There are many types of water, as well as water treatment technologies, processes, and products that are used in agriculture. This sheet combines definitions from U.S. federal agencies and national organizations related to water used in agriculture. Definitions often differ between specific states. We have identified definitions that differ by state with a star (*).

**TYPES OF WATER**

**AGRICULTURAL WATER:** Water used on produce normally consumed raw in activities such as growing (including directly applied irrigation water, water used for preparing crop sprays, and water used for growing sprouts), harvesting, packing, and holding (including water used for washing or cooling harvested produce and water used to prevent dehydration). Also includes water intended or likely to come in contact with food-contact surfaces.

– Food and Drug Administration (FDA), 2013

**BRACKISH WATER:** Distastefully salty but less saline than seawater (between 1,000 to 10,000 ppm [parts per million] in total dissolved solids [TDS]). Brackish water can be found in estuaries as well as aquifers.

– National Ground Water Association, 2010

**DESALINATED WATER:** Saline water that has had its dissolved salts removed.


**GROUNDWATER**: The zone beneath the earth’s surface saturated with water that has seeped down through soil and rock.

– EPA, 2004

**EFFLUENT**: The final product from a treatment or purification process, specifically water or wastewater treatment plants. Water quality varies depending on the type and amount of treatment; its quality can even meet or exceed drinking water standards.

– WateReuse, 2015

**INDUSTRIAL WATER**: Water used for fabrication, processing, washing, and cooling in industries including chemical, food, mining, paper, petroleum refining, and steel industries.

– USGS, 2016

**IRRIGATION WATER**: Water applied by an irrigation system to grow plants in agricultural, horticultural, and landscaping practices. Irrigation can also include water used for pre-irrigation, frost protection, application of chemicals, weed control, field preparation, crop cooling, harvesting, dust suppression, and leaching salts from the root zone.

– USGS, 2016a

**GRAYWATER/GREYWATER**: Wastewater from a domestic collection system that is reused on site. This water can come from showers, bathtubs, washing machines, and bathroom sinks. Water from toilets or wash water from diapers is not graywater. Many buildings or individual dwellings have systems that capture, treat and distribute greywater for irrigation or other nonpotable uses.

– WateReuse, 2015

**EFFLUENT leaving a wastewater facility.**

Courtesy of Dr. Rachel Rosenberg Goldstein.

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CONSERVE: A Center of Excellence at the Nexus of Sustainable Water Reuse, Food and Health

and “recycled” are often used interchangeably depending on geographic region. The treatment allows for its reuse for a beneficial purpose. Can include grey water, produced water, fracking water, and wastewater among others. – WateReuse, 2015

RETURN FLOW: Surface and subsurface water that leaves a field after the application of irrigation water. – Womach, 2005

RUNOFF: Surface flow of water from a specific area. – Alliance for Water Efficiency, 2016

SURFACE WATER*: Water located on the surface of the earth including ponds, streams, rivers, reservoirs, lakes, and tidewater. Surface water may also include springs, wells, or other collectors that are directly influenced by surface water. – MDE, 2016; PSA, 2016; Stoeckel et al., 2016

TAIL WATER: The runoff of irrigation water from the lower end of an irrigated field. – Federal Remediation Technologies Roundtable, 2016

WASTEWATER: Used water discharged from homes, businesses, industry, and agricultural facilities. – EPA, 2012

CORE TERMS & CONCEPTS

ACRE-FOOT: A volume of water equal to one foot in depth covering an area of one acre, or 43,560 cubic feet; approximately 325,851 gallons or 1234 cubic meters. – Rock et al., 2012

BEST MANAGEMENT PRACTICE (BMP): A practice or combination of practices established as the best means of increasing water use efficiency. – Alliance for Water Efficiency, 2016

BENEFICIAL REUSE: The use of recycled water for purposes that benefit a community’s water needs, economy, and/or environment. – WateReuse, 2015

CONSERVATION: Preserving water resources by reducing water demand, loss, and waste. – Alliance for Water Efficiency, 2016

DROUGHT: A long period of decreased precipitation and streamflow. – USGS, 2016b

INTEGRATED RESOURCE PLANNING (IRP): A forward-looking method that incorporates environmental, engineering, social, financial, and economic considerations. IRP uses the same criteria to evaluate both supply and demand options while involving stakeholders in the process. – Rock et al., 2012

MAXIMUM CONTAMINANT LEVEL (MCL): Maximum level of a contaminant allowed in water delivered to any user of a public water system. – EPA, 2017

Examples of a drip irrigation system (L) where the water is applied close to the soil surface and an overhead spray irrigation system (R) where the water is applied from above the plant. (L) Adobe Stock Images. (R) iStock Photos.

NONPOTABLE WATER: Water not for drinking. – EPA, 1998

NONTRADITIONAL WATER: Any water source other than groundwater including agricultural runoff, treated wastewater, recycled water, produced water, untreated surface water**, and brackish surface and groundwater. – USDA, 2017

PRODUCTION WATER: Water that contacts produce usually eaten raw during the growth process. Includes irrigation, fertigation, foliar sprays, and frost protection. – Produce Safety Alliance (PSA), 2016

POSTHARVEST WATER: Water used during or after harvest of produce usually eaten raw. Includes water used in the field as well as packing and holding activities. – PSA, 2016

POTABLE WATER: Meets federal and state drinking water standards and is considered safe for human consumption. – WateReuse, 2015

PRODUCED WATER: Water resulting from oil and gas processes in sub-surface hydraulic aquifers. – U.S. Bureau of Reclamation, 2017

RAW WATER: Surface or groundwater that has not gone through an approved water treatment process. – WateReuse, 2015

RECLAIMED WATER*: Treated municipal wastewater that meets state-specific water quality standards and is intended to be reused for multiple purposes. Some states and organizations use “reclaimed” and “recycled” interchangeably. – EPA, 2012

RECYCLED WATER*: Treated domestic wastewater used more than once before passing back into water cycle. The terms “reused” and “recycled” are often used interchangeably depending on geographic region. The treatment allows for its reuse for a beneficial purpose. Can include grey water, produced water, fracking water, and wastewater among others. – WateReuse, 2015

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WATER TREATMENT TECHNOLOGIES, PROCESSES & PRODUCTS

ADVANCED OXIDATION: Process that can be used as a safety barrier in the water purification process. Hydrogen peroxide, ultraviolet (UV) light, and other processes are used in combination to form a powerful oxidant that provides further disinfection of the water and breaks down remaining chemicals and microorganisms, providing further disinfection. – WateReuse, 2015

AUGMENTATION: The process of adding recycled water into an existing raw water supply (such as a reservoir, lake, river, wetland, and/or groundwater basin). – WateReuse, 2015

CHLORINATION: The process of adding chlorine gas or chloride compounds to wastewater for disinfection. – EPA, 2004

DIRECT INJECTION: Injecting recycled water through an injection well directly into a groundwater basin. If the water will later be used for drinking, the recycled water will receive advanced treatment prior to injection. – Rock et al., 2012

DISCHARGE: The release of effluent, that meets regulatory standards, into the environment. – WateReuse, 2015

DISINFECTION: The killing of pathogens. – EPA, 2004

DUAL MEDIA FILTRATION: Filtration method that uses two different types of filter media, usually sand and finely granulated anthracite. – WateReuse, 2015

FILTRATION: A process that separates small particles or microorganisms from water by using a porous barrier to trap the particles while allowing water to pass. – WateReuse, 2015

GRANULAR ACTIVATED CARBON: Process used to remove chemicals that are dissolved in used water with activated carbon. – WateReuse, 2015

GROUNDWATER RECHARGE: Naturally occurring as part of the water cycle and can be enhanced using constructed facilities to add water into a groundwater basin. – WateReuse, 2015

MICROFILTRATION: A physical separation process where tiny, hollow, straw-like membranes separate particles from water. It is used as a pretreatment for reverse osmosis. – WateReuse, 2015

MULTI-BARRIER PROCESSES: Purification processes that consist of several barriers to ensure sufficient reduction and/or elimination of various substances that need to be controlled. Monitoring is an important component to verify that the processes are working properly and efficiently. Components of a multi-barrier process may include some or all of the following: membrane filtration, reverse osmosis, advanced oxidation, riverbank filtration, soil aquifer treatment, and constructed wetlands. – WateReuse, 2015

**OZONATION**: Process of applying ozone (O$_3$) for the disinfection of water/wastewater. Ozone is a strong oxidant.
- WateReuse, 2015

**REVERSE OSMOSIS**: Method of removing dissolved salts, ions and other constituents from water. Pressure is used to force the water through a semi-permeable membrane that transmits the water but stops most dissolved materials from passing through the membrane. This treatment method is commonly used in desalination.
- WateReuse, 2015

**SOIL AQUIFER TREATMENT**: When water, including recycled water, soaks into the ground and is purified by the physical, chemical, and biological processes that naturally occur in soil.
- WateReuse, 2015

**TAILWATER RECOVERY**: An irrigation system in which all facilities utilized for the collection, storage, and transportation of irrigation tailwater for reuse have been installed.
- USDA, Natural Resources Conservation Service, 2008

**ULTRAVIOLET TREATMENT (UV)**: The use of ultraviolet light for disinfection or as part of an advanced oxidation process. This usually renders the pathogens inactive by changing the DNA so that the pathogens cannot replicate.
- WateReuse, 2015

**ZERO-VALENT IRON (ZVI) BIOSAND FILTERS**: Iron hydroxides, oxides and oxyhydroxides are formed from ZVI’s reactions with dissolved oxygen and protons in water. The hydroxides, oxides and oxyhydroxides have high pH point of zero charge (pHpzc) that strongly adsorb viruses and negatively charged microorganisms. Unlike other chemical treatments, ZVI does not create potentially harmful by-products.
- Ingram et al., 2012


*Terms differ by state.

**The term “nontraditional water” defined by the USDA includes untreated surface water to emphasize that its quality can be impacted by external environmental factors. The agricultural community (dependent upon region and availability) already uses surface water to irrigate and considers surface water to be a “traditional water” source.

REFERENCES


