



Water:
the key resource
in the sustainability
plan of the world's
countries

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Water is a strategic and finite natural resource that is also becoming increasingly attractive from an economic and financial point of view, so much so that it is being redefined by many as “the oil of the future”.

Water for industrialised countries has always been understood as a low-cost, freely available, public resource, but current trends of urbanisation and exploitation in industrial and agricultural processes are putting its accessibility at serious risk for years to come.

Worldwide, 40% of the population suffers from water scarcity, **2.2 billion** people - 28.2% of the world's population - have no access to safe drinking water and **4.2 billion** people - 53.8% of the population - are deprived of safe sanitation and hygiene systems (UNICEF data).

Climate change has only worsened the situation by alternating periods of extreme drought with others of high rainfall. Specifically, extreme drought conditions and melting glaciers have had a major impact on the reduction of water reserves, which are of fundamental importance for the availability of water as a resource.

Water is certainly a key resource in the sustainability plan of the world's countries, so much so that it is one of the 17 Development Goals of the UN 2030 Agenda and has a direct impact on 10 of the 17 goals. In addition to addressing the concept of drinking water and sanitation, Goal 6 also addresses the efficiency, quality and sustainability of water resources worldwide.

It is therefore of paramount importance today to make the entire water supply chain more efficient and the industrial processes that impact on its consumption more sustainable.

In order to objectively measure freshwater consumption, the **water footprint parameter** was introduced.

The water footprint is an indicator measuring the consumption of fresh water. This consumption can be generated either directly, i.e. the consumption of water for basic needs (quenching thirst, washing, etc.), or indirectly, i.e. the amount of water consumed for the industrial and agricultural production of goods and services. The latter is also called **virtual water**, as it is not necessarily visible in the final product. **Italy is the third largest net importer of virtual water** after Japan and Mexico.

In addition to voluntary water consumption by the individual, the community or industry, there is a structural criticality related to network losses. These factors, combined with a low rate of investment in national water systems, increase the wastage of water circulating in the distribution system. THE

Water cycle

As shown in Figure 1, the water cycle can be briefly described as follows:

- **Abstraction**, the process of drawing water from natural cycles such as wells, aquifers, springs, reservoirs.
- **Purification and storage treatment**, i.e. the purification of water to remove pollutants or contamination through filtration and chemical-physical processes.
- **Distribution**, the use of an aqueduct network that reaches end users, businesses, companies.
- **Utilisation**, the process of using the water fed into the network.



Figure 1

- **Sewerage**, the collection of waste water, sent to the sewer system.
- **Post-use purification**, mechanical, chemical and biological processes to separate and eliminate waste water contamination and return the resource to the water cycle.

The main causes with the greatest impact on water consumption are:

- Inefficient networks;
- Urbanisation and mega-cities (domestic use);
- Industrial products and services;
- Agriculture and animal husbandry.

For each of these factors, it is essential to embark on a virtuous path in order to make the use of water resources more efficient and sustainable. Through targeted initiatives, major improvements can be achieved even with small everyday gestures.

Inefficient water networks

It is estimated that over 50% of the Italian water network is over 30 years old and 25% over 50 years old. The age of the national network and the difficulty of maintenance operations are responsible for the loss of almost half of the water captured along the transport chain. Similar situations can be observed in other countries around the world.

Technology, innovation and investment in infrastructure can go a long way towards reducing network losses and making water transport more efficient.

Water losses are caused by damage to pipelines or fittings, deterioration of materials, or unauthorised volumes or unauthorised connections.

There are systems on the market that use a plant-based compound, which instantly seals all leakage points along the pressure pipe, and guarantee a repair life of about 15 years. Advanced sensors are able to monitor leaks in order to constantly assess their occurrence, intensity, progress over time and the effectiveness of repairs carried out.

These software, sensors and operating parameter meters will help to repair and prevent network damage with less costly and invasive interventions, which is why investment in this area will be a key factor in the future.

Urbanisation and mega city (domestic use)

Population growth, coupled with urbanisation and industrialisation, has had a major impact on resource consumption.

Currently, human activity is consuming more resources than Nature is capable of producing; this trend is clearly not sustainable for the planet.

The increase in population density in large urban areas has led to the occupation of land in concentrated areas. This overbuilding has eroded green areas, making the soil itself more impermeable with a consequent reduction in the absorption of rainwater, especially during high rainfall.

Today, Italy ranks last among European countries for efficient and sustainable use of water resources. Italy is also the country with the highest consumption of bottled mineral water in the world and in Europe. The consumption of bottled water creates an increase in plastic waste, only part of which can be recycled, and indirect CO₂ production. The consumption pattern of metropolises will have to change towards a more sustainable and responsible mode.

Industrial products and services, agriculture

The four most water-intensive industrial sectors are: **agriculture** in first place, the **chemical** industry, **rubber** and **plastic** manufacturing, the **steel** and **paper** industry. In manufacturing, this resource is mainly used as a primary process element and as a supporting element for cooling, dust suppression and cleaning.



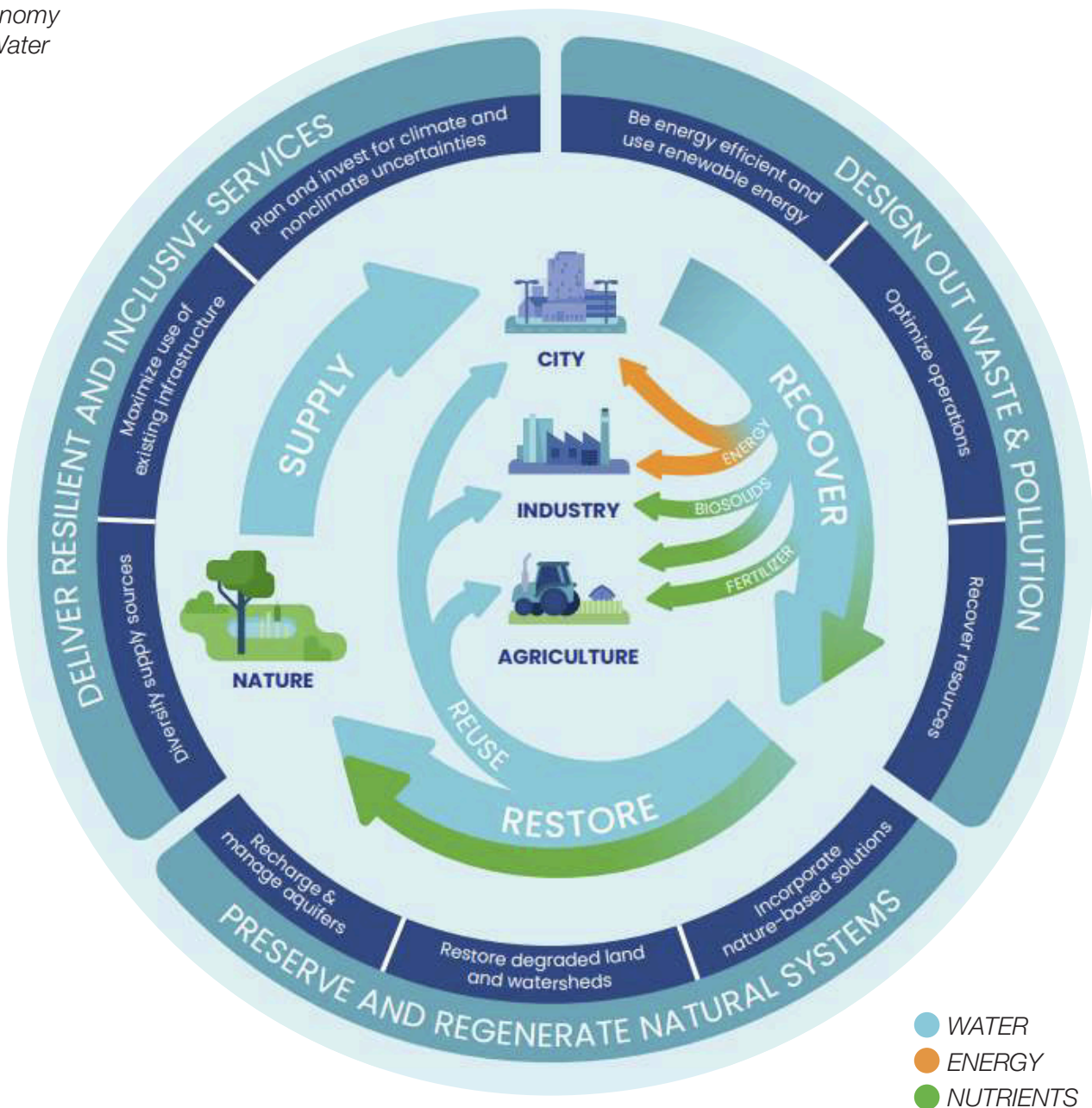
The solution to increase water efficiency The 5 key factors

In order to reduce our water footprint the commitment of everyone will be required, from the small consumer to the company. The 5 key factors on which to base future actions will be:

- The development of technologically advanced infra-

- structures and plants to reduce losses and rationalise consumption;
- the increase in the recirculation and reuse of water for non-potable use;
- the reduction of drinking water withdrawal for food production, moving towards more conscious consumption and the promotion of sustainable agriculture;
- the reduction of pollutant particles in waste water in order to relieve pressure on aquifers, maritime areas and purification plants;
- the intensification of rainwater harvesting and desalination plants for industrial and agricultural activities.

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