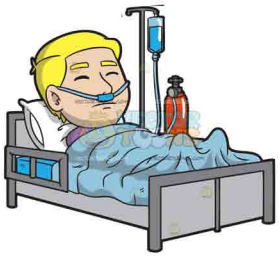
Is the water you are drinking safe ????



Surface water and Ground Water

Do you know about the basic sources of water?

There are two basic sources of water. These are (i) Ground Water and (ii) Surface water.

What is Ground water and Surface water?

Groundwater is the water found below the earth's surface. The water collected through deep tube well is an example of Groundwater.

Surface water is the water found above the surface of earth. Lakes, rivers, creeks are some of the sources of surface water.

What are the differences of ground water and surface water?

The following are the differences of ground water and surface water:

Ground Water

i) Groundwater is the water found below earth's surface.The water collected through deep tube well is an example of Groundwater.

ii) The Ground water is very high in mineral contents.

iii) Groundwater is not the source for fresh water.

iv) Ground water contains more minerals so the amount of harmful mineral in ground water is more making it more polluted.

v) Polluted groundwater is less visible, but more difficult to clean up, than pollution in rivers and lakes.

vi) Ground water is not the primary source of water.

Surface Water

i) Surface water is the water found above the surface of earth. Lakes, rivers, creeks are some of the sources of surface water.

ii) This water is usually not high in mineral content.

iii) Surface water is the source of fresh water

iv) Surface water contains less minerals so the harmful mineral contamination chances are low.

v) Polluted surface water is less difficult to clean

vi) Surface water is the primary source of water

Is the water you are drinking safe?

The water you are drinking may not be safe for drinking. Even though the water is seen clean and clear but it may not be safe for drinking. The potability of water depends on some of the parameters of measurement.

What are the causes that pollute the source water?

What are the stages where water is polluted?

Water is polluted in two stages; at the source and at the storage level.

The following are the causes of pollution of the water source:

a) Humans or animals defecating near the water sources.

b) Bathing and cleaning at the water source.

c) Washing clothes or utensils at the water source.

d) Release of fertilizer wastes into water source.

e) Discharge of untreated industrial effluents into the rivers and ponds.

f) Tube well without platform.

g) Mixing of garbages and other soil-borne wastes with river, canal or pond water as run-off during or after rains.

h) Concentration of certain mineral salts within the soil becoming exceedingly high.

What are the causes that pollute the storage water?

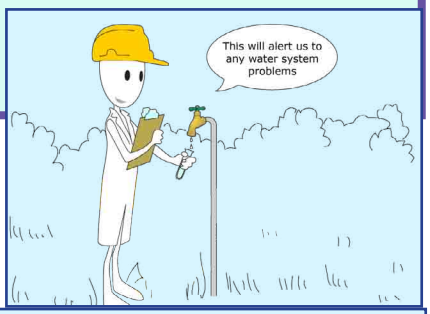
a) Water is collected in un-cleaned utensils

b) Keeping water at an uncover utensil

c) Dirty utensils or hands are dipped in stored water

Why Water testing is needed?

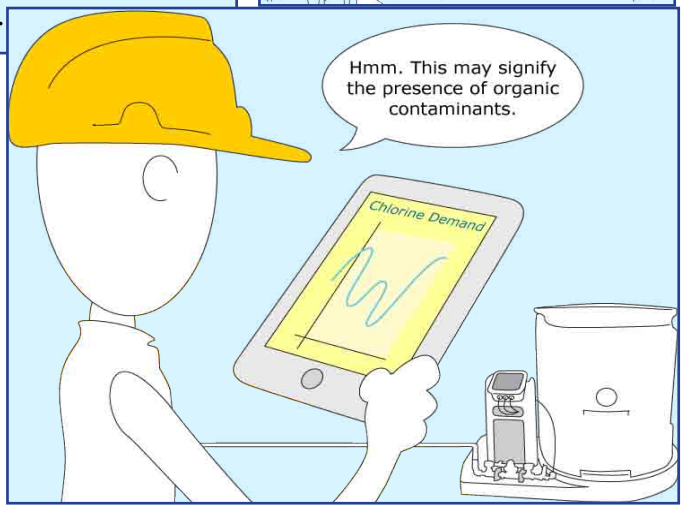
To detect impurities that can cause potential harm due to presence of certain chemical constituents like hardness, pH, nitrate, fluorides, chlorides, iron, solid, turbidity, arsenic etc. or even biological contamination water testing is done.



What are the parameters of measurement of water quality?

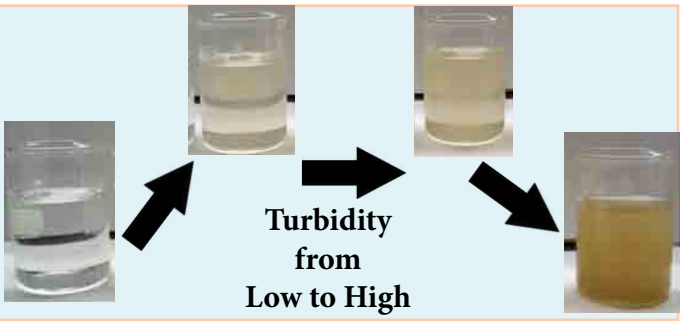
There are certain parameters that indicate the quality of the water and also indicate whether it is potable by human or not. Following are the basic parameters for measuring the quality of the water.

i) Turbidity
ii) Iron
iii) Residual Chlorine
iv) Nitrate
v) Hardness
vi) pH
vii) Fluorides
viii) Bacteriological contamination
ix) Arsenic



What is the effect of turbidity in water?

Turbidity basically means the suspended particles, algae and other visible elements in the water that makes the water look cloudy (dirty). Turbidity itself is a mark of pollution it makes the water dirty to drink.



What effect does turbidity have in human health?

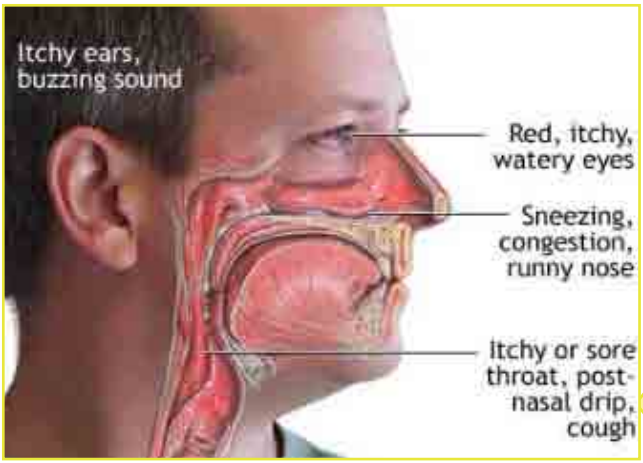
Turbidity above permissible amount of 5NTU may cause irritation, vomiting and bacteriological diseases.

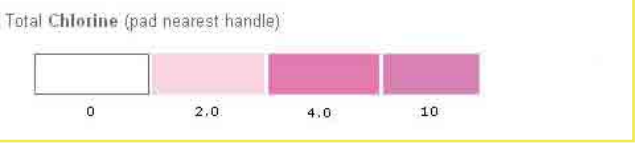
What is the effect of iron in water?

Iron in water will make the water taste metallic. The water may be discolored and appear brownish due to higher level of iron in the water.

What affect does iron have in human health?

Long time consumption of drinking water with higher concentration of Iron can lead to liver diseases (hemosiderosis). Higher concentration of Iron induces intestinal ulcers, digestive disorders, skin diseases and dental problems.





What effect does residual chlorine have in human health?

Consumption of water concentrated with residual chlorine will create irritation in the mouth, eyes and skin.

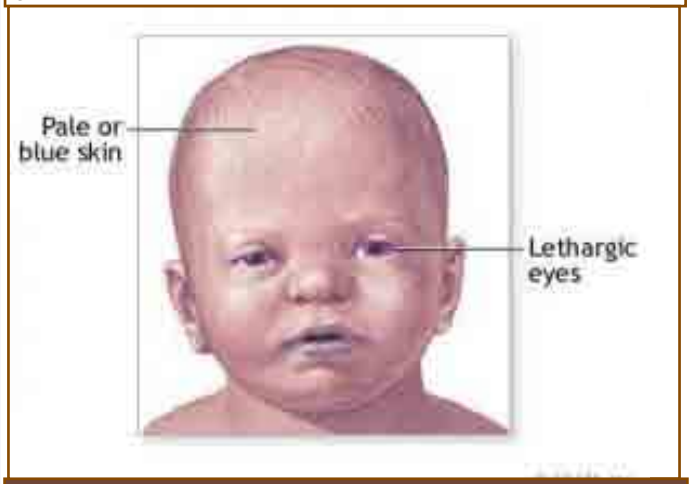
More over consuption of residual concentrated water will give a bitter taste.

What is the effect of residual chlorine in water?

Residual chlorine is the left over chlorine used as disinfectant in the water for purification.

What is the effect of nitrate in water?

Nitrate can be found in both ground water and surface water, but the amount of nitrate is higher in ground water.

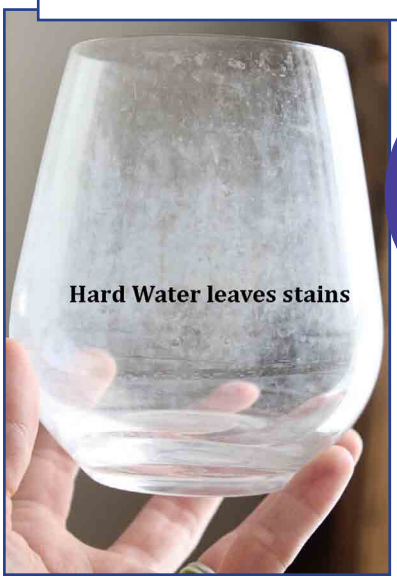


What effect does nitrate have in human health?

Consumption of nitrate water will lead to illness known as methemoglobinemia which affects the ability of blood to carry oxygen to blood.

What is hardness in water?

Hard water is formed when water passes through or over limestone or chalk areas and calcium and magnesium ions dissolve into the water. The amount of calcium and magnesium ions dissolved in the water determines the hardness of the water.

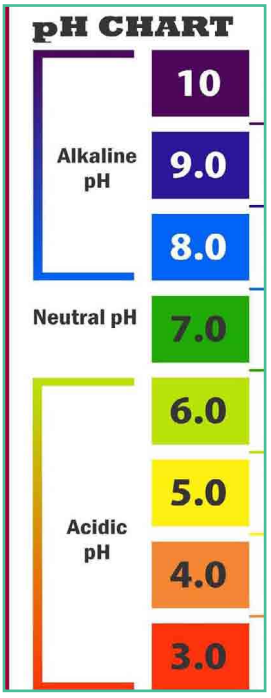


What effect does hardness have in human health?

Consumption of hard water for a long time causes cardiovascular diseases.

What is the effect of pH in water?

The pH is an indicator of relative acidity or alkalinity of water. It indicates the taste of water whether it is sour or alkaline depending on its amount in the water. It does not change the visual appearance of the water.



What effect does pH have in human health?

Difference in pH level in water (increase or decrease than 7 mg/l) can give rise to eye, skin and mouth irritation to human after consuming.

What is fluoride in water?

Fluoride is one of the elements that have shown to cause significant effect in people through drinking water. Fluoride is found in all natural water sources at some concentration. But the amount is higher in ground water.

What affect does fluoride have in human health?

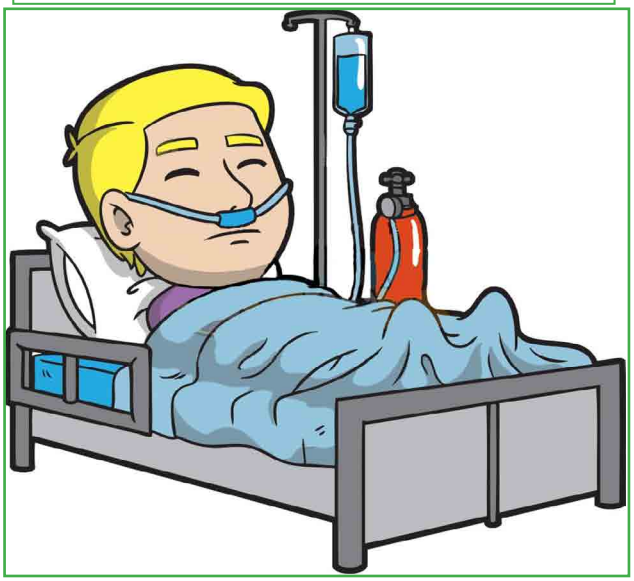
Consumption of fluoride affected water for a long period of time can lead to dental fluorosis and at adverse effect it can lead to crippling skeletal fluorosis.

What affect does arsenic have in human health?

Arsenic is considered the most harmful element found in the water. Long term consumption of arsenic contaminated water leads to arsenic poisoning or arsenicosis. This can latter create cancer of skin, bladder, kidney or lung.

What is bacteriological contamination of water?

Human and animal wastes are a primary source of bacteria in water. Bacterial contamination cannot be detected by sight, smell or taste. The only way to know if a water supply contains bacteria is to have it tested.



What effect does bacteriological contamination have in human health?

Consumption of water with bacteriological present in the water causes diarrhea, dysentery, cholera, typhoid, etc

What is arsenic in water?

Arsenic (As) is an odourless and tasteless metalloid found mostly in ground water. Arsenic is introduced to water through the dissolution of rocks and minerals.

Sl No	Parameters	Specification of parameter	Effect on human health	Permissible limit of consumption	Precautions
1	Turbidity	Turbidity is caused by particles dissolved in water making the water appear cloudy or murky.	Excessive turbidity, or cloudiness, in drinking water indicates its polluted and can give rise to waterborne disease outbreaks, which have caused significant cases of gastroenteritis.	5 NTU.	Use different water treatment methods to remove turbidity and other pollutants.
2	Iron	Higher level of iron in water will give the water a metallic taste and also it will left iron stains in every place used.	Long time consumption of drinking water with higher concentration of Iron can lead to liver diseases(hemosiderosis).	0.3 ppm	Proper water treatment techniques may be used for cleaning of Iron from drinking water.
3	Residual Chlorine	Residual Chlorine is the remaining chlorine amount in the water left after chlorine used as disinfectant.	Higher level of chlorine in water will impart bitter taste and causes irritation in the mucus membrane, eyes and skin.	0.2 mg/L to 0.4 mg/L	In case the water is polluted with chlorine more than 0.4mg/L the water should be purified by using proper water treatment methods.
4	Nitrate	Nitrate is a compound that is formed naturally when nitrogen combines with oxygen or ozone.	Consumption of nitrate polluted water contributes to the illness known as methemoglobinemia and its harmful for human.	45 ppm	The best solution is to find an alternative water supply for drinking and cooking water purposes.
5	Hardness	The simple definition of water hardness is the amount of dissolved calcium and magnesium in the water.	Hard water may cause cardiovascular diseases.	600 ppm	Boiling of water helps get rid of hardness of water.
6	pH	It is an indicator of relative acidity or alkalinity of water.	pH has no direct effect on health. Low value below 4mg/L produces a sour taste and higher value above 8.5mg/L produces alkaline taste.	6.5mg/L to 8.5 mg/L.	In case the water taste sour, lime to be added to the water and if the water tastes bitter, than alum to be added in the water
7	Fluorides	Fluoride is found in low or high concentrations in all natural waters including ground waters.	Consumption of high fluorides concentrated water can lead to mild dental fluorosis to crippling skeletal fluorosis depending on the period of consumption.	1 mg/L to 1.5 mg/L	Change the source of water or use several different water treatment methods for fluoride removal from drinking water.
8	Bacteriological Contamination	Human and animal wastes are a primary sources of bacterial contamination.	Bacteriological contamination causes diseases like diarrhea, dysentery, cholera, typhoid.	------	To get rid of bacteriological contamination, drinking water sources should be kept clean and proper sanitary construction around the tube well should be done. Adding of bleaching powder 4mg/L and boiling of water at 1000c for 20 minutes can help to get rid of bacteriological contamination.
9	Arsenic	Arsenic (As) is an odourless and tasteless metalloid widely distributed in the earth's crust and in groundwater.	Long-term intake of arsenic contaminated water leads to arsenic poisoning or arsenicosis, with cancer of skin, bladder, kidney or lung or diseases of skin or blood vessels of legs and feet	.01 mg/l	The only way to get rid of Arsenic contaminated water is to change the source water.

What are the precautions that can be taken to get water free from pollutants?

The following are the precautions that can be taken to get rid of these water pollutants:

i) Different water treatment methods to be used and alum to be added to get rid of turbidity in water.

ii) For removing iron proper treatment techniques to be used.

iii) Adding lime and alum in the water and filtering will minimize the effect of pH level in water.

iv) The best solution is to change the source if water is polluted with nitrate.

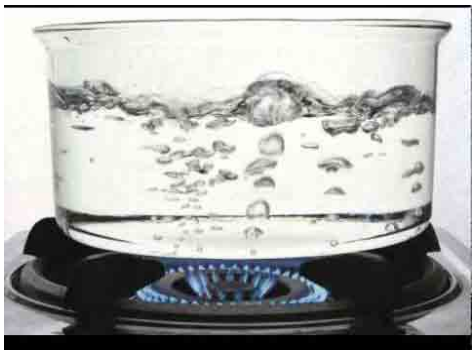
v) Filtration techniques can help reduce the residual chlorine from water.

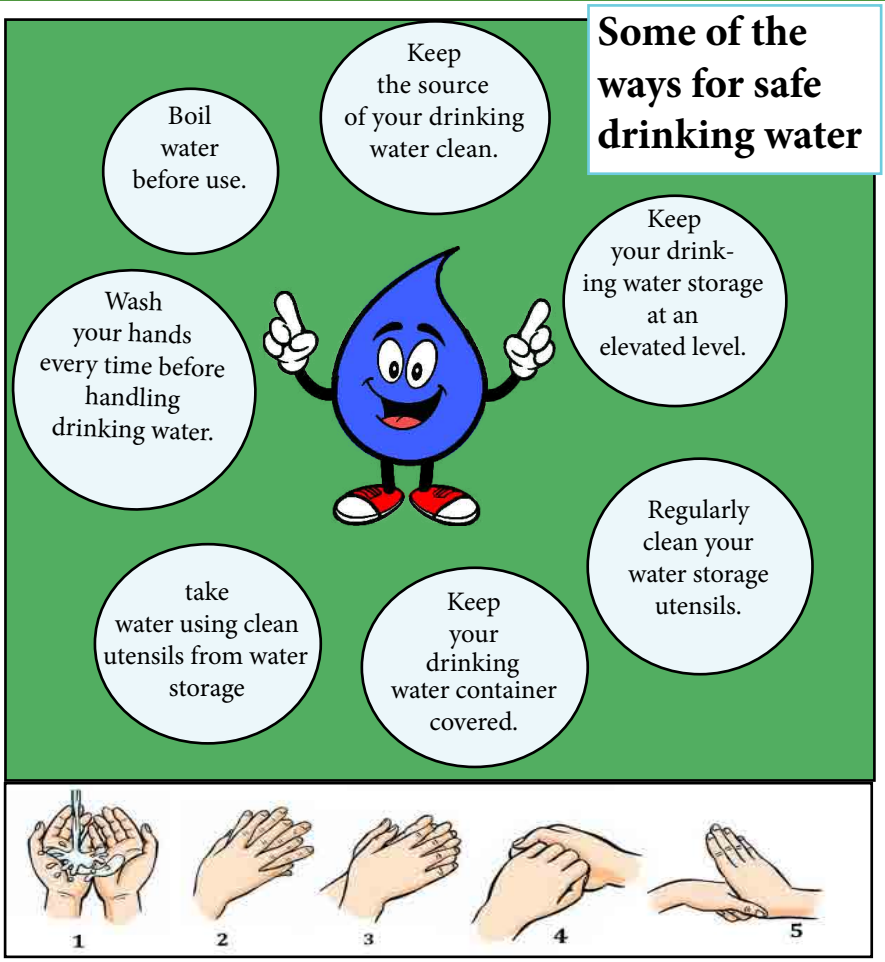
vi) Boiling of water and filtration will remove hardness in water.

vii) The best way to get rid of bacteriological contamination from water is to boil the water and maintain cleanliness in storing and handling water.

viii) The best way to get rid of fluoride contaminated water is to change the water source.

ix) Water treatment methods such as reverse osmosis, ultra-filtration, distillation, or ion exchange may be used to decrease the amount of arsenic. But it is better to change the source of the water.





So what is the solution to remove these pollutants from water?

➡ **Use of treated surface water is the best way to get rid of these pollutants.**

Where can you get treated safe water?

➡ **Treated water will be provided through Neer Nirmal Pariyojana piped water supply.**

Neer Nirmal Pariyojana, Assam
(A World Bank Aided Project,
Public Health Engineering Department, Assam)
Ph: 1800-345-3990, E-mail-gr.nnpassam@gmail.com

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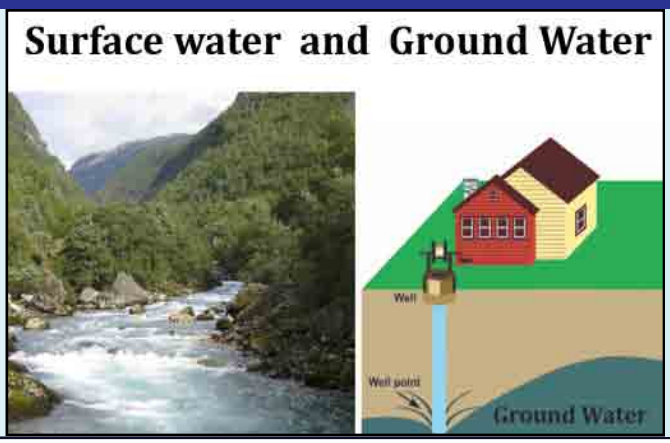
Some information/facts about Drinking Water:

1) Do you know about the basic sources of water?

There are two basic sources of water. These are (i) Ground Water and (ii) Surface water.



2) What is Ground water and Surface water?

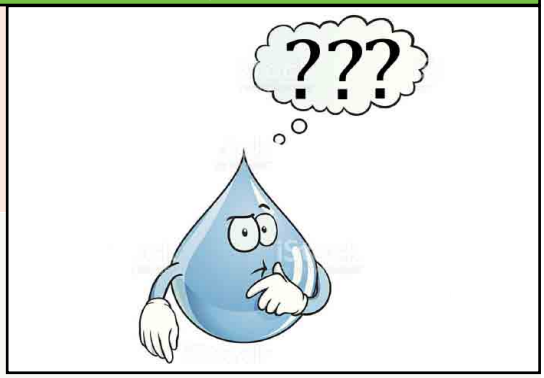
Groundwater is the water found below the earth's surface. The water collected through deep tube well is an example of Groundwater. Surface water is the water found above the surface of earth. Lakes, rivers, creeks are some of the sources of surface water.

3) What are the main differences of Ground water and Surface water?

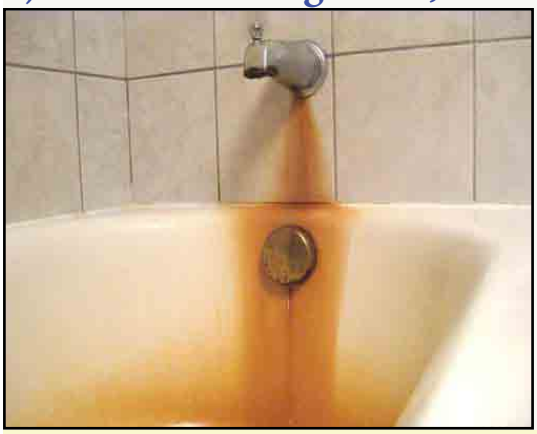
Ground Water	*Surface Water*
i) Groundwater is the water found below the earth's surface.The water collected through deep tube well is an example of Groundwater.	i) Surface water is the water found above the surface of earth. Lakes, rivers, creeks are some of the sources of surface water.
ii) The Ground water is very high in mineral contents.	ii) This water is usually not high in mineral content.
iii) Groundwater is not the source for fresh water.	iii) Surface water is the source of fresh water
iv) Ground water contains more minerals so the amount of harmful mineral in ground water is more making it more polluted.	iv) Surface water contains less minerals so the harmful mineral contamination chances are low.
v) Polluted groundwater is less visible, but more difficult to clean up, than pollution in rivers and lakes.	v) Polluted surface water is less difficult to clean
vi) Ground water is not the primary source of water.	vi) Surface water is the primary source of water

4) Is the source of your drinking water safe?

The source of your drinking water may not be free from pollutant and safe for drinking. Though the water seems clean yet it may be polluted with bacteria or may be with different minerals that can hamper human health.



5) While drinking water, have you ever felt a metallic taste?



This is because of presence of Iron in the water in large amount. This iron makes the water taste metallic. The water may be discolored and appear brownish due to higher level of iron in the water.

3) Is it harmful to human?

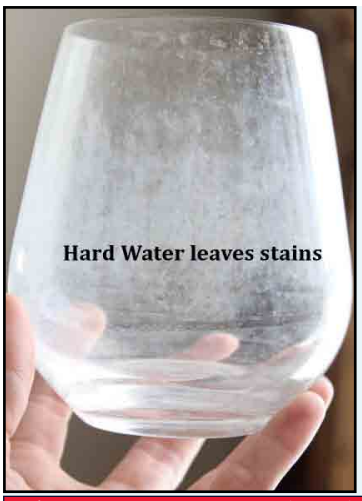
Yes, it is harmful to human; consumption of such water will create intestinal ulcers, digestive disorders, skin diseases and dental problems.

4) Some times the water Taste Sour or Alkaline, why does it happen?

This happens because of increase and decrease of some element in the water.

5) Is it harmful to consume such water?

Yes, it is harmful to consume such water. Consumption of such water above the permissible limit will create irritation in eye and mouth and skin.



6) While washing hand with soap it becomes hard to get rid of soap; do you know why it happens?

This happens becasue of presence of some elements in the water and this state this water is called the hard water.

7) Is it Harmful to consume such water?

Yes, it is harmful to consume such water for long time. It create heart and nerve problem.

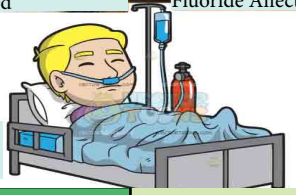
The mentioned pollutants are mostly found in ground water. Proper Filtration & Boiling the water can make the water drinkable.

There are some other harmful elements found in ground water which cannot be detected with smell or colour, these are Arsenic, Fluoride, Nitrate etc.

At times the water looks muddy, this happens becasue of suspended particle in the water which harms health and paves ways for bacteria.


Arsenic Affected


Fluoride Affected


Bacterial Contamination

Water is also contaminated with Bacteria due to improper handling, improper source of water and storage.

To keep your water safe from bacterial contamination following steps needs to be followed.

So what is the solution to remove these pollutants from water?

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Where can you get treated safe water?

➡ Treated water will be provided through Neer Nirmal Pariyojana piped water supply.

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