**ENGLISH PAPER**

**“CLEAN WATER AND DRINKING WATER”**



**ENVIRONMENTAL HEALTH STUDY PROGRAM**

**WIDYAGAMA HUSADA SCHOOL OF HEALTH SCIENCE**

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**CLEAN WATER AND DRINKING WATER**

1. **CLEAN WATER**

Clean water is a type of good water and is usually used by humans for consumption or in carrying out daily activities including sanitation (Natara, 2018). Water quality standards are contained in the Regulation of the Minister of Health of the Republic of Indonesia Number 32 of 2017 concerning Water Health Requirements for Sanitary Hygiene Needs, including:

1. The physical requirements for water are colorless, tasteless, odorless, and clear
2. Biological requirements for drinking water to be free from bacteria such as Coliform and Escherichia Coli with coloni forming units in 100 ml of water sample.
3. The chemical requirement for clean water is to have a pH of 6.5 - 8.5, iron 1 mg/l, zinc 16 mg/l and sulfate 400 mg/l.

Sources of clean water intended for humans must come from clean and safe sources. The limits of clean and safe water sources, among others (Natara, 2018):

1. Free from contaminants or germs
2. Free from harmful and toxic chemical substances
3. Tasteless and odorless
4. Can be used to meet domestic and household needs
5. Meet the minimum standards set by the Ministry of Health of the Republic of Indonesia.
6. **DRINKING WATER**

Drinking water according to the Decree of the Minister of Health of the Republic of Indonesia No.492/MENKES/SK/IX/2008 is water that has been processed or without processing that meets health requirements and can be drunk directly. Sources of raw water that can be used for drinking water needs can consist of spring water, river water, rain water, or well water (Wahyudi, 2017). Surface water can be used as a source of raw water, through the PDAM drinking water treatment plant. The requirements for drinking water quality include (Prihatini, 2012) :

1. Physical requirements for drinking water are colorless, tasteless, and odorless.
2. Biological requirements for drinking water to be free from bacteria such as Total Coliform and Escherichia Coli with colony units in 100 ml of water sample.
3. Chemical requirements are not excessively polluted by chemical substances, such as pH 6.5 - 8.5, iron 0.3 mg/l, Arsenic 0.01 mg/l and Fluoride 1.5 mg/l.
4. **WATER POLLUTION**

Water pollution is the entry of substances in water by human activities so that water quality decreases which causes the water to not function properly. Water is declared polluted if it contains germs, parasites, hazardous chemicals, and garbage or industrial waste. Sources of water pollution such as (Magdalena, 2017) :

1) Domestic activities

1. Domestic waste such as soapy water and detergent from washing activities
2. Garbage that is thrown carelessly into water bodies
3. Waste from bathroom activities that are not treated and are directly discharged into water bodies.
4. Industry

Industrial waste is often B3 (Hazardous and Toxic) which is very dangerous for human health and aquatic biota. Example: heavy metal pollutants Cd, Hg, Cu, Zn etc.

1. Agriculture

Irrigation channels contain chemical fertilizers, insecticides and pesticides which are used to maintain crops. This can contaminate the water contained in the soil.

1. Farm
2. Blood from slaughtering livestock can contaminate water if it is dumped into rivers or disposed of carelessly.
3. Dirt and food waste from livestock if disposed of in rivers can pollute the water.
4. Fishery : Water pollution by fish feed residue
5. Health Facilities

The sources of hospital liquid waste include hospital septic waste water, pus, kitchen & domestic waste water, washing drugs, and blood.

1. **IMPACT OF POOR WATER AND SANITATION**

Water, Sanitation, and Hygiene (WASH) is a basic human need that is closely related to health and has a significant impact on business and the economy. The study report on the impact of sanitation in Indonesia reports that poor water sanitation is a contributor to the increase in water-borne diseases. Other impacts of poor water sanitation include contamination of water sources, disruption of water ecosystems, inadequate access to clean water, and problems in the tourism sector (Dewi, 2015).

1. **WATERBORNE DISEASE**

Diseases caused by water include such as (Magdalena, 2017):

1. Cholera : This disease is caused by the bacterium Vibrio chlorae when you consume water or food contaminated with the feces of a person who has this disease.
2. Dysentery: Dysentery is caused by bacteria that enter the mouth through contaminated water or food.
3. Diarrhea: Infectious diarrhea is one of the most common diseases caused by bacteria and parasites that live in polluted water.
4. Hepatitis A: This disease is caused by the hepatitis A virus which attacks the liver. It is usually spread through ingestion of water or food contaminated with faeces.

**F. TREATMENT OF CONTAMINATED WATER SOURCES**

**1. Sedimentation**

Sedimentation is the process of deposition of solid particles suspended in a liquid or liquid under the influence of gravity (gravity) naturally. The cost of water treatment with sedimentation is relatively low because it does not require mechanical equipment or the addition of chemicals. However, it takes at least 24 hours of detection time (Magdalena, 2017).

**2. Coagulation/Flocation**

Coagulation and flocculation is the process of collecting fine particles that cannot be deposited by gravity, into larger particles that can be obtained by adding coagulant materials. The coagulant material for the coagulation process is alum (Al2(SO4). Alum is widely used for reasons of being the most economical, inexpensive, easily available on the market, and easy to store (Magdalena, 2017).

1. **Filtration**

Filtration is a filtering process to remove suspended solids (as measured by turbidity) from water through a porous medium. Filters used in the filtration process are usually considered as filters that trap or retain suspended solids between the filter media (Natara, 2018).

1. **Boiling Water**

Water treatment process by boiling water, and turning off the stove after 3 minutes of boiling. The energy needed is obtained from burning oil, gas, wood or others (Natara, 2018).

1. **Chlorination**

The process of treating water by adding chlorine in the form of tablets or liquid into the water to kill bacteria and viruses (Natara, 2018).

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