

NATURAL WATER SUPPLY

Water is a precious natural resource, yet in many countries around the world, it is not readily available and people tend to take it for granted. Water is used for household or domestic activities such as washing, drinking, cooking sanitation and cleaning. It can also be a source of recreation through water sports

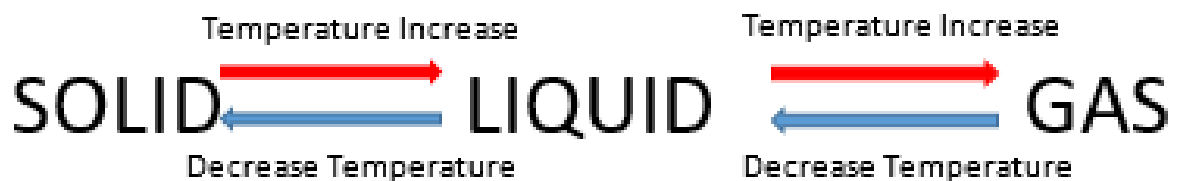
such as swimming, sailing and water skiing. Water also has many industrial and agricultural uses. Most of the water that we use comes from the rain that collects in streams, dams and rivers. Rainwater might seem pure and clean, but it picks up a lot of impurities as it falls through the

polluted air and runs through muddy fields and along dirty streets. Even ground water from boreholes, although much more likely to be safe, may have contaminants. We therefore cannot just drink or use this water without treating or purifying it first.

PHASES OF WATER

70% of the earth's surface is covered with water. However, of this approximately 97% is saltwater and 3% is freshwater. Of this 3% less than 1% is available for life on earth whilst the rest is in the form of ice in the Polar Regions.

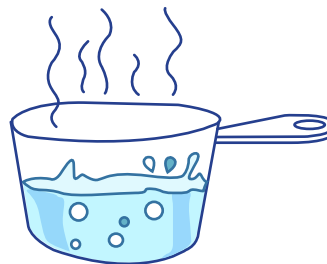
Water has three forms/phases.



Solid



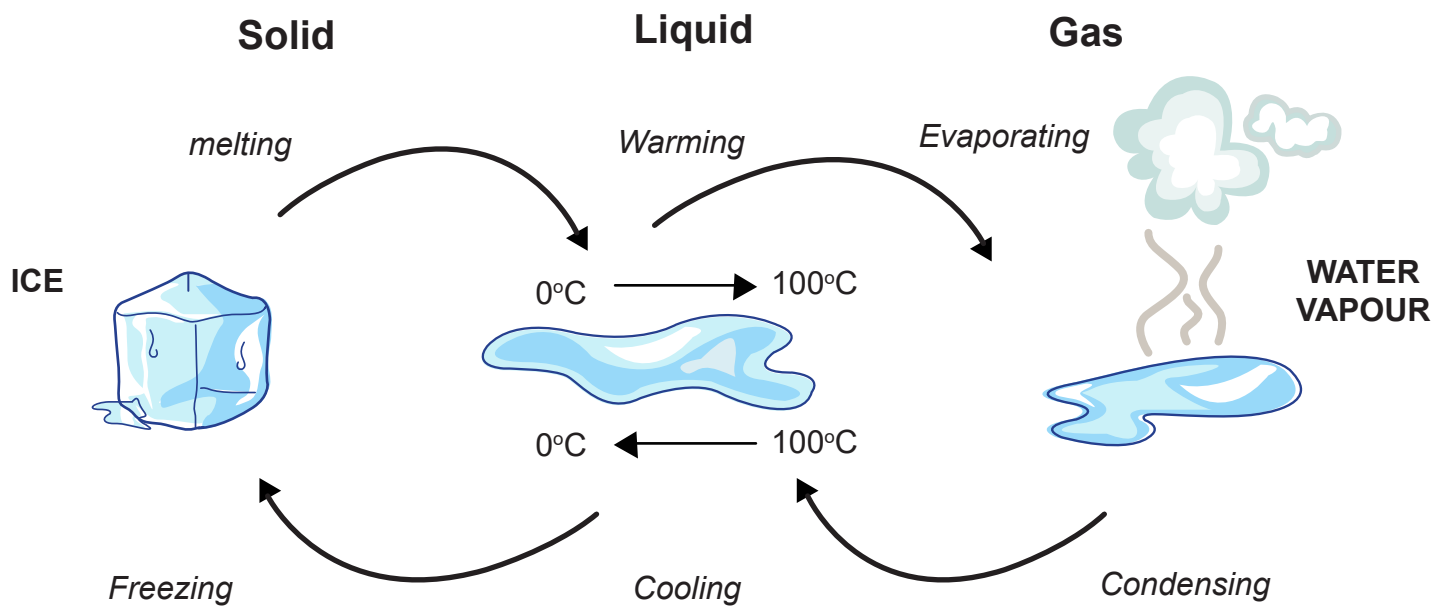
liquid



gas



**Think Water,
think Umgeni Water.**

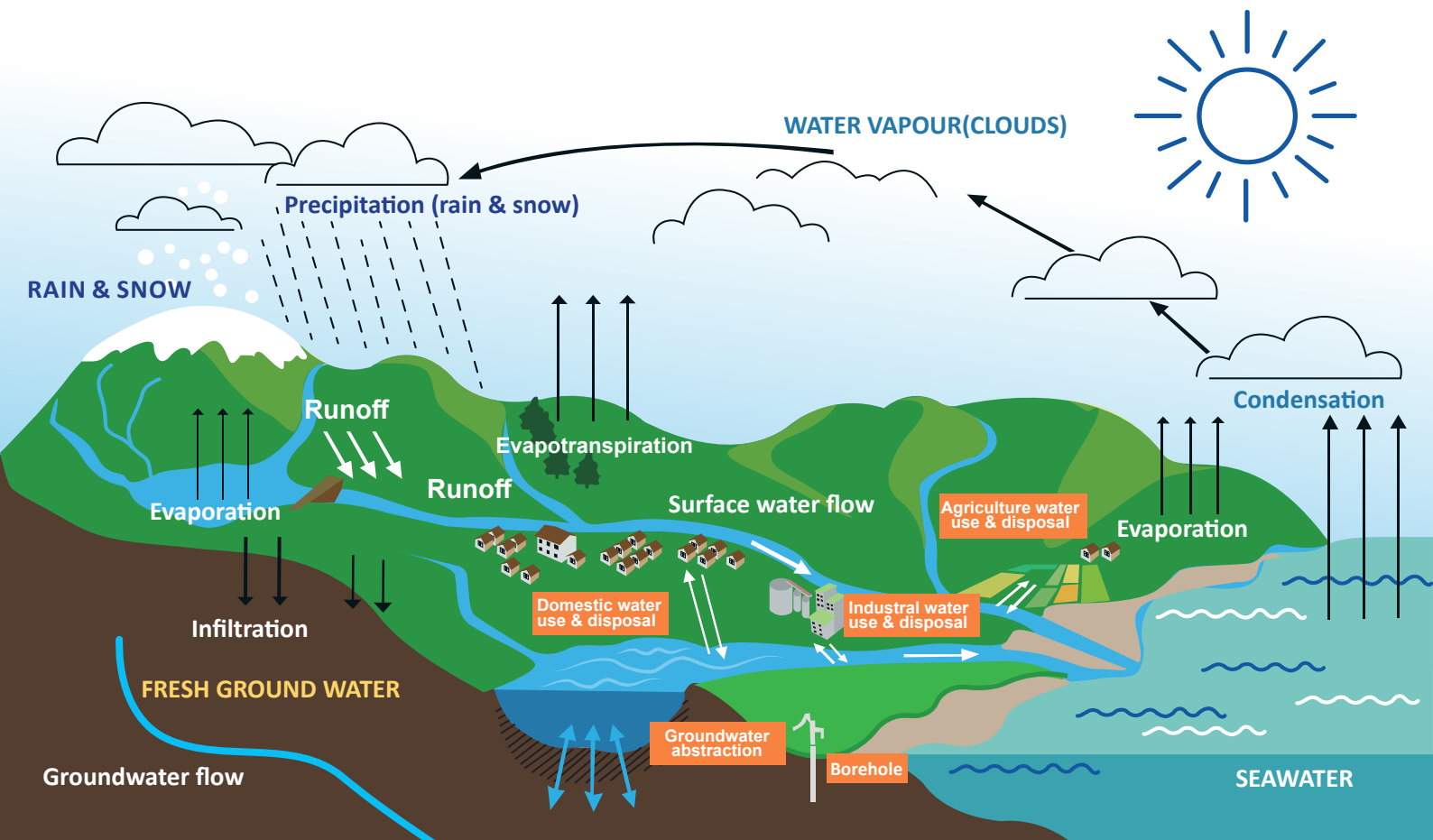


NATURAL WATER CYCLE

The hydrological (water cycle) is the circulation of water within the Earth's hydrosphere, involving changes in the physical state of water between liquid, solid and gas phases and the exchange of water between atmosphere, land, surface and subsurface waters. The amount of water on the Earth changes because water moves around in a continuous cycle called the Water Cycle. The sun heats the liquid water in the

rivers, dams and especially in the oceans and water evaporates and rise into the atmosphere as water vapour. During evaporation, salt is left behind and the water that rises is fresh. When this cools down, it changes back into the droplet of liquid water, forming clouds. This process is condensation. These droplets of water eventually fall back to the Earth as rain, sleet or snow through the process of precipitation. The cycle is completed as the water

collects on the ground and in dams, rivers and oceans. The water from the dams is pumped to waterworks where it undergoes purification before being piped out to homes, factories, etc. for people to use. After use the water eventually collects at waste waterworks where it is recycled before being discharged back into the rivers for the cycle to continue.





WATER PURIFICATION PROCESS

Rainwater might seem pure and clean, but it picks up a lot of impurities as it falls through the polluted air and runs through muddy fields and along dirty streets. Even ground water from boreholes, although much more likely to be safe, may have contaminants. We therefore cannot just drink or use this water without treating or purifying it first. Like the natural water cycle a similar cycle is present which ensures that we have a safe water supply.

The water treatment process varies throughout South Africa and the world, but the end result is always the same – safe clean (potable) water.



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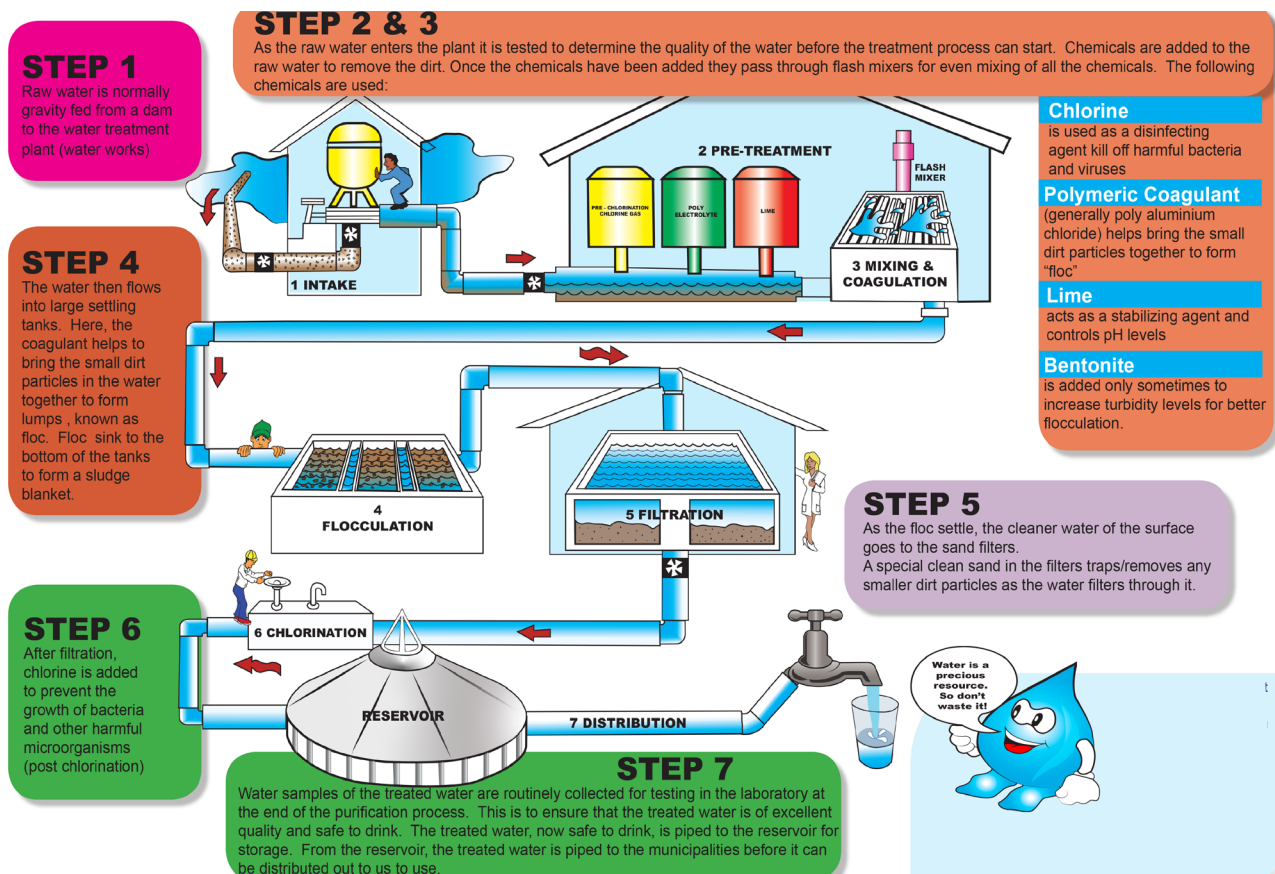
THE WATER TREATMENT PROCESS MAY BE BRIEFLY EXPLAINED AS FOLLOWS:

- Water from a dam or river is transferred to a waterworks (water treatment works) through large pipes called aqueducts. This is called raw water. The raw water generally looks slightly brown in colour due to suspended dirt particles in the water as a result of soil erosion. Chlorine may be added at this stage to kill off bacteria and algae.
- These dirt particles need to be removed. At the waterworks chemicals called coagulants are added to remove this dirt. Alum or Poly Aluminium Chloride is most often used. The coagulants act like magnets. They cling to the suspended dirt particles in the water to form floc particles. This process is called flocculation or coagulation. Lime is also added to stabilize the water by controlling pH levels.
- The floc particles sink to the bottom of large settling tanks. The clear water is then sent to the sand filters. The special sand in the filters removes any remaining floc particles.
- After filtration, chlorine is added as a disinfectant. This means that it kills any harmful germs in the water that could cause diseases. The purified water is tested to make sure that it is pure and of the right quality.
- The clean water is stored in huge covered tanks called reservoirs. When the water is needed it is pumped from the reservoir through pipes to our homes, factories and schools where we get clean safe water from our taps.

As water trickles through soil and rocks, some natural cleansing will take place. Water taken from underground wells or natural springs is often virtually free from impurities and requires little treatment. Our river water, however, is generally dirtier. To ensure that all the water going to the consumer is of the right quality, it has to undergo careful intensive treatment.

How do we do it?

Not all water treatment plants are the same as illustrated here. Methods vary throughout the country. It all depends on the quality of the raw water with which you start. Remember, drinking water is a carefully monitored product, going through many steps before it arrives at your home. It is also a precious resource so don't waste it!



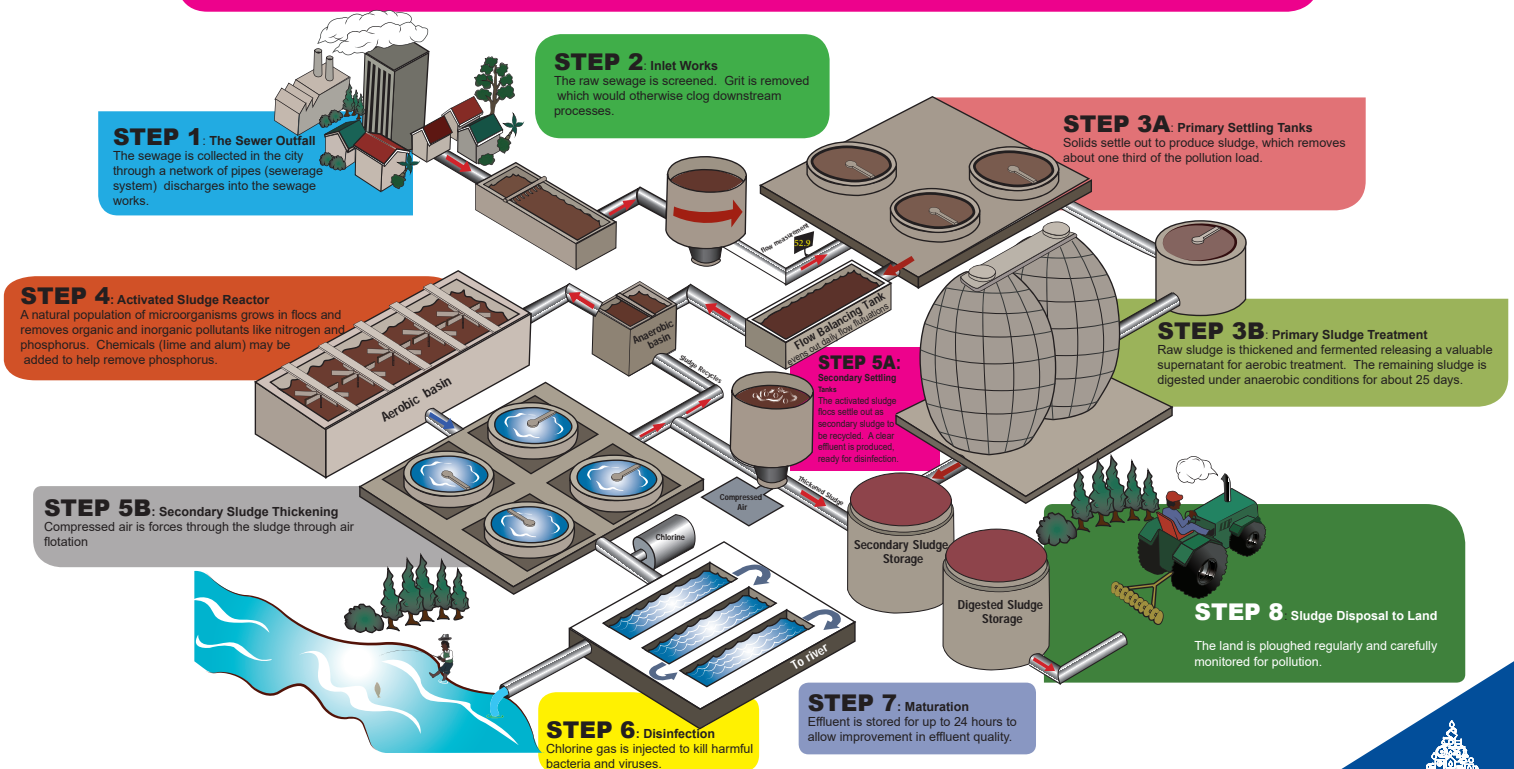
WASTE WATER TREATMENT PROCESS

The clean purified water that comes out of our taps is used for various activities like cooking, washing dishes, taking a bath, brushing our teeth, washing clothes or flushing the toilet. All this waste water goes down the drains through underground pipes

and tunnels called sewers to a sewage treatment plant (waste water works). Due to limited resources and population growth water also has to be recycled. The end-results of the various processes that may be used are the same – the

dirty water is made clean. In this way, we are able to re-use the same water several times over.

Strictly, no water should be regarded as waste. Even in wet countries, water is a valuable resource, to be re-used whenever possible. But, humans cannot help polluting the water they use. Our body's waste products (urine and faeces) which are carried away by water to form a polluted liquid called sewage cause serious pollution. In most places, animal wastes and industrial effluents (the water used in factories, mills and chemical plants or refineries) make the problem more complex. However, the most effective and widely used treatment methods harness natural biological processes to purify the sewage or decompose the sludge produced. In this way, the impact of human waste on the environment can be minimised.



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