QUANTITY OF WATER

MODULE 4
MOUSUMEE ROUT

Sources of water:

- The various sources of water can be classified into two categories:
- 1. Surface sources, such as

a. **Ponds and lakes**
b. **Streams and rivers**
c. **Storage reservoirs**
d. **Oceans, generally not used for water supplies, at present**

- 2. Sub-surface sources or underground sources, such as

a. **Springs**
b. **Infiltration wells**
c. **Wells and Tube-wells**

SOURCES OF WATER

Well

Rain

River

Tap

Lake

Stream

. Per capita demand:

• Per capita demand of water is the ratio of a community's average annual water consumption to its total population for 365 days. It's calculated in liters per person per day.

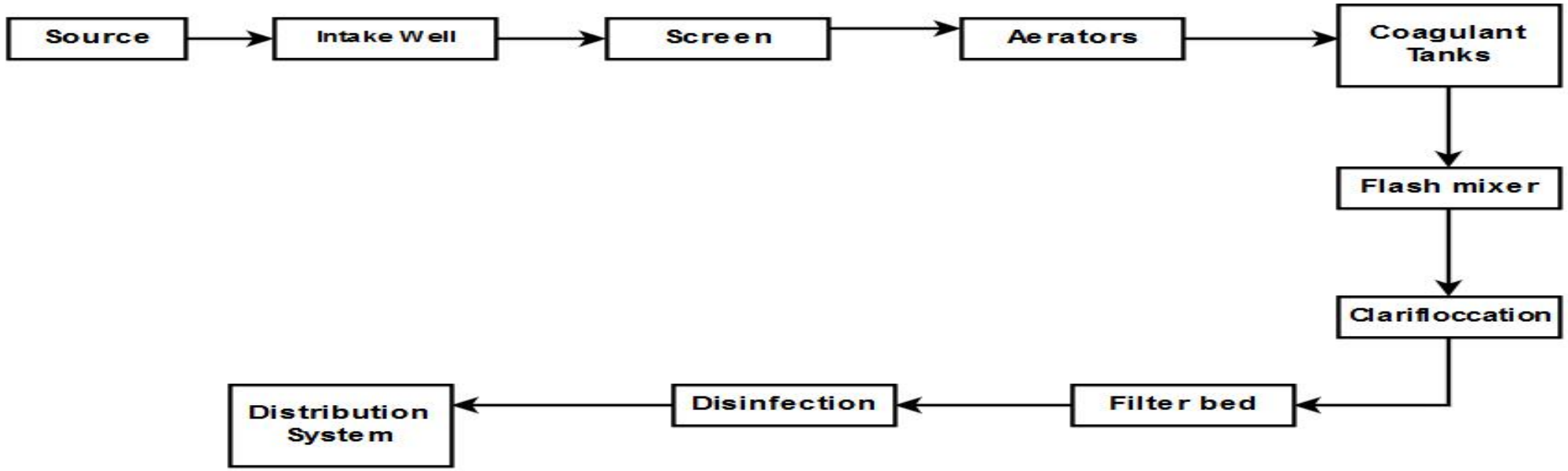
- Domestic use: *135 liters* per capita per day
- Public use: *25 liters per* capita per day
- Industrial use: *40 liters* per capita per day
- Fire demand: *15 liters* per capita per day
- Losses, wastages, and thefts: *55 liters* per capita per day

INDIAN STANDARDS FOR DRINKING WATER:

Parameter	Desirable-Tolerable	If no alternative source available, limit extended upto
	Physical	
Turbidity (NTU unit)	< 10	25
Colour (Hazen scale)	< 10	50
Taste and Odour	Un-objectionable	Un-objectionable
	Chemical	
pH	7.0-8.5	6.5-9.2
Total Dissolved Solids mg/l	500-1500	3000
Total Hardness mg/l (as $CaCO_3$)	200-300	600
Chlorides mg/l (as Cl)	200-250	1000
Sulphates mg/l (as SO_4)	150-200	400
Fluorides mg/l (as F)	0.6-1.2	1.5
Nitrates mg/l (as NO_3)	45	45
Calcium mg/l (as Ca)	75	200
Iron mg/l (as Fe)	0.1-0.3	1.0

Public Water Supply System: Necessity and Basic lay out

The available raw waters must be treated and purified before they can be supplied to the public for their domestic, industrial or any other uses. The extent of treatment required to be given to the particular water depends upon the characteristics and quality of the available water, and also upon the quality requirements for the intended use.



The types of treatment required for different sources are given in the following table

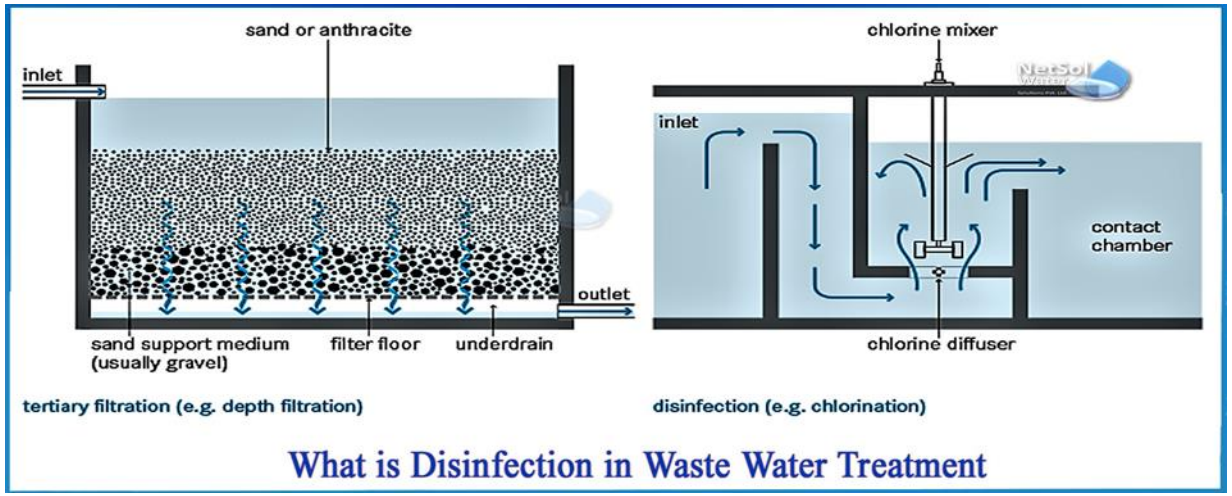
Source	Treatment required
Ground water and spring water fairly free from contamination	No treatment or Chlorination
Ground water with chemicals, minerals and gases	Aeration. coagulation (if gases necessary), filtration and disinfection
Lakes, surface water reservoirs with less Disinfection amount of pollution	Disinfection
Other surface waters such as rivers, canals Complete treatment and impounded reservoirs with a considerable amount of pollution	Complete treatment

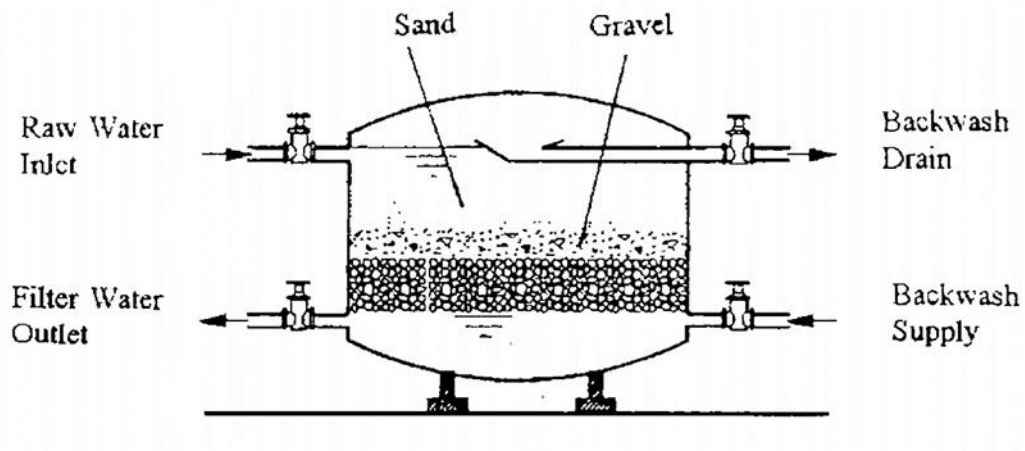
- ***SCREENING*:** it is a pretreatment process where water is allowed to pass through screen fixed intake works or at the entrance of the treatment plant. This process removes bigger suspended particles that could make the whole system less efficient and damage expensive and essential water treatment equipment.

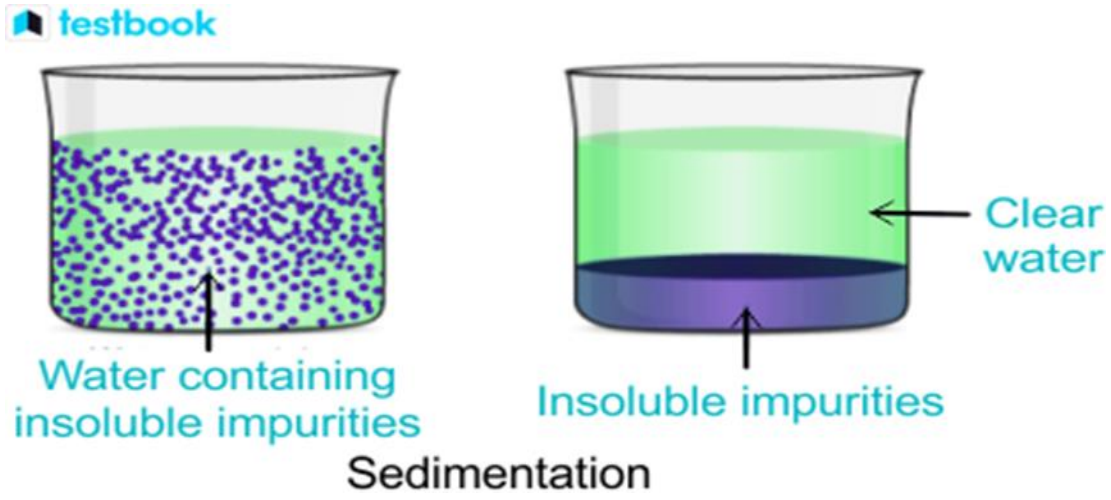
- ***SEDIMENTATION:***
- The mechanism of sedimentation is due to force of gravity and the associate settling velocity of the particle, which causes it to cross the streamlines and reach the collector.
- Most of the impurities settles by gravity alone. This process is known as plain sedimentation.
- When chemical coagulants added to the water to hasten arrogation and faster settlement. This process Is known as sedimentation with coagulation or clarification

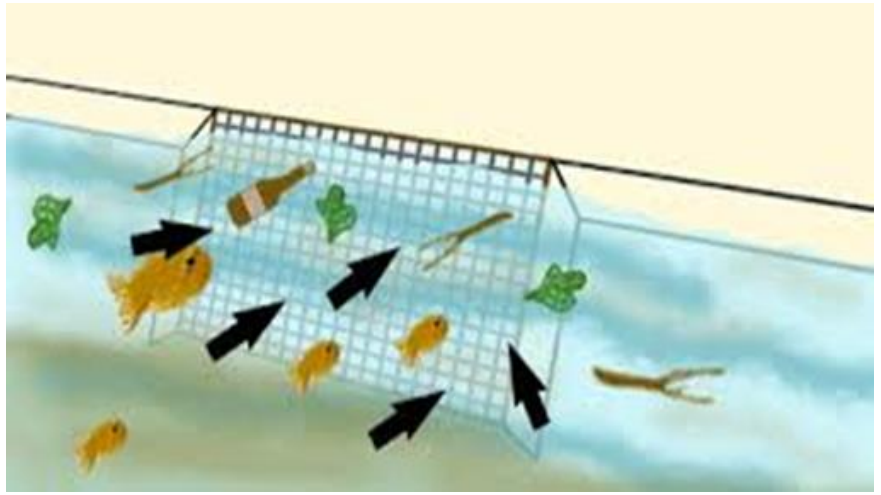
- ***FILTRATION:*** ***This process involves the treatment of water by passing it through a bed of granular materials such as sand and stones during filtration.***
- ***The leftover particular matter from the sedimentation process is removed. This system is useful in the removal of bacteria, and improvement colour order and taste.***

- ***DISSINFACTION :*** ***The water coming out of the filter plants may still contain some harmful bacteria and microbes. It is therefore necessary of disinfect water before use.***
- ***This is done by adding one or more chemical disinfectants such as chlorines, chlorination and ozone or passing the water through UV light***
- ***chlorination or disinfection for public water supply. It is applied to water in any of the following from that includes bleaching powder, chloramines free chlorine or chlorine dioxide.***


sand or anthracite
inlet
outlet
sand support medium
(usually gravel)
filter floor
underdrain
tertiary filtration (e.g. depth filtration)
chlorine mixer
inlet
contact
chamber
chlorine diffuser
disinfection (e.g. chlorination)
What is Disinfection in Waste Water Treatment


Sand
Gravel
Raw Water
Inlet
Backwash
Drain
Filter Water
Outlet
Backwash
Supply


testbook
Water containing
insoluble impurities
Clear
water
Insoluble impurities
Sedimentation



Thank you