WP5. CAPACITY BUILDING AND EXCHANGE OF EXPERIENCES

Output 5.4 Interactive web platform

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Water Reuse.
Terms and definitions

FOUNDATION CENTA

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1 SCOPE, FACTS AND FIGURES

It is a reality that demand for water is growing globally, that conventional water resources are limited and that water has become a strategic resource, especially in arid and semi-arid regions.

Climate change, over-exploitation and pollution are putting considerable pressure on freshwater supplies, which, in turn, is leading to water scarcity and deteriorating water quality.

Water scarcity already affects every continent. Water use has been growing globally at more than twice the rate of population increase in the last century, and an increasing number of regions are reaching the limit at which water services can be sustainably delivered, especially in arid regions.

As significant figures that contextualize the situation, considering water availability, water demand and use; the following can be considered:

- Water availability:
  - Water stress, essentially measured as water use as a function of available supply, affects many parts of the world. Over two billion people live in countries experiencing water stress.
  - Physical water stress is often a seasonal rather than an annual phenomenon, as exemplified by the seasonal variability in water availability. An estimated four billion people live in areas suffering from severe physical water scarcity for at least one month per year.
  - Several of the world's main aquifers are under increasing stress and 30% of the largest groundwater systems are being depleted. Water withdrawals for irrigation are the primary driver of groundwater depletion worldwide.
- Water demand and use:
  - Freshwater use has increased by a factor of six over the past 100 years and continues to grow at a rate of roughly 1% per year since the 1980s. Much of this growth can be attributed to a combination of population growth, economic development and shifting consumption patterns.
  - Agriculture currently accounts for 69% of global water withdrawals, which are mainly used for irrigation but also include water used for livestock and aquaculture. This ratio can reach up to 95% in some developing countries.

- Industry (including energy and power generation) accounts for 19%, while municipalities are responsible for the remaining 12%.
- The Food and Agriculture Organization of the United Nations (FAO) estimates, based on a business-as-usual scenario, that the world will need about 60% more food by 2050, and that irrigated food production will increase by more than 50% over the same period. The necessary amounts of water for these developments are not available. FAO recognizes that the amounts of water withdrawn by agriculture can only increase by 10%.
- The 2030 Water Resources Group (2009) concluded that the world would face a 40% global water deficit by 2030 under a business-as-usual scenario.

In the above-mentioned context, appropriate and sustainable strategies must be sought and implemented to manage the imbalances between water resources availability and possible demands for use, ensuring the protection of natural resources.

Increasing water demand in places where the resource is scarce, or where there is high competition for water, creates the need to use so-called "**non-conventional water sources**", including the **use of treated wastewater**.

Water reuse has the potential to fill the gap between availability and demand for agricultural, industrial and domestic purposes, while providing financial and environmental benefits. It is no longer a marginal resource, but one of the basic strategies for water resources management and a key asset of the "circular economy" concept, not only from the point of view of water availability, but also from the point of view of nutrient and energy recovery.

Appropriate water reuse should be based on state-of-the-art technology, standards, legislation, and sound knowledge, but also in the use of correct terminology between all users and stakeholders.

Several different terms are used to describe forms of water and wastewater and their sub-sequent treatment and reuse, that are used interchangeably to define water reuse globally. This has created confusion among different stakeholders and between different countries.

To facilitate communication among different disciplines associated with wastewater, water reclamation and reuse practices, it is important to establish a broad understanding of the terminology used in the field.

In this sense, the aim of this document is to provide an overview of commonly used terms and definitions relating to water reuse, contributing to ensuring the proper use of associated terms.

With the aim to facilitate a proper understanding of the terminology used in the frame of water reuse, the terms and definitions included in this document are grouped into the following items:

- Foundational terms
- Terms to describe different types of water
- Terms to describe wastewater treatment processes and products
- Water reuse related terms
- Water reclamation system related components
- Health and environment related terms

2 TERMS AND DEFINITIONS

2.1 Foundational terms

- **Consumptive use.** The part of water withdrawn that is evaporated, transpired, incorporated into products or crops, consumed by humans or livestock, or otherwise removed from the immediate water environment.
- **Evapotranspiration.** A collective term that includes loss of water from the soil by evaporation and by transpiration from plants.
- **Global hydrologic cycle.** The annual accounting of the moisture fluxes over the entire globe in all of their various forms.
- **Return flow.** The water that reaches a ground-or surface-water source after release from the point of use thus becoming available for future use.
- **Runoff.** Part of the precipitation that appears in surface streams. It is the same as streamflow unaffected by artificial diversions, storage, or other works of man in or on the stream channels.
- **Sustainability.** The principle of optimizing the benefits of a present system without diminishing the capacity for similar benefits in the future.
- **Sustainable development.** Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
- **Water Cycle.** It describes how water moves on the Earth. Water evaporates from water bodies (such as oceans, lakes, and rivers), forms clouds, and returns to earth as precipitation (rain or snow). The amount of water that evaporates each year and the amount that falls back to the ground are virtually constant, meaning that the amount of water on Earth does not change.

  Note 1: **Water reuse** solutions essentially use technology to mimic the natural cycle and create clean water – faster and more efficiently – than it would otherwise be available.

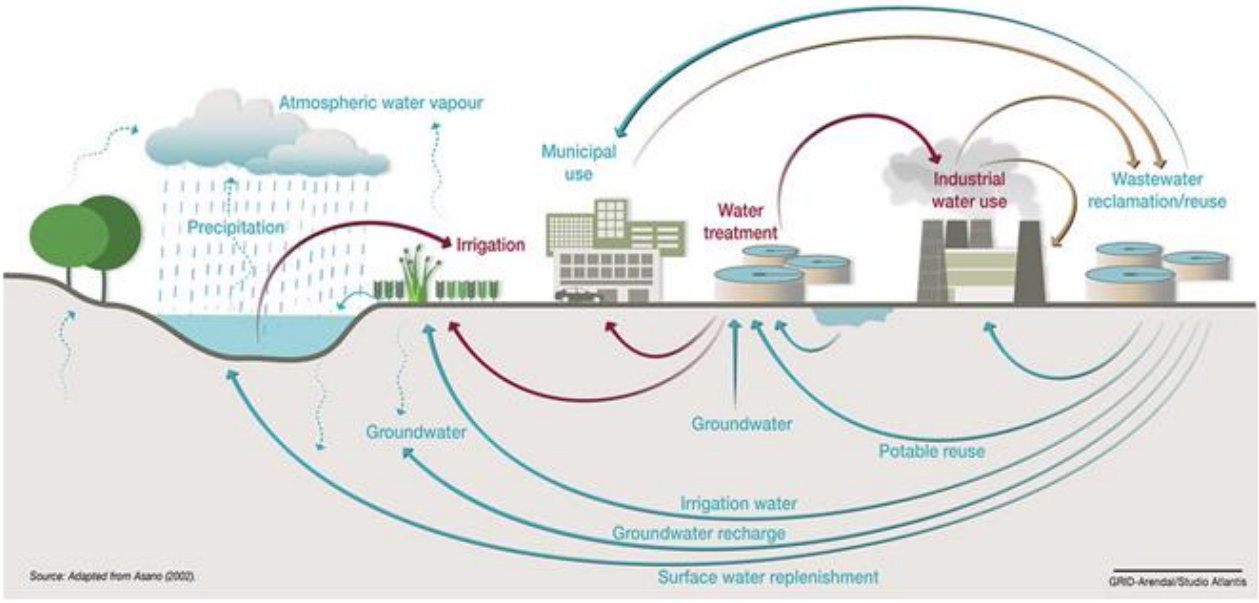

Figure 1. Water cycle and water reuse as part of natural water cycles (https://www.grida.no/resources/13724)

- **Watershed.** The natural unit of land upon which water from direct precipitation, snowmelt, and other storage collect and flows downhill to a common outlet where the water enters another water body such as a stream, river, wetland, lake, or the ocean.
- **Withdrawals.** The water removed from the ground or diverted from a stream or lake for use.

2.2 Terms to describe different types of water

- **Non-conventional Water.** Total volume of water obtained through the development of new technologies. They are water generations (productions) that come either from desalination of sea and brackish waters or from wastewater reclamation for reuse.
- **Conventional Water.** They include the part of the water cycle that corresponds to run-off, the so-called "useful rain" that is surface water, rivers and lakes, and groundwater that could be naturally available.
- **Freshwater.** Naturally occurring water on the Earth´s surface (in ice, lakes, rivers, and streams) and underground as groundwater in aquifers.

  Note 1: Freshwater includes desalinated seawater and desalinated brackish water, but excludes seawater and brackish water.

  Note 2: Conceptually, freshwater resources can be divided into green water resources and blue water resources.

- **Green water.** Site-specific precipitation that does not run off but more or less temporarily contributes to soil water storage and is eventually consumed by ecosystems through evapotranspiration. Green water consists of two components: productive green water, i.e. transpiration from biomass production in terrestrial ecosystems, and the non-productive green water, i.e. interception and soil evaporation.

  Note 1: Green water plays a critical role in terrestrial ecosystems, especially in arid and semi-arid regions.
- **Blue water.** Surface and groundwater that is stored in rivers, lakes, aquifers and dams and can be extracted for human use.
- **Non-potable water**. Water that is not of drinking water quality according to local jurisdiction.

  Note 1: It generally refers to wastewater or treated wastewater but can also include other kind of water of non-drinking quality.
- **Potable water**. Water that meets applicable drinking water standards and is safe for drinking, washing, and food preparation.
- **Wastewater**. Water arising from any combination of domestic, industrial, commercial or institutional activities, surface runoff and any sewer inflow/infiltration water and which can include collected storm water.
- **Municipal wastewater**. Water arising from any combination of domestic, commercial activities, surface runoff and any accidental sewer inflow/infiltration water.

Note 1: Municipal wastewater includes collected stormwater and water discharged to the environment or sewer.

- **Domestic wastewater/sewage**. Wastewater from residential settlements and services, which originates predominantly from the human metabolism and from household activities.

  Note 1: Sewage is the used water of a household and commercial businesses that contains human waste. The term sewage is distinguished from industrial wastewater. The term sewage can be used interchangeably with wastewater.

- **Blackwater**. Wastewater originating from sanitary sources (e.g toilets, urinals, and bidets), as well as drainage from food preparation and utensil cleaning activities (e.g. kitchen sinks and dishwashers).
- **Greywater/graywater**. Wastewater from household baths and showers, hand basins and kitchen sinks.

  Note 1: Greywater includes used water from showers, bathtubs, bathroom/toilet, washbasins and water from clothes washing and laundry tubs.

  Note 2: Greywater excludes used water from toilets, urinals, or wastewater from food waste (i.e. kitchen sinks and food waste grinders).

- **Industrial and Commercial Wastewater/Sewage.** It is the liquid waste generated by industries, small businesses and commercial enterprises and can be discharged to a sewer upon approval of a regulating authority. Some industrial wastewater may require pre-treatment before it can be discharged into the sewer system, while other industrial and commercial wastewaters are explicitly excluded.
- **Background water**. Freshwater supplied for domestic, institutional, commercial and industrial use, from which wastewater is generated.
- **Brackish water**. Water containing dissolved solids at a concentration higher than acceptable standards for intended use.

  Note 1: The concentration of total dissolved solids in brackish water can vary from 1 000 mg/1 to 10 000 mg/1. Brackish water is less saline than sea water (1 000 to 10,000 mg/l of TDS for brackish up to 35 000 mg/1 for sea water).

  Note 2: The concentration of total dissolved solids of many brackish waters can vary considerably over space and/or time.

- **Rainwater**. Water arising from atmospheric precipitation, which has not yet contacted the surface.
- **Raw Water**. Water that is supplied to a water treatment process for the purpose of removing constituents that would otherwise impair its intended beneficial use.

Note 1: surface or groundwater that has not gone through an approved water treatment process.

- **Raw wastewater (RWW).** Wastewater which has not undergone any treatment.
- **Stormwater**. Water resulting from rainwater, melted snow and ice draining from roofs, roads, footpaths and all other ground surfaces

Note 1: Stormwater can either be collected and stored for direct use, or collected and discharged into a sewer system or environment and/or infiltrate into the soil.

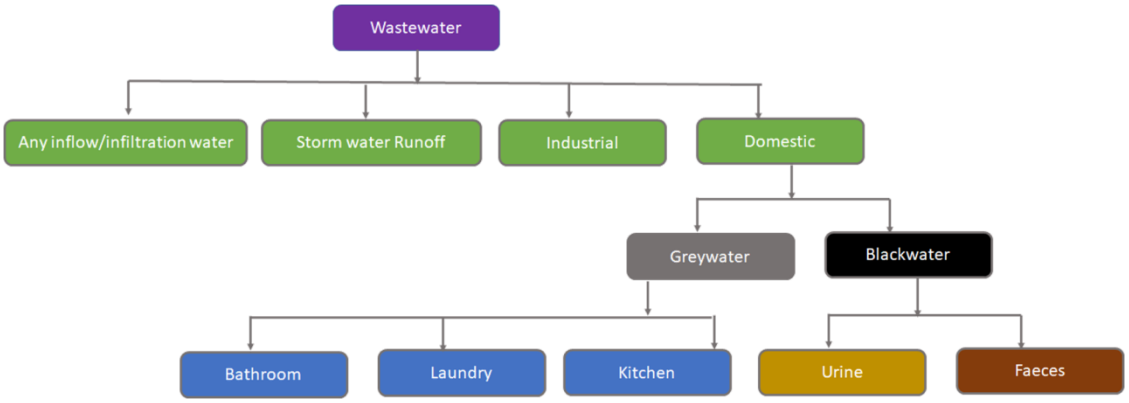

Figure 2. Scheme of the different types of wastewater. (Martín, I., 2021)

2.3 Terms to describe wastewater treatment processes and products

- **Agglomeration**. An area where the population and/or economic activities are sufficiently concentrated for urban wastewater to be collected and conducted to an urban wastewater treatment plant or to a final discharge point.
- **Collecting system**. System of conduits which collects and conducts urban wastewater.
- **Municipal separate storm sewer system**. System that uses separate pipes for sanitary sewage and stormwater flow.
- **Combined sewer system**. System that uses the same pipes for sanitary sewage and stormwater flow.
- **Centralized wastewater management**. The collection and drainage of wastewater, and sometimes stormwater, from a large, generally urban and suburban, area using an extensive network of pumps and piping to transport to a central location for treatment and reclamation, usually near the point of a convenient environmental discharge.
- **Decentralized wastewater management**. Collection, treatment and discharge/reuse of wastewater from individual homes, clusters of homes, isolated communities, industries, or institutional facilities, as well as from portions of existing communities at or near the point of wastewater generation.
- **Wastewater Treatment Plant (WWTP).** Facility designed to treat wastewater by a combination of physical, chemical and biological processes, for the purpose of reducing the organic, inorganic and some microbial contaminants in the wastewater.

  Note 1: There are different levels of wastewater treatment, according to the desired quality of treated wastewater and the level of contamination.
- **Treated wastewater.** Wastewater that has undergone a treatment process capable of adjusting its quality to the discharge regulations applicable**.**
- **Treatment process**. Unit process designed to transform the water quality by physical, biological and/or chemical means.
- **Treatment system**, set of interrelated or interacting unit treatment processes.

- **Treatment technology**. Wastewater treatment unit process or group of integrated unit processes designed to transform the water quality by physical, biological and/or chemical means.
- **Pre-treatment**. It is the preliminary removal of wastewater or sludge constituents, such as oil, grease, and various solids (e.g., sand, fibers and trash). Built before a conveyance or treatment technology, pre-treatment units can retard the accumulation of solids and minimize subsequent blockages. They can also help to reduce abrasion of mechanical parts and extend the life of the sanitation infrastructure.
- **Primary Treatment.** Process where solid matter is removed. The remaining liquid may be discharged or subjected to further treatment.
- **Secondary Treatment.** Process where dissolved and suspended biological matter is removed to a non-potable level so that the water may be disinfected and discharged into a stream or river, or used for irrigation at controlled locations.
- **Sewage Sludge.** It refers to the residual, semi-solid material that is produced as part of primary and secondary treatment. Sewage sludge is further treated by aerobic or anaerobic digestion and dewatered at a wastewater treatment plant or resource recovery facility to produce biosolids and other byproducts such as methane gas and struvite recovery.
- **Tertiary Treatment or Advanced Water Treatment.** It refers to processes that purify water for uses such as irrigation or for water blended with other environmental systems such as a river, reservoir, or groundwater basin prior to reuse. It can also include treatment processes to remove nitrogen and phosphorus in order to allow discharge into a highly sensitive or fragile ecosystem (estuaries, low-flow rivers, coral reefs, etc.)

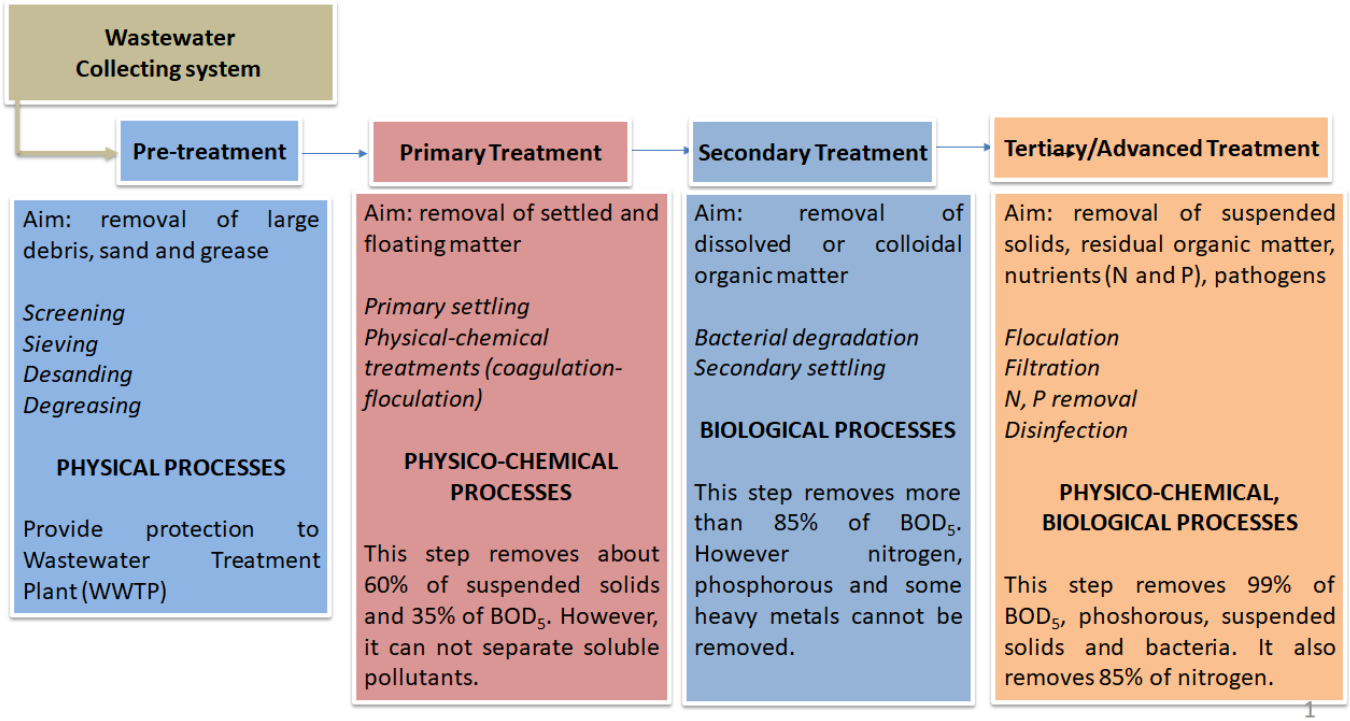

Figure 3. Wastewater treatment processes. (Martín, I., 2021)

2.4 Water reuse related terms

- **Water reuse.** Use of treated wastewater for beneficial use.

  Note 1: Water reuse is the part of the urban water cycle from the outlet of the Wastewater treatment plant (WWTP) to the point of delivery to the end user, where reclaimed water is produced and supplied with qualities adapted to the end uses.

  Note 2: Water reuse refers to the production of water through water treatment processes which introduces a feedback loop in the water cycle. As such, water reuse is not an additional water source but rather a product that needs to be tailored to the intended uses.
- **Beneficial use**. Water use for overall advantages which include environmental health and wellbeing to promote sustainability.

  Note 1: e.g. municipal water supply, agricultural and urban irrigation, industrial applications, navigation, stream augmentation for fish and wildlife habitat enhancement, toilet & urinal flushing, and water recreational water contact.
- **Water reuse safety**. Condition of water reuse which will not cause harm to the health of users, water reclamation facility operators and the general public, as well as the facilities and the environment where its service is prepared and/or provided according to its intended uses

  Note 1: The safety is ensured in each component of the reclaimed water system, including treatment, storage, reclaimed water distribution, monitoring and end use.
- **"Fit for purpose" approach.** An important new concept in water reuse, which entails the production of reclaimed water to a quality that meets the needs of the intended end-uses.
- **Water reclamation**. Process of treating and processing of wastewater to make it suitable for beneficial use.
- **Reclaimed water/reuse water**. Wastewater that has been treated to meet specific water quality for intended beneficial use.
- **Recycled water**. Water which has been previously used and is then subsequently used for beneficial purposes with or without treatment prior to the subsequent use.

  Note 1: The terms "recycled water" is often used as a synonym for "reclaimed water " or "reuse water "; however, the latter two terms refer to water that has been treated, whereas "water recycling" refers to using water again for beneficial purposes with or without treatment.

- **Centralized water reuse system**. Water reuse system typically applied on a large scale such as municipal level, and includes the entire reclaimed water source, treatment, distribution, storage, and monitoring components to produce a final treated effluent for its intended uses.
- **Decentralized water reuse system**. Water reuse system applied on a small scale.

  Note 1: e.g. water reuse system which works offline from centralized system, water reuse system at private level. In this context, decentralized water reuse systems refer to specialized reuse projects for individual residential homes, clusters of homes or commercial/institutional facilities.
- **Direct reuse**. Production and supply of reclaimed water to a distribution system via pipelines, storage tanks, and other infrastructure for reuse purposes. It requires the existence of pipes or other conveyance facilities for delivering reclaimed water to the end-user.

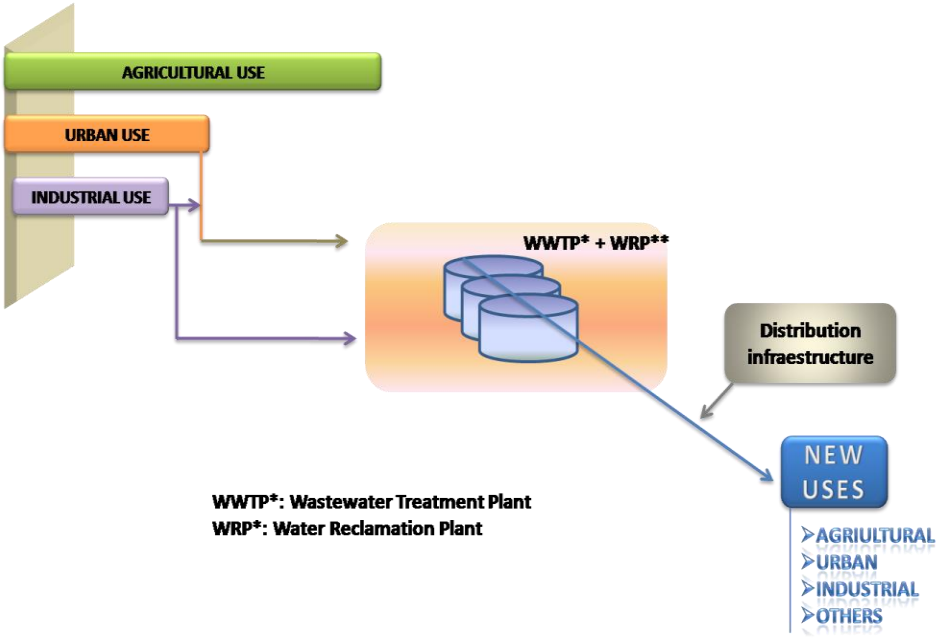

Figure 4. General scheme of direct water reuse. (Martín, I., 2021)

- **Indirect reuse**. Through discharge of an effluent to a receiving water or groundwater for assimilation and withdrawals downstream, is recognized to be important but does not constitute planned direct water reuse.

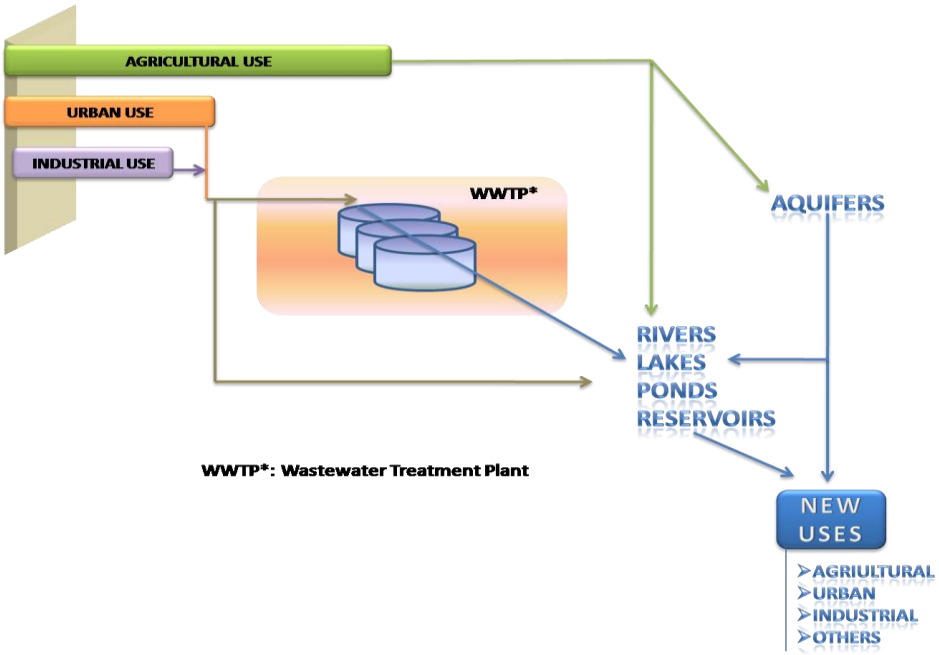

Figure 5. General scheme of indirect water reuse. (Martín, I., 2021)

- **Potable reuse**. Use of high quality reclaimed water as a raw water source for drinking water treatment and distribution systems.
- **Indirect potable reuse**. Augmentation of a drinking water source (surface or groundwater) with reclaimed water followed by an environmental buffer that precedes drinking water treatment.
- **Industrial reuse**. Reuse of industrial wastewater, or the reuse of municipal wastewater, to satisfy industrial water requirements

  Note 1: The reuse can occur within a particular industrial facility, as well as between industrial facilities of different natures.
- **Planned use. It** refers to systems that are developed with the goal of supplying and using treated wastewater.

  Note 1: The definition of planned reuse includes reference to treatment of the water appropriate to its intended use.
- **Unplanned use.** It refers to uncontrolled reuse of wastewater after discharge, for example downstream users using water from a river that has received a discharge of wastewater upstream.

  Note 1: Water managers should include unplanned use in water balance calculations.
- **Water reuse system.** Facilities that include the water reclamation plant, if applicable and the storage and distribution infrastructure required until reclaimed water reaches its final point of delivery to users, at the flow rate and with the quality required for its final intended purpose.

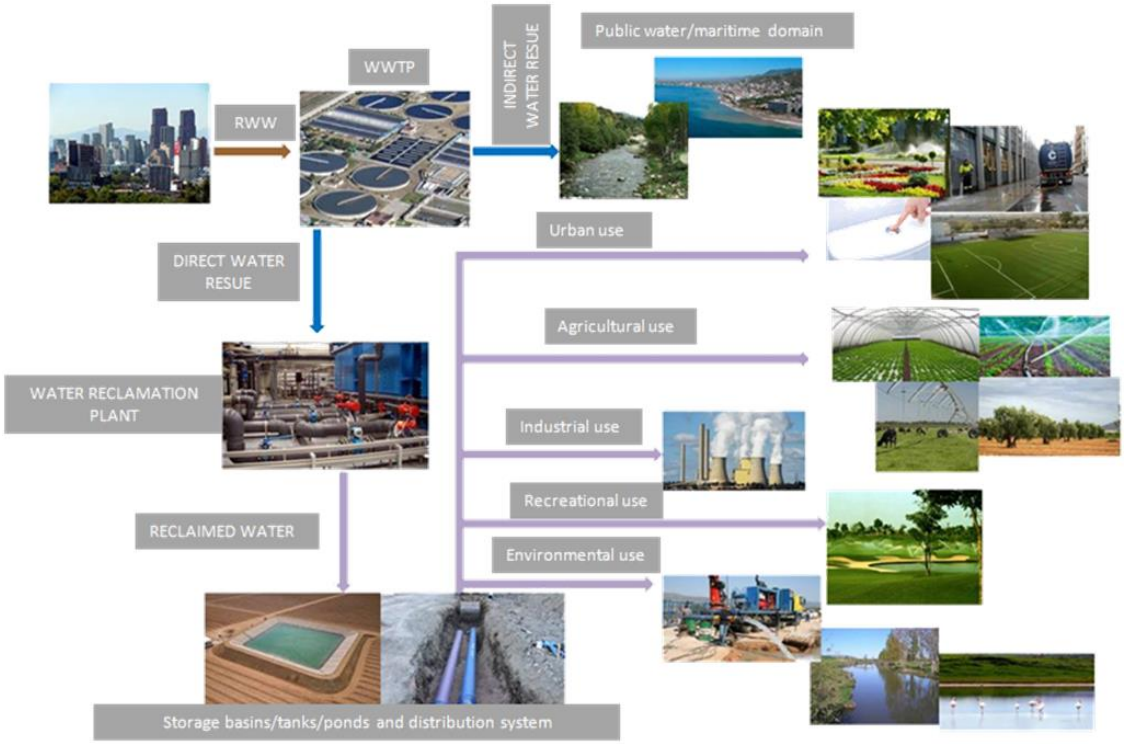

Figure 6. General scheme of municipal wastewater reuse process. (Martín, I., 2021)

- **Storage and distribution infrastructure.** Facilities intended for storing and distribution reclaimed water to its final destination through a pipeline network or by means of public or private water transport companies.
- **Distribution system**. Piping network required to deliver water from a transmission pipeline to the points of connection to users' plumbing systems.

  Note 1: Pumping stations are included as part of the distribution system.
- **Reclaimed water user**. An individual or a public or private legal entity that uses reclaimed water for its intended purpose.
- **Augmentation.** Process of using reclaimed water to increase the amount of water flowing through a surface body of water or aquifer (i.e. reservoir, lake, river, stream, wetland, and/or groundwater basin), for beneficial purposes.
- **Irrigation project**. Design, development, construction, selection of equipment, operation and monitoring of works to provide suitable water for irrigation.
- **Irrigation system**. Assembly of pipes, components, and devices installed in the field for the purpose of irrigating a specific area.

- **Restricted irrigation**. Irrigation of areas in which public access during irrigation with reclaimed water can be controlled, such as some golf courses, cemeteries, and highway medians.
- **Unrestricted irrigation**. Irrigation of areas where public access during irrigation is not restricted.

  Note 1: Unrestricted irrigation often requires higher water quality than restricted irrigation to deal with the health risks associated with the likelihood of public contact with the reclaimed water. e.g. gardens, playgrounds.
- **Crop water requirement.** The total water needed for evapotranspiration, from planting to harvest for a given crop in a specific climate regime, when adequate soil water is maintained by rainfall and/or irrigation so that it does not limit plant growth and crop yield.
- **Effective precipitation.** The portion of the total precipitation that is retained by the soil so that it is available for crop production.
- **Fodder crops**. Crops not for human consumption.

  Note 1: e.g. pastures and forage, fibre, ornamental, seed, forest crops and natural grasslands.
- **Food crops.** Crops for human consumption

  Note 1: Food crops are often further classified according to whether the food crop is to be cooked, processed or consumed raw.

2.5 Water reclamation system related components

- **Water reclamation plant**. Facilities in which treated wastewaters undergone the additional treatment processes that may be required to bring its quality to the level required for its final intended purpose.
- **Minimum treatment requirement**. Minimum treatment to be adopted to achieve the water quality requirements for protecting and maintaining the safe, reliable and stable reclaimed water use.
- **Advanced treatment.** Treatment for the removal of total dissolved solids and/or trace constituents as required for specific water reuse applications (e.g. activated carbon adsorption, reverse osmosis, and advanced oxidation processes).
- **Desalination.** Partial or nearly complete removal of ionic species from seawater or brackish water, usually to make it drinkable or usable as processing water, cooling water, or irrigation water.
- **Disinfection.** Process that destroys, inactivates or removes microorganisms until an appropriate level is reached
- **Additional disinfection**. Disinfection of treated wastewater in a water reuse project intended to raise the quality of the treated wastewater before irrigation.
- **Filtration**. Physical separation of solid particles from water, by passing the water through a physical porous barrier to trap and separate suspended solids from the water

  Note 1: Examples of barrier include media bed, surface or depth filter, screen, or membrane.
- **Membrane filtration**. Filtration by membrane with pore size equal or less than 0,45 μm

  Note 1: Membrane filtration may also be considered as disinfection, according to the log units of pathogen reduction that it achieves.
- **Reservoir.** System to store temporarily unused treated wastewater depending on the demand for water irrigation and the treatment plant discharge.

  Note 1: The following are different types of reservoirs that can be used:
  - **open reservoirs** which are commonly used for short-term storage with hydraulic residence times from one day to two weeks;
  - **closed reservoirs** for short-term storage to limit bacterial re-growth and external contamination common with hydraulic residence time of 0,5 day to a week;
  - **surface reservoirs** for long-term or seasonal storage of treated wastewater to accumulate water during periods of treatment plant discharge higher than irrigation demand and to satisfy irrigation

requirements when the demand is higher than the treatment plant discharge. The hydraulic residence time changes according to the seasons;

- **aquifer storage** and recovery for long-term storage which is commonly combined with soil aquifer treatment (by means of infiltration basins). The residence time is also a variable that is affected by the treated wastewater discharge and irrigation demand. This aquifer storage should not contribute to the aquifer recharge for potential potable water use.

- **Storage.** Retained temporary unused treated wastewater for short or long term before their release for use in irrigation systems.
- **Treated wastewater pumping stations and transport systems.** System of pipelines and pumps transporting the treated wastewater from the WWTP to storage reservoirs and to the use site.

2.6 Health and environment related terms

- **Barrier**. Means that reduces or prevents the health and environmental risks, by preventing contact with the treated wastewater and/or by improving its quality.
- **Multiple barrier concept**. Provision of multiple safeguards to maintain finished water quality reliability to the point of use.

  Note 1: e.g. source control, treatment processes arranged sequentially as well as monitoring.
- **Biofilm**. Growth of surface attached microorganisms within their extracellular polymeric substances, which results in surface slime known as biofilm.
- **Biological stability**. Maintaining microbial water quality from the point of water production up to the point of consumption.
- **Chemical stability.** Trend that all kinds of components of the treated water possibly have reactions during the water distribution, storage or use processes (e.g. deposition of calcium carbonate and the formation of disinfection by products) and the scaling, fouling and corrosion effects on pipes and equipment to which the water is exposed (e.g. release of toxic and harmful chemicals from the surface of non metallic pipes, corrosion on the surface of metallic pipe).
- **Constituents.** Individual or group of physical, chemical or biological substances or matter present in water that are the target of removal, reduction or transformation in the treatment process.
- **Contaminant**. Physical, chemical, biological or radiological substance or matter in water.

  Note 1: The presence of contaminants does not necessarily indicate that the water poses a health risk.
- **Critical control point**. Point, step or procedure at which control can be applied and is essential to prevent or eliminate a hazard or reduce it to an acceptable level.
- **Cross-connection.** Actual or potential connection between a potable water system and any source or system that could or does contain non-potable water or other substances that poses a public health risk.
- **Exposure assessment**. Estimation (qualitative or quantitative) of the magnitude, frequency, duration, route, and extent of exposure to one or more contaminated media.

- **Hazard**. Source or situation with a potential for harm in terms of human injury or ill health (both short and long term), damage to property, the environment, soil and vegetation, or a combination of these.
- **Hazard analysis and critical control point**. Systematic methodology that recognizes and reviews the hazards throughout a process and identifies critical control points where preventative measures or set-points can be established and controlled to ensure product quality.

  Note 1: The main objective is to establish a monitoring program that can effectively manage the risks of each individual system in a process, and establish effective procedures to react to excursions of critical control points to ensure end-product quality.
- **Hazard identification**. Process of recognizing the existence of hazards and defining their characteristics.
- **Health risk.** Combination of the likelihood of occurrence of harm to health and the severity of that harm.
- **Health risk analysis.** Use of available information to identify health hazards and to estimate health risk.
- **Indicator microorganism**. Indirect measure or indicator to infer whether pathogenic (disease causing) microorganism may be present.
- **Patogens**. Disease-causing organisms capable of inflicting damage on a host it infects.
- **Pollutant.** Substance which either alone or in combination with other substances or through its products of degradation or emissions can have a harmful effect on human health or the environment.
- **Public health aspect**. Element of an organization's activities, projects or products that can interact with the public health.
- **Public health impact**. Change to public health, whether adverse or beneficial, wholly or partly resulting from an organization's activities, projects or products.
- **Public health parameter**. Quantifiable attribute of a public health aspect.
- **Receptor**. Defined entity that is vulnerable to the adverse effect(s) of a hazardous substance or agent.
- **Risk.** Effect of uncertainty on objectives including the potential for adverse effects of exposure to hazards.
- **Risk analysis.** Process to comprehend the nature of risk and to determine the level of risk.
- **Risk assessment.** Overall process comprising a risk analysis and a risk evaluation.
- **Risk characterization**. Evaluation and conclusion based on the hazard identification and the exposure and effect assessment.

- **Risk evaluation**. Process of comparing the results of risk analysis with risk criteria to determine whether the risk and/or its magnitude is acceptable or tolerable.
- **Risk management.** Coordinated activities to direct and control an organization with regard to risk.
- **Surrogate parameter.** Quantifiable change of a bulk parameter that can measure the performance of a treatment technology in removing a health or environmental hazard.
- **Thermo-tolerant coliforms** (also known as fecal coliform). A subset of the coliform group of bacteria found in the intestinal tract of humans and other warm-blooded animals. They can produce acid and gas from lactose at 44.0-44.5ºC; hence the test for them is more specific than for total coliforms and selects a narrower range of organisms. *Escherichia coli* (*E. coli*) is typically the mayor proportion of thermo-tolerant coliforms.
- **Total coliforms.** All bacteria in the coliform group, including those not associated with the fecal matter of warm-blooded animals.
- **Fecal coliforms.** Bacteria in the coliform group that inhabit the instestinal tract and are associated with fecal contamination. *Escherichia coli* (*E. coli*), the most common enteric bacterium, is commonly used as an indicator organism.

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