BACKGROUND PAPER

WATER

LAST UPDATED: MARCH, 2021

LANXESS
Energizing Chemistry

MANAGEMENT SUMMARY

The availability of fresh water is essential for life and socio-economic development. As a chemicals company, we rely on water for cooling (81%), for process purposes (17%) and in the form of steam (2%). At LANXESS, we are committed to a responsible use of water, and the Board of Management is responsible for overseeing our water strategy, risk management and performance. Globally, we aim to decouple economic growth from water consumption and wastewater loads. We are committed to using water more efficiently and to increasing the share of alternative water sources. Since 2016, we have reduced our specific water consumption by around 13%.

- **Continuous target:** 2% y/y reduction of specific water consumption and specific TOC (total organic carbon) in wastewater

Local context plays an important role in sustainable water management. The local water stress situation is one of the most important aspects. More than 90% of our total water withdrawal takes place in low stress areas, and only around 2% in areas with high or extremely high water stress. In order to prioritize and to develop context-based goals and measures, we combine aspects like water stress and operational or regulatory risks for water risk assessments. In total, we have identified four water risk sites in India, Italy and China. At all these sites, we have started to implement water stewardship (programs) and are committed to further reducing our water withdrawal – for example, by installing a cooling tower and by increasing the internal recycling rate of water.

- **New target:** Implementation of water stewardship programs at water risk sites until 2023
- **New target:** 15% absolute reduction of water withdrawal at water risk sites until 2023 (base year 2019)

At LANXESS, we understand that our responsibility for water does not end at our factory gates. Instead, we aim for a holistic approach taking into account all relevant stakeholders along the value chain and especially local communities. We engage as a corporate citizen in the communities where we operate, and we participate in multi-stakeholder initiatives.

CONTENT

LANXESS WATER PROGRAM

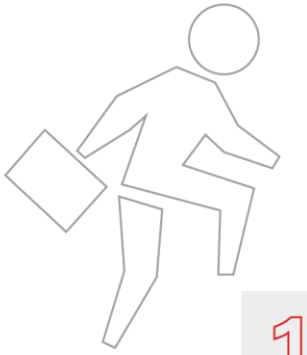
Fresh water is essential for life and socio-economic development, but water scarcity and the increasing pollution of water sources are a growing concern. Billions of people do not have adequate access to water – a fact that has devastating effects on their health, dignity and prosperity. Access to water and sanitation is a basic human right. Sustainable water management and sanitation for all is anchored in UN Sustainable Development Goal (SDG) 6. Water is not only important for human health and our ecosystems, but also for a thriving economy. Many industry sectors, like agriculture, power generation or manufacturing, depend on water of a certain quality and quantity.

More information on LANXESS and the SDGs

At LANXESS, we are committed to a responsible use of water. That is why we have initiated our global LANXESS Water Program consisting of three elements:

As the first part of this program, we are committed to sustainable water management in our production that is compliant with all relevant regulations. We report transparently on our water use and management, and we aim to continuously improve our overall water performance (see 1. “Global water management”). Building on our global water management, we develop concepts for water stewardship. This means addressing local water challenges and taking actions on a river basin level to ensure that we live up to our responsibility for the local system (see 2. “Local water stewardship”). Thirdly, we are engaged beyond our gates. As a corporate citizen, we help to safeguard the supply of clean drinking water in the communities where we operate. We further develop our understanding of our water-related impacts along the value chain and our management of these impacts (see 3. “Beyond the gates”).

LANXESS Water Program



3 **Beyond the gates:**
Social engagement and impact valuation

2 **Local water stewardship:**
Risk assessment and management approach

1 **Global water management:**
Regulatory compliance, transparent reporting, performance and targets

1. GLOBAL WATER MANAGEMENT

With regard to water management, we follow a Group-wide approach. Our CEO heading our Sustainability Committee is responsible for overseeing the water management strategy and performance. As part of the risk management process managed by the Corporate Risk Committee, we report water-related risks and opportunities. Details on our risk reporting can be found in the CDP Water Security.

More information on our committees and functions

Regulatory Compliance and Transparent Reporting

To ensure legal compliance with all water-related permit limits and regulations, management systems are in place at all our production sites. We monitor the withdrawal, consumption and discharge of water as well as the wastewater loads at all our production sites. We report this data annually. In this context, the data is verified by an external party. An extensive list of our water KPIs can be found in the ESG Data Factsheet.

ESG Data Factsheet

As part of our commitment to safeguarding resources, we use state-of-the-art wastewater treatment facilities. At our large "Verbund" sites along the Lower Rhine, Currenta is our professional partner for wastewater management. At some other sites, we run our own wastewater treatment facilities. In Antwerp, we not only treat our own wastewater, but also that of our "Verbundpark" partner. At other smaller sites, we opt for local wastewater treatment.

We support the work of the CDP Water Security and participate in the respective CDP questionnaire, which was acknowledged with a B rating in 2020.

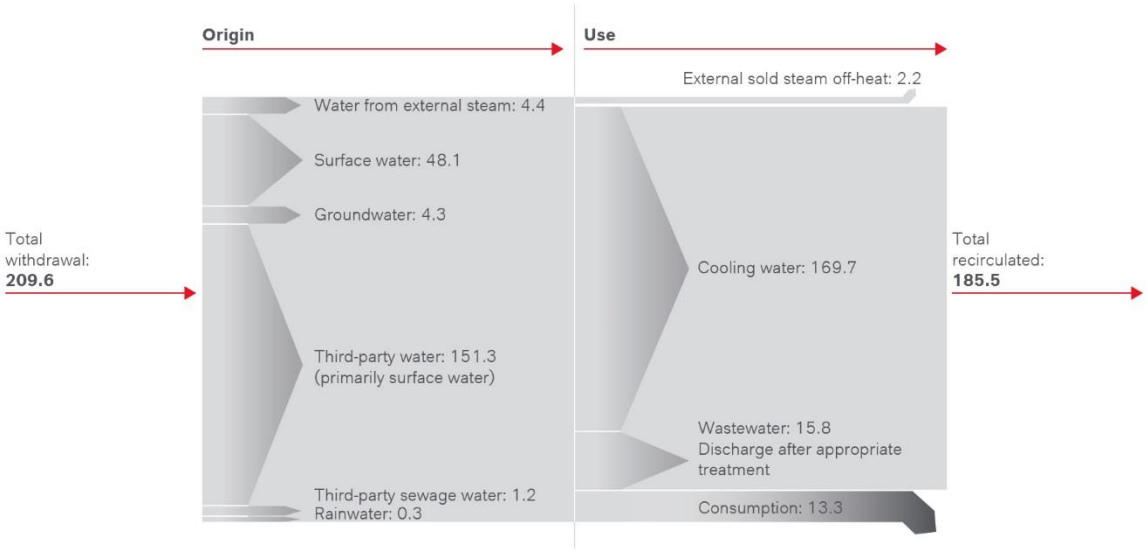
CDP Water Security

Performance and Targets

As a chemicals company, we rely on water for our production. We use water mainly for cooling (81%). Also, we use water for process purposes in production facilities (17%) or in the form of steam (2%).

Because cooling water is not contaminated, the majority of our withdrawn water does not need any treatment and can re-enter the water cycle directly. The discharged water from processes is treated as required and returned to the natural cycle as well. As illustrated below, we consume less than 10% of the water we withdraw.

Water Balance
in m m³



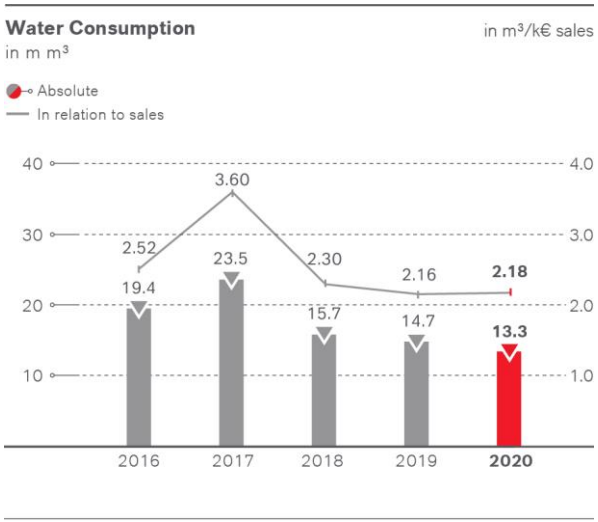
Rounded figures
Indicative ratios

Data from 2020

Water Quantity

We aim to decouple our economic growth from water consumption and water withdrawal. To achieve our global reduction target, we are committed to continuously improving our overall water efficiency. In addition, we calculate the impact of investment projects (CAPEX) on our water KPIs to ensure that our investments do not alter our efforts towards a more sustainable use of water. In order to further protect groundwater sources, we aim to continuously increase the share of rainwater or sewage in the total water withdrawal, especially at our water risk sites (see "Information on our water risk sites"). At other plants such as Porto Feliz (Brazil) we use cleaned surface water. Since 2016, we have reduced our specific water consumption by around 13% – even considering the increase in 2017 due to the acquisition of specialty chemicals company Chemtura. We aim to continue that trend.

Continuous target: 2% y/y reduction of specific water consumption

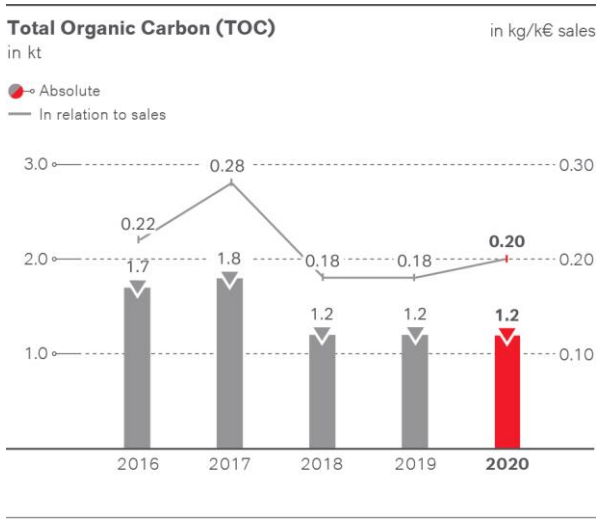


Water Quality

The pollution of water bodies is a growing concern. Water pollution takes place when toxic substances enter water bodies and therefore degrade the quality of the water. This is not only problematic for aquatic ecosystems, but also for humans who rely on surface water as a fresh water source. Furthermore, pollutants in the surface water can seep through and also contaminate the groundwater.

We monitor the wastewater loads at all our sites. In addition to the TOC (resp. COD) amount, we also measure, and report on, total nitrogen, total phosphorus and heavy metals (As, Cd, Cr, Cu, Hg, Ni, Pb, Sn, Zn) and comply with all water-related permit limits and regulations. We are committed to continuously reducing all our wastewater loads and set ourselves the target of a 2% specific reduction (year-on-year) of TOC in wastewater.

Continuous target: 2% y/y reduction of specific TOC in wastewater



Besides reducing the TOC levels, we also monitor other discharges (like rainwater) to surrounding fresh water resources. If the quality of these discharges does not meet the standards that we have set for ourselves, we take steps for improvement, as for example in El Dorado, Arkansas (USA).

Best practice: Constructed wetlands project at the south plant in El Dorado (USA)

When we acquire companies, we take over responsibility for all their assets. With regard to industrial sites, this also includes taking responsibility for prior contamination. The south plant in El Dorado (USA) which we acquired in 2017, is a case in point. Over the past decades, historic site uses have resulted in the accumulation of heavy metals in shallow soil surfaces. During rain events, these metals could eventually mix with storm water runoff and be discharged offsite. To reduce this risk, we implemented a constructed wetlands project. The constructed wetlands are a passive treatment technology that utilizes vertical flow filtration and biological processes (anaerobic metal-sulfide reactions) in individual treatment cells to recover heavy metals prior to discharge. Sulfate-reducing bacteria in the media produce sulfide that causes heavy metals to precipitate as insoluble metal-sulfide complexes. For this project, we received the Diamond Award for Excellence in Environmental Leadership from the Arkansas Environmental Federation as well as the Sustainability Award in Waste Minimization from the American Chemistry Council.

2. LOCAL WATER STEWARDSHIP

Local context plays an important role in sustainable water management. We operate in 18 countries. As can be seen below our main water withdrawal takes place at the Lower Rhine sites in Germany and in the rest of Europe.

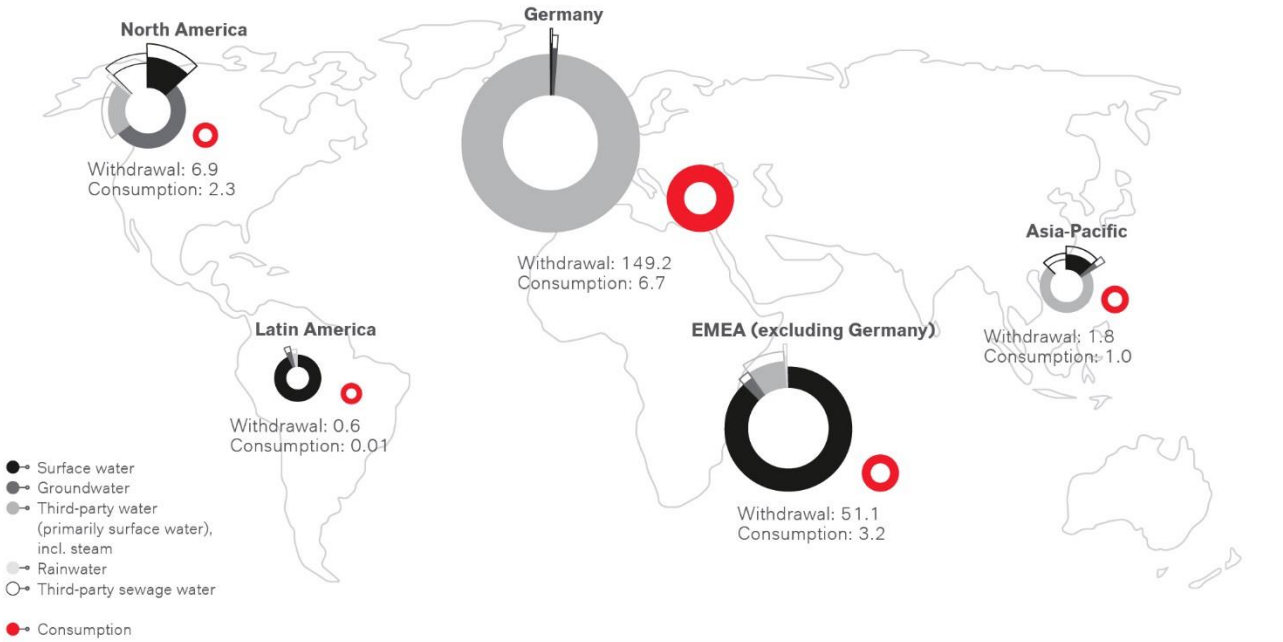
The most important factor in this context is the "water stress level" of a region. Water stress is calculated as the ratio of the total annual water withdrawals to the total available renewable water supply in that year. A high water stress score indicates that much of the available and accessible fresh water is needed to meet human and ecological demands.

As a consequence, a high water stress score requires an even more responsible use of water. For our assessment we used the WWF water risk filter. In total, 13 of our 55 sites are located in water stress areas. Our water withdrawal at these 13 sites accounts for only around 2.2% of our total water withdrawal. More than 90% of our water withdrawal takes place in low stress areas.

Water Risk Assessment

To determine our water risk sites and to derive local measures, we have developed a water risk assessment. The assessment combines internal data with external scientific data like water stress, operational or regulatory risks and relevant water-related KPIs. Overall, ten indicators are used.

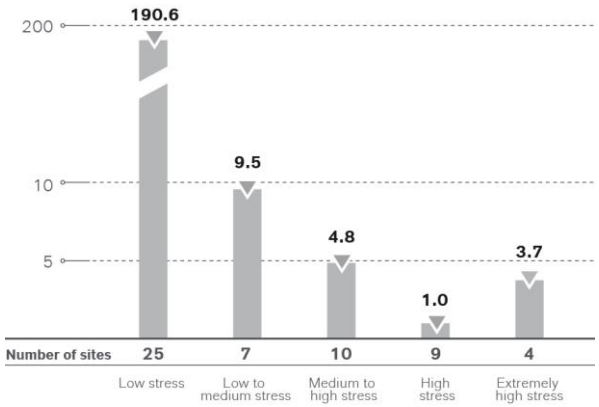
Water Withdrawal and Consumption by Region
in m m³



Indicative ratios

Data from 2020

Water Withdrawal in the Different Water Stress Areas
in m m³



Data from 2020

The water risk assessment helps to prioritize our sites based on the magnitude of water risk, and it lays the foundation for context-based goals and measures for the site. Our main indicators for water risk are the water stress score and the specific water withdrawal per ton of product. The water stress score is the average of the current and future water stress, and therefore reflects the current situation as well as the expected future change (in a pessimistic scenario with higher population growth and a lower rate of urbanization). The second indicator is the specific water withdrawal per ton of product. The less water a site withdraws for production, the lower the risk posed by water scarcity.

Using this assessment, we have determined four water risk sites, namely Jhagadia (India), Latina (Italy), Nagda (India) and Qingdao (China). The risk assessment is updated regularly.

Management Approach for Water Risk Sites

We specifically address water risk sites identified by the water risk analysis. We decided to implement site-specific water stewardship programs until 2023. They include site-specific action plans, collaborative and multi-stakeholder water projects to address shared basin risks and best water practices on site. Moreover, we aim to develop a LANXESS-specific Water Stewardship Standard that is based on accepted standards and reflects the special needs of our company. As a cornerstone of these local water stewardship programs, we are committed to reducing water withdrawal at these four sites.

New target: Implementation of water stewardship programs at water risk sites until 2023

New target: 15% absolute reduction of water withdrawal at water risk sites until 2023 (base year 2019)

Information on our Water Risk Sites

Nagda (India)

Two water risk sites, Nagda and Jhagadia, are located in India. Nagda is located in the Chambal River Basin in the Madhya Pradesh province and Jhagadia in the Narmada River Basin in the Gujarat province. In both river basins, the current water stress is extremely high. In a ten-year pessimistic future scenario, the water supply and demand situation in the basins will remain at a critical level. Although neither of the two sites experienced production disruptions due to inadequate water supply in the past decade, we are continuously working to improve our water management.

In Nadga, the Advanced Industrial Intermediates business unit produces benzyl and related flavors and fragrance products. At this site, we have invested heavily in sustainability projects and continue to do so.

A sewage treatment plant and a wastewater post-treatment plant are in place. Therefore, more than half of the water withdrawal comes from community sewage water. The water is mainly used for cooling (70%) and as process water (30%). The only water consumption is due to evaporation losses in the cooling tower or to the sale of by-products containing water. Nagda is a zero liquid discharge site: no water is discharged outside the site. All available water is recycled and recovered for reuse within the site, which leads to huge water savings. We are also exploring rainwater harvesting. For our engagement in Nagda, we have won several awards and certifications, like the prestigious awards from the Indian Chemical Council (ICC) including the Best Company award for “Management of Environment” for 2019.

Together with others, we are working to further improve the overall situation. In 2021, a big water-consuming company will follow our zero liquid discharge model. Additionally, the government has linked the Narmada River to the Kshipra River, which increases the water flow in both rivers. As a next step, the Kshipra River will be linked to the Chambal River to further augment the water supply.

More information on sustainability initiatives in Nagda, India

Best practice: Water management in Nagda (India)

In Nadga (India), we have built our own sewage treatment plant. It processes sewage water from surrounding towns for industrial use. Additionally, a wastewater post-treatment plant has been put into operation. The water recovered from this plant is used for production purposes. These measures not only prevent contamination of the Chambal River, but also significantly reduce dependence on conventional water sources. To ensure that water can be reused multiple times, we use our own water purification products, Lewatit® ion exchangers.

Jhagadia (India)

Multiple business units have operations at our site in Jhagadia (India). Among the many useful products that originate from Jhagadia are the Lewatit® ion exchange resins for water treatment and the Preventol® active ingredients for preservation, disinfection and wood protection. To improve our water balance, methods such as recycling treated wastewater through reverse osmosis and rainwater harvesting are being explored at Jhagadia.

Latina (Italy)

Latina is located in the Lazio province (Italy), in the Rio Martino River Basin. The river basin already has an extremely high water stress, and the water supply is expected to decrease further in a ten-year pessimistic scenario. Two business units, Urethane Systems and Lubricant Additives Business, operate in Latina. The site has a relatively high water withdrawal. About half of this water is used for washing, while the other half is used as cooling water and never comes in contact with any product. High volumes of cooling water are required to achieve high flow rates so that the water temperature increase is kept to a minimum before discharge. We are working on technical solutions to reduce the withdrawal amount. This includes the installation of a cooling tower and an increased internal water recycling rate.

Qingdao (China)

Qingdao has by far the lowest water withdrawal of the water risk sites. It is located in the Dagu River Basin in the Shandong province (China), a region with extremely high water stress. In a ten-year pessimistic scenario, the water supply will increase slightly, but the water demand will increase even more. Rhein Chemie produces additives and high-performance bladders for tire production at this site. The only water source is municipal water. The very small water withdrawal is entirely used as process water. After treatment, most of the process water is returned to the water cycle.

3. BEYOND THE GATES

At LANXESS, we understand that our responsibility for water does not end at our factory gates. Instead, we want to take a holistic approach that takes into account all relevant stakeholders – especially the communities located close to our production sites. At present, the general discussion on water footprints along value chains has not yet led to a generally accepted methodology. However, we are constantly broadening our understanding of this issue and are committed to implementing further steps in this direction.

Social Engagement, Stakeholder and Community Activities

Both on a corporate level and locally, we conduct an active stakeholder dialogue that addresses, among other topics, water availability. On top of that, in 2018 we invited representatives from the fields of politics, science, environmental organizations and industry to a round table discussion on "water stress".

More information on our stakeholder dialogue

More information on our round table on water

Water is one of the four focus topics for our corporate citizenship activities, together with education, climate protection and culture. Through local projects, we help to safeguard the supply of clean drinking water. Additionally, we are encouraging young people to adopt a more responsible approach in order to use this valuable resource efficiently.

More information on our corporate citizenship activities

We participate in relevant multi-stakeholder and industry initiatives, for example:

- The German Water Partnership, a network to develop new solutions for water management issues
- The "Low Water Action Plan" for the Rhine River, which focuses on our three main German production sites (Leverkusen, Dormagen, Krefeld-Uerdingen)
- The Sparta Aquifer project in Arkansas (USA), an initiative to recover the Sparta Aquifer by using alternative water sources

More information on the German Water Partnership

More information on the Low Water Action Plan

More information on the Sparta Aquifer project

Our Water Impact along the Value Chain

To create value for society, we need to understand the impact of our actions along the entire value chain, both positive and negative, and manage it actively and consciously. This also applies for water.

Through our water stewardship program, we systematically work on better understanding our water impact along the entire value chain, the volume of water we use throughout the value chain, as well as the context in which the water is being used. An integrated water impact scheme considers the availability, quality and regulation of water and addresses social issues across our value chain. Broadening our scope and managing water holistically in the long term will not only address societal concerns, but will also enable us to manage risks and opportunities more effectively going forward.

We cooperate with our supply chain partners to evaluate and audit their water performance and share learnings and best practices. In the context of the industry initiative "Together for Sustainability" (TfS), we collaborate with other chemical companies to enhance the environmental, social and governance performance of chemical supply chains. The TfS program is based on the UN Global Compact and Responsible Care® principles.

More information on the "Together for Sustainability" initiative

We also calculate the impact of our core business activities on society. Water is an important part of this impact valuation.

More information on our impact valuation

The pollution of rivers and oceans worldwide with microplastics is a critical issue. To tackle it, we have been involved in Operation Clean Sweep (OCS) since 2016. Plastics manufacturers from all over the world have voluntarily committed themselves to this campaign, which aims to close plastic leaks and prevent industry-related environmental pollution caused by microplastics. This concerns all stages of the supply chain, from production to storage and transport to processing. Incidentally, the number of OCS signatories in Europe represents about 98% of all European plastics production.

More information on the "Operation Clean Sweep" initiative

GLOSSARY

Carbon Disclosure Project (CDP): An independent, non-profit organization whose mission is to help companies all over the world to transparently disclose information concerning their greenhouse gas emissions and utilization of water resources and forests. By 2020, data had been received from more than 9,600 companies, making the CDP data platform one of the world's most detailed sources of environmentally relevant information.

Chemical oxygen demand (COD): An indicative measure of the amount of oxygen required for fully oxidizing organic matter. The amount is calculated indirectly, whereby a chemical oxidant is added to a sample and its consumption measured. To yield the COD value, the TOC value is multiplied by three.

Cooling water: Water used for cooling containers in which chemical reactions take place. It does not come into contact with products or raw materials.

External sold steam off-heat: Heat generated during operation is transported in the form of steam and can be sold externally as an energy source.

Groundwater[1]: Water that is being held in, and that can be recovered from, an underground formation.

Rainwater: Collected or accumulated water for operational use. Rainwater is also classified as surface water in accordance with the GRI, though it has its own separate entry here.

Recirculated water[1]: Sum of effluents, used water, and unused water released to surface water, groundwater, seawater, or a third party, for which the organization has no further use, over the course of the reporting period.

Specific withdrawal / ton of product: The volume of water withdrawn in order to produce one ton of product.

Surface water[1]: Water that occurs naturally on the Earth's surface in ice sheets, ice caps, glaciers, icebergs, bogs, ponds, lakes, rivers, and streams.

Third-party sewage water: Treated or untreated wastewater from third parties for operational use.

Third-party water[1]: Municipal water suppliers and municipal wastewater treatment plants, public or private utilities, and other organizations involved in the provision, transport, treatment, disposal, or use of water and effluent.

Total organic carbon (TOC): An indicative measure of the total organic carbon content in a sample. Thermal or wet-chemical oxidation is induced, and the resulting CO_2 is then measured.

Wastewater discharge[1]: Treated or untreated wastewater that is discharged.

Water consumption[1]: Sum of all water that has been withdrawn and incorporated into products […] or generated as waste, has evaporated, transpired, or been consumed by humans […], or is polluted to the point of being unusable by other users, and is therefore not released back to surface water, groundwater, seawater, or a third party over the course of the reporting period.

Water from external steam: Externally produced steam used primarily for energy supply purposes. Steam condensate is considered to be a source of water.

Water risk[2]: Refers to the risk of an enterprise experiencing challenges such as water scarcity, flooding, infrastructure decay or drought.

Water risk site: A location experiencing very high water stress currently or at risk of very high water stress in the future.

Water scarcity[2]: Describes the human-driven lack of freshwater resources and is expressed as a function of the volume of water consumption by humans relative to the volume of water resources in a given area.

Water stewardship[3]: Defined as the use of water that is socially and culturally equitable, environmentally sustainable and economically beneficial, achieved through a stakeholder-inclusive process that includes both site- and catchment-based actions.

(Current) water stress[2]: Refers to the ability – or lack thereof – to meet the human and ecological demand for freshwater. In addition to freshwater availability, it also takes into account the quality and accessibility of water. The WWF has developed a water risk filter containing five different water stress categories.

S	Water Stress Categories	Ratio of Withdrawals to Supply
1	Low stress	<10%
2	Low to medium stress	10-20%
3	Medium to high stress	20-40%
4	High stress	40-80%
5	Extremely high stress	>80%

(Future) water stress[4]: A distinction is made between current and future water stress. To determine future water stress, we have used the pessimistic, ten-year scenario (based on the Aqueduct Water Risk Atlas). It assumes as standard a high rate of population growth and a low rate of urbanization.

Water stress score: The average value of current and future water stress.

Water withdrawal[1]: Sum of all water drawn from surface water, groundwater, seawater, or a third party for any use over the course of the reporting period

[1] Source: GRI 303: Water and effluents (2018)

[2] Sources: UNGC, CEO Water Mandate and WWF, Water Risk Filter

[3] Source: Alliance for Water Stewardship (AWS), International Water Stewardship Standard v2.0, March 2019

[4] Source: World Resource Institute, Aqueduct projected water stress country ratings

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LANXESS

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