

# **Basis of waste water treatment**

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# WASTE WATER TREATMENT

The background of the slide is a pixelated image of a sunset or sunrise. The sky is filled with horizontal bands of yellow, orange, and red. In the foreground, there is a dark silhouette of a person standing on the right side, looking out over a body of water. The overall aesthetic is low-resolution and digital.

# What is waste water?

Used water .....includes....

- Food scraps, oil and soaps.
- Human wastes.
- Industrial wastes.





# Where does it all go!



Where does the water from the washer go?



When you flush the toilet where does the contents go?

By gravity flow, the waste is on its way to your local **wastewater treatment plant!**

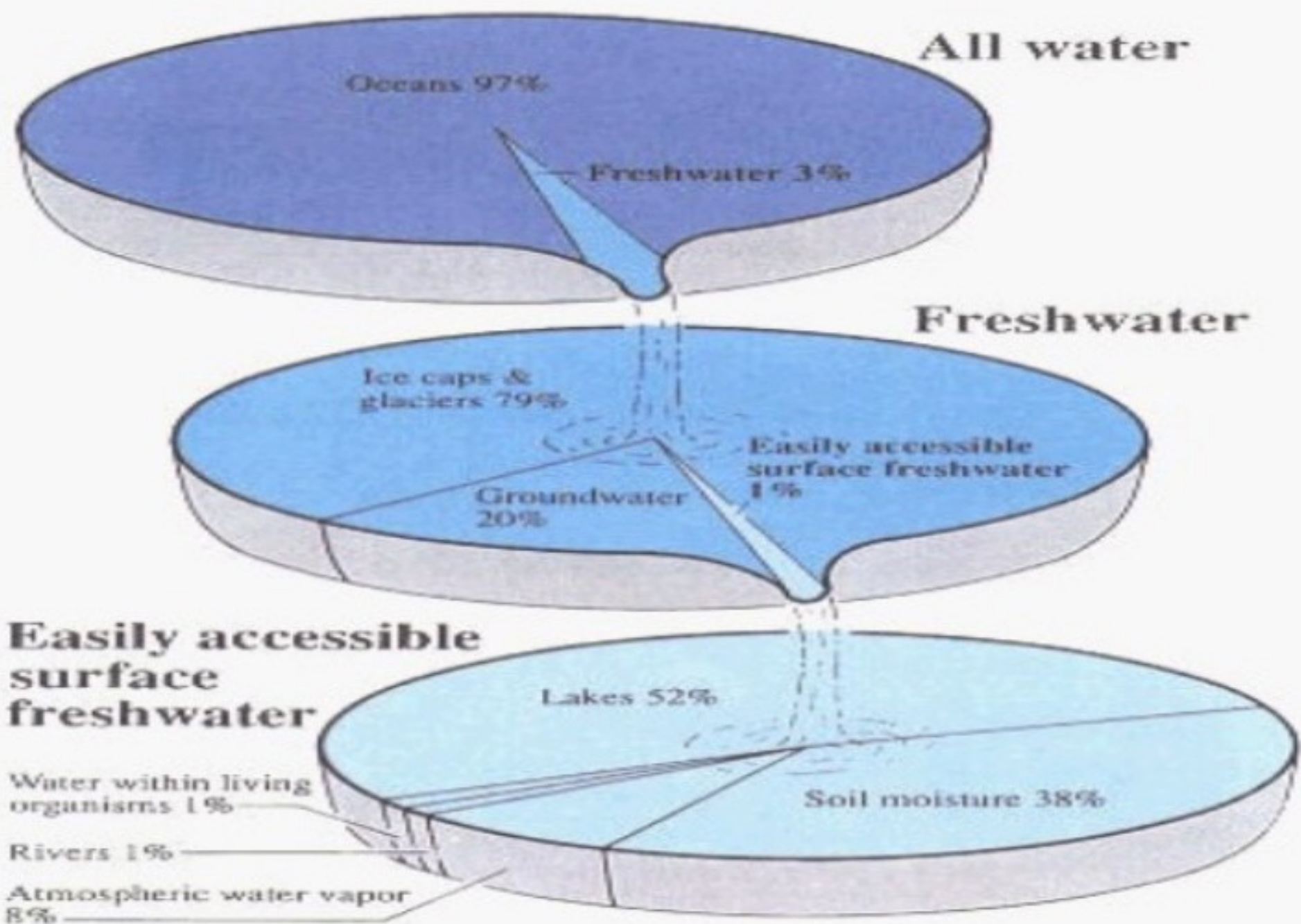


# Why treat wastewater?

- To remove pollutants from waste water for its recycling.
- To promote health concern and public hygiene.
- To preserve aquatic life and wildlife habitat.
- To promote recreation and quality of life.



# Distribution of the world's water



# Stages OF TREATMENT

1.Primary treatment

2.Secondary treatment.

3.Tertiary treatment.

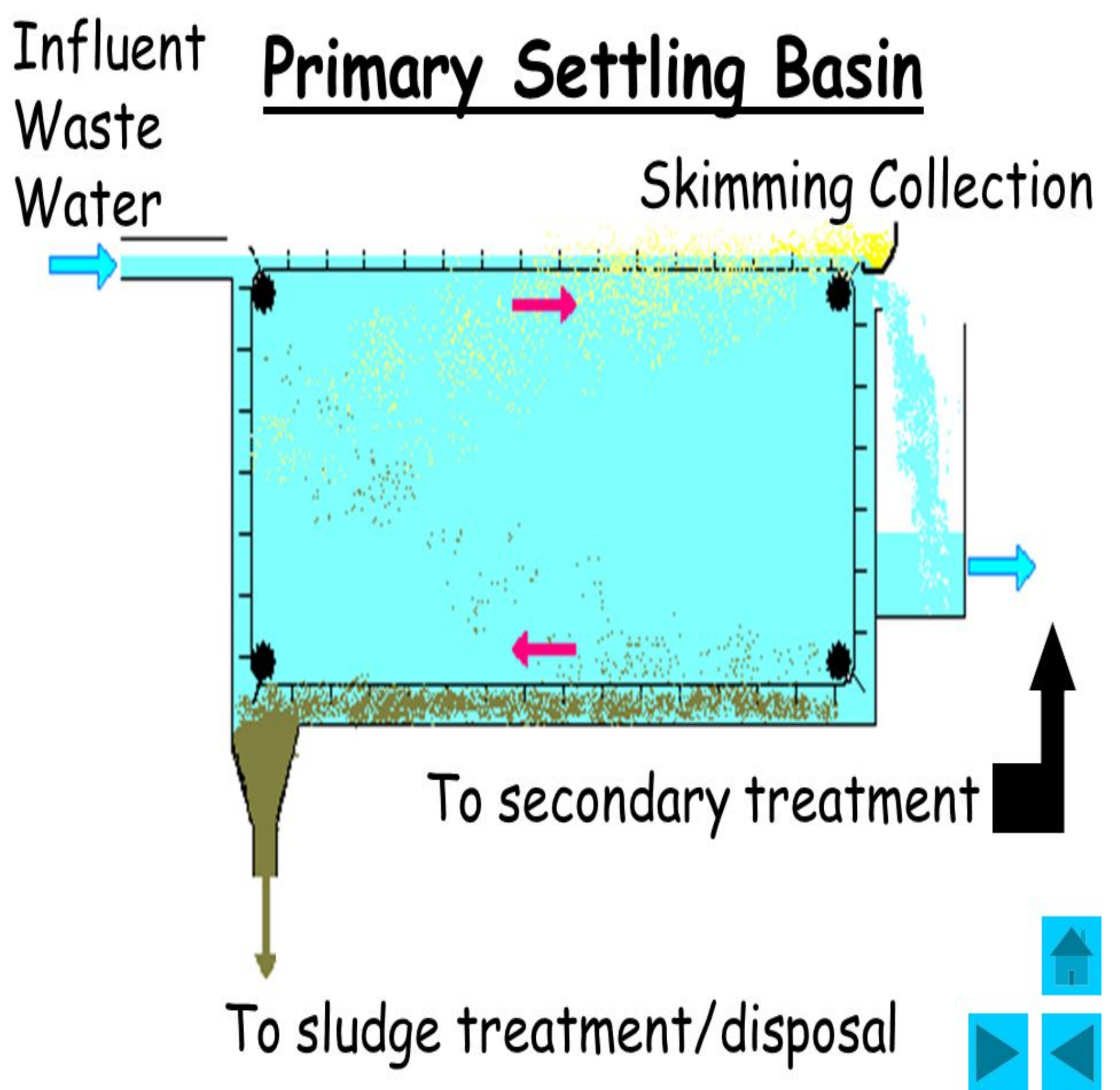


# PRIMARY TREATMENT

❑ Removal of large objects from **influent sewage.**

Ex. by physical separation of grit and large objects (material to landfill for disposal)







# Secondary treatment

- Utilizes biological treatment processes
- removes dissolved colloidal and organic matter from waste water.
- microorganisms convert nonsettleable solids to settleable solids.

Ex....

**Bacteria and protozoa**

:Three approaches are there to accomplish this



# APPROACHES TO SECONDARY TREATMENT

- **FIXED FILM SYSTEMS**
- **SUSPENDED FILM SYSTEMS**
- **LAGOON SYSTEMS**

organic matter +  $O_2 \rightarrow CO_2 + NH_3 + H_2O$

$NH_3 \rightarrow NO_3^-$   aquatic nutrient

# FIXED FILM SYSTEMS

- ❖ Micro-organisms on substrates such as rocks, sand or plastic are cultured.
- ❖ Waste water is spread over the substrate .
- ❖ Nutrients and organic matter are absorbed by micro-organisms as they grow in size.
- ❖ Eg. trickling filters, rotating biological contactors, and sand filters.

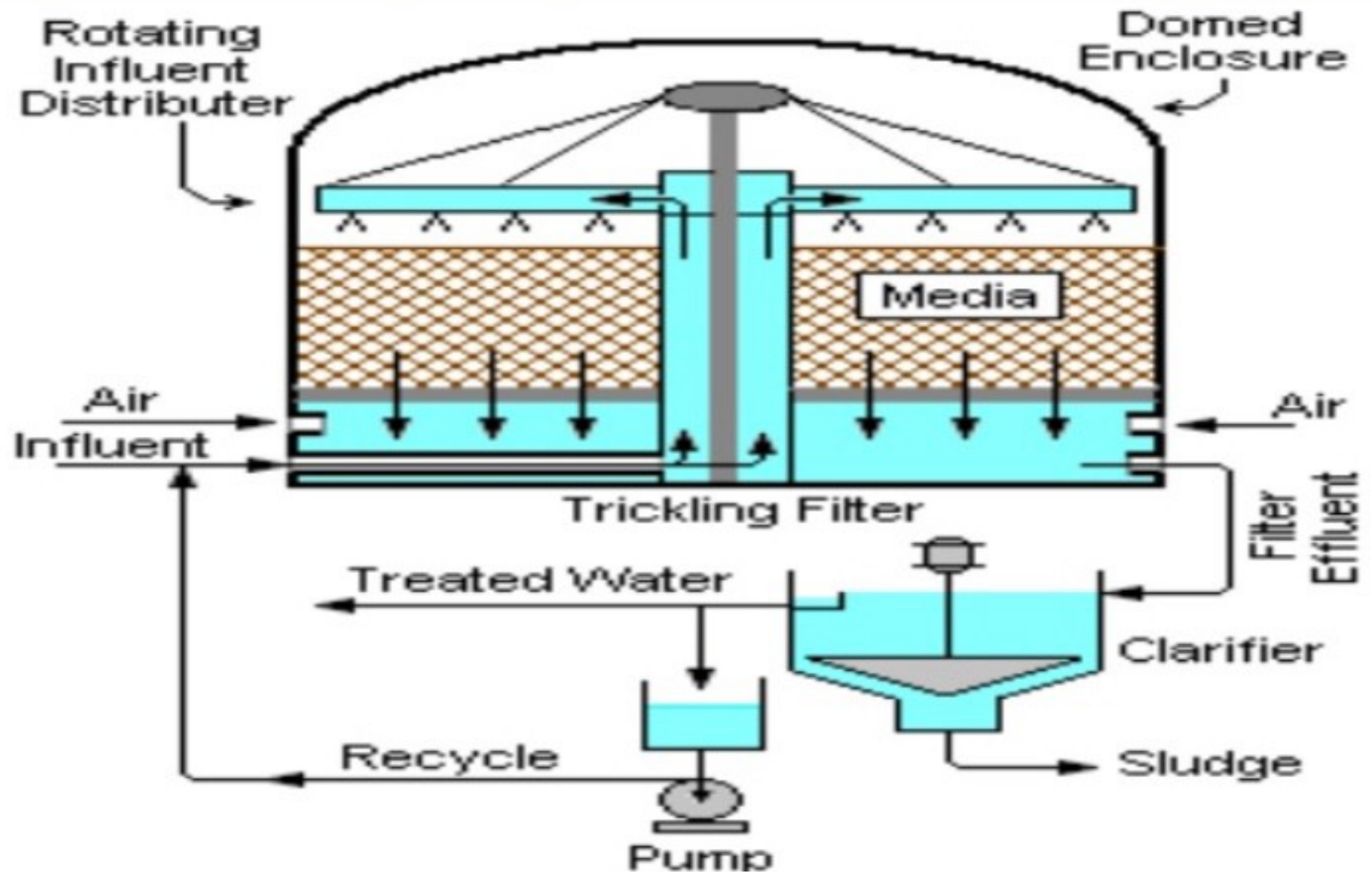


# TRICKLING FILTERS

- Organic material present in the wastewater is metabolised by the biomass.
- Biological slime grows in thickness as the organic matter abstracted from the flowing wastewater is synthesized into new cellular material.
- The liquid then washes the slime off the medium and a new slime layer starts to grow-----sloughing.
- The collected liquid is passed to a settling tank used for solid- liquid separation.

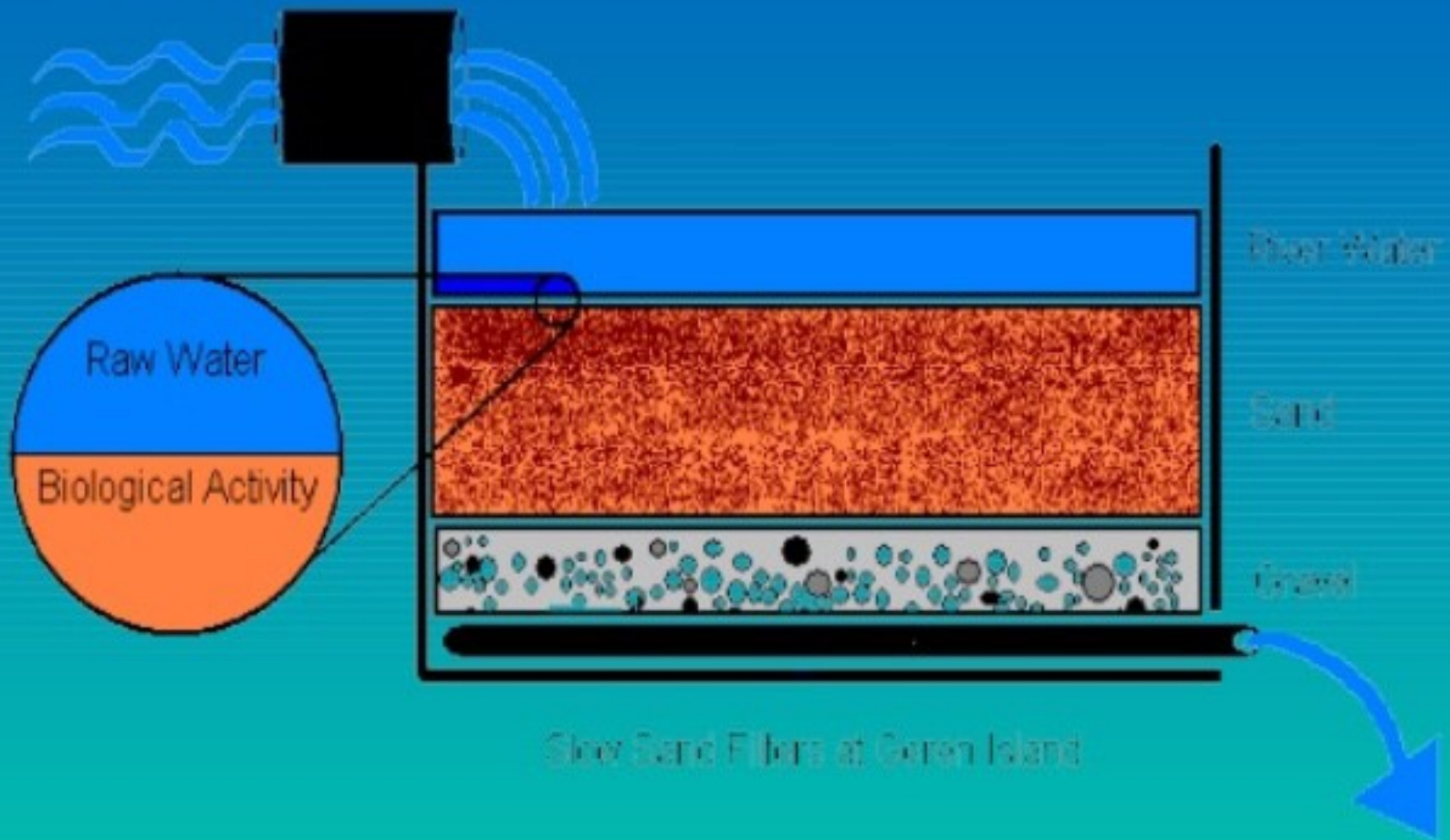


# Trickling filter



# SAND FILTERS

North Saniam River



Slow Sand Filters at Goren Island

To Disinfection  
and Fluoridation

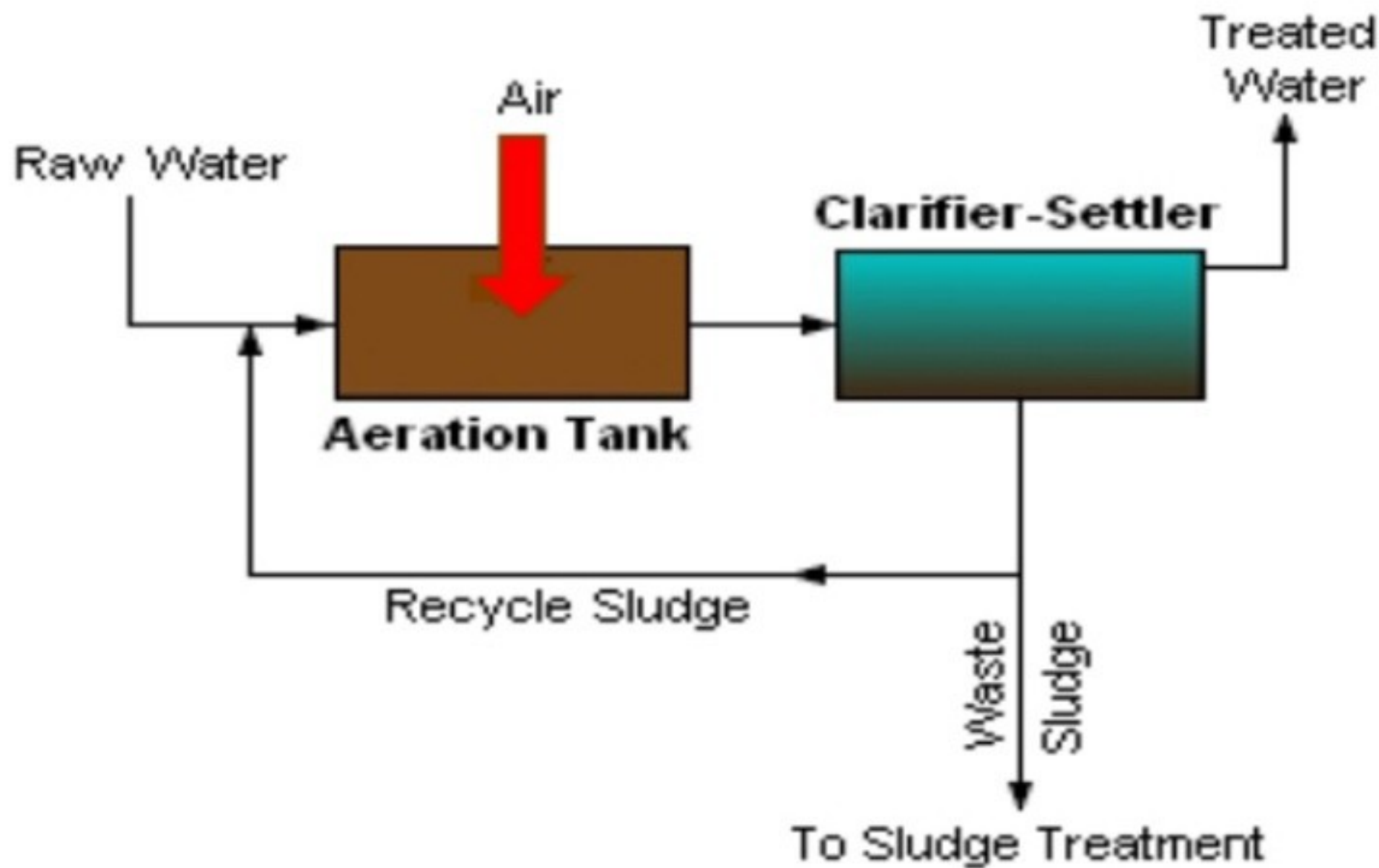
# Activated sludge system

- ❑ It consists of 2 parts:
  1. An aeration tank
  2. A settling tank (clarifiers)
- ❑ Aeration tank : it consists of sludge (mixed microbial culture) which contains bacteria, protozoa, fungi and algae etc.





# Activated sludge system



# LAGOON SYSTEMS

- ❑ Consist of in-ground earthen basins in which the waste is detained for a specified time and then discharged.
- ❑ They take advantage of natural aeration and microorganisms in the wastewater to remove sewage.



# Tertiary treatment

(Disinfection)

PURPOSE: Destruction of harmful (pathogenic) microorganisms, i.e. disease causing germs.

Done through:

1. Chlorination

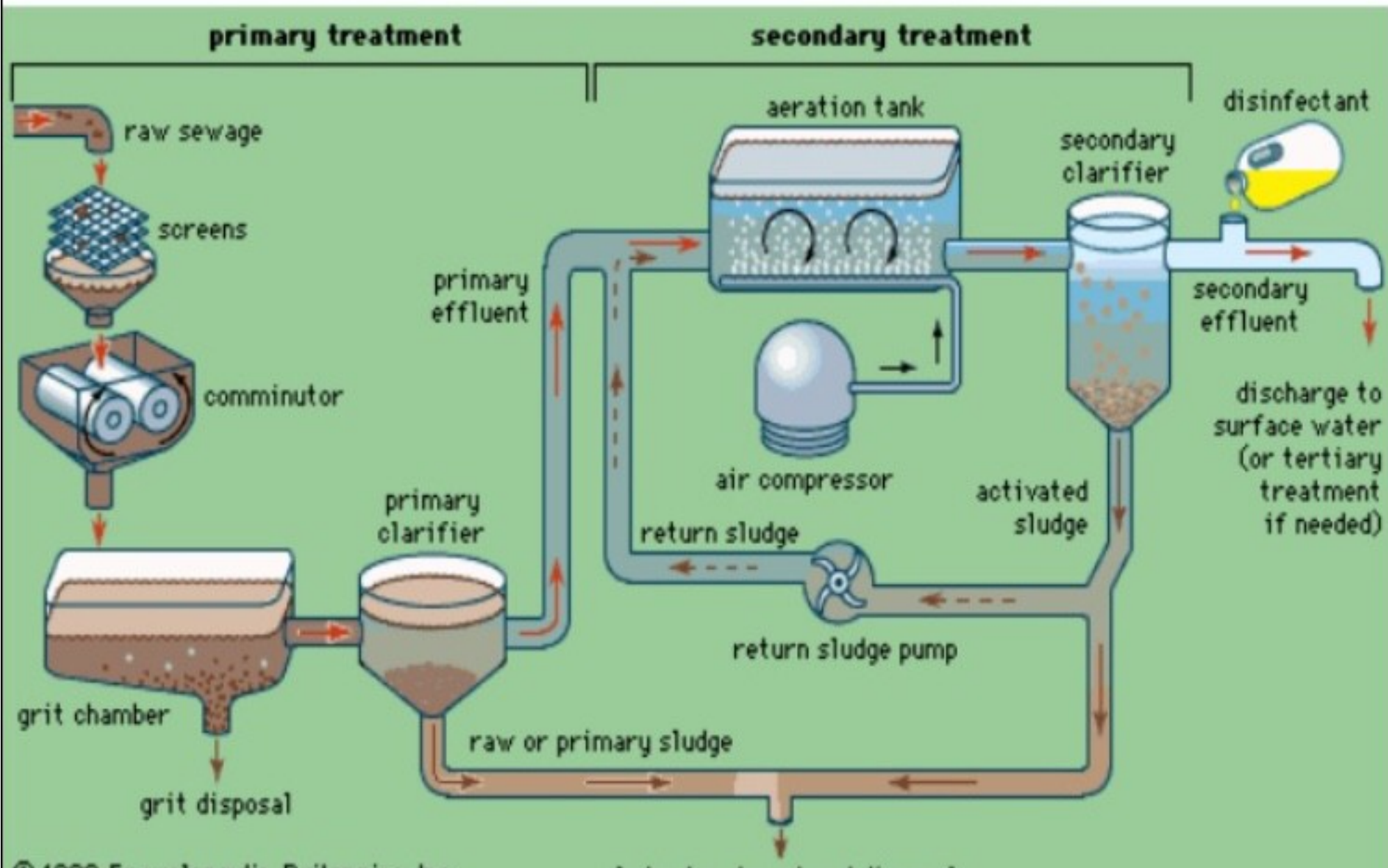
2. Ozone: more powerful but unstable to store.

3. Ultraviolet light

4. Hydrogen peroxide: similar to ozone but activators such as formic acid is required to improve its working.



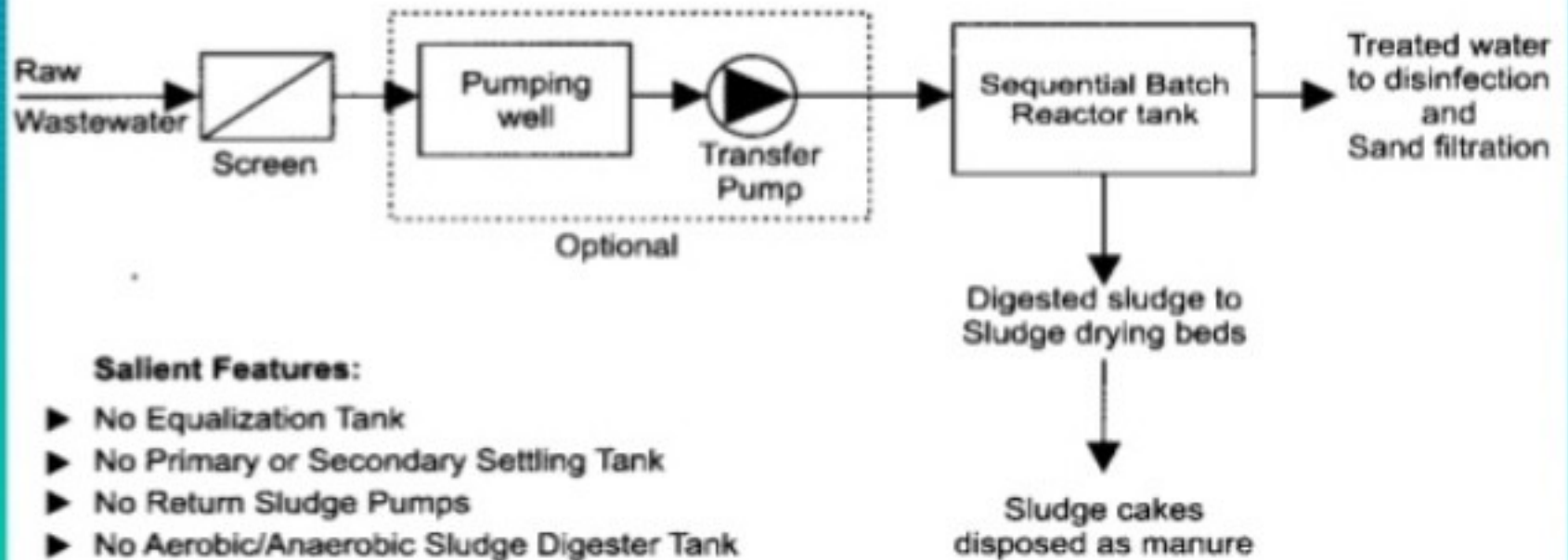
# SUMMARY



# OTHER TREATMENT.....

## SLUDGE TREATMENT

### Advanced Sequential Batch Reactor Technology



# When the treatment is done...

- **Effluent back to stream after**
  - a final carbon filtration and
  - chlorination/dechlorination
- **Sludge – very nutrient rich**
  - applied directly to land as fertilizer
  - incinerated (good fuel after drying)
  - composted .



**CONSEQUENCE.....!!**

**Water**  
**is Life**

A stylized blue water splash graphic, resembling a wave or a splash of water, is positioned behind the text 'Water is Life'. The splash is light blue and has a soft, ethereal quality, with some darker blue lines suggesting movement and depth. It is centered behind the text, which is in a bold, dark blue font.



Thank you

