Program

2.8.2. Proclamations

There are a number of proclamations which provide support for regions, zones and woredas to develop a regulatory framework which can back-up the above policy directions.

The proclamations include the following:

- Public Health Proclamation - the proclamation states that no person shall dispose of solid, liquid or any other waste in a manner which contaminates the environment or affects the health of the society. Art. 12 No. 2 (no enabling bylaws).
- Ethiopian Water Resources Management Proclamation
- Environmental Protection Authority Establishment Proclamation.

2.9. Sanitation and Hygiene Practices

Hygiene and sanitation practices are the things we do to keep clean ourselves, the food product and the living environment. This includes:

- Hand washing
- Clean clothe
- Following work instructions
- Cleaning the plant during and after production

Self-checking -2	Written Test

Direction: write short answer for the give question. You have allowed 3 Minute for each question and each question have equal 5 points. For your answer use the given answer sheet space.

1. Write sanitation and hygiene practices?
2. What is the meaning of policy?
3. Write the components of healthy issue

ANSWER SHEET

Name: _____ Date: _____

1----------

2----------

3.----------

4.----------

Note: Satisfactory rating 7 points and above **Unsatisfactory – below7 points**

You can ask you trainer for the copy of the correct answers

Operation sheet-1	Steps in hazard and risk identification

OPERATIONTITLE: Hazard and risk identification

PURPOSE: To treat water by cloth filtration method

EQUIPMENT TOOLS AND MATERIALS: Cloth, cotton, storage vessel, water to be filtered

PROCEDURE:

The steps in cloth filtration are as follows:

1. Determine hazards.
2. Assess the severity and risks of the hazards.
3. Identify critical control points.
4. Institute control measures.
5. Establish criteria to ensure control.
6. Monitor critical control points.
7. Take action whenever monitoring results indicate criteria are not met.
8. Verify that the system is functioning as planned.
9. Establish a documentation system for procedures and records. Develop and maintain procedures and practices for record keeping.

PRECAUTION: Avoid using harsh words and don't express offenses

QUALITY CRITERIA: filtered water as per required level physical water characteristic

PERFORMANCE CRITERIA (CHECKLIST)

Operation sheet-2	Techniques of cloth filtration

OPERATIONTITLE: water treatment by cloth filtration

PURPOSE: To treat water by cloth filtration method

EQUIPMENT TOOLS AND MATERIALS: Cloth, cotton, storage vessel, water to be filtered

PROCEDURE:

The steps in cloth filtration are as follows:

1. Use a large cloth, preferably made of finely-woven cotton. Fold the cloth at least four times so that there are multiple layers of fabric, and place this over the opening of the storage vessel.
2. The cloth, once folded, must be big enough to easily cover the opening of the receiving water container.
3. Place the cloth over the mouth of the container.
4. Fasten the cloth securely around the rim of the opening, using string. If reusing the cloth, always use the same side up each time.
5. Pour the water through the cloth, into the container.
6. Wash the filter cloth after each use, with a final rinse using cloth-filtered water, and then leave the cloth in the sun until it is dry.
7. Clean the cloth regularly using detergent, and use a new piece of cloth as soon as there are any visible tears or holes.
8. Always keep filtered water separate from non-filtered water.

PRECAUTION: Avoid using harsh words and don't express offenses

QUALITY CRITERIA: filtered water as per required level physical water characteristic

PERFORMANCE CRITERIA (CHECKLIST)

Instruction sheet	Learning Guide 19: Prevent food and other item contamination

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Using and maintaining food contamination preventing clothes and bandages
- Ensuring clothing or other items worn is contaminating food
- Unnecessary direct contact is prevented with ready to eat food
- Avoiding and maintaining food contamination over food or food preparation surfaces.

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon completion of this Learning Guide, you will be able to**:

- Using and maintaining food contamination preventing clothes and bandages
- Ensuring clothing or other items worn is contaminating food
- Unnecessary direct contact is prevented with ready to eat food
- Avoiding and maintaining food contamination over food or food preparation surfaces.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below
3. Read the information written in the “Information Sheets 1- 4”. Try to understand what are being discussed.
4. Accomplish the “Self-checks 1,2, 3 and 4 ” in each information sheets on pages 32,36,39 and 55.
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If you earned a satisfactory evaluation proceed to “Operation sheets 1, and 2 on pages 58 and 59 and do the LAP Test on page 60”.
7. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity.

Information sheet-1	Using & maintaining food contamination preventing clothes & bandages

1.1. Different Stages and Processes at Which Food may be contaminated

Pathogenic and toxic substances may find their way into food through contamination or through spoilage. Contamination of food can be either from biological agents or chemicals. Biological agents in food that are of concern to public health include bacteria, viruses, parasites, helminthes, protozoa, algae, and certain toxic products they may produce.

Table 2 the different stages for possible food contamination

Stage	**Process**	**Possible contaminant and vital areas of concern**
Primary production	Planting, rearing livestock, fishing	Night-soil, garbage, pesticides, etc.
Processing	Freezing, canning	Food-plant sanitation, personal hygiene of food handlers, additives, etc.
Distribution	Containers, trucks	Sanitation of collection and delivery vehicles
Marketing	Market, retail shop	Expired goods, sanitation of premises and markets
Food preparation	Home, restaurants	Sanitation of food premises, personal hygiene of food handlers, etc.
Serving and consumption	Home, restaurants	Cleanliness of utensils, personal hygiene of consumers

1.2. Sources of contamination of food:

Food products are rich in nutrients required by microorganisms and may become contaminated. Major contamination sources are (4, 7,19):-

- **Water:** If a safe water supply is not used in processing and preparation of food it then becomes a source of contamination of the food (chemical or biological agents).
- **Sewage:** Raw, untreated sewage can contain pathogens that have been eliminated from the human body, as well as other materials including toxic chemicals from the environment. If raw sewage is used to irrigate vegetable farms, it can be a source of food contamination
- **Air:** Contamination can result from airborne microorganisms and chemicals in food processing, packaging, storage, and preparation areas.
- **Equipment:** contamination of equipment used for processing, preparing or serving food occurs during production (manufacture) and when the material is not properly cleaned.
- **Food handlers:** The hands, hair, nose, and mouth harbor microorganisms that can be transferred to food during processing, packaging, preparation, and service by touching, breathing, coughing, or sneezing. Of all the viable means of exposing microorganisms to food, employees are the largest contamination source.
- **Adjuncts and additives:** Ingredients (especially spices, flavoring and coloring
- agents, preservatives) are potential vehicles of harmful or potentially harmful microorganisms and toxins.
- **Insects and rodents:** Flies, cockroaches and rodents are associated with living quarters, eating establishments, and food processing facilities, as well as with toilets, garbage, and other filth. These animals transfer contaminants to food through their waste products; mouth, fur, intestinal tract, feet, and other body parts; and during regurgitation onto clean food during consumption.
- **Soil:** Soil may contain microorganisms as well as poisonous chemicals. These agents may get access to food either due to direct contamination or through dusts.

- **Plants and plant products:** Most of the organisms found in soil and water are also found on plants, since soil and water constitute the primary sources of microorganisms to plants. Chemicals sprayed to plants are other potential health risks.
- **Other animals' bodies:** From the intestinal tracts of animals, microorganisms find their way directly to the soil and water. From there, they may find their way into plants, dust, utensils and/or food. Meat of animals can get contaminated during slaughtering, cutting, processing, storage, and distribution. Other contamination can occur by contact of the carcass with the hide, feet, manure, dirt, and visceral contents. Likewise drugs used to prevent disease and promote growth in animals may also become potential risk for human health due persisting of these drugs in the meat or milk products.

Others:

- Mistaken use of a toxic chemical in the preparation seasoning or sweetening of food or by children believing it is a drink.
- Deliberate and malicious contamination of food by a person for some irrational reason.
- Water polluted by chemicals from farm and or spraying food trees (4,6).

Information sheet-2	Ensuring clothing or other items worn is contaminating food

2.1. Transfer of contamination

Before a food-borne disease can occur, food-borne disease transmission requires that several conditions be met. There are two related models that illustrate the relationship among factors that cause food-borne diseases. These are (7):

a. Chain of infection:

This is a series of related events or factors that must exist or materialized and be linked together before an infection will occur. The infection chain emphasizes the multiple causations of food-borne diseases. The presence of the disease agent is indispensable, but all of the steps are essential in the designated sequence before food-bore diseases can result (see also figure 3.2.2 below)

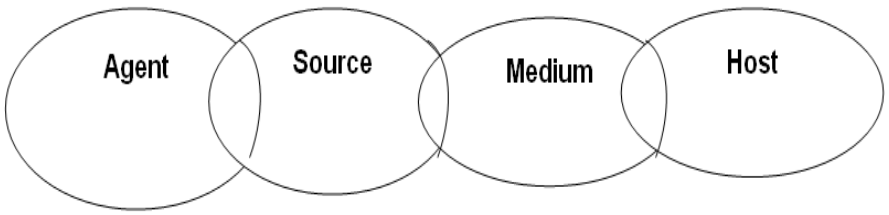

Figure 23: The chain of infection

b. Web of causation:

This is a complex flow chart that indicates the factors that affect the transmission of food-borne diseases. This presentation of disease causation attempts to incorporable all of the factors and their complex interrelationships (7).

2.3. Factors most commonly contributing to food-borne disease outbreaks

There are a number of factors that may lead to the occurrence of food-borne illness outbreaks. The major ones are:

- Preparation of food more than half a day in advance of needs
- Storage at ambient temperature

- Inadequate cooling
- Inadequate reheating
- Use of contaminated processed food (cooked meats and poultry, and the like)
- Undercooking
- Cross contamination from raw to cooked food from utensils, and unhygienic kitchen environment
- Infected food handlers or poor personal hygiene of food handlers
- Unsanitary dishware, utensils and equipment
- Improper food handling procedures such as unnecessary use of the hands during preparation and serving of food
- Improper food storage that may lead to cross contamination by agents of diseases (micro-organisms, poisonous chemicals), or exposure to moisture that may facilitate microbial growth
- Insects and rodents (4, 13).

2.4. Prevention and Control of Food-borne Diseases

In practical terms, safe food can be defined as food that, after being consumed, causes no adverse health effects.

To ensure high quality of the food supply a number of parties must play specific roles.

The main factors include the government, consumers, and the food industry. It is critical that preventive measures for ensuring food safety should be given great attention to prevent and or reduce food borne diseases. The following are possible preventive measures for ensuring food safety at various stages:

2.4.1. Production of raw materials:

To ensure safe food production, it is important to look at the agricultural level, where foods are initially produced, and improve the hygienic quality of raw foods.

- By improving the conditions under which crops, fruits, vegetables and food animals are raised, the hygienic quality of raw food products can be significantly improved.
- Use of both pesticides and fertilizers should be reduced as much as possible.

- Residue levels of toxic chemicals used to improve crop production should be systematically monitored.
- Prohibition of use of untreated sewage water for irrigation of vegetable fields is also an area of attention.

2.4.2. Food Processing:

Substantial losses of food by contamination and spoilage can be prevented through concerted inspection and monitoring of food processing infrastructures. Inspection services are usually inadequate in our country. This needs to be strengthened. A modern approach to food safety in food establishments is Hazard Analysis and Critical

Control Point (HACCP) system.

This is an attempt to make a significant impact on the prevention of food-borne diseases. The HACCP system consists of a series of interrelated actions that should be taken to ensure the safety of all processed and prepared foods at critical points during the stages of production, storage, transport, processing, preparation, and service. The elements of the HACCP system are summarized in Box 1 as follows .

Information sheet-3	Unnecessary direct contact is prevented with ready to eat food

3.1. Food Preservation and Storage

The aim of food preservation is to eradicate or prevent the growth of harmful pathogens during manufacturing, processing and preparation of food so that it will remain, safe to eat for longer periods of time.

3.2. Food Preparation in the Home:

The household is perhaps the most relevant place for developing strategies to combat food borne illness, as it is the location where the consumers, can exert the most control over what they eat. Strategies that can be employed at home include:

- Maintaining a clean and hygienic environment in the kitchen or other food preparation areas.
- Proper sanitation facilities, cleanliness of household members who prepare the food, and
- Control of pests.
- Keeping chemicals away from kitchens and areas of food preparation. If needed, use chemicals cautiously.
- Consumption of fresh food, or cooked food while still hot will not cause food borne infection.

Many bacterial pathogens are able to multiply in food because of the temperature at which the food is stored. Refer to figure 3.2.3 for the control of pathogenic bacteria by temperature.

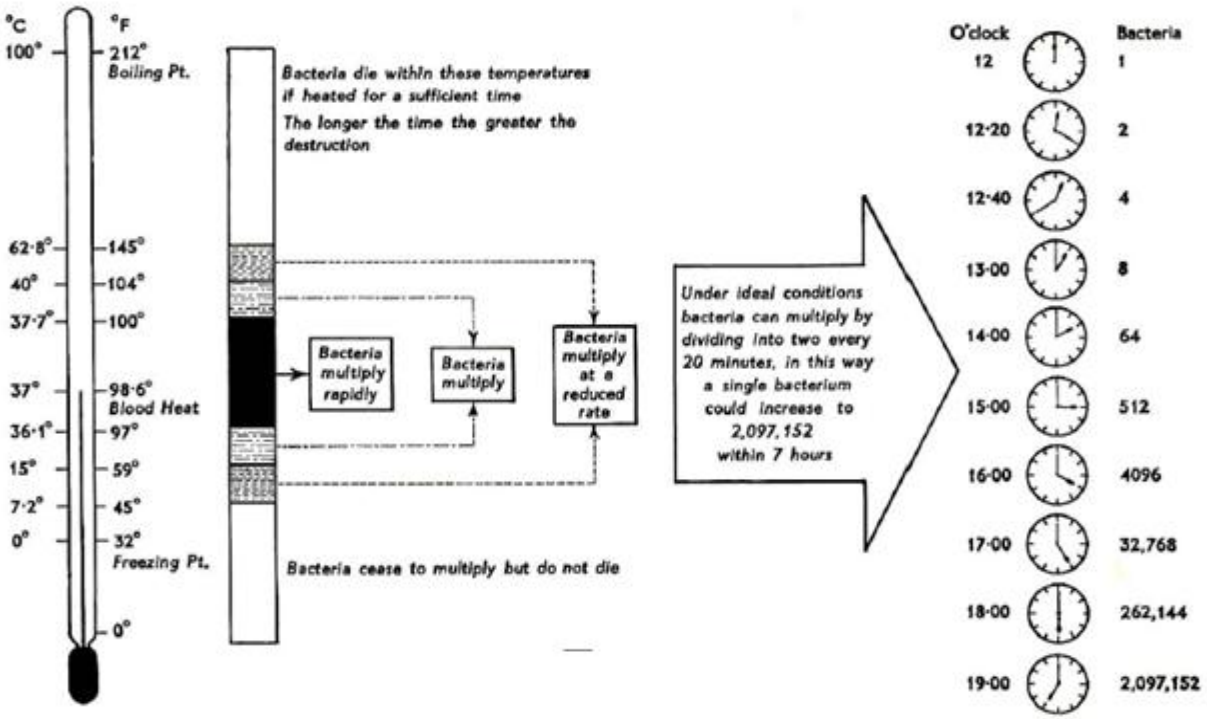

Figure 28:Effect of temperature and time on the growth of bacteria, safe and dangers for foodstuffs. Taken from Food Poisoning & Food Hygiene. Third Edition. 1974. By Food-borne Diseases,DiplomaProgram,For Health Extension Workers

Information sheet-4	Avoiding and maintaining food contamination over food or food preparation surfaces.

4.1. Food preparation in the food service industry:

The consequences of improper food preparation in food services such as canteens and restaurants can be much greater than that in the household, simply because a large number of individuals may be simultaneously exposed to unsafe food items. Street foods are particularly prone to lapses in safe food preparation, hence requiring stringent control measures. It is essential to have a quality control program (inspection) that will ensure the maintenance of food product standards during all stages of handling, processing and preparation; it must also be applied to all areas and equipment that come into contact with food and beverages.

The prevention and control strategies for food borne diseases emanate from the three basic principles (described in section 2.11). The different methods for applying these principles are discussed below:

4.2. Methods to keep food safe

The primary objective of keeping food safe is to prevent food from acquiring injurious properties during preparation, shipment, or storage. The principal methods and the techniques used to keep food safe include temperature control (including pasteurization, cooking, canning, refrigeration, freezing and drying), fermentation and pickling, chemical treatment and irradiation (2, 3, 4, 6, 7).

a. Temperature control:

i. The use of high temperature:

Heat is one of the oldest methods of destroying microorganisms in food. Heat destroys many microorganisms / pathogens and some forms of toxins produced, such as the toxin of Clostridium botulin. Heat treatment may involve the following techniques.

- **Cooking / boiling / frying operations**
- Blanching operations. Blanching is mild pre-cooking involving brief scolding by hot water or steam used to reduce the bacterial load and insects on vegetable foods.

- Canning: This is the process of placing prepared (heat-treated) food in cans, exhausting the air from the cans, sealing the cans, sterilizing the sealed can and cooling it.
- **Pasteurization**: A process of heat treatment of food that kills pathogenic
- Microorganisms without destroying taste, digestibility and nutritive value of food and milk. It also destroys some food spoilage microorganisms.
- Drying (Desiccation): Bacteria cannot multiply in the absence of water (moisture).
- This can be achieved by application of heat or chemical treatment (described below).

ii. The use of low temperature

Unlike high temperature, low temperature (cold) is not an effective means of destroying microorganisms and toxins in foods except retarding their multiplication and metabolic activities there by reducing toxin production.

- Chilling (cold storage or refrigeration): is reducing food temperatures to below ambient temperatures. This is a suitable temperature to preserve perishable food items that may get spoiled at freezing temperature.
- Freezing: This is a dehydration method because the water in the food is transformed to ice, thus rendering it unavailable for microbial metabolic function.

Freezing temperature depends upon the kind of food and the intended storage time.

b. Fermentation and pickling:

In fermentation the food is transformed into an acid state based on the pH control principle. Some fermented foods have high amount of alcohol, which is antimicrobial. Pickling on the other hand refers to the immersion of certain foods in concentrated natural acid solution such as vinegar

c. Chemical treatment:

This involves osmotic balance disturbance or direct actions of the chemicals on the microorganisms. Liquids pass into or out of bacterial cells by the process of osmosis. Examples for osmotic actions are salting and sugaring. Some other chemicals may destroy or inhibit growth of microorganisms in food. Examples include application of nitrites and smoking.

d. Radiation: this is a process of exposure of the food to high- speed electrons to destroy microbial cells. Beta, gamma or x-rays irradiate microorganisms in foods. A cell inactivated by irradiation cannot divide and produce visible growth (7).

e. Other important methods /supportive procedures that facilitate the safety of food:

- Health education
- Good personal and environmental hygiene
- Availability of safe, ample and convenient water supply
- Training of food handlers and managers
- Stringent inspection and control actions
- Legislative support (ordinances and codes), licensing
- Good-housekeeping practices including separate storage and care of toxic chemicals.
- Understanding about additives and restrictions of unauthorized use.
- Food equipment selection to avoid chemical poisoning arising from the material Constituency and or coatings of some food utensils.
- Avoidance and care of insecticide use in food processing and preparation areas.

3.4.10 Factors most commonly contributing to food-borne disease outbreaks

There are a number of factors that may lead to the occurrence of food-borne illness outbreaks. The major ones are:

- Preparation of food more than half a day in advance of needs
- Storage at ambient temperature
- Inadequate cooling
- Inadequate reheating
- Use of contaminated processed food (cooked meats and poultry, and the like)
- Undercooking

- Cross contamination from raw to cooked food from utensils, and unhygienic kitchen environment
- Infected food handlers or poor personal hygiene of food handlers
- Unsanitary dishware, utensils and equipment
- Improper food handling procedures such as unnecessary use of the hands during preparation and serving of food
- Improper food storage that may lead to cross contamination by agents of diseases (micro-organisms, poisonous chemicals), or exposure to moisture that may facilitate microbial growth Insects and rodents.

4.3. Prevention and Control:

The roles that Health Extension Package Workers can and should play in the prevention and control of food-borne diseases in particular and infectious diseases in general, are many.

Some of these roles are:

1. Provision of information and education on the means of transmission of foodborne diseases and their methods of prevention at household levels such as

- Proper disposal of human excrement and other wastes,
- Proper hand washing always after using the toilet and before and during food preparation and serving,
- Keeping compound sanitation so as to prevent the breeding of flies, rats and roaches,
- Keeping already prepared food items in the proper place and environmental conditions,
- Proper cooking of animal foods before consumption,
- Boiling of milk,
- Proper washing and cooking of vegetables
- Other important methods that facilitate the safety of food include the following:
  - ✓ Health education

- ✓ Good personal and environmental hygiene
- ✓ Availability of safe, ample and convenient water supply

Instruction sheet	Learning Guide 20: Prevent cross-contaminations by washing hands

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Washing hands as per appropriate procedures
- Using hand wash facilities Hands

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon completion of this Learning Guide, you will be able to**:

- Report any personal health issues that are likely to cause a hygiene risk
- report incidents of food contamination that have resulted from the personal health issue

Learning Instructions:

6. Read the specific objectives of this Learning Guide.
7. Follow the instructions described in number 3 to 20.
8. Read the information written in the “Information Sheets 1”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
9. Accomplish the “Self-check at tje end of each information sheet before you proceed next information sheet.
10. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check by yourself).

Information sheet-1	Washing hands as per appropriate procedures

1.1. Introduction

Good health requires certain efforts and cannot be purchased. It the result of having safe, sustainable and ample water supply, adequate sanitation facility and maintained hygiene behaviors and healthy dietary practices to main nutritional status. Cleanliness inside and outside the house, along with proper sanitation helps in keeping the environment disease free. Knowledge of first aid can be of great help in saving a victim's life in case of an emergency.

1.2. Personal Health

1.2.1. Health and Hygiene

Different people may consider good health differently. But to define it formally, health is a state of complete physical, mental and social well-being. Good health may enable us to do well at work and in life. To keep ourselves free from diseases and to have good health, we should be careful about hygiene. Thus, health and hygiene go hand in hand or they are interrelated. Proper nutrition, physical exercise, rest and sleep, cleanliness, and medical care are essential parts of maintaining good health. Health includes both personal and community health.

Taking care of oneself to remain healthy and free from diseases is personal health. The food consumed to maintain health should be grown by safe water, processed safely and consumed in an optimal amount and maintained throughout the life.

Some important aspects of good personal health are as follows:

1. Healthy and balanced diet: Obtaining a balanced diet depends on one's choice and what one can usually afford. It also includes hazards free and correct proportion of carbohydrates, proteins, vitamins, minerals and roughage in your diet.
2. Personal hygiene**:** There are some activities you perform every day in order to keep yourself clean. These activities are:
    - Regular toilet habits: Regular bowel movements keep us free of body wastes generated health problems inside the body.

- Washing hands before eating: Having food with dirty hands may make us sick because the dirt in our hand might carry certain disease causing germs. We should wash our hands after going to the toilet. Washing hands with soap make them germ free.
- Bathing regularly and wearing clean clothes: Dirt is a place for germs to grow. Bathing regularly keeps your body free of dirt, body lice and germs.
- Cleaning the teeth: After eating food, some food particles may remain sticking to your teeth. These food particles form a medium for the germs to grow, harm your gums and teeth, and cause bad breath. Brushing of teeth every day do not let the germs grow. Brushing of teeth before going to bed is a very good habit.
- Washing hair, cleaning eyes, ears and nails: Regular washing and combing of hair helps in preventing dirt accumulation to keep the germs away. Nails should be clipped regularly; nail biting is unhygienic and must be avoided.

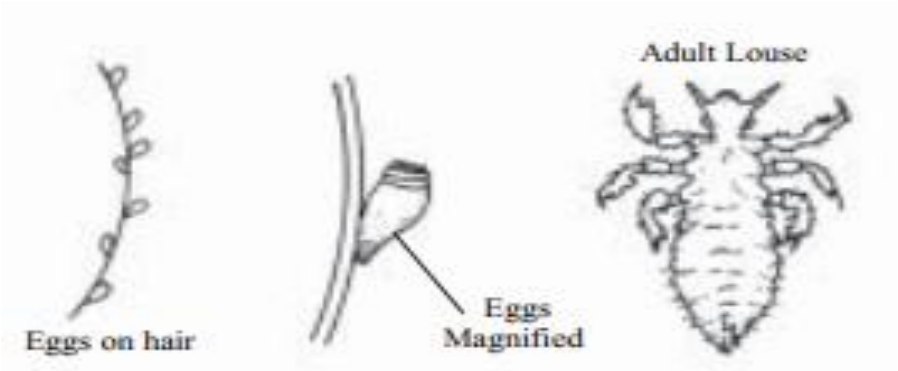

Figure 29: Regular Cleaning and combing keeps hair free from lice

3. Domestic Hygiene
   - House should be kept clean and free from dirt, flies and germs.
   - Cooking utensils, plates, cups and other utensils should be kept clean.
4. Safe food and water
   - Fruits and vegetables should be washed in clean water to make them free from germs and pesticides (chemicals sprayed on plants to keep them insect free) before consumption and cooking.
   - Water used for drinking, cooking, bathing and washing utensils should be from a clean source.

5. Cooking with care: Food should be prepared in a clean kitchen and in a clean manner.

- While cooking food, it is important to heat it to high temperature to kill any germs present in it.
- Cooked food should be eaten fresh or stored in cool, fly-proof place.
- Milk stored in the refrigerator or outside should be boiled again to make it germ free.

1.3. Personal Hygiene

Personal hygiene is an important aspect of how you take care of and demonstrate your respect for yourself. Good personal hygiene is an important aspect of taking care of your health, and also influences how people respond to you in a working and social situation. Maintain personal cleanliness and hygiene according to company policy to prevent illness, contamination and infection.

Good personal hygiene practices are an essential part of providing safe food to our customers. Among these hygiene practices, the most important is hand washing. The use of clean materials and clothes and safe and hygienic practices is maintained to ensure that no **cross-contamination** of other items in the workplace occurs

Figure 30:Hand washing, the most important part of good personal hygiene

Steps of hand washing

Figure 31:Hand washing steps

Poor personal hygiene may include: -

- Poor personal habits
    - Digging nose or ear
    - Putting fingers in mouth
    - Rubbing of eyes by unclean hands
    - Spitting without shielding
- Sharing of personal items, eg. tooth brush, towels, etc.
- Sharing of eating & drinking utensils or food & drinks

Environmental hygiene deals primarily with:

- Cleanliness & housekeeping of premises & facilities – toilets, classrooms, play & eating areas, etc.
- Disinfection of changing & eating surfaces and objects including toys.
- Waste management – disposal of litter, diapers, etc.
- Control of vectors/pest

Why is toilet hygiene very important?

- Raw sewage contains billions of microorganisms, including pathogenic ones.
- Good to close the toilet bowl before flushing!
- Food hygiene
- Kitchen facilities

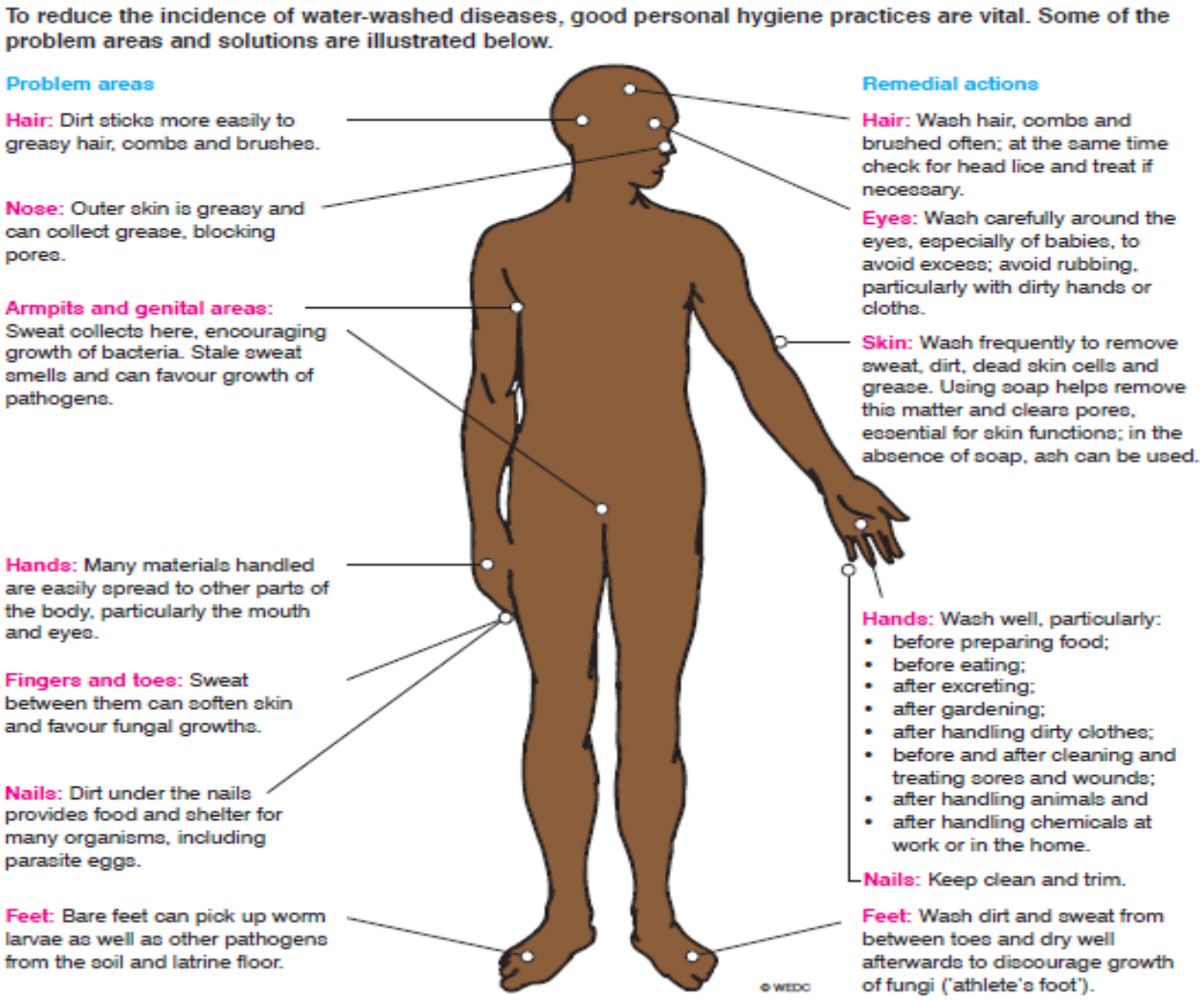

Figure 32:Personal hygiene problems and solutions

Household level

Awareness on improved hygiene standards and the need to change current practices is the first step toward successful hygiene behaviour change. Communities need to be educated on the advantages of hygiene behaviour change. Improved hygiene practices lead to better health and less illness among the adult population as well as children and the elderly. Adults can have a more productive life, and children will miss fewer classes at school, whereas the households can also spend less on medical bills. They will have a more convenient life, especially when women and girls have access to safe latrines,

and do not have to wait until dark to relieve themselves. It also gives the household a higher status in the community if they have access to a latrine and show improved hygiene behavior. In this regard, it is important to note that it is not always the perceived health benefits that motivate households to change their hygiene behavior.

To start hygiene behavior interventions, it is best to identify the most dangerous hygiene behaviors first and seek sustainable solutions to address those. Often this is related to a lack of access to safe sanitation facilities or the use of contaminated water for drinking purpose. In case of lack of sanitation facilities at household level, special attention should be given to children under the age of 5, as they often defecate nearby the house, and are most vulnerable to the effect of diarrheal diseases.

While introducing hygiene behavior change, it is most effective to promote only a few simple and achievable targets at a time. Any hardware interventions should be affordable without outside financial support. Changes in hygiene behavior could also been seen as a threat for some members of the household, like the elderly who might be less recipient to accept any change in their behavior pattern. While undertaking hygiene behavior change for household level, it is important to all members of the households; men, women, children and the elderly, as all have their specific needs and reasons to change their behavior (or not).

Household Level Hygiene Behavior Change Process Check List

- Assess current hygiene status and practices through knowledge, skills and practice (KAP) surveys or similar exercise with all members of the household.
- Identify high risk hygiene behaviour practices with adverse health impact
- Conduct good hygiene behaviour education for all members of the household
- Jointly with the households, identify one or two poor hygiene behaviour practices that need (and want) to address to minimize health risks to the household
- Make household level hygiene behaviour change plan,
- Regular follow up and review by the Hygiene promoters

4.4.2. Community Level

A first step for addressing hygiene issues at community level is to do an assessment on the current hygiene practices and community hygiene status. Like at household level, it is important to identify the most pressing poor hygiene behaviours or conditions that need to be addressed. It is important to realize that different seasons in the year often have different pressing hygiene issues.

In the rainy season there can be a lot of stagnant water around in the community, whereas in the dry season, shortage of water can pose other problems. For successful community level hygiene behaviour transformation, it is crucial to include all sections of the community in the planning and implementation phases of the intervention. It is important to aim for hygiene behaviour transformation for the entire community, and not focus on certain groups only.

For instance, if there are only a few members of the community who continue practicing open defecation, they can bring the entire community at risk for the spreading of diseases. Community level hygiene behaviour transformation interventions should be linked with follow up activities at household level. Assuring communities understand the importance of hygiene in reducing infectious disease is the first step in changing hygiene behaviors for the better. Research has shown participatory processes are effective in encouraging behaviour change. Healthy hygiene approaches can improve the living conditions and health of communities. When adapted to local conditions and shared in participatory processes, these approaches build self-esteem and foster a sense of ownership in healthy hygiene practices.

Community Level Hygiene Check List

Assess current community level hygiene knowledge and practices, with focus on latrine use, handwashing, food hygiene, water treatment and use and storage related hygiene and environmental hygiene and identify any gaps in safe hygiene practices.

In the community assessment, identify differences in perceptions and practices between the various population groups like men, women, children, elderly, disabled and sick and other marginalized groups.

Check communities' perception of the identified safe hygiene practice gaps, and assess if community feels a need to address these.

Identify and support actions that create a demand within the community to address key safe hygiene practice gaps as identified above.

Identify jointly with community the priority hygiene practices that require change, and make plans for community level behaviour change for 1-2 practices at a time only. Once these practices are adopted by the community, the programme can move on with addressing the next set of hygiene behaviours.

School hygiene and sanitation

School children have proven to be an excellent entry point to promoting hygiene behaviour changes as they are generally more receptive for change. Children also take hygiene message back home and in their communities, so that the impact of school based hygiene interventions can spread out to the wider community.

Figure 33 water point in elementary school of one of rural areas of Ethiopia (Photo: AberaKumie)

(Water points are a foundation for good hygiene)

To promote good hygiene behaviour at schools, it is essential to combine hardware and software components to produce a healthy school environment and to develop or support safe hygiene behaviours.

The hardware components:

- drinking water
- hand washing
- excreta disposal
- solid waste disposal facilities in and around the school compound.

Software components: activities that promote conditions at school and practices of school staff and children that help to prevent water and sanitation-related diseases and parasites

The water supply and sanitation conditions of schools have become a public health concern in recent years. A Ministry of Health report in 2007 about school hygiene in Ethiopia indicated that the majority of surveyed primary schools did not have access to drinking water sources or adequate sanitation facilities for hand washing and excreta disposal.Other studies in Ethiopia among school children indicate that upper respiratory infections, skin infections, abdominal discomfort, eye infections, gastroenteritis(diarrhoea) and tonsillitis are the commonest ailments for school clinic visits. The provision of school hygiene and sanitation ensures the rights of students to acceptable hygiene practices, safe water supply, latrines and a healthy school environment in general.

Check List for Hygiene Promotion at Schools

Identify past and ongoing hygiene promotion activities at school, and assess its effectiveness through observing current hygiene practices of students and staff related to latrine use, handwashing practices, cleanliness of school compound, and access to safe water.

- Current school level hygiene knowledge, practices, and facilities with focus on latrine use, handwashing with soap, food hygiene, water use and storage related hygiene and environmental hygiene and identify any gaps in safe hygiene practices.
- Discuss school hygiene development needs and plan with all stakeholders involved; education authorities, teaching staff, parents and students to come to realistic plan and mobilize support from stakeholders.
- School health clubs to be at the center of hygiene promotion and follow up activities.
- Assure availability soap and cleaning materials.
- Identify special needs and develop facilities **menstruation hygiene management** at school level.

- Identify special needs and develop facilities to secure school WASH facilities and services are inclusive for all.
    - Encourage students to promote hygiene messages to their families and wider community.

Information sheet-	Using hand wash facilities Hands

2.1.Personal Health and Hygiene Risk

Infection can be transmitted through:

- Consumption of water or food that has been contaminated through environment, washing or cooking.
- Hand to mouth transmission when availability of water for personal hygiene is reduced.
- Vectors (e.g. flies and mosquitoes) which breed near waste sites and stagnant water.

Inadequate WASH service can lead to an increased risk of several diseases including: diarrhea, Hepatitis A, Cholera, Typhoid and Shigella Dysentery, Intestinal helminthes, Malaria and Trachoma.

Inadequate management of human excreta poses a serious health risk due to potential contamination and loss of local water sources.

Children's excreta can be particularly high risk. it is more infectious than adults, yet often perceived by communities to be less so.

Lack of adequate supplies of clean water restricts the functioning and safe practices of health facilities and health workers. Pathogenic risks from exposure to medical waste include Hepatitis B & C, HIV, hemorrhagic fever, skin respiratory and gastro enteric infections; it is estimated that 20% of health care waste is infectious.

Table 1 Health risk prevention methods

1. Waste disposal	Throw everything that is not necessary for the process away immediately.
2. Chemical containers – Full & Empty	Store them correctly and separately or dispose of them immediately and correctly.
3. Working areas	Clean working areas.
4. Open wounds	Cover them immediately and wear an additional pair of disposable gloves. If there is any danger of exposure to the food product, the person should rather be placed on light duty.
5. Hand washing	Wash hands as per the previously discussed procedure as prescribed.

Figure 34- Young girl collecting water in Malawi, 2011

The following are identifying health risks with water and sanitation

- People still practice open defecation, contaminating the river,
- Most villagers are fishermen and many community members enter the river on a daily basis,
- Hygiene practice is generally poor,
- Although the snails live attached to the rocks, snail control is not applicable in this vast river.

Information sheet-	Performing proper food handling procedures

3.2. Food handling activities

Raw food Transportation

Raw food which is to be cooked can be safely handled with bare hands. Cooked or ready-to-eat foods should be handled with utensils such as tongs, spoons, spatulas or disposable gloves. If gloves are worn, they must be changed at least hourly or sooner if they become torn or if there is a change in task. Always wash hands before putting on gloves. Always put on new gloves when changing from raw food to ready-to eat food. Never touch food with gloves that have been used for cleaning.

Cook and Heating

Thoroughly cook all foods, especially those of animal origin. When cooking meat, ensure juices run clear. If reheating food, ensure that it is brought to the boil and simmered for at least five minutes. Thaw frozen food before cooking. If the food is to be cooked from a frozen state, take extra care to make sure that the food is cooked right through.

When thawing food, do so in the bottom part of the refrigerator. Microwave ovens can be used to thaw food provided that the food is cooked immediately afterwards. Never refreeze food which has been thawed.

Food Storage and Display

Food naturally contains bacteria and some food may contain food poisoning bacteria. If food is not stored, displayed or transported correctly, these bacteria can multiply to dangerous levels. One of the most important factors for growth is temperature. The temperature range between 5ºC and 60ºC is known as the temperature danger zone. 'High risk' foods must spend only the minimum possible time in this zone. Food that is displayed should either be wrapped or covered. Refrigerated display cases must be able to maintain foods below 5ºC.

Transporting Food

Ensure that all food that is delivered to you is done so in a vehicle that prevents contamination of the food. Food must be transported completely separately from chemicals such as detergents.

3.3. Food Hygiene

Maintaining food hygiene is making the food free from microbial contaminants ny reducing the different hazard discussed in chapter three. Food hygiene is very important to have healthy, safe, nutritious food that is good sources of nutrient and energy to support the health of most vulnerable community groups/ children and pregnant and lactating women.

When handling, preparing, cooking, and storing food, the individual must keep the food safely, healthy person that do not drop his/her fluids, hair, nail and keep his personal and working areas hygiene that do not contaminate food to have safe, nutritious food that support and promote the growth and development.

Specially the food prepared for children, pregnant and lactating mothers should be maintained safe throughout its journey as these age groups need special attention for their health and improve their nutritional status.

Poor food hygiene results in food borne diseases. Food borne diseases are diseases that could be caused by inappropriate food handling, cooking, storage practices and poor personal health condition of the food handlers during preparation. Most communicable diseases dominant in the rural community of Ethiopia like shigellosis, cholera, giardia, typhoid, typhus, are some of the food born and water borne diseases. The high episode of these diseases affect the nutritional status of women and child very badly. Therefore, special attention should be given to these vulnerable age groups.

Self-assessment Questions 6 (SAQ 6)

1. Write some important aspects of personal health
2. Discus infection transmission ways?
3. Mention some of health risks with water and sanitation

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Acknowledgement

This training manual is the result of a collaboration between the Ethiopian water technology institute (EWTI) and JHPIEGO. EWTI and JHPIEGO gratefully acknowledge the valuable contributions of the following trainers of Technical and Vocation Education in Ethiopia, professionalsfromEWTI, and JHPIEGO staff and trainers who reviewed this manual at different stages during the development process:

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This document was made possible through support provided by Feed the Future's Growth through Nutrition Activity primed by Save the Children International in partnership with Jhpiego.

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August 8 2020