

## COURSE GUIDE

### **EHS 208** **HYGIENE EDUCATION AND PROMOTION IN** **ENVIRONMENTAL HEALTH**

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## **Introduction**

EHS 208: Hygiene Education and Promotion in Environmental Health is a two (2) credit unit course available to all students offering Bachelor of Science (BSc.) in Environmental Health and other related fields. Environmental health is increasingly being recognized as an important part of general health especially in developing countries.

The course is broken into three modules and 9 study units. It introduces the students to the definition and importance of hygiene education and promotion in environmental health science. It also educates the students on the principles and concepts of hygiene and environmental Health. The course exposes the students to the knowledge of human interaction with the environment, environmental health hazards and personal hygiene.

At the end of this course, it is expected that students should be able to understand, explain and be adequately equipped on issues concerning hygiene education and promotion in environmental health.

The course guide, therefore, tells you briefly what the course: EHS 203 is all about, the types of course materials to be used, what you are expected to know in each unit, and how to work through the course material. It suggests the general guidelines and also emphasizes the need for self-assessment and tutor-marked assignments (TMAs). There are also tutorial classes that are linked to this course and students are advised to attend.

## **What You Will Learn in this Course**

The overall aim of this course, EHS 203, is to introduce students to the variables associated with hygiene education and promotion. During this course, you will learn about the issues of environmental health in broad perspectives: ranging from historical perspectives on the environment and environmental health; environmental health hazards; categories of environmental health hazards; principles of hazard management; personal hygiene and components of personal hygiene. It will explain the place of environmental health in your community; environmental intervention models; how to improve your personal hygiene; healthful housing; factors affecting healthful housing and planning for the improvement of healthful housing.

## **Course Aim**

The aim of this course is to provide you with an understanding of basics of hygiene education and promotion. It aims at helping you to become more responsible to your own health and other peoples' health.

## Course Objectives

Each unit has specific objectives to guide you into the purpose of the study. You should read the objectives before you begin the study and ask yourself whether the objectives have been met after you are through with such unit.

However, below are the overall objectives of this course. On successful completion of this course, you will be able to:

- briefly describe the history of hygiene and environmental health
- describe the significance of environmental health at community level
- define hygiene and sanitation
- identify types of sanitation in relation to various situations
- describe the components of personal hygiene
- identify possible environmental health interventions
- describe the relationship between human activity and environment
- identify areas of special effects of human activity on the environment
- explain the renewable and non-renewable resources
- identify the role of technology on environment
- identify the categories of environmental hazards
- describe the nature of environmental hazards
- explain the possible effects of environmental hazards
- define pollution
- identify sources and categories of pollution
- discuss how to manage pollution
- explain the principles of pollution prevention
- identify measures towards control of pollution and waste after being generated.
- discuss practices of pollution control
- describe the public health importance of personal hygiene.
- list and describe the components of personal hygiene.
- describe what acceptable and poor personal hygiene practices are.
- prioritize the components of personal hygiene that are critical for public health concerns
- explain hygienic hand washing using standard procedures
- list the critical situations for effective hand washing
- explain the elements and activities that are needed for planning personal hygiene promotion
- describe the criteria that are used for evaluating the effectiveness of personal hygiene application
- identify measures to promote personal hygiene.

## Working through the Course

To satisfactorily complete this course, you are expected to read the study units, read recommended textbooks and other materials provided by the National Open University of Nigeria (NOUN). Most of the units contain exercise tagged 'Tutor-Marked Assignment'. At a point in the course, you are required to submit these assignments for assessment prior to the real examination. Stated below are the components of the course and what you are expected to do.

## Course Materials

The major components of this course are:

- i. Course Guide
- ii. Study Units
- iii. Text Books and References Sources (listed at the end of each Unit)
- iv. Assignment File
- v. Presentation Schedule

## Study Units

There are three modules and nine units in this course and they are as follows

### Module 1 Principles and Concepts of Hygiene and Environmental Health

- Unit 1 Historical perspectives on hygiene and environmental health
- Unit 2 Concepts and principles in hygiene and environmental health
- Unit 3 Human interaction with the environment

### Module 2 Environment Health Hazards

- Unit 1 Categories of environmental health hazards health
- Unit 2 Principles of hazard management
- Unit 3 Principles of pollution prevention

### Module 3 Personal Hygiene

- Unit 1 Concept of personal hygiene
- Unit 2 Planning for the improvement of personal hygiene
- Unit 3 Plan of action for personal hygiene education

## **Assignment File**

There are two types of assessments in this course. First are the Tutor-Marked Assessments (TMAs); second is the written examination. In solving the questions in the assignments, you are expected to apply the information, knowledge and experience acquired during the course. The assignments must be submitted to your facilitator for formal assessment in accordance with prescribed deadlines stated in the assignment file. The work you submit to your facilitator for assessment accounts for 30 percent of your total course mark. At the end of the course, you will be required to sit for a final examination of three hours duration at your study centre. This final examination will account for 70 percent of your total course mark.

## **Presentation Schedule**

The presentation schedule included in this course guide provides you with important dates for completion of each e-tutor marked assignment (e-TMAs).

You should therefore try to meet the deadlines.

## **Assessment**

There are two aspects to the assessment of this course. First, there are e-tutor marked assignments; and second, the written examination.

You are thus expected to apply the knowledge, comprehension, information and problem solving gathered during the course. The e-tutor marked assignments must be submitted to your tutor for formal assessment, in accordance with the deadline given. The work submitted will count for 30% of your total course mark.

At the end of the course, you will sit for a final written examination.

This examination will account for 70% of your total score.

## **Tutor-Marked Assignments**

There are about nine TMAs in this course for your practice. There is also four e- TMAs. You need to submit all the TMAs. The best three out of four will therefore be counted. When you have completed each assignment, send them to your tutor as soon as possible and make sure that it gets to your tutor on or before the stated deadline.

The mean TMAs score will be computed with the examination score to give you your final score in the course. Note that if you did not complete your TMAs, even though you sit for the examination, your score will not be computed because there is no TMA score. So please endeavour to do all your TMAs.

If for any reason you cannot complete your assignment on time, contact your tutor before the assignment is due to discuss the possibility of extension. Extension will not be granted after the deadline, unless on exceptional cases.

### **Final Examination and Grading**

The final examination for EHS 203: Hygiene Education and Promotion in Environmental Health will be of 1½ hours duration. This accounts for 70 percent of the total course grade. The examination will consist of questions which reflect the practice, exercises and the tutor-marked assignments you have already attempted in the past. Note that all areas of the course will be assessed. To revise the entire course, you must start from the first unit to the twelfth unit in order to get prepared for the examination. It may be useful to go over your TMAs and probably discuss with your course mates or group if need be. This will make you to be more prepared, since the examination covers information from all aspects of the course.

### **Course Marking Scheme**

The following table includes the course marking scheme:

**Table 1: Course Marking Scheme**

Assessment	Marks
Assignment 1-4 TMAs	30% for the best 3
Total	10% x 3 = 30%
Final Examination	70% of overall course marks
Total	100% of Course Marks



## Course Overview

This table indicates the units, the number of weeks required to complete them and the assignments.

**Table 2: Course Organisation**

Unit	Title of Work	Weeks Activity	Assessment (End of Unit)
	<b>Course Guide</b>	<b>Week</b>	
1	Historical perspectives on hygiene and environmental health	Week 1	Assignment 1
2	Concepts and principles of hygiene and environmental health	Week 2	Assignment 2
3	Human interaction with the environment	Week 3	Assignment 3
4	Categories of environmental health hazards	Week 4	Assignment 4
5	Principles of hazard management	Week 5	Assignment 5
6	Principles of pollution prevention	Week 6	Assignment 6
7	What is personal hygiene?	Week 7	Assignment 7
8	Planning for the improvement of personal hygiene	Week 8	Assignment 8
9	Plan of action for personal hygiene education	Week 9	Assignment 9

## How to Get the Most Out of This Course

In distance learning, the study units replace the university lecturer. This is one of the huge advantages of distance learning mode; you can read and work through specially designed study materials at your own pace and at a time and place that suit you best. Think of it as reading from the teacher, the study guide tells you what to read, when to read and the relevant texts to consult. You are provided exercises at appropriate points, just as a lecturer might give you an in-class exercise.

Each of the study units follows a common format. The first item is an introduction to the subject matter of the unit and how a particular unit is integrated with the other units and the course as a whole. Next to this is a set of learning objectives. These learning objectives are meant to guide your studies. The moment a unit is finished, you must go back and check whether you have achieved the objectives. If this is made a habit, then you will significantly improve your chances of passing the course.

The main body of the units also guides you through the required readings from other sources.

This will usually be either from a set book or from other sources.

Self-assessment exercises are provided throughout the unit, to aid personal studies and answers are provided at the end of the unit. Working through these self-tests will help you to achieve the objectives of the unit and also prepare you for tutor marked assignments and examinations. You should attempt each self-test as you encounter them in the units.

The following are practical strategies for working through this course

1. Read the Course Guide thoroughly.
2. Organize a study schedule. Refer to the course overview for more details. Note the time you are expected to spend on each unit and how the assignment relates to the units. Important details, e.g. details of your tutorials and the date of the first day of the semester are available. You need to gather together all this information in one place such as a diary, a wall chart calendar or an organizer. Whatever method you choose, you should decide on and write in your own dates for working on each unit.
3. Once you have created your own study schedule, do everything you can to stick to it. The major reason that students fail is that they get behind with their course works. If you get into difficulties with your schedule, please let your tutor know before it is too late for help.
4. Turn to Unit 1 and read the introduction and the objectives for the unit.
5. Assemble the study materials. Information about what you need for a unit is given in the table of contents at the beginning of each unit. You will almost always need both the study unit you are working on and one of the materials recommended for further readings, on your desk at the same time.
6. Work through the unit, the content of the unit itself has been arranged to provide a sequence for you to follow. As you work through the unit, you will be encouraged to read from your set books.
7. Keep in mind that you will learn a lot by doing all your assignments carefully. They have been designed to help you meet the objectives of the course and will help you pass the examination.

8. Review the objectives of each study unit to confirm that you have achieved them. If you are not certain about any of the objectives, review the study material and consult your tutor.
9. When you are confident that you have achieved a unit's objectives, you can start on the next unit. Proceed unit by unit through the course and try to pace your study so that you can keep yourself on schedule.
10. When you have submitted an assignment to your tutor for marking, do not wait for its return before starting on the next unit. Keep to your schedule. When the assignment is returned, pay particular attention to your tutor's comments, both on the tutor-marked assignment form and also that written on the assignment. Consult your tutor as soon as possible if you have any questions or problems.
11. After completing the last unit, review the course and prepare yourself for the final examination. Check that you have achieved the unit objectives (listed at the beginning of each unit) and the course objectives (listed in this course guide).

### **Facilitators/Tutors and Tutorials**

There are 12 hours of tutorials provided in support of this course. You will be notified of the dates, time and location together with the name and phone number of your tutor as soon as you are allocated a tutorial group.

Your tutor will mark and comment on your assignments, keep a close watch on your progress and on any difficulties you might encounter and provide assistance to you during the course. You must upload your e-tutor-marked assignment to your tutor well before the due date. At least two working days are required for this purpose. They will be marked by your tutor and the scores credited to you as soon as possible.

Do not hesitate to contact your tutor by telephone, e-mail or discussion board if you need help. The following might be circumstances in which you would find help necessary: contact your tutor if:

- You do not understand any part of the study units or the assigned readings.
- You have difficulty with the self-test or exercise.

- You have questions or problems with an assignment, with your tutor's comments on an assignment or with the grading of an assignment.

You should try your best to attend the tutorials. This is the only chance to have face to face contact with your tutor and ask questions which are answered instantly. You can raise any problem encountered in the course of your study. To gain the maximum benefit from the course tutorials, prepare a question list before attending them. You will learn a lot from participating in discussion actively.

### **Summary**

This course is designed to impart functional knowledge of hygiene education and promotion to you. This knowledge being functional is expected to empower you with the ability to be responsible for your own health and discharging it with excellence. We wish you success in this course and hope that you will translate the knowledge gained to becoming a solution in all health problems.

Good Luck!

**MAIN  
COURSE**

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## **MODULE 1 PRINCIPLES AND CONCEPTS OF HYGIENE AND ENVIRONMENTAL HEALTH**

Unit 1	Historical Perspectives on Hygiene and Environmental Health
Unit 2	Concepts and Principles in Hygiene and Environmental Health
Unit 3	Human Interaction with the Environment

### **UNIT 1 HISTORICAL PERSPECTIVES ON HYGIENE AND ENVIRONMENTAL HEALTH**

#### **Unit Structure**

- 1.1 Introduction
- 1.2 Intended Learning Outcomes
- 1.3 History of Hygiene and Environmental Health
- 1.4 Prehistoric and Ancient Civilization
- 1.5 Modern Times
- 1.6 Summary
- 1.7 References/Further Reading/Web Resources
- 1.8 Possible Answers to Self- Assessment Exercise(s)

#### **1.0 Introduction**

The course guide has described the general overview of this unit and how it is linked specifically to this course. This unit will expose you to the basic concept of environmental hygiene education and promotion, its place in public health practice. Now, let us identify what you should learn in the unit as described in the following specific objectives.

#### **1.2 Intended Learning Outcomes**

By the end of this unit, you will be able to:

- describe the history of hygiene and environmental health
- describe the significance of environmental health at community level.

#### **1.3 History of Hygiene and Environmental Health**

Hygiene and sanitation have a long history at various levels of human civilization. We can roughly divide the historical events into two periods: the ancient and the modern.

## **1.4 Prehistoric and Ancient Civilisation**

Religious laws, such as Moses' Law, writings in the Old and New Testaments and laws in the Koran, played major roles in the lives of ancient peoples. These laws mainly concentrated on the provision of personal hygiene. Dead bodies and contaminated surfaces were known to be unclean or unhygienic to touch. The importance of burying human faeces was also strongly indicated. The importance of body cleanliness before praying was a motive for maintaining the integrity of hygiene with a religious practice.

The importance of hygiene and sanitation flourished at the times of Greek, Roman and Egyptian civilization. The use of private and public baths and latrines, cleaning of the body, shaving the head for protection from lice infestation, and the construction of water pipelines and sewage ditches were widely observed. The transmission of schistosomiasis (bilharzia) was linked to bathing and swimming in the Nile River. In these civilizations, the focus was on personal hygiene (hygiene) and human waste management (sanitation).

### **Self-Assessment Exercise**

State some important aspects of hygiene in per-historic and ancient civilisation

## **1.5 Modern Times**

A number of discoveries in the 19th century were important events for the understanding of communicable diseases. For example, the link between contaminated water and cholera was discovered by John Snow in 1854; the importance of hygienic hand washing before attending delivery of a baby was noted by Semmelweis in 1845; and the discovery that microorganisms (very small organisms only visible under a microscope) cause disease was made by Louis Pasteur around this time.

The period following the industrial revolution in Europe in the 19th century showed that improvements in sanitation, water supply and housing significantly reduced the occurrence of communicable diseases. The term 'environmental health' is used to describe human health in relation to environmental factors such as these.

Environmental health can be defined as the control of all the factors in a person's physical environment that have, or can have, a damaging effect on their physical, mental or social wellbeing. The issue of environmental health is now a global matter under the guidance of the United Nations (UN) through the World Health Organization.

Although hygiene and infection are vital factors in environmental health, it is also good to be aware of emerging issues such as global warming and the links between medical conditions such as cardio-vascular disease and our environment and lifestyles. Our **environment** is everything that surrounds us. It includes all the external influences and conditions that can affect our health, life and growth. These influences are constantly changing and the effects on our health may not be easily foreseen.

### Self-Assessment Exercise

List some essential features of hygiene in modern civilization.

## 1.6 Summary

In this unit, we have been looked at some historical perspectives of hygiene and environment health. We now understand the two divisions of the history of hygiene and environmental health: ancient and modern. We saw that pre-historic and ancient hygiene and sanitation are rooted in:

- Holy books (Koran and Bible)
- Greek, Roman and Egyptian civilizations

We also discussed modern time hygiene in the light of 19<sup>th</sup> century discoveries of communicable diseases. The link between contamination and infectious diseases were established in this unit.

## 1.7 References and Reading Materials

Ablutions or Bathing, Historical Perspectives + (Latin: abluere, to wash away)". *Word Information*. Retrieved 22 February 2017.

Composting for the Homeowner - University of Illinois Extension". [Web.extension.illinois.edu](http://Web.extension.illinois.edu). Retrieved 2013-07-18.

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Knows and unknowns on burden of disease due to chemicals: a systematic review. Press-Ustinov, A., et al. 2011. *Environmental Health* 10:9.



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Masters, Gilbert M. (1997). *Introduction to Environmental Engineering and Science*. Prentice Hall. ISBN 9780131553842.

### **1.8 Possible Answers to Self- Assessment Exercise(s)**

#### **Answers**

- i. Hygiene and sanitation law and practices existed in ancient as well as in modern times
- ii. Laws in different religions are important for hygiene practices in ancient and modern times
- iii. Ancient hygiene practices concentrated on personal hygiene and waste management (sanitation)
- iv. Modern understanding and practices of hygiene improved as it was discovered that microorganisms cause diseases
- v. Improvement in housing, water supply and sanitation have improved health.

## UNIT 2 CONCEPTS AND PRINCIPLES IN HYGIENE AND ENVIRONMENTAL HEALTH

### Unit Structure

- 2.1 Introduction
- 2.2 Intended Learning Outcomes
- 2.3 Hygiene and sanitation Environmental health
- 2.4 Components of environmental health
- 2.5 Environmental health and disease transmission
- 2.6 Summary
- 2.7 References and Reading Materials
- 1.8 Possible Answers to Self- Assessment Exercise(s)

### 2.1 Introduction

Improvements in personal knowledge, skill and practice that modify an individual's behaviour towards healthy practice are the focus of hygiene promotion. Safe hygiene practice includes a broad range of healthy behaviours, such as hand washing before eating and after cleaning a child's bottom, and safe faeces disposal. When you carry out hygiene education and promotion the aim is to transfer knowledge and understanding of hygiene and associated health risks in order to help people change their behaviour to use better hygiene practices.

### 2.2 Intended Learning Outcomes

By the end of this unit, you will be able to;

- define hygiene and sanitation
- identify types of sanitation in relation to various situations
- describe the components of personal hygiene
- identify possible environmental health interventions.

### 2.3 Hygiene, Sanitation and Environmental Health

Hygiene is related to personal cleanliness, such as personal hygiene (body, clothing). Sanitation refers to waste management, particularly management of human waste.

- **Hygiene** generally refers to the set of practices associated with the preservation of health and healthy living. The focus is mainly on personal hygiene that looks at cleanliness of the hair, body, hands, fingers, feet and clothing, and menstrual hygiene.

- **Sanitation** means the prevention of human contact with wastes, for hygienic purposes. It also means promoting health through the prevention of human contact with the hazards associated with the lack of healthy food, clean water and healthful housing, the control of **vectors** (living organisms that transmit diseases), and a clean environment. It focuses on management of waste produced by human activities.

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

- **Basic sanitation:** refers to the management of human faeces 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 deposited.
- **Food sanitation:** refers to the hygienic measures for ensuring food safety. Food hygiene is similar to food sanitation.
- **Housing sanitation:** refers to safeguarding the home environment (the dwelling and its immediate environment).
- **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.

Environmental health is broader than hygiene and sanitation; it encompasses hygiene, sanitation and many other aspects of the environment such as global warming, climate change, radiation, gene technology, flooding and natural disasters. It also involves studying the environmental factors that affect health. The World Health Organization's definition is as follows:

Environmental health addresses all the physical, chemical, and biological factors external to a person, and all the related factors impacting behaviours. It encompasses the assessment and control of those environmental factors that can potentially affect health.

### **Self-Assessment Exercise**

- |                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"><li>i. Define sanitation and list the various types.</li><li>ii. List the basic aspects environment health.</li></ol> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|

## 2.4 Components of Environmental Health

Table 1 describes the areas of environmental health and hygiene that will be of importance to you as a health worker and that you will learn about in the rest of this Module.

**Table 1: Components of hygiene and environmental health**

Description	Concerns
Personal hygiene	Hygiene of body and clothing
Water supply	Adequacy, safety (chemical, bacteriological, physical) of water for domestic, drinking and recreational use
Human waste disposal	Proper excreta disposal and liquid waste management
Solid waste management	Proper application of storage, collection, disposal of waste. Waste production and recycling
Vector control	Control of mammals (such as rats) and arthropods (insects such as flies and other creatures such as mites) that transmit disease
Food hygiene	Food safety and wholesomeness in its production, storage, preparation, distribution and sale, until consumption
Healthful housing	Physiological needs, protection against disease and accidents, psychological and social comforts in residential and recreational areas
Institutional hygiene	Communal hygiene in schools, prisons, health facilities, refugee camps, detention homes and settlement areas
Water pollution	Sources, characteristics, impact and mitigation
Occupational hygiene	Hygiene and safety in the workplace

Key phrases in this definition are environmental factors and potentially affect health.

### Self-Assessment Exercise

List the components of hygiene and environment health.
--------------------------------------------------------

## 2.5 Environmental Health and Disease Transmission

The description of diarrhoea transmission represents a good way to understand the pathways of disease through the environment and how environmental health and hygiene can help prevent disease transmission.

**Table 2: Possible environmental health interventions for diarrhoea**

Intervention strategies	Activities
Intervention at the source (where the diarrhoea infection comes from)	Avoid open defecation
	Install a latrine
	Always use a latrine to bury faeces and urine
	Use safe drinking water
	Hand washing
Intervention in the environment (how the diarrhoea infection is transmitted)	Vector control and management
	Proper refuse and liquid waste management
	Provision of food safety
	Healthful housing
Intervention at the host (the person who might become infected)	Hygiene promotion through hygiene education and community mobilisation
	Vaccination (if available)
	Healthy living

### The Role of Environmental Health in Public Health

Our living environment is composed of home, work and recreational centres where people spend their time. Water, air and food are our concern. The provision of environmental health services extends to all these aspects of our lives.

- List the locations in your *community* where environmental health is important.
- You may have thought of a list that includes the following, but the detail will depend on your own community.
- workplaces: health facilities, local workplaces, public offices, shops, mill house, metal and wood works
- schools
- social places: church, mosque
- Homes: different types of home in your area

### Environmental Risk Factors

- You have learned in previous Modules that infectious agents play a part in the transmission of disease. **Infectious agents** are pathogenic (disease-causing) bacteria, viruses, fungi, protozoa and parasites. To cause a disease, they must be introduced into

our bodies in sufficient quantities. The environmental conditions and practices that facilitate the carrying of such infectious agents into our bodies are termed **environmental risk factors**. A good example is drinking water, which can be contaminated by human faecal matter that contains these infectious agents. When this water is consumed, we are likely to get diarrheal diseases.

- There are other ways that infectious agents can get into our bodies; for example, the air we breathe can be contaminated by droplets that come out of a patient's lungs when they breathe or cough. TB and pneumonia are droplet-related infections that are transmitted in this way. There are also diseases and conditions that are not caused by pathogenic organisms, but are caused by other environmental risk factors, which may be due to chemicals or physical hazards such as noise. Major environmental risks and examples of the diseases and conditions that are related to these risks are indicated in Table 3.5 Further descriptions of these diseases can be found in the *Communicable Diseases and Non-Communicable Diseases, Emergency Care and Mental Health* Modules.

**Table 3: Major environmental risk factors with related diseases and conditions**

<b>Environmental risk factors</b>	<b>Related diseases and conditions</b>
Contaminated water, lack of latrines poor hand washing, inappropriate solid waste management, open defecation vector infestation	Diarrhoeal diseases, trachoma schistosomiasis, ascariasis, trichuriasis hookworm, typhoid fever, relapsing fever
Indoor air pollution	Chronic obstructive pulmonary disease, lower respiratory infections, lung cancer
Outdoor/ambient air pollution	Respiratory infections, cardiovascular diseases, lung cancer
General environmental hazards (climate, mosquitoes, nutrition)	Diarrhoea diseases, malnutrition, malaria and other vector-borne diseases; heat exhaustion
Environmental hazards in workplaces (excess noise, heat, dust, chemicals)	Injuries, hearing loss, cancer, asthma, back pain, chronic obstructive pulmonary disease

### **Environmental Intervention Models**

According to the Federal Ministry of Health, more than 80% of communicable diseases in Nigeria are believed to be preventable using environmental health interventions. Generally, there are two intervention models: the clinical intervention model, which looks at treating the sick person, and the public health model, including environmental health, which looks at how to stop people getting sick in the first place by providing a healthy environment.

If we look at these two models in a wider context, then there are additional factors that must be considered. These include having helpful local policies, appropriate community level organizations, sanitation legislation, developing sanitation technology options and poverty alleviation efforts. Political will in policy development in health and environmental health, designing the hygiene and sanitation legal frameworks and long-term socio-economic developments, are aspects of the government's responsibilities. As a Health Extension Practitioner, you have an important role in the prevention of environmental hazards that affect the health of the public.

### **Self-Assessment Exercise**

Mention and explain the roles of environmental health and public health.

## **2.6 Summary**

The concepts and principles of hygiene and environmental health were discussed in this unit. Important aspects of the discussions centered on:

- Hygiene, sanitation and vector
- Components of environmental health
- Environmental health and disease transmission
- The role of environmental health in public health
- Environmental risk factors in disease transmission

Discussion in this unit ended with environmental intervention models. It is my hope that the lessons learnt in this unit will help you to develop a positive attitude about health environment.

## **2.7 References/Further Readings/Web Resources**

Environmental Health: from Global to Local (2 Editor= Howard Frumkin ed.). San Francisco: John Wiley & Sons. 2010.

Environmental hazard". Defined Term - A dictionary of legal, industry-specific, and uncommon terms. Retrieved 23 August 2017. Quoted from Code of Maryland, January 1, 2014

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## 2.8 Possible Answers to Self- Assessment Exercise(s)

Answer	
<b>Table 4:</b> Important areas of environmental health and hygiene	
Description	Concerns
Personal hygiene	Hygiene of body and clothing
Water supply	Adequacy, safety (chemical, bacteriological, physical) of water for domestic, drinking and recreational use
Human waste disposal	Proper excreta disposal and liquid waste management
Solid waste management	Proper application of storage, collection, disposal of waste. Waste production and recycling



## **UNIT 3    HUMAN    INTERACTION    WITH    THE ENVIRONMENT**

### **Unit Structure**

- 3.1 Introduction
- 3.2 Intended Learning Outcomes
- 3.3 Relationships between Human Activity and the Environment
- 3.4 Use of Natural Resources
- 3.5 Production of Waste and Pollutants
- 3.6 Technology and The Environment
- 3.7 Agriculture and Environment
- 3.8 Summary
- 3.9 References/Further Reading/Web Resources

### **3.1 Introduction**

Humans need to interact with the environment to obtain our food, water, fuel, medicines, building materials and many other things. Advances in science and technology have helped us to exploit the environment for our benefit, but we have also introduced pollution and caused environmental damage. The impact of environmental problems on humans is significant, affecting all human activities, including health and socio-economic development. In this study session you will learn about the relationships between humans and the environment, and the ways in which we use environmental resources.

### **3.2 Intended Learning Outcomes**

By the end of this unit, you will be able to:

- describe the relationship between human activity and environment
- identify areas of special effects of human activity on the environment
- explain the renewable and non-renewable resources
- identify the role of technology on environment.

### **3.3 Relationships Between Human Activity and The Environment**

Our environment means our physical surroundings and the characteristics of the place in which we live. It also refers to the wider natural world of land, sea and atmosphere. Humans have been interacting with their environment since people first walked the Earth. For example, humans have been cutting down forests to clear land to

grow crops for centuries and by doing so we have altered the environment. Conversely, the environment affects us in many different ways as well. A simple example is the way we change our clothes in response to cold or hot weather. In this section we will introduce some of the ways in which humans influence their environment and how the environment influences us, both positively and negatively.

A good climate, accessible clean water, fertile soil, etc. are aspects of the physical environment that enable people to live and thrive. However, harsh environments, such as a very hot climate, limited water and infertile land, make it more difficult for people to survive. We are also affected by major environmental events such as earthquakes, floods and drought that damage homes, property and agriculture. These can lead to the displacement of people and can cause injury, loss of life and destruction of livelihoods. They can also damage water sources and pipelines, causing water contamination and spreading waterborne diseases. In Study Session 10 you will learn more about the effects of floods and droughts.

Our relationship with the environment changed with industrialization, which began in the 18th century in the UK, shortly followed by elsewhere in Europe and North America, and then spreading across the world. Prior to industrialization, the impacts of human activity were not very significant because the technologies used were not capable of modifying the environment on a large scale. People at that time lived in agricultural societies using hand tools and simple technologies with limited environmental impact. Industrialization has allowed for a greater exploitation of resources. For example, we now use powerful chainsaws to cut down trees and industrially produced chemical fertilizers and pesticides for crop production. These changes have rapidly increased the human impact on the environment.

The links between human activity and the environment are complex and varied, but can be grouped into two main types of activity:

- *Use of natural resources* such as land, food, water, soils, minerals, plants and animals
- *Production of wastes* from a range of activities including agriculture, industry and mining, as well as wastes from our own bodies.

#### **Self-Assessment Exercise**

List and explain two types of human activities in the environment
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### **3.4 Use of Natural Resources**

We use many different types of natural resources in our daily lives. We depend on food and water for survival and we need energy for many different purposes, from domestic cooking through to major industrial processes. Our clothes, transport, buildings, tools and all other items we

use require many different resources for their production. Let's take a simple example. Think about the resources that have been used to produce a notebook of the type you may be using right now as you study this Module. Manufacturing the paper needed raw materials of wood and water as well as energy for the production process. The trees that supplied the wood required soil, water and land to grow on. There may be ink or metal staples or other components in your notebook that were made from other types of resources. Our need for resources is vast and it is growing as the population increases and consumption per person increases with socio-economic progress. Depletion of natural resources by extraction and exploitation is especially of concern for non-renewable resources

### **Renewable and non-renewable Resources**

The resources we use can be classified as renewable or non-renewable. The basic difference between the two is the rate at which they are regenerated back into a usable form, relative to the rate at which they are used by humans. **Non-renewable resources** cannot be replenished by natural means as quickly as the rate at which they are consumed. They include minerals and **fossil fuels** such as oil, coal and gas, which are formed over millions of years by natural processes from decayed plants and animals.

**Renewable resources** are constantly available or regenerated over short timescales by natural processes. Some renewable resources, such as solar energy, are not modified or used up by humans. Others, such as water, are altered when we use them and can be over-exploited or damaged such that the resource is no longer available for use.

### **Deforestation**

One particular problem caused by over-exploitation of natural resources is deforestation, which occurs when forest areas are cleared and the trees are not replanted or allowed to regrow. In Ethiopia, clearing land for agriculture to meet the food needs of the growing population and the demand for fuel and construction materials has resulted in a steady loss of forest area, which is still continuing

The loss of forest has several undesirable consequences. Forests are home to many different types of trees, as well as other plants, and a wide range of animals from insects to birds and mammals. The conversion of forests to agriculture greatly reduces biodiversity, which is a measure of the variety of living organisms (all life forms). Biodiversity is important for humans because we use other living organisms to provide several essentials:

- *Food:* we use plants and animals such as fish, goats, wheat, rice and maize as sources of food.

- *Medicines:* many traditional medicines are made from plants and animals and new medicines are developed from them.
- *Ecological services:* living organisms, especially plants and micro-organisms, play an important role in processes that maintain our lives and environment such as providing oxygen, cleaning the air, purifying water, breaking down wastes and controlling erosion.

Deforestation is a significant contributory cause of soil erosion. Once the trees and undergrowth are removed, the underlying ground is exposed. Without the intercepting effect of the vegetation and the tree roots binding the soil together, the soil is more likely to be washed away when it rains. Loss of forests also has a significant impact on water supply. Tree roots reach deep into the soil and create spaces between the particles which increases soil permeability, allowing rainwater to soak in and replenish groundwater. (Permeability means the ease with which water moves through soil or rock).

### **Energy resources**

The use of renewable or non-renewable resources is a critical factor when considering energy resources. Fossil fuels have been the main energy source for global industrialization, but because they are non-renewable, the quantity is ultimately limited and their use is not sustainable over the long term. Furthermore, burning of fossil fuels is the main cause of climate change. There are several renewable alternatives to fossil fuels. Wood used as a fuel is renewable in the sense that trees will regrow but there are other disadvantages such as deforestation, as you have read. Hydroelectric power is renewable because it makes use of the energy of flowing water but does not use up the water in the process. Another renewable energy source is solar power, using photovoltaic cells that convert the sun's energy into electricity.

### **Water resources**

You may have noticed that the four categories of resources do not include water, and yet this is one of our most vital resources and is obviously central to the WASH sector. The direct use of water by people falls into three main categories:

- Domestic uses, including drinking, washing and cooking
- Agricultural uses, principally irrigation
- Industrial uses, in manufacturing processes and for energy generation.

The relative proportions of these three categories vary in different parts of the world, but globally the sector using the most water is agriculture (FAO, 2012).

As well as direct use of water for human activities, water is also essential for the environment and to maintain biodiversity. Rivers, lakes and wetlands are important habitats for wildlife and need a minimum amount of water at all times. This becomes a problem when the demand for water for human activities exceeds the supply.

Water is not an endlessly renewable resource. In many parts of the world water demand is significantly above sustainable water supply. Sustainable water supply means there are adequate supplies, in both quality and quantity, to meet the current and future needs of people and of the environment.

Many countries are already experiencing water stress or scarcity. These terms refer to the volume of water available *relative to* the use and demand for it, which is linked to the population served. Countries which have less than 1700 m<sup>3</sup> of water per person per year for all purposes are defined as water stressed (United Nations, 2014). Water scarce countries have been defined as those with less than 1000 m<sup>3</sup> of water per person per year. These precise figures should be used with caution, however, because they do not recognize variations between countries and they hide the underlying causes of water scarcity.

### Self-Assessment Exercise

List any five categories of resources found in the environment
----------------------------------------------------------------

## 3.5 Production of Waste and Pollutants

Following on from our use of natural resources, it is inevitable that wastes are produced. For the WASH sector, the most important of these is our own bodily wastes. The impacts of open defecation and inadequate sanitation on human health and on the wider environment are profound. Waterborne diseases are caused by pathogens (disease-causing agents) in water and food that have been contaminated by the wastes from infected people. Preventing this connection between human wastes and the intake of contaminated water is the primary goal of WASH services.

Industry, agriculture and energy production all generate wastes that can pollute air, water and soil. Pollution means the introduction into the environment of substances liable to cause harm to humans and other living organisms. For example, the leather industry produces large amounts of liquid wastes from the tanning process. These wastes contain

organic materials such as fat from the hides and **toxic** (poisonous) chemicals including some human carcinogens (cancer-causing agents). Another example is the release of so-called greenhouse gases such as carbon dioxide, methane and nitrous oxide, which contribute to human-induced climate change.

### **Self-Assessment Exercise**

Explain how wastes are generated into the environment
-------------------------------------------------------

## **3.6 Technology and The Environment**

Technologies have transformed transport, industry, communications and our lives at home and work. For instance, gadgets such as mobile phones, computers, televisions, microwave ovens and refrigerators have improved living standards for those people who can afford them. Technology can also improve the quality of our environment. For example, energy can be generated from renewable sources such as wind and solar power, which reduces our reliance on non-renewable energy sources such as fossil fuels, and also helps to reduce the release of polluting gases to the atmosphere.

Another example of the benefits from technology is the highly advanced eco-friendly wastewater treatment plant at the St. George Brewery in Addis Ababa. This plant recovers nutrients and waste water from the brewery that would otherwise be released into the environment.

This type of technology can help to alleviate the problem of water shortage, prevent surface water pollution and protect the environment.

Although technology has many positive impacts on people and the environment, it also has negative impacts, including the production of toxic waste from technological processes and electronic gadgets that are thrown away when they reach the end of their useful lives,

### **Self-Assessment Exercise**

List three positive and negative aspects of technology in our environment
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## **3.7 Agriculture and Environment**

Agriculture is very important in Ethiopia to provide essential food crops and as a source of income, contributing about 46% of our country's Gross Domestic Product (GDP). About 80% of the labour force in Ethiopia is in the agricultural sector, so it is vital to the livelihoods of the majority of people. However, agriculture also has significant negative impacts on our environment, including loss of biodiversity,

pollution, climate change, soil erosion and the use of large amounts of water for irrigation.

Agricultural activities are also major sources of water pollution. Pesticides and fertilizers applied to crops may wash into rivers and leach into soil and groundwater. Poor farming practices, especially on steeply sloping land, are a significant cause of soil erosion in Ethiopia because rainfall washes away the soil particles downhill. Each year more than 1.5 billion tons of soil are lost from the Ethiopian highlands (Tamene and Vlek, 2008). This lost soil is not only a problem for agriculture, it silts up rivers and lakes. Soil erosion and loss of soil biodiversity causes a decline in soil fertility and this in turn reduces agricultural productivity. Good agricultural practices, such as the use of terraces and diversion ditches, can help stop soil being lost from hillsides

Agriculture also plays a role in causing climate change through the release of greenhouse gases into the atmosphere. For example, fertilizers added to the soil release nitrous oxide and livestock production releases methane from the digestion process in cattle and the decomposition of manure. The use of fossil fuels to power agricultural machines and burning trees to clear agricultural land both release carbon dioxide.

### Self-Assessment Exercise

State the role of agriculture in the environment.

## 3.8 Summary

This unit covered lessons on the interactions between humans and the environment. The relationship between human activities and the environment was established. The use of natural resources, their positive and negative impacts in the environment were highlighted. The production of waste and pollutants into the environment as a result the use of resources was also studied. Other important lessons learnt in this unit had to do with the role of technology and agriculture in the environment. Students are advised to practice the lessons of this unit.

## 3.9 References/Further Reading/Web Resources

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## MODULE 2 ENVIRONMENTAL HEALTH HAZARDS

Unit 1	Categories of Environment Health Hazards
Unit 2	Principles of Hazard Management
Unit 3	Principles of Pollution

### UNIT 1 CATEGORIES OF ENVIRONMENTAL HEALTH HAZARDS

#### Unit Structure

- 1.1 Introduction
- 1.2 Intended Learning Outcomes
- 1.3 Environment Health Hazards
  - 1.3.1 Physical Hazards
  - 1.3.2 Biological Hazards
  - 1.3.3 Chemical Hazards
  - 1.3.4 Cultural/Practice-Related Hazards
  - 1.3.5 Social Hazards
- 1.4 Summary
- 1.5 References/Further Reading/Web Resources
- 1.6 Possible Answers to Self- Assessment Exercise(s)

#### 1.1 Introduction

There are a range of environmental health hazards that affect our wellbeing. Hazards can be grouped together to improve understanding and action planning. The actions that you need to carry out to protect the health of your community depend on knowing how these hazards can affect us all. In this study unit, you will learn about the types and categories of environmental health hazards, the routes of exposure and the ways of preventing and controlling them.

#### 1.2 Intended Learning Outcomes

By the end of this unit, you will be able to:

- identify the categories of environmental hazards
- describe the nature of the environmental hazards
- explain the possible effects the environmental hazards.

#### 1.3 Environment Health Hazards

In module 1, you learned that environmental health addresses the assessment and control of environmental factors that can potentially



affect health. It is targeted towards preventing disease, creating health-supporting environments and encouraging positive human behaviours. You have also learned about the general issues of environmental health risks. Our environment generally consists of physical, chemical and biological factors and our relationship with our environment is always interactive. This means that we affect our environment and our environment affects us. These interactions may expose us to environmental health hazards; that is any environmental factors or situations that can cause injury, disease or death. It is worth pausing here to clarify the difference between hazard and risk.

A hazard is something which is known to cause harm, that is, a source of danger to health. Risk is the likelihood or probability of the hazard occurring and the magnitude of the resulting effects. For example, if you climb a ladder you know there is a chance you could fall off and be injured, although it is unlikely. The ladder is the hazard and the chance of injury is the risk you take by climbing the ladder.

We will illustrate an environmental health hazard with an example. Fresh dung supports the breeding of flies. Dung cake is usually prepared near to the house. Young flies need food and move from the dung to the food that is found in the house. The flies pick up pathogenic organisms from the dung and transfer them to fresh food that is ready for consumption. A child eats the contaminated food and gets diarrhoea in a few days. The conditions or the situation of producing dung cake close to the house is hazardous (or dangerous) because it facilitates the breeding of flies near to fresh food in the house. The infected food is the hazard that damages the child's health. In this example, the hazard arises because of the infectious agent (the pathogenic organisms) and the process or condition (the preparation of cow dung cake close to the house). The risk of getting an infection is very high if someone consumes food that is contaminated with an infectious agent. What causes environmental hazards? List some different types of natural and human-produced hazards. You may have listed a number of factors. Natural hazards include earthquakes, volcanic eruptions and flooding. Human-produced hazards are mainly related to pollution of the air, water and soil, and contamination of food.

### **1.3.1 Physical Hazards**

Physical hazards are those substances or conditions that threaten our physical safety. Fires, explosive materials, temperature (hot or cold), noise, radiation, spills on floors and unguarded machines are some examples of physical hazards. Physical hazards also include ergonomic hazards which occur when the type of work, body position and working conditions put strain on your body. This happens when your capacity for work is restricted by the type of work. These instances are hard to spot since you don't always immediately notice the strain on your body or the harm these hazards cause. Short-term exposure in badly designed

work may result in muscle fatigue or tiredness, but long-term exposure can result in serious long-term injuries of the muscular-skeletal system. Injera baking is one of the hardest tasks a woman faces routinely.

She spends one to two hours in a forced sitting and bending position which can be damaging to her body. Ergonomic hazards also exist among farmers, for example while manually plugging and cleaning the weeds in farmland. A farmer plugging his land needs lots of physical effort.

### **Self-Assessment Exercise**

Define physical hazard and list examples
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### **1.3.2 Biological Hazards**

Biological hazards are organisms, or by-products from an organism, that are harmful or potentially harmful to human beings. They include pathogenic bacteria, viruses and parasites, and also toxins (poisons) that are produced by organisms. Biological hazards are the cause of the majority of human diseases. For example, bacteria cause cholera, tuberculosis, leprosy, relapsing fever and many diarrhea diseases; viruses are responsible for hepatitis B and C, HIV, measles and polio; and there are many diseases caused by parasites. A parasite is any organism that lives on or in another organism, called the host, and causes damage, ill health or even death to the host. Some human parasites are external and live on the skin and hair, for example, mites that cause scabies. Internal parasites, living inside the body, include protozoa and helminthes. Protozoan parasites are single-celled organisms that enter the body either by ingestion or via the bite of an infected insect. Malaria, sleeping sickness and leishmaniasis are examples of diseases caused by protozoan parasites introduced by insect bites; amoebic dysentery and giardiasis result from drinking or eating contaminated water or food.

Helminthes are parasitic worms that live inside the body. Several helminthes have complicated life cycles involving humans and other animals as secondary hosts. They have different routes of entry into the human body depending on the type of worm including ingestion with food or water, the faeco-oral route, insect bites and penetration through the skin. 'Helminthes' is the general term used to describe several different types of parasitic worm. There are three main groups: tapeworms, roundworms and flukes. Tapeworms may be ingested with food, especially under-cooked meat, or with water or soil contaminated with faeces. Roundworms, also called nematodes, are responsible for many different diseases including ascariasis, dracunculiasis (guinea worm), filariasis, hookworm, onchocerciasis (river blindness),

trichinosis and trichuriasis (whipworm). A type of fluke is the cause of schistosomiasis, also known as bilharzia. People become infected with schistosomiasis, not through food, but by standing or swimming in water that contains the immature form of the fluke; these are released into the water from the snail secondary host. The fluke gets into the water and the snail from the excreta of infected people.

Biological hazards arise from working with infected people or animals, or handling infectious waste and body fluids, as well as contact with unsafe water, food and waste. The hazards may occur in the home, at school or at work. In particular, work in hospitals, hotel and hospital laundries, laboratories, veterinary offices and nursing homes may expose someone to biological hazards.

### **Self-Assessment Exercise**

Give examples of biological hazards that are common in our environment

### **1.3.3 Chemical Hazards**

Chemical hazards are present when a person is exposed to a harmful chemical at home or at work. The chemicals can be in the form of gases, solids or liquids. Exposure to chemicals could cause acute health effects (an immediate or rapid onset) if taken in large quantities in a single dose; and chronic health effects (long-term effects on health) if taken in small doses over an extended time. Detergents (powdered soap, bleaching powder), drugs (veterinary and human) and pesticides (DDT, Malathion, diazinon, zinc phosphide, warfarin) are chemical hazards that are commonly found in rural households. Farmers, young children (under 5 years) and household animals are vulnerable to chemical exposure, but it is always possible that anyone might come into contact with the chemical during preparation, spraying, use or storage. A person is exposed to chemicals through various ways: through inhaling the vapours, gases or dusts; through skin contact with solvents, acids and alkalis; and through ingestion of unknown chemicals with food and water.

#### **Household Chemical Hazard**

Household chemical hazard could come from insecticides. Incomplete burning of fuel releases carbon monoxide (CO) which is a chemical hazard. When breathed in, CO binds to the haemoglobin in our blood, reducing the uptake of oxygen; the cells of the body then suffer because they are not getting enough oxygen. This can result in severe sickness and even death.

### **Self-Assessment Exercise**

State the sources of chemical pollutants in our environment.

### 1.3.4 Cultural Practice-Related Hazards

Culture is the knowledge, belief, art, law, morals, customs and habits that are acquired by people as members of society. It is also the common ways of life and set of thoughts and feelings shared by the members of a society. Just as there are cultural practices that are good for health, such as breastfeeding a child, there are also cultural practices that adversely affect health and these can be considered to be cultural hazards. There are practices that are widely accepted and found in different areas of Ethiopia that can be hazards for health; for example, the belief that evil spirits are the source of diseases, practices of storing drinking water uncovered, open defecation and not hand washing before meals and after latrine use. Hygiene and health promotion and community mobilization are critical interventions that help improve practices that are not useful to the community. To change human behaviour away from undesired practices, you need to change knowledge and attitudes. Let us assume you have observed that one of the households in your area has a clean latrine but it has not been used for the last few months. What could be the explanation for not using the latrine? You may have thought of some different reasons, but here are some we have thought of: The head of the household might not have taken the lead and guided others in using the latrine. Children may be afraid of falling into the latrine hole. They may be afraid the bad odour will cause a disease. They have plenty of space for open defecation and don't understand why this is not a good practice.

#### Self-Assessment Exercise

List some cultural practices that constitute environmental hazards
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### 1.3.5 Social Hazards

Poverty and illiteracy are examples of social hazards. We know that poor and uneducated people get sick more frequently, compared to wealthier and more educated people. Alcoholism, obesity, smoking and drug abuse are also social hazards that affect our health. A person with such habits is, over time, degraded, not respected by society, physically and mentally dissatisfied, and ultimately is likely to suffer with chronic illnesses such as lung and cardio-vascular diseases.

Describing environmental exposure to hazards to reduce the adverse impacts of environmental hazards on human health you need to understand where the hazard comes from, identify it and the pathway it can take to affect people. The source of the hazard is the place of origin from proposed and existing activities. Patients and carriers discharge infectious agents (biological hazards) that could infect healthy people. Industrial processes in a factory release chemical hazards that may be

found in sewage; the sewage could reach drinking water, thereby creating the possibility of ingesting these chemicals. Household activities could also be sources of hazards, for example, cooking with fuels such as animal dung and charcoal produces toxic smoke that can cause lung diseases. The type of hazard is the particular chemical, infectious agent or other agent involved. The pathway is the route by which the hazard gets from the source to the person. The response or the effect is the health outcome (changes in body function or health) after the hazard has affected the person.

The amount and type of change (or response) depends on the type of hazard and the effect it can have on different people. This would depend on the person's individual health and factors such as their age; for example, young children or people who are already sick are often more harmed by diseases such as diarrhoea than healthy adults. If you want to prevent a hazard, you need to understand the source of the hazard (where it comes from), the type of hazard (for example the type and concentration of a chemical), the pathway (the affected environment and how the exposure could take place), and the response (the effect the hazard could have on people). We will demonstrate this with an example. Sewage containing cadmium (a toxic chemical) is produced by a hide-processing factory and flows into a river. People downstream of the point of discharge drink the contaminated water and become sick. The hazard exposure is described as follows: The source is sewage from a factory. The type of hazard is chemical, in this case cadmium. The pathway or affected environment is the river that is used by the public as a source of drinking water and the exposure took place by swallowing/ingesting the chemical with drinking water. In addition, any fish contaminated with cadmium may have been eaten. The response is that people who consumed the contaminated water and fish had symptoms of cadmium poisoning (i.e. joint and spinal pains, pains in the abdomen) and they complained to a health centre.

### **Self-Assessment Exercise**

Explain the role of poverty and illiteracy as social hazards.
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## **1.4 Summary**

In this unit, we learnt that the environment presents some health hazards. We noted that environmental health hazards are generally group into: natural hazards (earthquakes, volcanic eruptions and flooding) and man-made hazards (mainly related to pollution of the air, water and soil, and contamination of food).

We also discussed environmental health hazards under the following groupings: physical, biological, chemical, cultural and social hazards.

The sources, effects and precautions against environmental health hazards were discussed.

### 1.5 References/Further Reading/Web Resources

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### 1.6 Possible Answers to Self- Assessment Exercise(s)

#### Answer

You may have identified a range of hazards; here are some possibilities.

Type of hazard	Source of hazard	Possible health effect
Biological hazard:	pathogenic microorganisms (bacteria, fungi, protozoa, worms)	Infected discharges (e.g. blood, secretions, oral swabs, pus)
Communicable diseases such as	TB, diarrhoea, typhoid fever,	Physical hazard: slips and trips
Wet or slippery floor	Broken bones, muscle injuries, twists and sprains	

Chemical hazard: drugs, detergents Medicines and cleaning products used and stored in the Health Post Poisoning, skin or lung damage.

## **UNIT 2      PRINCIPLES OF HAZARD MANAGEMENT**

### **Unit Structure**

- 2.1 Introduction
- 2.2 Intended Learning Outcomes
- 2.3 Main contents
  - 2.3.1 What is pollution?
  - 2.3.2 Pollution sources and categories
  - 2.3.3 Pollution management
- 2.4 Summary
- 2.5 References/Further Reading/Web Resources
- 2.6 Possible Answers to Self- Assessment Exercise(s)

### **2.1 Introduction**

Involvement in hazard management requires you to follow certain steps, which are outlined below. Establish the context and identify the hazard: These are the first steps. You have learned that a hazard is something that is harmful to our health. A description of the categories of hazards is given above. You should identify the type of the hazard in as much detail as you can. You should also describe the exposure conditions and try to answer the following questions: What is the source of the hazard? Who is exposed? What are the pathways or activities that expose a person? What part of the environment is involved in the transfer of the hazard to humans? Hazard/risk analysis and evaluation: Here you would analyse the risk and evaluate the potential of the hazard to cause damage to health. This step needs a deeper appraisal in collaboration with the word environmental health worker. The evaluation may require appropriate design, sampling and laboratory investigation.

### **2.2 Intended Learning Outcomes**

By the end of the unit, you will be able to:

- define pollution
- identify sources and categories of pollution
- discuss how to manage pollution.

### **2.3 Main Content**

When a description of the categories of hazards and risks has been determined, advice can be communicated on the interventions or control measures that are needed to control the hazard. There can also be consultations with relevant people and organizations. Treat the hazard/risk: The interventions or control measures are carried out by the

person or people responsible for the hazard or risk. Monitoring and reviewing: The implementation of interventions or control measures for the hazard must be followed up in order to determine whether they are successful. Correction measures can be applied if there is any failure. Identifying appropriate indicators for monitoring is critical and must be done formally. Record keeping: Keeping records and reports on hazard management are always important. These records must contain the type of hazard, exposures and what control measures were taken.

### 2.3.1 What Is Pollution?

We have seen that hazards are things that endanger human health or life, but hazards can also be harmful to our environment. Pollution is the introduction of contaminants into an environment causing harm, instability or disorder to the ecosystem. (An ecosystem includes all the living organisms (plants, animals, microorganisms) and their physical environment and the interactions between them.) Pollution can be also defined as the presence of a substance in a medium or environment that results in a change to its 'natural' state, potentially causing an adverse effect. Pollution, however, is not simply the introduction of contaminants. There is always a response in the form of modification or change in the environment. From this standpoint, pollution is the harm that results because substances are present where they would not normally be found, or because they are present in larger than normal quantities. Contaminants are not necessarily pollutants. A contaminant is a minor substance, material or agent that is unwanted in the environment and may or may not be harmful. A pollutant is a contaminant which, due to its properties or amount or concentration, causes harm. Gases (carbon monoxide, ozone, and nitrogen dioxides), chemical vapours, dust particles, fumes and liquid chemicals (pesticides, solvents, drugs, acids, etc.) are examples of potential pollutants of air and water ecosystems. In nature, the environment has an inherent capacity to clean itself through self-cleaning processes. Natural environmental processes have the ability to deal with many pollutants and correct most imbalances if given enough time.

**Dilution:** this takes place when a small amount of a chemical in sewage enters a large flowing river and the pollutant is diluted in the water.

**Oxygenation:** this process occurs through mixing of air with water which introduces oxygen that can then be used by aquatic (water-living) plants and animals. Microorganisms consume oxygen when they break down organic matter. Sedimentation: this takes place when larger particles settle out at the bottom of the river.



**Biodegradation:** this takes place when organic matter is broken down by microorganisms. Organic matter means everything that is derived from living organisms. In a river this could be human and animal waste, decaying plant material, etc.

### Self-Assessment Exercise

Define the following terms with pollution in view:

(a) Dilution (b) Oxygenation (c) Biodegradation

### 2.3.2 Pollution Sources and Categories

Pollutants can come from natural or man-made sources. Examples of natural sources of pollution are volcanoes which give out ash and dust into the atmosphere and metals such as arsenic which are naturally present in some rocks and soils. Man-made pollutants can come from industrial, domestic (home), transport and agricultural sources. Think of one example of a pollutant from industrial, domestic (home), transport and agricultural sources. There are lots of different examples that you could think of. Here are some that we came up with:

- **Industrial sources:** sewage discharged into water bodies; air emission of smoke released to the atmosphere.
- **Domestic sources:** cooking and heating that releases smoke to the atmosphere. Solid waste and liquid waste are other forms of pollutants that can be released to water bodies and soil.
- **Transport:** discharge of air pollutants from various types of vehicles. Heavy trucks and diesel engine vehicles are much more polluting than a petrol engine. Agricultural sources: organic wastes such as agriculture residues, animal dung and wastes from agriculture-based plants.
- **Air pollution from an industrial source:** Pollution can take many forms. The air we breathe, the water we drink, the soil where we grow our food, and even the increasing noise we hear every day all contribute to health problems and a lower quality of life. Pollution can be classified as:
  - **Air pollution:** The release of chemicals and particulates into the atmosphere.
  - **Water pollution:** the release of wastes, chemicals and other contaminants into surface and groundwater.
  - **Soil pollution:** the release of wastes, chemicals and other contaminants into soil.
  - **Radioactive pollution:** presence of radioactive substances in the environment.
  - **Noise pollution:** unacceptable levels of noise in work, residential and recreational places.

- Thermal pollution: the release of heat into the environment; for example heated water into a river. Air pollution this occurs with the release of chemicals in gaseous or dust form into the atmosphere. Household cooking, industries, vehicles and incinerators are common sources of air pollution.
- **Water pollution:** Water can be polluted by the release of liquid waste (human, animal or industrial) into rivers, streams and lakes. A common type of water pollution is organic material such as human and animal wastes and in waste water from food processing. These wastes can be removed from rivers and lakes by the self-cleaning processes described above but, if present in large quantities, the biodegradation process can reduce the level of dissolved oxygen in the water so much that fish and other aquatic life cannot survive. As well as these environmental impacts, water contaminated with human waste is a significant cause of many diseases that will be □described in more detail elsewhere in this Module. Some pollutants can be extremely harmful even if they are taken in small quantities and may cause cancer, reproductive health effects (abortion, embryo malformation, birth defects) or nerve damage when the contaminated water is consumed.
- **Land/soil pollution:** this occurs when land is used as a site for accumulating wastes that are generated from various sources (industry, agriculture, health facilities, and villages, private and public organizations). These wastes may be biologically, chemically or physically hazardous to plants and animals. The pollution by chemicals such as pesticides may have long-term consequences, such as groundwater pollution.

### Self-Assessment Exercise

List and explain any six pollution sources.
---------------------------------------------

### 2.3.3 Pollution Management/Control

It is easier to talk of pollution management via control. Pollution control is a term used in environmental management. It means the control of emissions and effluents into air, water or soil. Without pollution control, the waste products from overconsumption, heating, agriculture, mining, manufacturing, transportation and other human activities, whether they accumulate or disperse, will degrade the environment. In the hierarchy of controls, pollution prevention and waste minimization are more desirable than pollution control. In the field of land development, low impact development is a similar technique for the prevention of urban runoff.

Two forms of pollution control:

- **Practices:** Recycling, Reusing, Waste minimisation, Mitigating, Preventing and Compost
- **Pollution control devices:** Air pollution control, Thermal oxidizer, Dust collection systems, Baghouses, Cyclones, Electrostatic precipitators, Scrubbers, Baffle spray scrubber, Cyclonic spray scrubber, Ejector venturi scrubber, Mechanically aided scrubber, Spray tower, Wet scrubber, Sewage treatment, Sedimentation (Primary treatment), Activated sludge biotreaters, Aerated lagoons, Constructed wetlands (also used for urban runoff), Industrial wastewater treatment, API oil-water separators, Biofilters, Dissolved air flotation (DAF), Powdered activated carbon treatment, Ultrafiltration and Vapor recovery systems

### Self-Assessment Exercise

State the two forms of pollution control and give examples of each

## 2.4 Summary

The basic principles of environmental hazard management with particular reference to pollution were treated in this unit. You were introduced to the concepts of pollution as environmental hazard. We defined pollution and related terms such as: contamination, dilution, oxygenation and biodegradation.

Students were also introduced to eight (8) sources of environmental pollution and management or control of environmental pollution. I am sure that your perception of hazard management has improved and you are now better ready to take care of yourself and the environment.

## 2.5 References/Further Reading/Web Resources

National and regional story (Netherlands) - Environmental burden of disease in Europe: The Abode Project. EEA.

Masters, Gilbert M. (1997). *Introduction to Environmental Engineering and Science*. Prentice Hall. ISBN 9780131553842.

The Chain of Infection Transmission in the Home and Everyday Life Settings, and the Role of Hygiene in Reducing the Risk of Infection". *International Scientific Forum on Home Hygiene*. 2012.

## 2.6 Possible Answers to Self- Assessment Exercise(s)

### Answer

You may have identified a range of hazards; here are some possibilities.  
 Type of hazard Source of hazard Possible health effect  
 Biological hazard: pathogenic microorganisms (bacteria, fungi, protozoa, worms)  
 Infected discharges (e.g. blood, secretions, oral swabs, pus)  
 Communicable diseases such as TB, diarrhoea typhoid fever  
 Physical hazard: slips and trips Wet or slippery floor Broken bones, muscle injuries, twists and sprains

Chemical hazard: drugs, detergents Medicines and cleaning products used and stored in the Health Post  
 Poisoning, skin or lung damage

**Table 5:** Types, sources and effects of environmental hazards

Type of hazard	Source of hazard	Possible effect
Biological	Pathogenic microorganisms (bacteria, fungi, viruses, protozoa, worms); infected discharge (blood, secretions, oral swabs, pus); communicable diseases (TB, diarrhoea, typhoid fever)	
Physical hazard	Slips and trips Wet or slippery floor Broken bones, muscle injuries, twists and sprains	
Chemical hazard	drugs, detergents Medicines and cleaning products used and stored in the Health Post Poisoning, skin or lung damage	

## **UNIT 3      PRINCIPLES OF POLLUTION PREVENTION**

### **Unit Structure**

- 3.1 Introduction
- 3.2 Intended Learning Outcomes
- 3.3 Pollution Prevention
- 3.4 The Waste Hierarchy
- 3.5 Principle Of 'Cradle to Grave'
- 3.6 Principle of Discharge/Emission Permit
- 3.7 Pollution Control
- 3.8 Summary
- 3.9 References/Further Reading/Web Resources
- 3.10 Possible Answers to Self- Assessment Exercise(s)

### **3.1 Introduction**

This unit explains the differences between a hazard, a contaminant and a pollutant. A hazard is anything that harms our health. A contaminant is something introduced to the environment (air and water) that may or may not pose a significant health risk. A pollutant is a contaminant introduced into the environment that adversely affects animal and human life. There are two main approaches to pollution management:

### **3.3 Intended Learning Outcomes**

By the end of the unit, you should be able to

- Explain the principles of pollution prevention
- Identify measures towards control of pollution and waste after the have been generated.
- Discuss practices of pollution control

### **3.3 Pollution Prevention**

Pollution prevention focuses on stopping pollution being produced in the first place, or reducing any waste generation at the source. Pollution control: those measures taken to control pollution and wastes after they have been generated or produced.

There are a number of principles of pollution prevention; we will briefly discuss some of them. Principle of waste optimization: The motto in this principle is 'Do not produce any waste; if this is not possible, reduce or minimize waste generation as much as possible'. View larger image.

### 3.4 The Waste Hierarchy

Waste management options are listed in order of desirability from most desirable at the top to least desirable at the bottom. There are three 'Rs' that are applied in waste optimization: Reduce, Reuse and Recover. Reduction refers to changing the process so that waste is not produced in the first place. Reuse involves using an item more than once (for example you can reuse plastic bottles for collecting water). Recovery involves recovery of materials or energy through recycling, composting and incineration. An example of recycling is taking used aluminium cans (tin cans) and recycles the metal to make it into something else. In composting we can take waste organic matter and make it into useful compost for fertilizer. Through incineration (burning) we can recover the energy contained in waste materials. The concept of waste optimization is applied in industries through cleaner production. Cleaner production implies appropriate environmental management, waste minimization, and replacement of toxic chemicals, process and product modification, and the application of the three 'Rs'. Polluter pays principle: This principle identifies the people or organizations who generate or produce waste or pollution as those who are accountable for any human or ecological damage. They are responsible for paying the costs of any damage. The principle is an economic tool to enforce accountability and responsibility. Strict standards for pollutant discharge permissions and enforcing heavy taxation on products or waste handling are ways of making the polluter pay.

#### Self-Assessment Exercise

State the basic principles of the 'waste hierarchy' in pollution prevention
-----------------------------------------------------------------------------

### 3.5 Principle of 'Cradle to Grave'

This principle applies to the production of any object or to any activity by an individual or institution and all the pollution that object or activity might cause throughout its lifecycle; that is, from its 'cradle' to its 'grave'. For example, if you make a plastic bottle, pollution might be caused in the manufacturing process; pollution is also caused by the Lorries that transport the bottles around the country; and pollution is caused when the bottle is thrown away. All these aspects should be taken into account. Precautionary principle: For any activity, there is an obligation not to cause harm even when someone is uncertain about the effect of the activity on humans and the environment. Under this principle, you take precautions to avoid environmental damage, even if you are not certain that damage will result. The application of waste minimization is an example. Principle of duty of care: Any person or organization that produces waste, i.e. a waste generator, has a citizenship and ethical obligation to handle their waste properly. They

have a duty to ensure that it does not harm other people or the environment.

#### **Self-Assessment Exercise**

Illustrate the principle of 'cradle to grave' using an example

### **3.6 Principle of Discharge/Emission Permit**

A waste generator has an obligation to obtain permission from the regulatory authority in order to discharge waste to surface water and to the atmosphere. Principle of sustainable development: What do you remember about the term 'sustainable development'? Sustainable development is 'development which meets the needs of the present without compromising the ability of future generations to meet their own needs'. You could think of this as friendly coexistence where people and the environment sustain each other.

Sustainable development requires people to carry out environmental mitigation (lessening the damaging effects) for newly developed factories, dams, irrigation schemes and other undertakings as prescribed by law. Principle of the right to know: The public has the right to information about pollution from a particular process. Public participation at various stages of project development avoids mistrust and the consequences of conflicts of interest.

#### **Self-Assessment Exercise**

Explain the principle of 'discharge/emission permit' in waste prevention.

### **3.7 Pollution Control**

Pollution prevention through various applicable principles and methods is not always possible and the consequence is that some pollution is produced. If pollution is produced, there should be some measures to control it and minimized the effects on people and the environment. The application of waste treatment before disposal, restricting contact between the waste and the public, and monitoring and evaluating the effect of the waste on the immediate environment are some of the intervention options in waste control.

Pollution control is a term used in environmental management. It means the control of emissions and effluents into air, water or soil. Without pollution control, the waste products from overconsumption, heating, agriculture, mining, manufacturing, transportation and other human activities, whether they accumulate or disperse, will degrade the environment. In the hierarchy of controls, pollution prevention and waste minimization are more desirable than pollution control. In the

field of land development, low impact development is a similar technique for the prevention of urban runoff.

### **Recycling**

This is the process of converting waste materials into new materials and objects. It is an alternative to "conventional" waste disposal that can save material and help lower greenhouse gas emissions. Recycling can prevent the waste of potentially useful materials and reduce the consumption of fresh raw materials, thereby reducing: energy usage, air pollution (from incineration), and water pollution (from landfilling).

Recycling is a key component of modern waste reduction and is the third component of the "Reduce, Reuse, and Recycle" waste hierarchy. Thus, recycling aims at environmental sustainability by substituting raw material inputs into and redirecting waste outputs out of the economic system.

### **Recyclable materials**

This includes many kinds of glass, paper, and cardboard, metal, plastic, tires, textiles, and electronics. The composting or other reuse of biodegradable waste such as food or garden waste is also considered recycling. Materials to be recycled are either brought to a collection centre or picked up from the curb side, then sorted, cleaned, and reprocessed into new materials destined for manufacturing.

### **Reuse**

This is the action or practice of using something again, whether for its original purpose (conventional reuse) or to fulfil a different function (creative reuse or repurposing). It should be distinguished from recycling, which is the breaking down of used items to make raw materials for the manufacture of new products. Reuse – by taking, but not reprocessing, previously used items helps save time, money, energy and resources. In broader economic terms, it can make quality products available to people and organizations with limited means, while generating jobs and business activity that contribute to the economy.

### **Waste minimization**

This is a set of processes and practices intended to reduce the amount of waste produced. By reducing or eliminating the generation of harmful and persistent wastes, waste minimization supports efforts to promote a more sustainable society. Waste minimization involves redesigning products and processes and/or changing societal patterns of consumption and production.

### **Environmental mitigation,**



compensatory mitigation or mitigation banking, are terms used primarily by the United States government and the related environmental industry to describe projects or programs intended to offset known impacts to an existing historic or natural resource such as a stream, wetland, endangered species, archaeological site, paleontological site or historic structure. To "mitigate" means to make less harsh or hostile. Environmental mitigation is typically a part of an environmental crediting system established by governing bodies which involves allocating debits and credits. Debits occur in situations where a natural resource has been destroyed or severely impaired and credits are given in situations where a natural resource has been deemed to be improved or preserved.

### **Pollution prevention**

This reduces the amount of pollution generated by industries, agriculture, or consumers. In contrast to pollution control strategies which seek to manage a pollutant after it is produced and to reduce its impact on the environment, the pollution prevention approach seeks to increase efficiency of a process, reducing the amount of pollution generated. Although there is wide agreement that source reduction is the preferred strategy, some professionals also use the term pollution prevention.

### **Compost**

This is organic matter that has been decomposed in a process called composting. This process recycles various organic materials - otherwise regarded as waste products - and produces a soil conditioner (the compost).

Compost is rich in nutrients. It is used for example in gardens, landscaping, horticulture, urban agriculture and organic farming. The compost itself is beneficial for the land in many ways, including as a soil conditioner, a fertilizer, addition of vital humus or hemic acids, and as a natural pesticide for soil. In ecosystems, compost is useful for erosion control, land and stream reclamation, wetland construction, and as landfill cover.

### **SELF-ASSESSMENT EXERCISE**

Explain the terms: (a) environmental mitigation and (b) waste minimization.
-----------------------------------------------------------------------------

### 3.8 Summary

Pollution prevention, like every other environmental phenomenon, is guided by principles. In this unit, we studied three (3) principles of pollution prevention:

- Principle of waste hierarchy which stresses emphasis on three 'Rs' (Reduce, Reuse and Recover)
- Principle of 'cradle to grave' (from point of production to removal/discharge)
- Principle of discharge/emission permit.

Practices of pollution control were also discussed: recycling, reuse, waste minimization, environmental mitigation, pollution prevention and compost. These principles are practicable.

### 3.9 References/Further Reading/Web Resources

Composting for the Homeowner - University of Illinois Extension".  
Web.extension.illinois.edu. Retrieved 2013-07-18.

Masters, Gilbert M. (1997). Introduction to Environmental Engineering and Science. Prentice Hall. ISBN 9780131553842.

### 3.10 Possible Answers to Self- Assessment Exercise(s)

#### Answer

The first step in hazard management planning is to identify the hazard including its type, source and the route of exposure. Then the potential to cause harm must be evaluated (risk analysis). When the hazard and risk have been assessed, this information must be shared with other people involved. Possible interventions to reduce the risk or measures to control or remove the hazard should be decided and then put into effect. The outcomes from the interventions or control measures must be monitored to check if they have been successful. Throughout this process, detailed records must be kept of the hazards and actions taken to control them. Your list of appropriate interventions will depend on your own answer.

This is a response for the answer we provided. Type of hazard Source of hazard Intervention  
Biological hazards: pathogenic microorganisms (bacteria, fungi, protozoa, worms) Infective discharges (blood, secretions, oral swabs, pus) Personal hygiene (hand washing, hand disinfection); proper disposal of wastes; disinfection and sterilization of medical equipment  
Physical hazard: slips and trips Wet or slippery floor

Ensure floors are cleaned properly; mop up spills; warn people of slippery floors  
Chemical hazard: drugs, detergents Medicines and cleaning products used and stored in the Health Post Store detergents properly in labelled containers; use according to instructions; use protective equipment such as gloves.

## **MODULE 3 PERSONAL HYGIENE**

Unit 1	Concepts of Personal Hygiene
Unit 2	Planning for the Improvement of Personal Hygiene
Unit 3	Plan of Action for Personal Hygiene Education

### **UNIT 1 CONCEPTS OF PERSONAL HYGIENE**

#### **Unit Structure**

- 1.1 Introduction
- 1.2 Intended Learning Outcomes
- 1.3 What Is Personal Hygiene?
- 1.4 Difference Between Cleanliness and Hygiene
- 1.5 Public Health Importance of Personal Hygiene
- 1.6 Summary
- 1.7 References/Further Reading/Web Resources

#### **1.1 Introduction**

The exercise of proper personal hygiene is one of the essential parts of our daily life. Many people in rural areas may not understand what good or bad personal hygiene is. The prevention of communicable diseases, like diarrhoea, trachoma and many others are highly possible through the application of proper personal hygiene. You need to learn the proper practice of personal hygiene and use this for the prevention and control of important public health diseases that are prevalent in your locality. This study session will also help you to understand the links between personal hygiene and one's dignity, confidence and comfort.

#### **1.2 Intended Learning Outcomes**

By the end of this unit, you will be able to:

- describe the public health importance of personal hygiene.
- list and describe the components of personal hygiene
- explain what acceptable and poor personal hygiene practices are.

#### **1.3 What Is Personal Hygiene?**

Personal hygiene is a concept that is commonly used in medical and public health practices. It is also widely practiced at the individual level and at home. It involves maintaining the cleanliness of our body and clothes. Personal hygiene is personal, as its name implies. In this regard, personal hygiene is defined as a condition promoting sanitary practices

to the self. Everybody has their own habits and standards that they have been taught or that they have learned from others. Generally, the practice of personal hygiene is employed to prevent or minimize the incidence and spread of communicable diseases.

#### **Self-Assessment Exercise**

Now that you have defined personal hygiene, give some personal examples by which you practice it regularly.

### **1.4 Difference between Cleanliness and Hygiene**

The term cleanliness should not be used in place of hygiene. Cleaning in many cases is removing dirt, wastes or unwanted things from the surface of objects using detergents and necessary equipment. Hygiene practice focuses on the prevention of diseases through the use of cleaning as one of several inputs. For example, a janitor cleans the floor of a health centre using detergent, mop and broom. They might also use chlorine solution to disinfect the floor. The cleaning process in this example is the removal of visible dirt, while the use of chlorine solution removes the invisible microorganisms. Hygienic practice encompasses both cleaning for the removal of physically observable matters *and* the use of chlorine for the removal of microorganisms. The hygiene practice in this example aims at preventing the spread of disease-causing organisms. Cleaning is a means to achieve this task.

#### **Self-Assessment Exercise**

Using specific example, give the difference between cleanliness and personal hygiene.

### **1.5 Public Health Importance of Personal Hygiene**

The knowledge and practice of personal hygiene are vital in all our everyday activities. The purposes are:

#### **Preventing Faeco-Orally Transmitted Diseases**

The fingers may get contaminated with one's own faeces, either directly or indirectly. Activities during defecation and child bottom-washing are additional opportunities for the contamination of the fingers that facilitate the transmission of infections.

#### **Aesthetic Values of Personal Hygiene**

A person with clean hands is proud while eating because they feel confident of preventing diseases. A teacher in a school is always happy to see their students with clean faces and eyes, and dressed in clean clothes. A mother is mentally satisfied to feed her infant with clean hands because she ensures the preservation of her child's health. Generally, cleaning oneself produces pride, comfort and dignity at home and in public places. Caring about the way you look is important to your self-esteem.

### **Social Impact**

A person with poor personal hygiene might be isolated from friendship because telling the person about the situation might be sensitive and culturally difficult. The success of a job application or the chance of promotion could be affected by poor personal hygiene; no company wants to be represented by someone who does not appear to be able to look after themselves.

### **Self-Assessment Exercise**

List and explain the purpose of personal hygiene in public health.
--------------------------------------------------------------------

## **1.6 Summary**

In this unit, you have learnt that:

- Personal hygiene is a necessity for our daily activities. It is very important for the protection of our health and helps to prevent the spread of communicable diseases.
- Personal hygiene has social and aesthetic values. An individual who follows the practice of proper personal hygiene gains confidence, pride and dignity.

## **1.7 References/Further Reading/Web Resources**

National and regional story (Netherlands) - Environmental burden of disease in Europe: the Abode project. EEA.

Masters, Gilbert M. (1997). *Introduction to Environmental Engineering and Science*. Prentice Hall. ISBN 9780131553842.

The Chain of Infection Transmission in the Home and Everyday Life Settings, and the Role of Hygiene in Reducing the Risk of Infection". *International Scientific Forum on Home Hygiene*. 2012.

## **UNIT 2     COMPONENTS OF PERSONAL HYGIENE**

### **Unit Structure**

- 2.1 Introduction
- 2.2 Intended Learning Outcomes
- 2.3 Body Hygiene?
- 2.4 Oral Hygiene (Oral Care)
- 2.5 Hand Washing (Hand Care)
- 2.6 Personal Hygiene Situation in Healthcare Activities
- 2.7 Summary
- 2.8 References/Further Reading/Web Resources
- 2.9 Possible Answers to Self- Assessment Exercise(s)

### **2.1 Introduction**

This unit, is a continuation of unit 1. Personal hygiene is one of the essential parts of our daily life. The prevention of communicable diseases, like diarrhoea, trachoma and many others are highly possible through the application of proper personal hygiene. You need to learn the components of proper practice of personal hygiene and use this for the prevention and control of important public health diseases that are prevalent in your locality. This study unit will also help you to understand the links between personal hygiene and one's dignity, confidence and comfort.

### **2.2 Intended Learning Outcomes**

By the end of this unit, you will be able to:

- prioritize the components of personal hygiene that are critical for public health concerns
- explain hygienic hand washing using standard procedures,
- list the critical situations for effective hand washing.

### **2.3 Body Hygiene: Skin Care**

The body has nearly two million sweat glands. Moistened and dried sweat and dead skin cells all together make dirt that sticks on to the skin and the surface of underclothes. The action of bacteria decomposes the sweat, thereby generating bad odour and irritating the skin. This is especially observed in the groin, underarms and feet, and in clothing that has absorbed sweat. Skin infections such as scabies, pimples and ringworm are results of poor body hygiene.

Scalp *Tineacapitis* (scalp ringworm). (Source: University of California, Dermatology Glossary)

The first task in body hygiene is to find water, soap and other cleansing materials. Taking a bath or a shower using body soap at least weekly is very important to ensuring our body stays clean. Bathing can be every day or after periods of sweating or getting dirty. The genitals and the anal region need to be cleaned well because of the natural secretions of these areas. Dry the body with a clean towel after thorough rinsing. Change into clean underwear after a bath. Changing sweat-soaked clothes after each bath is advised. Cleaning the ears after every bath is also necessary. Avoid sharing soaps and towels because of the danger of cross-infection.

### Self-Assessment Exercise

List the essential items required to achieve good body hygiene.
-----------------------------------------------------------------

## 2.4 Oral Hygiene: Oral Care

The mouth is the area of the body most prone to collecting harmful bacteria and generating infections. Our mouth mechanically breaks food into pieces. This process leaves food particles (food debris) that stick to the surface of our gums and teeth. Our mouth cavity is full of bacteria and is a good environment for bacterial growth.

- Why is the mouth a good environment for bacterial growth?
- It is at the optimum temperature (37°C) and is often rich in food particles that support bacterial growth.

The decaying process that takes place on the surface of the teeth eventually produces a build-up called *plaque* (a sticky deposit on which bacteria grow) that is then converted into *tartar* (a hard, yellowish, calcified deposit on the teeth, consisting of organic secretions and food particles). The result is tooth decay. In addition, unpleasant smelling breath (*halitosis* or *stinking odour*), teeth and gum infections could be a result of poor oral hygiene.

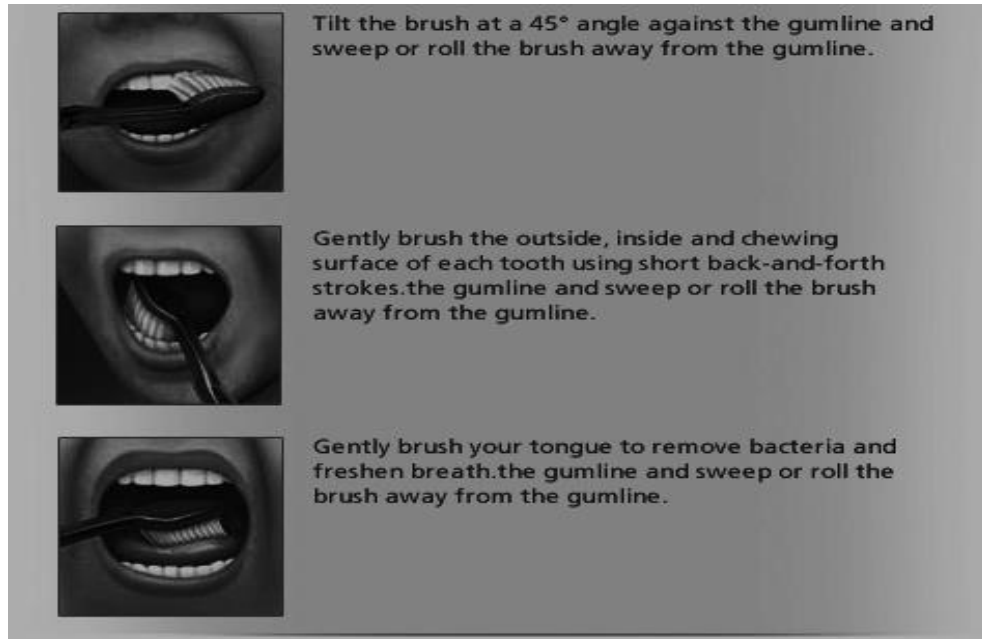
### Mouth cleaning (Fig. 2)

- Rinse the mouth after each meal.
- Brush your teeth with a fluoride-containing toothpaste twice a day – before breakfast and before you go to bed. Cleaning the mouth with twigs is possible if done carefully.
- During the day, fill your mouth with water and swish it around to get rid of anything sticking to your teeth.
- In addition to regular brushing, it is advisable to floss your teeth at least once a day, usually before you go to bed.



**Self-Assessment Exercise**

Mention the steps you would take in an effective mouth washing technique



**Figure 2:** Mouth washing techniques

Source: Goggle.com

## 2.5 Hand Washing: Hand Care

The cleanliness of our hands is very important in all our daily activities. In our normal activities our hands frequently get dirty. There are many situations in which microorganisms are likely to attach to our hands along with the dirt. There are many communicable diseases that follow the route of faeco-oral transmission. Hand hygiene plays a critically important role in preventing this transmission.

Hygienic hand washing involves the mechanical removal of microorganisms from contaminated hand surfaces using soap or detergent. Hand washing should involve more than a quick rinse under a tap (faucet) or in running water.

The following hand washing technique ensures that the hands are properly washed and it doesn't take long to complete:

### Hand washing technique

- First wet your hands with clean water and lather with a bar of soap.

- Next rub your hands together vigorously and scrub all surfaces up to your wrists.
- Clean under your fingernails.
- Continue for 15–30 seconds or about the length of a little tune (for example, the Happy Birthday song). It is the soap combined with the scrubbing action that helps dislodge and remove germs.
- Rinse your hands well with clean running water (pour from a jug or tap).
- Dry your hands in the air to avoid recontamination on a dirty towel – do not touch anything until your hands are dry.
- Wood ash will also rub off any dirt and smells. The slight irritation you feel when you wash your hands with ash shows the cleansing power of ash.
- Local seeds such as *indod* (Lemma's plant), which are known to be good cleaning agents, can also be used for regular hand washing.
- Clean sand with water can be used for hand washing to help to rub off dirt.

If you don't have soap, you can use alternatives. These serve the same purpose as the soap, to help 'scrub' what is stuck on your hands, so the running water can brush it off. To get clean hands, you must POUR the water over your hands (no dipping in a bowl!). The soap or ash 'lifts' the dirt, and the water then washes off the visible dirt and the invisible germs.

As well as routine personal hygiene that applies to everyone, your daily work will include many situations when you may ask yourself when you need to wash your hands. To know when to wash your hands at home and at work, you must first identify **critical situations**; that is, situations, activities or incidents that indicate the possibility that pathogenic microorganisms are present on hands, fingers and nail surfaces.

Personal hygiene situations in everyday activity include:

- After using the toilet (or disposing of human or animal faeces)
- After changing a baby's diaper (nappy) and disposing of the faeces.
- Immediately after touching raw food when preparing meals (e.g. chicken or other meat).
- Before preparing and handling cooked/ready-to-eat food.
- Before eating food or feeding children.
- After contact with contaminated surfaces (e.g. rubbish bins, cleaning cloths, food-contaminated surfaces).
- After handling pets and domestic animals.

- After wiping or blowing the nose or sneezing into the hands (respiratory hygiene).
- After handling soiled tissues (your own or others, e.g. children).

Correct hand washing should last for at least 30 seconds (Figure 3).

**Self-Assessment Exercise**

Outline the steps you would follow in correct hand washing



**Fig. 3:** Hand washing technique

Source: WHO, 2007.

**2.6 Personal Hygiene Situations in Healthcare Activity**

**Face hygiene**

Our face reveals our daily practice of personal hygiene. Face hygiene includes all parts of the face. The most important area to keep clean is the eyes. The eye discharges protective fluids that could dry and accumulate around the eye. They are visible when a person gets up in the morning. The organic substance of the eye discharge can attract flies and this is dangerous because the fly is a carrier (vector) of trachoma and conjunctivitis.

A person should wash their face every morning in order to remove all dirt that they have come in contact with during the course of the day. This will keep your face clean all day. Children are advised to wash their face frequently. Never share your face towel with others.

- Why is it inadvisable to share a face towel?
- Because some diseases, such as conjunctivitis and trachoma, can be transmitted easily from person to person in this way.

### **Fingernail and toenail hygiene (Nail care)**

A nail is hard tissue that constantly grows. Long fingernails tend to accumulate or trap dirt on the underside. The dirt could be as a result of defecation or touching infected and contaminated surfaces. Keeping nails trimmed and in good shape weekly is important in maintaining good health. Clip nails short along their shape but do not cut them so close that it damages the skin. Razor blades and fingernail cutters or scissors are used to cut nails. Nail cutters should not be shared with others.

- Why is it inadvisable to share nail cutters?
- Because some diseases, such as fungal infections, can be transmitted easily from person to person in this way.

### **Ear hygiene**

Ear wax accumulates in the ear canal that leads from the outer ear to the ear drum. As the secretion comes out of the ear it collects dust particles from the air. Daily washing with soap and water is enough to keep the outer ear clean. Do not reach farther than you can with your little finger into your ear. Putting in hairpins, safety pins or blunt-edged things for cleaning purposes might harm the ear. If you feel wax has accumulated and is plugging your ears and interfering with hearing, consult your doctor.

### **Hair hygiene (hair care)**

The hair follicles from which the hair grows produce oil from the sebaceous glands that keeps the hair smooth. The scalp (the skin covering the head) also has numerous sweat glands and is a surface for the accumulation of dead skin cells. The oil, sweat and dead cells all add together and can make the hair greasy and look dirty unless you wash it regularly.

Poor hair hygiene could cause dandruff and skin infections such as *Tineacapitis*. Dandruff is dead skin on the scalp that comes off in tiny flakes when sebaceous glands produce too much oil and accumulates on the scalp.

### **Hair cleaning**

Head hair is a good harbour for head lice (*Pediculus humanus capitis*) and nits (eggs of head lice). The head louse is a tiny insect that lives by sucking blood. Children are especially prone to lice infestation. Lice spread from one head to another when there is close contact as in school environments. They make the scalp itchy and are a cause of annoyance, irritation and embarrassment. Shaving of the head hair is possible in cases of heavy lice infestation. Sharing of blades with others, however, should be discouraged.

Hair cleaning is important to ensure it stays clean, healthy and strong.

The recommended procedures for cleaning the hair are:

- Use clean water to wash your hair regularly (at least twice weekly, preferably once every other day) with body soap or shampoo, whichever is available.
- Massage your scalp well. This will remove dead skin cells, excess oil and dirt.
- Rinse well with clear water.
- Conditioner is helpful if you have longer hair as it makes the hair smoother and easier to comb, but hair doesn't need to have conditioner.
- Use a wide toothed comb for wet hair as it is easier to pull through.
- Dry the hair and the head with a clean towel. Never share a towel with someone else.
- Comb the hair to look beautiful for the day.

### **Foot hygiene (foot care)**

We spend a lot of time on our feet. Our feet sweat as we walk day and night and the sweat accumulates on all foot surfaces and between the toes. The sweat may stain the shoes and can produce an awful odour.

- What causes sweat on the skin to produce an unpleasant odour?
- The action of bacteria as they decompose the sweat.

As well as bacteria, sweat also encourages fungal growth between the toes. This is called athlete's foot. The symptoms of athlete's foot are scaly skin and sores or blisters, which start between the toes but can often spread to the soles of the feet. This is a minor irritation and often disappears by itself but sometimes these cracks and sores become the site for other infections. The feet should be washed daily, or at least twice weekly.

Foot hygiene is also important in the treatment of podocoinosis, sometimes known as mossy foot. This disease causes swelling in the feet and lower legs and is common in certain parts of Ethiopia. It is a

reaction in the body to very small soil particles that have passed through the skin of the feet. Podoconiosis can easily be prevented by wearing shoes at all times but, if someone is affected, careful washing and drying of the feet is an important part of the treatment.

Toenails do not have much role in the transmission of diseases. However, they can accumulate dirt and this can increase the potential for bacterial and fungal breeding e.g. athlete's foot.

### **Armpit and bottom hygiene**

These are body parts that easily get sweaty and where ventilation is very poor. After puberty, our sweat gains a specific and unpleasant odour which may be offensive to others. The armpits and the bottom should be washed daily.

Anal cleansing is the hygienic practice of cleaning the anus after defecation. The anus and buttocks may be cleansed with clean toilet paper or similar paper products. Water may be used.

Hands must be washed with soap afterwards. The use of rags, leaves, stones, corn cobs, or sticks must be discouraged as these materials can damage the skin.

### **Clothes hygiene**

We usually have two layers of clothing. The internal layer is underwear (or underclothes) such as pants, vest and T-shirt. These are right next to our skin and collect sweat and dead skin cells, which can stain the cloth. Bacteria love to grow on this dirt and produce a bad smell in addition to the specific odour of the sweat. Underwear must be washed more frequently than the outer layer of clothing.

Clothes hygiene is an important aspect of one's dignity. Changing used clothes for clean ones every day is recommended. Washing dirty clothes requires adequate clean water, detergents (solid or powdered soap) and washing facilities. If possible, the washed clothes should be ironed to help the destruction of body lice and nits. Boiling water or insecticides can be used to destroy clothes infestation.

Frequent changing into clean clothes might not always be possible in poor households. However, the frequency of changing is advised to be twice a week for internal wear and 12 times per week for outerwear. The frequency mainly depends on the intensity of dirt on the clothes, and that depends on the climate and type of activity.

### **Menstrual hygiene (Personal hygiene for women)**

The vagina is able to clean itself; no special care is needed other than washing the external genitals. Washing the outer genital area with clean water must be a daily practice. Change tampons and sanitary napkins or pads regularly. Always wash your hands before and after handling a tampon or pad. Clean and soft cloths can be used in place of sanitary pads. The use of dirty cloths must be discouraged. Menstrual blood-absorbing items must be properly disposed of in a burial pit or other appropriate method.

### **Self-Assessment Exercise**

List 8 important aspects of personal hygiene you would recommend to a friend.

## **2.7 Summary**

In this unit, we have learnt that the:

- procedures that apply in personal hygiene (such as handwashing and oral hygiene) need to be followed strictly to gain the best results.
- promotion of personal hygiene should aim to change human behaviour.
- provision of hygiene information first impacts on knowledge and then practice.
- promotion of personal hygiene must be well planned in order to bring positive changes.

## **2.8 References/Further Reading/Web Resources**

Ablutions or Bathing, Historical Perspectives + (Latin: abluere, to wash away)". Word Information. Retrieved 22 February 2017.

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## 2.9 Possible Answers to Self- Assessment Exercise(s)

### Answer

1. Rinse the mouth after each meal.
2. Brush your teeth with a fluoride-containing toothpaste twice a day – before breakfast and before you go to bed. Cleaning the mouth with twigs is possible if done carefully.
3. During the day, fill your mouth with water and swish it around to get rid of anything sticking to your teeth.
4. In addition to regular brushing, it is advisable to floss your teeth at least once a day, usually before you go to bed.



## **UNIT 3      PLANNING FOR THE IMPROVEMENT OF PERSONAL HYGIENE**

### **Unit Structure**

- 3.1 Introduction
- 3.2 Intended Learning Outcomes
- 3.3 Preparing a Plan of Action for Personal Hygiene Promotion
- 3.4 Plan of Action for Personal Hygiene Education.
- 3.5 Summary
- 3.6 References/Further Reading/Web Resources
- 3.7 Possible Answers to Self- Assessment Exercise(s)

### **3.1 Introduction**

As a Health Extension Practitioner, educating the community members on personal hygiene is one of your main duties. In this unit you will learn about educating, educating whom, where, and how and how do monitor or evaluate success in the promotion of personal hygiene.

### **3.2 Intended Learning Outcomes**

By the end of this unit, you will be able to:

- explain the elements and activities that are needed for planning personal hygiene promotion.
- describe the criteria that are used for evaluating the effectiveness of personal hygiene application
- identify measures to promote personal hygiene.

### **3.3 Preparing a Plan of Action for Personal Hygiene Promotion**

You need to make a baseline survey of your community to help you understand the extent of personal hygiene problems. Villages and schools can be surveyed for this purpose. Designing a health survey will need collaboration with others but your input is valuable for structuring the questions so they relate to local knowledge, attitude and practice (abbreviated as KAP). Interviews with the respondents, group discussion and observations are all useful for exploring the practice of personal hygiene. From the results of the survey you should be able to identify the priorities and interventions for improving personal hygiene in your community. You can then design a plan of action knowing the key themes that need to be covered. The plan should include the themes, objectives, type of audience, key messages, etc. This is illustrated in

Table 3.1. The first few rows of the table have been completed to demonstrate how you could use a plan of this type.

### **Self-Assessment Exercise**

Mention three important things to be included in a plan of action for community hygiene promotion

## **3.4 Plan of Action for Personal Hygiene Education**

The objectives of a health promotion activity should target changing or modifying knowledge, attitude, practice and then behaviour.

### **Identifying the audience**

There must be a good reason why you want to educate the community on personal hygiene. You should identify which group of people you want to target so that you can prepare appropriate health messages and teaching materials. School children, women, elders, adults, teenagers and patients seeking medical help are some groups that you might decide are priorities.

### **Sites for personal hygiene promotion**

Whenever you have an outreach visit you can take the opportunity to promote personal hygiene to individual household members. Group meetings and mass gatherings (market, church, holiday) are also good opportunities, as are schools and patients in health facilities. Remember that the type and number of your audience will differ from site to site.

### **How to promote personal hygiene**

This is a basic question that you need to address carefully. The most important point is that you must be prepared for the theme you want to cover. The preparation must focus on gaining detailed knowledge and adequate information on that theme. This requires reading materials, collecting appropriate teaching aids and knowing the audience (educational background, their needs, behaviour, habits, etc.). Fixing the site, date and time is also important. You should identify the key messages you want to get across to your audience.

### **Evaluating the status of personal hygiene**

You will need to measure the success of your effort in the promotion of personal hygiene. It is not always a simple task to identify the absence of proper hygienic practice. Some of the methods that could be used widely are described as follows.

- **The Presence of Hygienic Hand Washing Procedures**

You should look for an instruction manual for hand washing procedures that should be available in public facilities (Health Post, health center,

hospitals). It's a good idea for the procedure to be posted on a wall where everyone can see it as an easy reminder.

- **Observation**

This is the easiest and most reliable method. In order to say if the surface of an object (body surface, eye, table top, floor, etc.) is clean or not, you should first understand what 'clean' means for those objects because the degree of cleanliness is judged in different ways. It may be clean or not clean; acceptable or not; or it may be categorized using a five-point scale: not clean, somewhat clean, clean, very clean, and super clean. You have to understand that the degree of cleanliness may vary between your own and someone else's observations of the same object. Such judgments, however, is only applicable to visible dirt. It is important to realize that a surface that looks clean is not necessarily free of microorganisms.

Why are some infections more prevalent in one area than another?  
What could be the reason if you get reports that diarrhoea is a frequent problem in one out of ten villages?

You must suspect that poor personal hygiene practice might be one of the factors for the sustained transmission of the disease. Lack of adequate water for hand washing or open defecation could be other factors.

- **Post-baseline surveying**

The behaviour of your community can be surveyed again to find out if your efforts in personal hygiene education have been successful. The design of any follow-up survey should be based on the original baseline survey so you can compare your survey findings with the baseline. The timing of a post-baseline survey will depend on the local circumstances. It should be long enough to allow time for behaviour to change but not later than one year after the initial survey.

### **Self-Assessment Exercise**

State the things to be considered in personal hygiene education curriculum.

## **3.5 Summary**

In this unit, we learnt three things we can do to improve our personal hygiene:

- Plan actions for personal hygiene promotion
- Plan actions and prepare for personal hygiene education
- Create and follow hygiene hand washing procedure

These actions are achievable and can improve/promote our hygiene and keep us healthier.

### 3.6 References/Further Reading/Web Resources

Ablutions or Bathing, Historical Perspectives + (Latin: abluere, to wash away)". *Word Information*. Retrieved 22 February 2017.

Composting for the Homeowner - University of Illinois Extension". [Web.extension.illinois.edu](http://Web.extension.illinois.edu). Retrieved 2013-07-18.

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Ustinov, A., *et al.*( 2011). Knows and unknowns on burden of disease due to chemicals: a systematic review. *Environmental Health* 10:9.

**3.7 Possible Answers to Self- Assessment Exercise(s)****Answer 1**

Here are some of the elements and activities you should include in your plan for community hygiene promotion:

- a) Identify which components of personal hygiene need to be promoted.
  - b) Identify the target audience.
  - c) Prepare teaching and educational materials.
  - d) Identify who to involve in hygiene education.
  - e) Engage actively in hygiene education.
  - f) Identify indicators for monitoring and evaluating hygiene promotion performance.
2. Imagine that you have given this hand washing promotion to a group of households. How will you evaluate whether the promotion was effective?

**Answer 2**

To monitor and evaluate the effectiveness of your promotion, you would need to identify indicators to show you if the performance of personal hygiene was correctly done or not. You would need to observe people's behaviour towards hand washing or ask them about their practice. If you can see that the household members are hand washing before and after critical times, i.e. good hygienic practice, then you could say your promotion had been successful. If not, and you observed poor hygienic practice by some people, then you should consider how you might improve the situation. This might be more promotional work with the group of households; perhaps taking a slightly different approach if the initial training had had limited success.