

# **Environmental Sanitation**

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# -:Environmental Health

## Introduction

Community participation in improving and sustaining **تحميل** water sources and making them safe for drinking, safely disposing human excreta and other house hold waste and ensuring good personal and home hygiene is critical **المراج وخطير** in ensuring cleaner and healthier environments for everyone.

# Definitions

## **:Environment**

Implies all the external factors-living and -non-living, material and non-material-which .surround man

Is all conditions and external forces which - influence human life, development and behaviour (e.g. water, air, food, home and .workplace)

## **:Environmental health**

Is a discipline **الاضباط** which concerns with any environmental factors such as biological, chemical and physical, which has any direct or indirect effects on human's physical, mental and social health.

# :Components of environment

Environment has been divided into 3  
:components all closely related

1. **Physical:** water, air, soil, housing, waste and radiation..etc.
2. **Biological:** including bacterial, virus, fungal, parasites, insects, rodents and animals.
3. **Social:** customs, culture, habits, income, occupation and religion.

# Importance of Environmental •

## -:sanitation

- **Preventive:** -
- **sanitary clean environment is free of**
  - .Vectors of disease -
  - Rodents, which may be reservoirs of infection -
  - Pathogenic agents of communicable diseases -
  - .(infectious and parasitic)
- **General welfare** and health promotion of the population.
- **Comfort**, and increased productivity and quality of work.
- **Ethics:** a clean environment is essential for human dignity.

## **:Elements of environmental sanitation**

- Town planning
- Housing
- Ventilation
- Lighting
- Water purification
- Refuse disposal. (Solid wastes)
- Sewage disposal (Waste water)
- Vector control
- Food sanitation
- Industrial sanitation



## **Town planning:**

**Is the policy of putting a scheme for the establishment of cities, towns and districts, taking into consideration future development and extension.**

### **:Principles of town planning**

1. Division of town districts: industrial, commercial and residential.
2. Sufficient wide streets, parks and playgrounds.
3. Sufficient spacing and open areas between buildings for good ventilation.
4. General public services

## **:Housing**

**Every family has got the right in a sanitary safe home and a suitable living environment.**

**Housing:** Is defined as the physical structure that man uses for shelter and the environment of that house including all necessary services, facilities, equipment and devices needed or desired for the physical, mental and social well-being of the family and individual.

**Substandard Housing:** Is that housing not supplied with the more important sanitation requirements or which is in urgent need of repairs.

**Slum area:** Is an area in which substandard housing predominates **يَسُوْدُ** For determining the quality of housing, any house having four or more of the following ten condition which represent a basic deficiency is considered a slum:

1. Contaminate water supply.
2. Water supply outside living unit or structure.
3. Toilet shared or outside the structure.
4. Bath shared or outside the structure.
5. More than 1.5 persons per habitual room.
6. Lack of dual egress **المخروج الثنائي**.
7. Lacking of heating in three quarters of rooms.
8. Lack of electricity.
9. Rooms lacking a window.
10. Serious deterioration.

# Ventilation

**Ventilation** of any confined محصور space is the process of providing and/or removing air by natural or mechanical means.

- Every good house should be well-ventilated keep all show live in a healthy and **free from droplet infection**.
- **:Value of air for human life**
  1. Gas exchange:
  2. Cooling power (allows heat loss from the body).
  3. Feeling of comfort and better performance of work.

## **Systems or types of ventilation**

.Natural

.Artificial

**Air pollution** results from the presence of foreign materials in the air and is either **.natural** or **man - made**

### **:Some form of air pollution**

- 1. Indoors:** people are exposed to vapors **البخار** in the kitchen, fumes **الأبخنة** from cleaning detergents **المنظفات**, aerosol **البخاخة** in spray cans tobacco, fibrous particle blankets, clothes, air conditioning circulate dust continuously.
- 2. Outdoors:** - people are exposed to particles from *insects, animals, dust* from streets and fields **الحقول...etc.**

# Lighting

To keep healthy, people need good light.

:There are two kinds of light

## 1. **Natural or sunlight:**

This is the best kind of light because it includes ultraviolet rays which acts as disinfectant, also acts on the skin to make vitamin.

## 1. **Artificial lighting:**

.Electricity, oil lamps and candles

## **Effect of poor lighting:**

1. Glare makes sight less sensitive.
2. Strong concentrated sources of light produce fatigue and eye strain.
3. Poor light increases strain produce fatigue and leads to accidents.
4. In factories strong shadows over a job can be dangerous.

# **Community laws and regulation for good :public light**

1. The lighting level must be such that even small objects are visible.
2. The lighting must be uniform and not patchy, particularly isolated dark spots have to be avoided as objects might disappear in them.
3. The lighting must cause no glare.



## **-: Water**

Unsafe drinking water, improper refuse disposal and excreta, and inadequate personal and household hygiene contribute to an environment which help cause and spread diseases. Diseases and deaths, especially among children, are very common because of unhealthy environment.

# Purposes of water

:The following are purpose of water

1. **Domestic purposes:** water is required for drinking, cooking, washing, personal cleanliness, cleaning of car sheds and flushing latrine.
2. **Public purposes:** water is required for public cleansing, fire-fighting, maintenance of public gardens, swimming pools and numerous other civic **مدني** purposes.
3. **Industrial purposes:** some industrials like the Iron, Pharmaceutical, steel and paper industries need lot of water.
4. **Agriculture purposes:** for cultivation **الزراعة** of foods, fruits and vegetables and raw materials water is essential.

# **Requirement of water**

**The consummation of water depends upon climatic conditions, standard of living and habits of the people**

**The daily drinking water requirement per person is 2 liters per capita per day will meet the requirements of most people under most conditions.**

**A higher quantity of about 20 liters per capita per day should be assured to take care of basic hygiene needs and basic food hygiene**

## **Safe and wholesome water (Characteristics of clean water)**

**Drinking water should be safe and agreeable to use or wholesome; such supply of water may be termed as acceptable or potable; potable water may be defined as water that is:**

- 1. Free from pathogenic agents**
- 2. Free from harmful chemical substances**
- 3. Pleasants to the taste. i.e., free from colour and odour**
- 4. Usable to the domestic purposes**

# Sources of water supply

Communities use water from a variety of sources, including

## A. Rain water

Rain is the main sources of all water. It is the purest water in nature. Physically, it is clean, bright and sparkling. Chemically, it is a very soft water in nature containing only traces of dissolved solids.

.Being soft it has a corrosive action on lead pipes

Rain water tends to became impure. As it passes through the atmosphere, it picks up suspended particles of dust, soot, microorganism and gases

.like CO<sub>2</sub>, N<sub>2</sub> and ammonia

## Surface water

**Reservoir:** الخزان These are the artificial lakes e.g. dams constructed usually by the earthwork or masonry in which large quantity of surfaces water is stored.

**Rivers:** are another sources of surfaces water. This water is grossly polluted and quite unfit .for drinking without treatment

**Tanks:** Lakes and Ponds البركات are sources of water supply. These are used for washing clothes, cattle, humans, cooking pots and swimming purposes. They are easily polluted by animals, plants and discharge from drains. So it is highly dangerous as a source of drinking water and leads to many water-borne diseases.

# Ground water

**Shallow well:** is one which taps the water from above the first impervious layer in the ground

**Deep wells:** is one which penetrates the first impervious layer in the ground and taps water lying beneath the impervious layer

**Springs:** is a kind of deep well in which the water arises above the level of ground because it is held under pressure, between two impervious strata

# Water pollution

## Sources of water pollution

**Sewage:** this is a serious source of water pollution. Swage contains decomposable organic matter and pathogenic agent

**Agriculture:** drinking water sources may be polluted by fertilizers or pesticides used in agriculture practices

**Industrial waste:** pollution by industrial waste is a growing problem in many countries



# Hazard of Water pollution

## -:Biological hazards

**Water borne diseases:** Those caused by presence of an infective  
-:agents

**Viral:** viral hepatitis A, and E, poliomyelitis and rotavirus diarrhea in infant

**Bacterial:** Shigellosis (Bacillary dysentery), typhoid and paratyphoid .fever, and cholera

**.Protozoal:** amoebiasis and giardiasis

**Helminthic:** round worm, thread worm and hydated disease

**.Leptospiral:** well's diseases

**Water-based infectious:** are due to the presence of aquatic host, such as

Schistosomiasis

Guinea worm

Fish tapeworm

**Water-washed diseases:** include infection of the outer body surfaces eg: trachoma, conjunctivitis, ascariasis and scabies

**Water-breeding diseases:** are caused by **mosquito** or flies living in or near water, such as

Malaria

Filarial

.Arbovirus

## -:Chemical hazards

1. Dental health: high level of fluoride cause mottling of dental enamel and low **level of fluoride** (less than 1 mg/liter) cause dental caries.
2. Cardiovascular diseases; due to **hardness of water**.
3. Cyanosis in infant: due to high level of **nitrate in water**.
4. Goiter: due to **deficiencies of iodine** in water.

## **:Purification of water on a large scales**

- 1. Coagulation and flocculation:** A chemical such as Alum (aluminum sulfate) is added to the water to cause suspended solids to attract one another and form larger particles (flakes, or floc).
- 2. Sedimentation:** The water is permitted to stand so that the large particles (flakes) will settle out.
- 3. Filtration:** The water is passed through filters (often carbon and sand filters) in order to remove any solids and dissolved chemicals remaining after sedimentation.
- 4. Disinfection:** Chlorine is added to the water to kill viruses, bacteria, algae, and fungi. Disinfection is sometimes accompanied by fluoridation, which helps prevent dental decay.

## Purification of water on a small scales

The methods employed for purification of water on a small scale such as for domestic purpose are as a :follow

**Boiling:** is a satisfactory method of purifying water for household purposes. Boiling for 5-10 minutes kills bacteria, but not killed spores, cysts and ova of .intestine parasites

### :Chemical

**Bleaching powder:** for disinfecting water, bleaching powder (good quality) should be used in dosage of 6.8 .gm per 1000 liter of water

**Chloride tablets:** these tablets are good for disinfecting .small quantities of water

**Domestic filters:** water for drinking purposes, can be purified by domestic filter. Filtration removes minute suspended particles, and eggs of worms from the .water

## -:Disposal of refuse

Refuse means any kind of waste material. **Solid refuse** is applied to, refuse from houses, street sweepings, commercial and industrial and agricultural operations. Excreta mean human urine and feces. Improper disposal of these wastes are caused ill health in the community

## **-:Types of Refuse and hazard**

.Dry (solid) refuse .1

.Wet (**liquid**) refuse .2

### **Dry refuse or solid refuse contains .1**

Solid refuse is applied to, refuse from houses, street sweepings الكناسة, commercial and industrial and agricultural operations.

### **Types**

1. Garbage: kitchen waste, left over food.
2. Rubbish: waste paper, broken glass, bottles, and tins, bits of metal, plastic and rags.
3. Ashes رماد from burning wood. Charcoal and cow dung fuel.
4. Animal dung,
5. Street sweepings.
6. Fallen leaves.
7. Dead animals.

## -:Hazards

1. Breeding of flies and other insects and rats.
2. Encouraging of dogs and cows.
3. Growth of bacteria, and spread of infection by means of flies, dust and contamination of water supply.
4. Unpleasant sights and smells.
5. Danger of falls,
6. Piles **الأولم** of refuse may be a fire hazard.

- **Wet Refuse or liquid waste:-** (Sullage water) in a rural community consists of
  - Waste water from houses after washing clothes, utensils, vegetables, bathing etc.
  - Waste from public wells and washing places.
  - Waste water from cattle shed and market places.
  - Waste water from industries.

**.Hazards:-** Liquid wastes from pools and cause

.Mosquito breeding .1

.Risk of polluting water supply .2

Dampness of house and danger to foundation of .3  
.building

.Bad smell .4



# التخلص من القمامه الجافه Methods of Disposal of

## -:Dry refuse

### حرق 1. Incineration -:

This is the best method of refuse disposal. By this method bacteria will be killed and refuse reduced to a small amount of ash. It should be carried away from houses to avoid smell and smoke, preferably in an incinerator. In this a chief drawback العائق الرئيسي is that the refuse is a loss to the community in terms of manure السماد.

## -:Controlled tipping .2

In a pit or trench, 3 ft deep, to prevent dogs or rats from getting at the refuse. Every time when refuse is dumped, it must be covered with some soil. When done in a large, this is called “Controlled tipping method. The refused may be broken down by bacteria into manure which may be used after 3-6 months and the pits used again for fresh . refuse

حفرة أو خندق، 3 قدم عمق، لمنع الكلاب أو الجرذان من الوصول يجب أن يُغطى ببعض التربة السماد الذي قد يُستعمل بعد أن إستعملتْ شهورَ 3-6

### 3. Composting: التسميد

In rural areas this is a very useful method. The compost pit is made as follows:

a. Select a site near to the house but away from any water source.

b. Dig a pit 3 meters x 3 meters x a meter deep, or a little larger if needed. حفر حفره

c. The walls of the pit may be lined with bricks.

d. Fill the pit with alternate layers of house refuse and cow dung in proportion of 3:1 and cover each layer with soil to avoid fly breeding.

e. From time to time the compost may be turned and mixed with a long pole. من وقت لآخر السماد العضوي يُخلط مع التربة.

f. The top layer should be of refuse covered with earth to about 30 cm. above ground level. When full, the compost pit is left for 6 months, after which the contents can be used as manure السماد and the pit used again. Two such pits will be needed for alternative use.

#### 4. Dumping on Land: إخراج القمامة

This is a method which can be used to fill up low-lying land, but is not without health hazards. The dumping ground must be well away from houses because it will attract flies and rats, and have a bad smell. To lessen flies, the refuse may be burned. لتقليل الذباب تحرق The land may later be used for cultivation. الأرض

لاحقاً تُستعمل للزراعة

## **:Vector control**

### **:Health hazards from insects**

Vectors of communicable disease -1

Directly invade the body (Scabies).-2

.3- Irritation, discomfort and hypersensitivity by bites

### **:Group of insects**

Insect: - Mosquitoes, flies, fleas, and bed bugs, sandy -1

.flies

.Arachnid: - Ticks, mites -2

### **:Control of insects**

1. Sanitation and cleanliness of the environment.
2. Control of breeding places.
3. Application of insecticides

# **Soil sanitation**

Sanitation of polluted soil and the monitoring industry. They are often used for groundwater extraction, infiltration and air sparging because of their appreciated unique features. The high open area does not clog, is chemical and heat resistant.

# Food sanitation

## :Objective

To provide the community with sound food which is safe and retaining its natural characters

## :Environmental hazards related to food

1. Microbiological contamination: Contaminated food may cause salmonellosis and shigellosis, Food poisoning from staphylococcus and clastridium butulinus toxins.
2. Chemical addition contamination: Intentional additives to improve or maintain flower color. Incidental additives enters and remain in food as result of there use as pesticides or herbicides.
3. Careless food handing
4. Inadequate pretreatment, a contaminated environment and poor storage have negative influences on food safety and quality

**THANK YOU**