Water is a colorless and odorless substance found all over Earth. Water is made up of billions of molecules. Each molecule is made of one oxygen and two hydrogen atoms held together by strong covalent bonds.

Water is found in three different forms on Earth - gas, solid, and liquid. The form water takes depends on the temperature. Water on our planet flows as liquid in rivers, streams, and oceans; is solid as ice at the North and South Poles; and is gas (vapor) in the atmosphere. Water is also underground and inside plants and animals. All living things need water in some form to survive on Earth. People can go weeks without food, but can live only a few days without water.

Water is an important resource with many uses including food production, cleaning, transportation, power generation, recreation, and more.

The availability of freshwater is one of the major limiting factors to South Africa’s development. We are a water-scarce country with rainfall distributed unevenly in our landscape, inconveniently away from the centres of mining and industry, and tied to seasonal cycles that drive us repeatedly from feast to famine, between floods and droughts.

Our ingenuity as a nation has focused on overcoming these limitations – bringing water to where we need it, storing it for when we need it, and enabling us to build our economy. The 1930s and then the 1970s and 80s saw a massive investment in dams and inter-basin transfer schemes to meet the needs of our growing economy.

A massive and expensive network of engineered infrastructure supplies the drier parts of the country. Gauteng, North West province and Limpopo, and major urban centers such as Durban, Port Elizabeth and Cape Town are supplied via dams, transfers and pumping schemes.

The cost to upgrade and maintain this engineered infrastructure is estimated at R680 billion over the next decade.

However, water doesn’t just come from a dam, a pipe or a tap. Our modern water cycle is comprised of both engineered infrastructure and ecological infrastructure. The built (engineered) part of our water system is dependent on the healthy functioning of the natural (ecological) part of the system.

The last century has seen a focus on the engineered system, the part that we can design and control. Our water security in this century will depend on our ability to plan our development in a way that is compatible with ecological infrastructure and limits the impacts that diminish nature’s ability to provide us with water.

We need to acknowledge the limitations of our natural water resources and prioritise their use and protection if we are to grow a sustainable economy that meets the needs and aspirations of all South Africans.

CONCERNS have been raised about the state of the country’s rivers, as it is estimated that the water is being polluted by billions of litres of raw sewage on a daily basis. Experts believe that this is reaching crisis levels.

While issues have been noted in Hartbeespoort Dam in North West, and the Vaal River in Gauteng, DA spokesperson on agriculture and rural development in KwaZulu-Natal, Christopher Pappas, said rivers in KZN were also affected.

He said the collapse of municipalities across the province has impacted on infrastructure which has resulted in sewage entering natural systems.

“Many of our rural communities and farmers who still rely on water from our rivers are negatively affected by the decreasing quality of water.

“Further downstream, the quality of water affects tourism, beaches and the quality of water in our ocean,” he said.

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Pappas said E.coli and other harmful bacteria in rivers have detrimental effects on agriculture and rural communities.

He noted recent issues with the contamination of the Umzimkulwana River in Harding where there have been reports of diarrhoea outbreaks in which at least 54 patients were treated.

Pappas said in KwaMasi, there were farmers, animals and residents that shared from the same dwindling and contaminated water sources.

He said the state was the biggest culprit of sewage and contaminants entering the system.

“We need to maintain and expand our infrastructure and capacity to deliver on basic services by ensuring that municipalities are supported financially and in terms of technical expertise,” Pappas said.

Douglas Macfarlane of Eco-Pulse, an environmental consulting service, said untreated or inadequately treated sewage was being illegally discharged into rivers and streams, mainly by small town municipalities located in the country’s poorer provinces.

He said poor quality water containing harmful contaminants was not favourable for crop irrigation and may have adverse impacts on crop yield in the long-run and a number of harmful bacteria present in typical sewage effluent can lead to serious gastrointestinal illness in humans if direct contact with water is made.

Macfarlane said the uMngeni River used to be a popular place to swim and learn about nature but it is now devoid of life, choked with algae and water weeds, and a hazard to swim in.

Earlier this month, the Department of Water and Sanitation embarked on a massive cleanup campaign to educate communities on the importance of clean rivers.

Departmental spokesperson Sputnik Ratau said while they were unaware of issues with the Umzimkulwana River, they called on residents to come forward with information about such cases.

“DWS engages communities and schools in many programmes which are geared at educating and creating awareness on such issues including the Clean Rivers Campaigns and water quality management.”

Preliminary tests done on the discoloured water in Cape Town's distribution system has found it does not pose a health risk, although residents are advised to continue boiling it before use.

According to the City of Cape Town, the Faure water treatment plant had received water from the Steenbras Upper Dam as well as the Palmiet River whose water had a naturally occurring "tea" colour caused by the soil structure, fynbos and vegetation.

During the treatment process, drinking water is dosed with coagulating chemicals, resulting in natural particles in the water to "flock together" and removed through settling, clarifying the water to the clear appearance usually seen coming from taps.

An error in the chemical dosage led to the brownish colour not being completely removed. "As soon as the City's bulk water department became aware of the problem, the Faure service reservoir was isolated from supplying the system and supply was switched to the Blackheath service reservoir," said a City spokesperson.

"A series of water tests are underway in phases and the results of preliminary tests undertaken by the City's scientific services laboratories have thus far indicated the water does not pose a health risk - nonetheless residents are encouraged to boil the water if they are still noting discolouration to be on the safe side."

The Faure water treatment plant provides between 150 million and 180 million litres of water - about a third of the 550 million litres currently used daily by residents across the city.

Felicia van Wyk of Delft told News24 her son had noticed the discolouration on Sunday while making himself something to drink