



## CLIMATE ACTION PATHWAY

# WATER

### Action Table

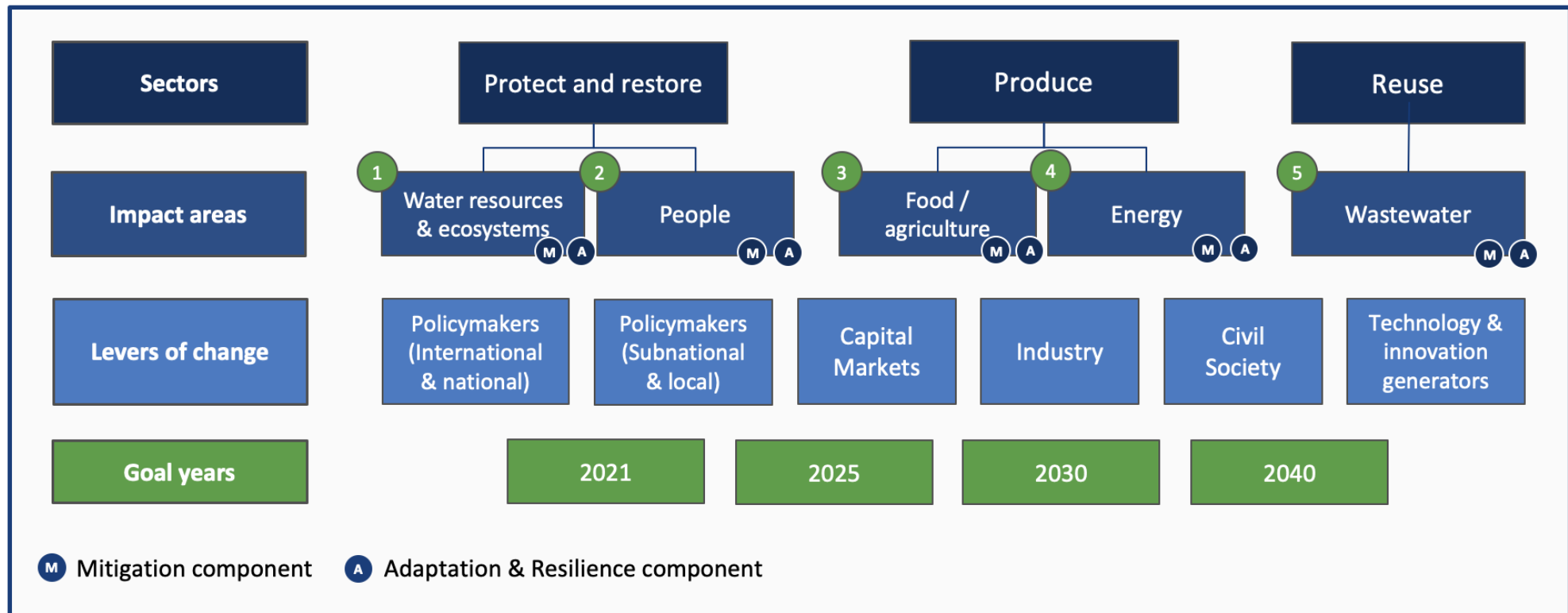
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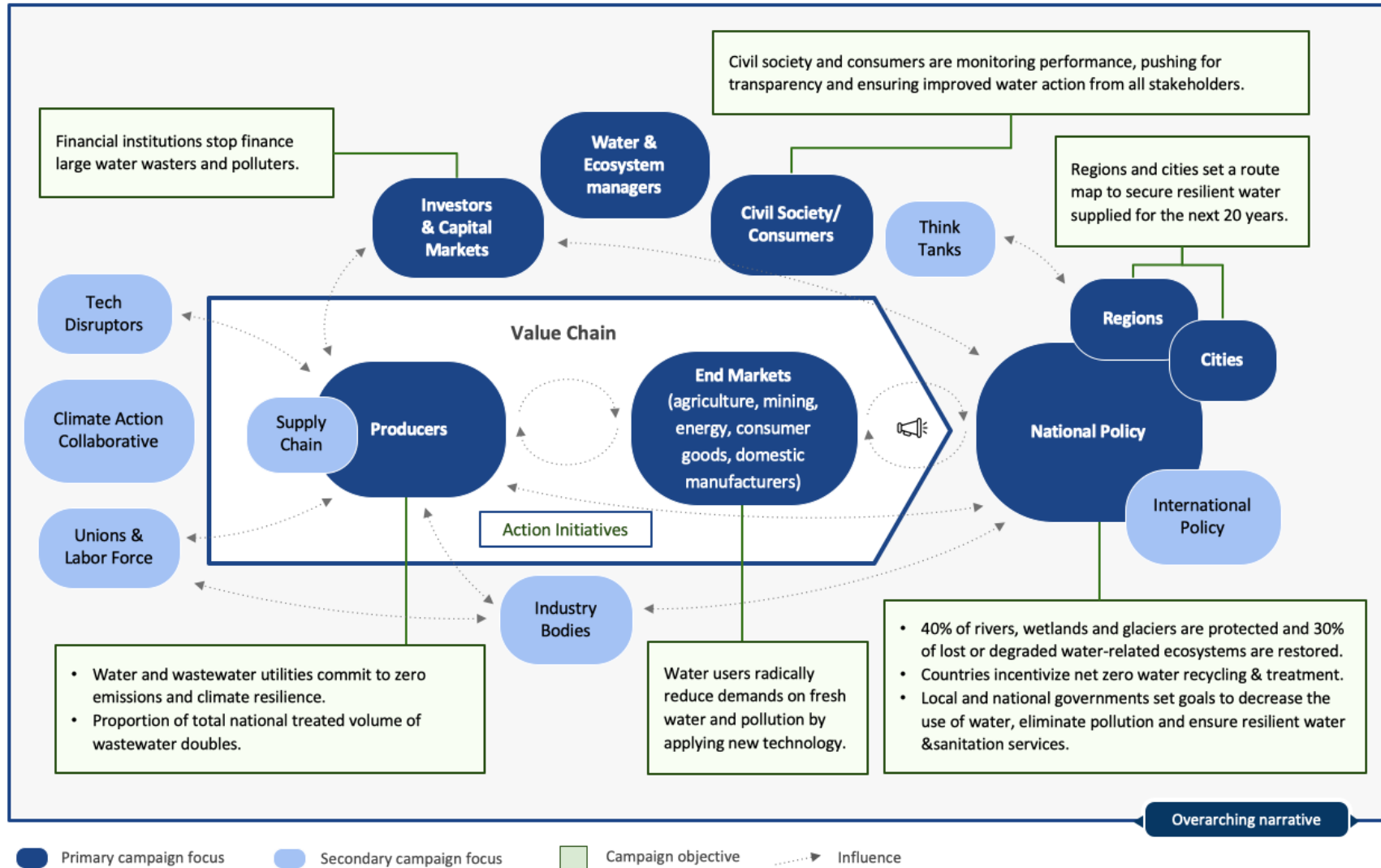
## ACTION TABLE STRUCTURE AND APPROACH

The purpose of the Water Action Table is to highlight specific, promotable actions to deliver the vision of and pathway towards a zero-carbon, climate-resilient future through water using a sector-based approach. It is not intended to cover the full range and complexity of water as a resource, the water sector or climate interventions; rather it points to key areas of impact as a starting point for more ambitious climate action. At its foundation, this contribution to the Marrakech Partnership for Global Climate Action supports ambitious, accelerated climate action toward the achievement of the 2030 Agenda and its 17 Sustainable Development Goals.

The Water Action Table employs the Three Horizons Framework, systems mapping and conservation hierarchy approaches. It contains and highlights existing and potential synergies with the Pathways for Energy, Human Settlements, Industry, Land Use, Oceans and Coastal Zones, Finance, and Resilience.



# WATER SYSTEMS MAP



## CONTRIBUTIONS

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Under the leadership of the High-Level Champions and through the Marrakech Partnership for Global Climate Action, the development of this Climate Action Pathway was led by the Alliance for Global Water Adaptation, CDP, the International Union for Conservation of Nature and the Stockholm International Water Institute.

We are grateful for the consultations and contributions from: Alliance for Water Stewardship, Deutsche Gesellschaft für Internationale Zusammenarbeit, Food and Agriculture Organization of the United Nations, French Water Partnership, Global Alliances for Water and Climate, Global Center on Adaptation, Global Resilience Partnership, Global Water Partnership, International Energy Agency, International Network of Basin Organizations, International Renewable Energy Agency, International Water Management Institute, Overseas Development Institute, REACH Programme at Oxford University, Sanitation and Water For All, The Nature Conservancy, United Nations Development Programme, United Nations Economic Commission for Europe, United Nations Educational, Scientific and Cultural Organization, Water.org, WaterAid, Water Witness International, Wetlands International, World Business Council for Sustainable Development and World Wildlife Fund for Nature.

A full list of supporters can be found at <https://unfccc.int/climate-action/marrakech-partnership/reporting-tracking/pathways/water-climate-action-pathway>.

## WATER CHANGE LEVERS

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**Policy and regulation**, at local, national, and international levels, have a key role to play in:

- protecting water resources and freshwater ecosystems and halting and reversing the degradation and enabling large-scale restoration of critical wetland systems;
- ensuring sustainable, universal and fair access to water, sanitation and hygiene through just and inclusive water governance;
- reallocating water towards society's most essential needs, including for populations most vulnerable to the impacts of climate change (the most vulnerable populations will vary by socioecological context);
- implementing policies that enable the complete and net-zero treatment, reuse and recycling of wastewater;
- building an enabling environment that encourages system-scale planning and actively plans for sustainable renewable energy options; and
- preventing, preparing for and responding to water-related humanitarian disasters and post-disaster rehabilitation.

Policy frameworks such as Integrated Water Resources Management (IWRM)<sup>1</sup> and water system resilience thinking can further support the coordinated management of water as an essential resource for climate adaptation and mitigation activities across sectors and geographic boundaries. While none of these interventions are new, many are politically challenging. Therefore, triggering change requires a water-related ambition loop, which is a positive feedback loop in which bold government policies and private sector leadership reinforce each other and jointly take water, ecosystem, and climate action to the next level.

The **financial** and investor communities, alongside empowered citizens, are catalysts of systemic change. On the one hand, there needs to be recognition, in their engagement, of water resources as a public good. On the other hand, water services have a cost, and private actors and investors have a role to play in improving water management and its role in the fight against climate change. Financial and investment institutions can spur the development, upscaling and uptake of critical technologies, policies and practices through the adoption of bold commitments to water security and through their cascading influence on the entire economy via portfolio holdings, loan books and other assets. Each sends a strong signal from the private sector to government in support of ambitious climate and water policy, serving to close the ambition loop. Mandatory greenhouse gas and water reporting and consideration of climate and water risks in financial decision-making,

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<sup>1</sup> Integrated Water Resources Management (IWRM), as recognized in Sustainable Development Goal 6, target 5 (SDG 6.5) as well as in international law (the 1992 Helsinki Convention, the 1997 New York Convention), at the scale of the hydrographic basins of lakes, rivers and aquifers, helps to balance competing uses, limit waste of this precious resource and adapt to climate change.

accompanied by appropriate policy measures, pushes corporate practices away from carbon-intensive, non-resilient water-related practices and towards more sustainable ones. The public and private finance sector will also need to direct investment into the protection of water resources and freshwater ecosystems in addition to strengthening institutional and civil society capacity. Funding for climate change mitigation and adaptation in the water sector must increase, with priority given to the least developed countries. In addition, access to funding must be facilitated for the most disadvantaged countries, regions and communities for as long as is required to build in-country capacity, test innovative funding models (10–15 years) and sustain solutions over the long term. In order to boost resilience to climate change, building financial resilience and addressing wider financial challenges for water are essential.

**Demand** from industry, agriculture and domestic consumers will need to shift from ever increasing use of scarce freshwater resources and unchecked pollution to regenerative and restorative approaches that align with the protection of freshwater resources, ecosystems and people, the recognition of water resources as a public good and of the human right to water and sanitation. The adoption of demand-side public commitments to practicing and embracing circular economy principles will be essential in triggering the wastewater revolution, as will a profound realization of the value of water, evidenced by adopting bold targets and linking them to C-suite compensation. Triggers of change for industry and agricultural demand include transparency, regulatory, reputational, legal and market mechanisms, whereas consumers overwhelmingly respond to the promotion of “greener” consumption and production habits and their associated economic and health benefits through advertising, marketing and public dialogue, further reinforcing the positive ambition loop for business and governments.

**Civil society** plays a role in increasing public awareness of the externalities of the current high-carbon, low-resilience approach to water and sanitation provision as well as degradation and loss of freshwater and coastal ecosystems through accountability monitoring, campaigns and calls-to-action, addressing research and policy gaps and improving information on sustainable choices. Civil society facilitates multi-stakeholder partnerships and dialogues that can enable a shared vision and plans for and investments in a transformation to a landscape that is more resilient to water shocks and stresses and brings returns to nature, the local economy and human well-being. Civil society can also influence policy by advocating for climate and water-supportive legislative change, working towards systems transformation, driving collective action and holding actors to account.

**Technology and innovation generators** are needed to deliver and scale up water reuse techniques and zero-carbon desalination. Advances in earth observation and real-time sensors, earth systems research as well as the widescale use of virtual and augmented reality concepts for demand-side stakeholders focused on the water-climate nexus may help to stimulate industry and consumer demand and improve decision-making. The value of local and indigenous knowledge is essential in developing and implementing responses at all levels.

This Marrakech Partnership Water Climate Action Pathway (W-CAP) aspires to fundamentally align with all other Climate Action Pathways. This alignment is essential, given the strong interlinkages across the water–climate–energy–food–environment nexus, which can lead to synergies and cross-benefits in many cases, and impose



difficult choices and trade-offs in others. This version of the W-CAP identifies key areas of synergy and co-benefits. Success in these pathways is fundamental to success in the water sector and vice versa. As such, readers should engage with the other Pathways to gain a fuller picture of the water-related change needed to win the Race to Zero and the Race to Resilience.

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# PROTECT & RESTORE WATER RESOURCES AND ECOSYSTEMS

MITIGATION & RESILIENCE



	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
<b>Policymakers (national, subnational, local levels)</b>	<ul style="list-style-type: none"> <li>Policymakers commit to the protection and restoration of the Earth’s water-related ecosystems including all lakes and rivers, underground aquifers, swamps and marshes, wet grasslands, peatlands, oases, estuaries, deltas and tidal flats, mangroves and other coastal areas, coral reefs, and all human-made sites such as fish ponds, rice paddies, reservoirs and salt pans (Ramsar definition of ‘wetlands’) so that we maximize carbon sequestration by natural ecosystems, protect biodiversity, and prevent the destruction of ecosystem</li> </ul>	<ul style="list-style-type: none"> <li>All Nationally Determined Contributions and National Adaptation Plans are accompanied by a specific water plan and budget that addresses the climate-water trade-offs and benefits across all sectors including energy and industry, agriculture and livestock, forestry and land use, public health, ecosystems and biodiversity, urban wastewater management, and urban regional and transboundary planning and infrastructure.</li> <li>All national climate plans with tree-planting (reforestation / afforestation) commitments</li> </ul>	<ul style="list-style-type: none"> <li>Protect and restore 30% of the Earth’s water-dependent ecosystems by 2030.</li> <li>Proportion of wetlands included on Ramsar list increases to 30% with all new listed areas accompanied by a management plan and budget.</li> <li>30 million hectares of wetlands safeguarded and restored as integral elements of productive river and lake landscapes by 2030, indicated by hectares with food or commodity production under sustainable or improved management practices while maintaining or improving ecological condition.</li> </ul>	<ul style="list-style-type: none"> <li>Protect and restore 40% of the Earth’s water-related ecosystems (wetlands) by 2040.</li> <li>Protect one-half of the world’s forested upper watersheds by 2050.</li> <li>Remaining peatlands are conserved and around 50 million hectares rewetted to prevent carbon emissions.</li> <li>Protect and restore riparian habitats along two-thirds of all rivers.</li> <li>Restore 25% of the world’s rivers to free-flowing state through removal of dams and</li> </ul>



	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	<p>services such as water filtration and rainfall generation.</p> <ul style="list-style-type: none"> <li>• Policymakers commit to enhance resilient water management through the Integrated Water Resources Management (IWRM) approach in particular at the scale of hydrographic basins of lakes, rivers and aquifers as promoted in the Sustainable Development Goals (target 6.5) and the Source-to-Sea approach in national climate plans including Nationally Determined Contributions, National Adaptation Plans, and Long-Term Strategies. Commit to strategic water resource management through improving water use efficiency and demand management policies.</li> <li>• National climate plans and sustainable development policies in at least 10 countries integrate Building with Nature and blue carbon solutions.</li> <li>• The network of Ramsar sites is expanded to include wetlands providing water and climate security at landscape scales, and wise use commitments are met by putting in place national scale polices and plans, site-scale management plans, and cross cutting communication,</li> </ul>	<p>integrate water management plans.</p> <ul style="list-style-type: none"> <li>• Public and private investments in ecosystem restoration and nature-based solutions to regulate water and carbon has doubled since 2021 as a result of operationalizing finance strategies, mechanisms and investment pipelines of government and international investors.</li> <li>• Wetlands and their carbon storage potential are assessed globally, covered in NDCs and proportion of wetlands registered on Ramsar list increases to 20%.</li> <li>• Partnerships of business, civil society and government committed and capacitated to operationalise landscape scale restoration and management of peatlands, particularly in top-emitter- from-drained-soils countries.</li> <li>• International and targeted national and regional trade policy supports peat-wise products and economies.</li> <li>• Government agencies bring Building with Nature into the mainstream of engineering practice by requesting nature-</li> </ul>	<ul style="list-style-type: none"> <li>• A net gain of 10% of tidal flats (1990 benchmark), recovering 50% of what was lost over the last 30 years.</li> <li>• Conservation of all intact peatlands and restoration of 10 million ha of peatlands is enabled by 2030, with indicators such as hectares re-wetted under improved management and number of peatland landscapes in good ecological condition.</li> <li>• Governments protect one-third of the world’s forested upper watersheds.</li> <li>• Global mangrove cover reaches a net gain of 20% by 2030, using 2015 levels as the benchmark.</li> <li>• Governments maintain two-thirds of all headwaters of the Earth’s major river systems undammed by 2030 through protection and removal of blocking infrastructure.</li> <li>• Remaining free-flowing rivers and floodplains remain intact and river connectivity is enhanced, restoring floodplain ecosystem functionality and area.</li> <li>• Governments protect and restore riparian habitats along one-third of all rivers.</li> </ul>	<p>barrages, including in transboundary basins</p>

	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	<p>education and capacity development actions.</p> <ul style="list-style-type: none"> <li>• Top emitting countries from drained soils incorporate peatlands in their NDCs and begin to implement restoration of degraded soils. Develop and implement business cases and risk assessments, incentives based on existing pilots for the reversal of drainage and the application of paludiculture (policy and financial).</li> <li>• Arctic countries acknowledge the role of maintenance of natural ecosystems in the Arctic and in highlands for permafrost protection. Tropical countries acknowledge the role of tropical peatlands in the maintenance of tropical ecosystems and global carbon cycle. A global moratorium is put in place to safeguard these global carbon megastores across tropics and Arctic regions.</li> <li>• Governments undertake drought vulnerability assessment of groundwater basins (national and shared) and identify appropriate nature-based solutions to drought management such as managed aquifer recharge.</li> <li>• G20 governments expand the definition of climate-related</li> </ul>	<p>based solutions as part of their tendering procedures.</p> <ul style="list-style-type: none"> <li>• Governments increase regulation of groundwater and better planning and allocation of water resources taken into account availability and high value water use, as well as transboundary/regional aspects of their management.</li> <li>• Cities in the most stressed river basins have established source water protection plans while also integrating role of wetlands which secure water sources in landscapes.</li> <li>• Create tax incentives for enterprises that desire to implement footprint reduction programs related to water conservation and carbon emissions.</li> </ul>	<ul style="list-style-type: none"> <li>• Adaptation-focused urban planning policies are put in place that include restoring urban natural spaces, ‘unsealing’ cities and reincorporating aquatic areas into urban watersheds.</li> <li>• At least 100 governments implement policies to improve the cross-sectoral management and accounting of water to ensure sufficient supply for climate mitigation and adaptation activities, while maintaining supply for basic services, the economy, and ecosystems.</li> <li>• Achieve the SDG target 6.5 on Integrated Water Resources Management at the scale of hydrographic basins of lakes, rivers and aquifers.</li> </ul>	

	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	<p>financial risk to include water security and water-risk related conflict.</p> <ul style="list-style-type: none"> <li>• Governments establish/ strengthen national-level mechanisms to foster a closer dialogue between ministries of environment/climate, water, energy, agriculture, planning, emergency response, and finance.</li> </ul>			
<b>Financial Institutions</b>	<ul style="list-style-type: none"> <li>• Establish and scale up Water Funds that help communities better manage water resources and water quality and equity of access for all by bringing water users together to collectively invest in upstream habitat protection and land management and which can mobilize innovative sources of funding, especially for women, indigenous, and local community organizations.</li> <li>• Disclosure of and accountability for financed water impacts from financial institutions begins to emerge and is normalised amongst the world's largest publicly listed financial institutions.</li> <li>• Engage with and support landscape restoration partnerships that will enhance water resiliency through systems approaches, bringing</li> </ul>	<ul style="list-style-type: none"> <li>• Amount of money invested in ecosystem restoration through landscape scale initiatives has doubled since 2021.</li> <li>• Boost demand for green bonds by implementing “green bond mandates” for domestic funds and promote the expanded use of labelled green bonds for financing climate- aligned water projects and assets.</li> <li>• Global portfolio of landscape scale restoration projects identified and blended finance investments triggered to implement transformative plans in 10 priority wetland landscapes each &gt; 100,000ha.</li> </ul>	<ul style="list-style-type: none"> <li>• €500 million committed by government and financial institutions to enable nature-based solutions that safeguard and restore freshwater wetlands, for climate mitigation and adaptation.</li> <li>• Investments in sustainable development enterprises are fully integrated into landscape initiatives that enhance water resiliency and restore wetland ecosystems alongside restoring agricultural productivity.</li> </ul>	<ul style="list-style-type: none"> <li>• Adoption of green water bonds at the speed and scale necessary by promoting regulatory policies and governance mechanisms that allow for and promote a green bond market. Policies are in place to reduce perceived risk of green investments that currently prevents access to bond markets.</li> </ul>

	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	financial returns alongside returns for nature and society.			
<b>Technology Providers and Innovators/ Business and Service Providers</b>	<ul style="list-style-type: none"> <li>Private-sector organizations expand efforts to understand the growing risks to supply chains and operating assets from the loss of natural capital. Companies identify nature-conservation investments to help mitigate these risks.</li> <li>Fisheries, cattle-raising, forestry and mineral extraction sectors increase commitments and business cases to developing nature-based solutions and for investment in river and lakes.</li> <li>3,500 companies report financial value at risk for each river basin they depend upon.</li> </ul>	<ul style="list-style-type: none"> <li>Establish data-driven methodologies to monitor and evaluate policies and progress on protection and restoration of watersheds and water-dependent ecosystems.</li> <li>Guidelines for wetland conservation and restoration integrated in certification schemes (ASC; Verra) and sectoral policies.</li> <li>Businesses adopt and adhere to peat-wise standards and apply best practices through commodity standards and investment requirements.</li> <li>5,000 companies report financial value at risk per river basin and investments made to enhance the health of the river basin.</li> <li>500 water users achieving third party verification for their water stewardship practices in the most water stressed locations.</li> </ul>	<ul style="list-style-type: none"> <li>Improvement of impact of peat-based industries with a focus on palm oil, pulp and timber in 10 million hectares of peatland as indicated by the hectares under improved management and number of peatland landscapes in good ecological condition.</li> <li>500 companies are setting and making progress against science-based targets for water.</li> <li>1,000 water users achieving third party verification for their water stewardship practices.</li> </ul>	<ul style="list-style-type: none"> <li>A globally diverse set of large businesses have decoupled business growth from the depletion of freshwater resources.</li> </ul>
<b>Civil society</b>	<ul style="list-style-type: none"> <li>Support 2021, UN-Water Year of "Valuing Water" to raise public awareness of the multi-dimensional value of water resources and water-dependent ecosystems.</li> <li>Regional multi-stakeholder platforms, inclusive of women,</li> </ul>	<ul style="list-style-type: none"> <li>Coalitions of business, civil society and government, including women and youth groups, local communities and indigenous peoples, committed and capacitated to operationalise landscape scale</li> </ul>		<ul style="list-style-type: none"> <li>Holistic and integrated understanding and behavioural change across society based on the value of water and the values of good water stewardship, water conservation and carbon mitigation, is achieved.</li> </ul>



	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	<p>local and indigenous communities, and youth, are in place across all globally significant water systems and wetland landscapes, paving the way for shared visions and plans for establishing resilient ecosystems and productive land at landscape and sectoral level.</p> <ul style="list-style-type: none"> <li>• Building with Nature approaches integrated in curricula of at least 50 universities globally.</li> <li>• Broad endorsement and adoption of the IIED Principles for Locally Led Adaptation, that includes water sector stakeholders, in decision-making on both climate change and water management issues.</li> <li>• Civil society is involved, including water sector stakeholders, in decision-making on both climate change and water management issues. Civil society is included at all stages of the decision-making process, from development through to implementation and monitoring &amp; evaluation including through water stewardship processes.</li> </ul>	<p>restoration and management in major wetland landscapes.</p>		

## EXISTING INITIATIVES

<p><a href="#">AWS International Water Stewardship Standard</a></p>	<p>A globally-applicable framework for major water users to understand their water use and impacts, and to work collaboratively and transparently for sustainable water management within a catchment context. The Standard is intended to drive social, environmental and economic benefits at the scale of a catchment. <a href="https://a4ws.org/the-aws-standard-2-0/">https://a4ws.org/the-aws-standard-2-0/</a></p>
<p><a href="#">Global Campaign for Nature</a></p>	<p>Commit to conserving 30% of the Earth's lands and oceans by 2030 and contribute to the Paris Agreement's goals through nature-based solutions. <a href="https://www.campaignfornature.org/">https://www.campaignfornature.org/</a></p>
<p><a href="#">Global Deal For Nature: Guiding principles, milestones, and targets</a></p>	<p>The Global Deal for Nature (GDN) is a time-bound, science-driven plan to save the diversity and abundance of life on Earth. <a href="https://advances.sciencemag.org/content/5/4/eaaw2869">https://advances.sciencemag.org/content/5/4/eaaw2869</a></p>
<p><a href="#">Global Mangrove Alliance</a></p>	<p>The Global Mangrove Alliance brings together technical experts, civil society organizations, governments, local communities, businesses, funding agencies and foundations to accelerate a comprehensive, coordinated, global approach to mangrove conservation and restoration at a scale that matters. <a href="https://www.mangrovealliance.org/">https://www.mangrovealliance.org/</a></p>
<p><a href="#">Source to Sea Action Platform</a></p>	<p>A multi-stakeholder initiative that helps freshwater, coastal and marine experts to contribute to global knowledge generation on source-to-sea interconnections, connect and engage in collaborative projects, promote best practices, and take collaborative action to improve the management of land, water, coastal and marine linkages. <a href="https://www.siwi.org/what-we-do/source-to-sea/">https://www.siwi.org/what-we-do/source-to-sea/</a></p>
<p><a href="#">UN Decade of Ecosystem Restoration, 2021 - 2030</a></p>	<p>The UN Decade on Ecosystem Restoration is a call for the protection and revival of ecosystems all around the world, for the benefit of people and nature. It aims to halt the degradation of ecosystems, and restore them to achieve global goals. Only with healthy ecosystems, can we enhance people's livelihoods, counteract climate change, and stop the collapse of biodiversity. <a href="https://www.decadeonrestoration.org">https://www.decadeonrestoration.org</a></p>
<p><a href="#">UN International Decade for Action on Water for Sustainable Development, 2018-2028</a></p>	<p>The objectives of the Decade focus on the sustainable development and integrated management of water resources for the achievement of social, economic and environmental objectives and on the implementation and promotion of related programmes and projects, as well as on the furtherance of cooperation and partnership at all levels in order to help to achieve internationally agreed water-related goals and targets, including those contained in the 2030 Agenda for Sustainable Development. <a href="https://www.wateractiondecade.org">https://www.wateractiondecade.org</a></p>

[Valuing Water Initiative, Government of The Netherlands](#)

At the World Economic Forum in January 2019, Prime Minister Rutte officially launched the Valuing Water Initiative (VWI). Using practical case studies, this initiative will showcase the implementation of the United Nations Valuing Water Principles in order to bring systemic change in the way water is valued in policy, practice, finance and behaviour and to inspire others to do the same. <https://www.government.nl/topics/water-management/valuing-water-initiative>

## FURTHER REFERENCES

[Biodiversity and Climate Change, Joint IPCC and IPBES report](#)

Tackling Biodiversity and Climate Crises Together and Their Combined Social Impacts. <https://www.ramsar.org/news/tackling-biodiversity-and-climate-crises-together-and-their-combined-social-impacts>

[Community Based Ecological Mangrove Restoration](#)

Holistic approach to mangrove restoration. <https://www.mangroveactionproject.org/cbemr/>

[Equator Initiative Nature-Based Solutions Database](#)

Open source data on locally-led adaptation efforts around the world. <https://www.equatorinitiative.org/knowledge-center/nature-based-solutions-database/>

[The 4 Returns Framework for Landscape Restoration](#)

A practical tested system-change framework used by stakeholders to undertake a landscape approach. <https://www.wetlands.org/publications/the-4-returns-framework-for-landscape-restoration/>

[The Geography of Future Water Challenges](#)

The report highlights the urgent need for an integrated approach to limiting climate- and water-related risks. Using maps and infographics, The geography of future water challenges shows the water-related challenges of tomorrow. <https://themasites.pbl.nl/future-water-challenges/>

[Global Land Outlook, UN Convention to Combat Desertification](#)

The premise of the Global Land Outlook is that land, and its associated resources such as soil, water, and biodiversity, comprise a relatively fixed stock of natural capital. <https://knowledge.unccd.int/glo/global-land-outlook-glo>

[Global Warming of 1.5°C, Intergovernmental Panel on Climate Change Special Report](#)

An IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. <https://www.ipcc.ch/sr15/>

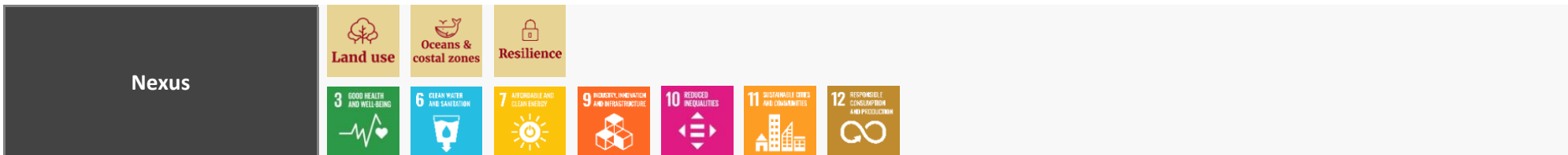
<p><a href="#">Interlinkages and interdependencies among climate, water, food, energy and health, IPBES Assessment</a></p>	<p>Scoping report on assessing the interlinkages among biodiversity, climate, water, food, energy and health (nexus assessment). <a href="https://ipbes.net/sites/default/files/2021-05/IPBES_8_3_nexus%20assessment_en.pdf">https://ipbes.net/sites/default/files/2021-05/IPBES_8_3_nexus%20assessment_en.pdf</a></p>
<p><a href="#">Overview of Environmental Risk Analysis by Financial Institutions, Network for Greening the Financial System (NGFS)</a></p>	<p>Review of different climate and environmental risk analyses and models used by financial institutions. <a href="https://www.ngfs.net/en/overview-environmental-risk-analysis-financial-institutions">https://www.ngfs.net/en/overview-environmental-risk-analysis-financial-institutions</a></p>
<p><a href="#">Ramsar Convention on Wetlands</a></p>	<p>The Convention’s mission is “the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world”. <a href="https://www.ramsar.org/about/the-convention-on-wetlands-and-its-mission">https://www.ramsar.org/about/the-convention-on-wetlands-and-its-mission</a></p>
<p><a href="#">Stop Floating, Start Swimming: Water and climate change – interlinkages and prospects for future action, GIZ</a></p>	<p>This report aims at improving the understanding of complex interrelations between climate change and water, and, based on this understanding, it identifies and showcases the most adequate water actions for improving climate resilience and mitigating greenhouse gas emissions. <a href="https://www.everydrop-counts.org/water-climate-report">https://www.everydrop-counts.org/water-climate-report</a></p>
<p><a href="#">Task Force on Climate-Related Financial Disclosures</a></p>	<p>Framework for disclosure of climate-related risks by companies to their investors. <a href="https://www.fsb-tcf.org/">https://www.fsb-tcf.org/</a></p>
<p><a href="#">Training manual on landscape restoration, IWMI and SIWI</a></p>	<p>Training modules on landscape restoration, the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed. <a href="https://www.siwi.org/publications/training-manual-on-landscape-restoration/">https://www.siwi.org/publications/training-manual-on-landscape-restoration/</a></p>
<p><a href="#">Water &amp; Climate Mitigation report, SIWI, Potsdam Institute, Stockholm Resilience Centre, UNDP</a></p>	<p>A forthcoming report on freshwater’s role in climate change mitigation that will identify high-potential and high-risk water-related mitigation measures from different sectors and present leverage points for embedding the freshwater perspectives within climate mitigation governance and management. <a href="https://www.siwi.org/latest/why-water-is-crucial-to-climate-mitigation/">https://www.siwi.org/latest/why-water-is-crucial-to-climate-mitigation/</a></p>
<p><a href="#">World Bank Water Data Portal</a></p>	<p>Online source for all water-related open data at the World Bank, disaggregated by country and region and organized by three interrelated pillars: Sustain water resources; Deliver services; Build resilience. <a href="https://wbwaterdata.org">https://wbwaterdata.org</a></p>



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# PROTECT PEOPLE

MITIGATION & RESILIENCE



	By 2021	By 2025	By 2030	By 2040
<b>Polymakers (national, subnational, local levels)</b>	<ul style="list-style-type: none"> <li>All NDCs consider adaptation needs and GHG mitigation potential in water and sanitation related mitigation activities, including those that reduce methane emissions and nitrous oxide emissions from wastewater, and in reducing pollution in wetlands and rivers.</li> <li>Water supply and sanitation line ministries and Ministries of finance, support the integration of climate priorities into water and sanitation sectoral strategies and plans with dedicated agreed budgets.</li> <li>Identified climate change risks are mapped together with the existence of disadvantaged communities and low levels of</li> </ul>	<ul style="list-style-type: none"> <li>Ensure response to future pandemics prioritize the provision of safe water, sanitation, and hygienic conditions for all, particularly for vulnerable households and healthcare facilities.</li> <li>National water supply and sanitation development policies and financing begin to incorporate risks related to climate change and are aligned with national mitigation and adaptation priorities.</li> <li>Governments facilitate the development of climate risk assessments to inform, at national/sub-national/local level, water supply and sanitation strategies and plans</li> </ul>	<ul style="list-style-type: none"> <li>Achieve resilient and healthy societies through universal and equitable access to safe, affordable and climate-resilient drinking water and sanitation services (SDG 6), especially servicing the most vulnerable populations who are first to be affected by the impacts of climate change.</li> <li>Ensure Sendai Framework Target 4 is met on 'Substantially reduce disaster damage to critical infrastructure and disruption of basic services including water and sanitation services. Mainstream the inclusion of disaster risk assessment in project finance for climate investments.</li> </ul>	<ul style="list-style-type: none"> <li>Governments create supportive institutional, legal and regulatory frameworks to promote resilient water management at all levels (local to transboundary).</li> <li>Water-centered adaptation policies implemented by over 100 countries, including a proportional number of middle and low-income countries.</li> <li>Climate resilient water management is included in 100 national Disaster Risk Reduction strategies under the Sendai Framework.</li> <li>Cities reduce catastrophic flooding incidents and/or plan for managed retreat.</li> </ul>

	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	<p>access to water and sanitation so that access to water and sanitation are improved for those most vulnerable to climate change impacts.</p> <ul style="list-style-type: none"> <li>Existing socio-ecological resistance and local adaptation strategies are mapped to support policies that build context-specific resilience and avoid maladaptation.</li> <li>Governments allocate sufficient resources and capacity to meet national objectives and international commitments in risk management, mitigation and adaptation to climate change.</li> <li>Governments build capacity of ecosystem managers to factor in the risks induced by climate change and include appropriate response strategies in restoration and management plans and actions.</li> <li>Governments ensure that, when targeting multilateral, bilateral and other sources of climate financing, proposals bring together cross-sectoral water and sanitation considerations.</li> <li>Governments strive for greater clarity on the financing gap and political commitment to close the financing gap for water and sanitation services, water</li> </ul>	<p>and financing. Governments foster the development of impact assessments of previous water and sanitation interventions that include analysis of climate threats.</p> <ul style="list-style-type: none"> <li>Access to water and sanitation are improved for those most vulnerable to climate change impacts.</li> <li>Ensure Sendai Framework Target 4 is met on 'Substantially reduce disaster damage to critical infrastructure and disruption of basic services including water and sanitation services.</li> <li>Climate change is integrated into water and sanitation sector dialogues, joint sector reviews, information exchange and coordination meetings.</li> <li>Water and sanitation development plans and strategies incorporate monitoring systems that include indicators to measure the effectiveness of prioritized mitigation and adaptation measures.</li> <li>National water and sanitation strategies include sustainable use of water and promote increased distribution efficiency, water savings and water reuse.</li> </ul>	<ul style="list-style-type: none"> <li>100 countries have included NBS for flood and drought risk in their NDCs and national DRR strategies under the Sendai Framework.</li> <li>Boost the resilience of ~30 million people in 15 landscapes in 5 countries by 2030, by promoting integration of ecosystem-based approaches in infrastructure development. (Wetlands International commitment in GCA Water Action Track)</li> <li>Robust funding targets and KPIs are agreed by affected stakeholders are met to ensure resilient water management.</li> <li>Commit to ensuring secure water tenure for all water users to enable equitable and resilient resource allocation, and adaptive water resource management in response to drought.</li> </ul>	<ul style="list-style-type: none"> <li>Establishment of mechanisms to recognise, manage and protect water tenure are in place and operational in the 35 most vulnerable territories.</li> </ul>



	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	resources management, and resilience to floods and droughts.	<ul style="list-style-type: none"> <li>All NDCs include climate-informed Disaster Risk Assessment frameworks.</li> <li>Integrated climate and disaster risk reduction planning is brought into action in drought and flood impacted areas which include preparedness, response and risk reduction.</li> <li>Cities draft Water Resilience Action Plans, using sets of water resilience indicator that help in assessing the current resilience capacity.</li> <li>Integrated water adaptation and resilience plans and projects are implemented and supported in at least 120 cities in Africa.</li> <li>Build climate change resilience in 10 transboundary basins and Small Island Developing States, e.g. by supporting transboundary vulnerability and water-food-energy-ecosystem nexus assessments, adaptation and disaster risk reduction strategies and plans and their implementation (Danube, Dniester, Drin, Drina, Neman, Bug, Chu Talas, Congo, Sava, North-Western Sahara Aquifer System, Niger) and increase the capacity of at least 10 basins to prepare bankable projects on adaptation to climate change, including organizing</li> </ul>		



	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
		<p>regional/basin-wide trainings, and increasing collaboration with global climate funds for better synergies between climate funding and transboundary cooperation.</p> <ul style="list-style-type: none"> <li>Achieve agreed financing targets and institutional KPIs in place and reported against to enhance resilient water and sanitation service provision, water resources management, and flood and drought management.</li> </ul>		
<b>Financial Institutions</b>	<ul style="list-style-type: none"> <li>Financial institutions commit to risk screening of investment portfolios, specifically in terms of water and climate risks.</li> <li>Financial institutions revise protocols and incentives to create an enabling environment for innovative green / nature-based solutions.</li> <li>Prioritize, support and invest in a least 20 metropolitan areas over the period 2020-2025, associated with Resilient Basin Futures and World Bank's Utilities of the Future Initiative (World Bank commitment in GCA Water Action Track).</li> <li>Stronger recognition by businesses and investors of the relationship between fair tax payment and the ability of governments to provide climate</li> </ul>	<ul style="list-style-type: none"> <li>Support 30+ countries to access climate finance for water-informed National Adaptation Plans and integrated flood and drought management policies and measures (Global Water Partnership's GCA Water Action Track commitment)</li> <li>100 Water Funds are established around the world.</li> <li>Investors are setting science-based targets for water and climate across their portfolios.</li> <li>The credit rating of the world's most impactful companies is based upon corporate efforts to improve water security and prevent water-climate-risk related conflict.</li> <li>World's most significant stock exchanges include corporate</li> </ul>	<ul style="list-style-type: none"> <li>Increase three-fold capital investments needed to meet the SDG targets 6.1 and 6.2 for safe water and sanitation. More climate financing directed to climate-resilient water and sanitation from, among others, Green Climate Fund.</li> </ul>	



	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	<p>resilient water services and governance, leading to stronger commitment paying a fair tax in all territories, particularly those which face acute climate and water related challenges and a financing gap for water and climate goals delivery.</p>	<p>climate and water disclosure in listing requirements.</p> <ul style="list-style-type: none"> <li>• Mandatory water and climate reporting for companies and financial institutions is realised across G20.</li> <li>• A 3-fold increase in investment for resilient water management training and capacity- building among national adaptation focal points and climate change managers / professionals.</li> <li>• Climate finance leverages over €1 billion for investments in climate-resilient water management and infrastructure founded on robust, inclusive, and effective water governance systems</li> <li>• Over 30 countries access climate finance to implement water-informed National Adaptation Plans/planning processes, and integrated flood and drought management policies and measures.</li> <li>• Prioritize support and investment by 2025 in investment in basin resilience, including support to strengthening institutions, information and governance systems and financing infrastructure and nature-based solutions in at least 20 basins</li> </ul>		



	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
		(World Bank commitment in GCA Water Action Track).		
<b>Technology Providers and Innovators/ Business Providers</b>	<ul style="list-style-type: none"> <li>• Build and upgrade a database of resilient water management case studies.</li> <li>• Scale up application of new frameworks and tools for climate resilient water management, including Climate Risk Informed Decision Analysis (CRIDA) and the World Bank's Decision Tree Framework.</li> <li>• Leading universities and academic institutions conduct research and collaborate with public and private institutions that invest in low-regret, climate-resilient and context specific water and sanitation infrastructure and technology and service delivery models.</li> <li>• National technical guidelines and specifications are developed for mitigation and adaptation to climate change of water and sanitation technologies, and for institutional settings (e.g. schools, healthcare centres).</li> <li>• Improve hydrological predictions and enhance forecasting and early warning capacities, particularly in support of more proactive flood and drought risk management.</li> </ul>	<ul style="list-style-type: none"> <li>• Water supply and sanitation service delivery systems are developed based on risk analysis that address climate change hazards and are appropriate to different contexts.</li> <li>• Transition to aerobic technologies in pit latrines, such as properly operated composting toilets alongside practices of regular emptying of septic tanks and good wastewater management.</li> <li>• Climate advisory services are established in 20 countries that provide forecasting and monitoring of drought and floods.</li> <li>• Governments foster formative research programs that provide information on the factors driving demand for sanitation, including the influence of climate risks</li> </ul>	<ul style="list-style-type: none"> <li>• Adapt sanitation infrastructure through additional technical components of sanitation infrastructure so as to, among others, improve their ability to withstand flood events and reduce contamination in the case of collapse.</li> <li>• Flood defences that use both 'hard' infrastructure and nature-based solutions are established in 10 critical river basins.</li> <li>• Rigorous climate information exists in all countries and is it available at the appropriate time and geographical scales is used effectively to prioritize interventions in the water supply and sanitation sector.</li> </ul>	

	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	<ul style="list-style-type: none"> <li>Upscale the City Water Resilience Approach, developed from an investment of £3m with eight cities (Amman, Cape Town, Hull, Manchester, Mexico City, Miami, Rotterdam, Thessaloniki) and to develop a resilience training program based on the Arup University – MIT Sloan Management School, Executive Masters on Resilience of Urban Systems (Arup's commitment in GCA Water Action Track).</li> </ul>			
<b>Civil society</b>	<ul style="list-style-type: none"> <li>Track, monitor, advocate and bargain to ensure that duty-bearers in government, private and finance sectors deliver on obligations and commitments for climate resilient water and sanitation, including via tracking budgets, spending and impact for the most climate vulnerable and high priority populations.</li> <li>Communicate the need to mainstream climate-resilient water management into national DRR plans under the Sendai Framework, with a particular emphasis on flood and drought management.</li> <li>Implement adaptation training programmes for climate focal points through, for instance, the UNFCCC Consultative Group of Experts (CGE) regional 30-day adaptation training programme</li> </ul>	<ul style="list-style-type: none"> <li>Tool kit guidance on establishing local drought or flood warning and response systems in 10 key basins.</li> <li>Youth and young water professionals are empowered as leaders and knowledge holders that provide solutions for water security and climate action that respect, protect and promote the fundamental human rights to water and sanitation.</li> <li>Clear and effective mechanisms exist in countries for citizen participation in national risk management, mitigation and adaptation processes.</li> <li>At least 150 national adaptation focal points have completed the regional training programme offered by the UNFCCC CGE and are working to implement the knowledge and skills learned</li> </ul>	<ul style="list-style-type: none"> <li>The global civil society oversight facility for resilient water management supports 100 countries.</li> </ul>	<ul style="list-style-type: none"> <li>High calibre performance tracking and bargaining by well-equipped civil society organisations has transformed the efficacy of water governance and financing for inclusion and resilience.</li> </ul>



	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	<p>at 3 universities: Asian Institute of Technology (Asia-Pacific), IHE-Delft (Europe-Africa), Oregon State University (Americas-Caribbean) and sponsor 50 national adaptation focal points to attend the first year.</p> <ul style="list-style-type: none"> <li>• Create virtual resilient water management decision support classes that reach 1,000 stakeholders in the first year.</li> <li>• Create capability within relevant sectors and actors on implementing ecosystem-based solutions for disaster risk reduction.</li> </ul>	<p>into the next round of NDCs / NAPs.</p> <ul style="list-style-type: none"> <li>• A global civil society oversight facility for resilient water management (financing, legal and technical support) has been launched and is operational in the 35 most vulnerable territories and river basins globally.</li> <li>• Financing gaps for inclusive and resilient water management / SDG delivery are well understood and action taken to close these.</li> </ul>		



## EXISTING INITIATIVES

<a href="#">ABC Waters- Active, Beautiful, Clean Waters Programme</a>	<p>Integration of drains, canals, and reservoirs to harness the full potential of waterways and improve quality of life and water for citizens. <a href="https://www.pub.gov.sg/abcwaters/about">https://www.pub.gov.sg/abcwaters/about</a></p>
<a href="#">Accountability for Sustainability, SIWI and UNICEF</a>	<p>This partnership between UNICEF and UNDP-SIWI Water Governance Facility aims to provide UNICEF and UNDP WASH staff with the accountability tools and guidance they need to achieve improved governance and thereby help shape programmes to deliver increased sustainability. <a href="https://www.siwi.org/what-we-do/accountability-for-sustainability/">https://www.siwi.org/what-we-do/accountability-for-sustainability/</a></p>
<a href="#">Accountability for Water</a>	<p>The Accountability for Water Partnership (Water Witness, Water Integrity Network, WaterAid, End Water Poverty, Partnership for African Social and Governance Research, Institute of Development Studies, African Civil Society Network on Water and the World Bank) is working to strengthen the knowledge base to inform the development of a global facility (financial, technical and legal support) to enable civil society to fulfil oversight, budget tracking, accountability monitoring and bargaining roles for climate resilient water governance. <a href="https://www.accountabilityforwater.org/">https://www.accountabilityforwater.org/</a></p>
<a href="#">Adapt'Action (AFD)</a>	<p>Technical assistance and capacity building for countries most vulnerable to climate change. <a href="https://www.afd.fr/en/adaptaction">https://www.afd.fr/en/adaptaction</a></p>
<a href="#">African Adaptation Initiative (UNCAS)</a>	<p>Enhance action on adaptation with the aim of addressing the financing gap, and implementing measures to address disaster risk reduction and resilience needs in Africa. <a href="https://africaadaptationinitiative.org/">https://africaadaptationinitiative.org/</a></p>
<a href="#">BRIDGE- Building River Dialogue and Governance</a>	<p>Capacity building for countries with shared river basins, including a benefit-sharing component to increase dialogue. <a href="https://www.iucn.org/theme/water/our-work/current-projects/bridge">https://www.iucn.org/theme/water/our-work/current-projects/bridge</a></p>
<a href="#">Building Climate Resilience for the Urban Poor (UNCAS)</a>	<p>Invest USD 15.2B by 2023 and USD 60.8B by 2030 to build resilience to the impacts of climate change for 600M urban poor people in 140 cities. <a href="https://climateaction.unfccc.int/views/cooperative-initiative-details.html?id=116">https://climateaction.unfccc.int/views/cooperative-initiative-details.html?id=116</a></p>
<a href="#">City Water Resilience Approach (CWRA)</a>	<p>Developed to help cities grow their capacity to provide high quality water resources for all residents, to protect them from water-related hazards, and to connect them through water-based transportation networks (“provide, protect, connect”). <a href="https://www.resilienceshift.org/campaign/city-water-resilience-approach/">https://www.resilienceshift.org/campaign/city-water-resilience-approach/</a></p>
<a href="#">Climate Resilient Infrastructure Guidance</a>	<p>Establishes common guidance across the infrastructure lifecycle to underpin every stage of resilience creation. <a href="https://www.resilienceshift.org/climate-resilient-infrastructure-guidance/">https://www.resilienceshift.org/climate-resilient-infrastructure-guidance/</a></p>

<p><a href="#">Climate Risk Informed Decision Analysis (CRIDA)</a></p>	<p>CRIDA provides stepwise planning guidance for water resources planners, managers, and engineers to implement robust water management as promoted by the AGWA network — particularly for water managers working in the developing world. <a href="https://agwaguide.org/about/CRIDA/">https://agwaguide.org/about/CRIDA/</a></p>
<p><a href="#">Community Based Adaptation Projects, UNDP Climate Change Adaptation</a></p>	<p>Small scale projects supported by UNDP CCA to support local communities who face the brunt of negative climate consequences. <a href="https://www.adaptation-undp.org/projects/spa-community-based-adaptation-project">https://www.adaptation-undp.org/projects/spa-community-based-adaptation-project</a></p>
<p><a href="#">Green Roads for Water</a></p>	<p>Changing the way roads are built, taking into consideration water management and climate change adaptation to the design and construction of them. <a href="https://roadsforwater.org/">https://roadsforwater.org/</a></p>
<p><a href="#">Insuring Nature to Ensure a Resilient Future</a></p>	<p>The first ever insurance policy of this type, in order to protect and repair coastal zones and coral reefs, which offer protection from extreme weather events. <a href="https://www.nature.org/en-us/what-we-do/our-insights/perspectives/insuring-nature-to-ensure-a-resilient-future/">https://www.nature.org/en-us/what-we-do/our-insights/perspectives/insuring-nature-to-ensure-a-resilient-future/</a></p>
<p><a href="#">The Mutual Accountability Mechanism, SWA</a></p>	<p>The Mutual Accountability Mechanism is a process for governments and other stakeholders to make commitments together on specific actions each actor will take to achieve their targets set in the short- to medium-term on the road to reaching the SDGs. <a href="https://www.sanitationandwaterforall.org/about/our-work/mutual-accountability-mechanism">https://www.sanitationandwaterforall.org/about/our-work/mutual-accountability-mechanism</a></p>
<p><a href="#">Ocean Risk and Resilience Action Alliance (ORRAA) (UNCAS)</a></p>	<p>Drive investment into coastal natural capital by pioneering ground-breaking finance products that incentivise blended finance and private investment. <a href="https://www.oceanriskalliance.org/">https://www.oceanriskalliance.org/</a></p>
<p><a href="#">SHARE, IWMI</a></p>	<p>SHARE II's objectives is to improve livelihoods of vulnerable people in Southern and Eastern Ethiopia while protecting the environment. <a href="https://www.iwmi.cgiar.org/what-we-do/projects/show-projects/?C=1089">https://www.iwmi.cgiar.org/what-we-do/projects/show-projects/?C=1089</a></p>
<p><a href="#">Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security, FAO</a></p>	<p>The Voluntary Guidelines on Tenure promote secure tenure rights and equitable access to land, fisheries and forests with respect to all forms of tenure: public, private, communal, indigenous, customary and informal. Water Guidance forthcoming. <a href="http://www.fao.org/tenure/voluntary-guidelines/en/">http://www.fao.org/tenure/voluntary-guidelines/en/</a></p>
<p><a href="#">WASH Pledge</a></p>	<p>The WBCSD Pledge for access to safe water, sanitation and hygiene (WASH) is an opportunity for companies to contribute concretely to the implementation of SDG 6, while at the same time ensuring that they provide international best practice on WASH. <a href="https://www.wbcd.org/Programs/Food-and-Nature/Water/Water-stewardship/WASH-access-to-water-sanitation-and-hygiene/The-WASH-Pledge">https://www.wbcd.org/Programs/Food-and-Nature/Water/Water-stewardship/WASH-access-to-water-sanitation-and-hygiene/The-WASH-Pledge</a></p>

[World Youth Parliament for Water](#)

The World Youth Parliament for Water is a network of passionate young people from over 80 countries implementing sustainable and practical solutions to global water issues. <https://youthforwater.org/>

## FURTHER REFERENCES

[Adapting to climate change and fostering a low carbon water and sanitation sector, SWA](#)

This briefing note explores how Sanitation and Water for All (SWA) partners can address the risks and challenges presented by climate change through adaptation and mitigation measures. <https://www.sanitationandwaterforall.org/about/about-us/water-sanitation-hygiene/climate-change>

[Just add water: a landscape analysis of climate finance for water](#)

This report presents a review of the existing landscape of international financial flows to the water sector, with a specific focus on climate finance. <https://washmatters.wateraid.org/publications/just-add-water-climate-finance>

[Manifesto for a healthy recovery from COVID-19, WHO](#)

This publication provides an overview of the WHO prescriptions and accompanied actionables for a green and healthy recovery from COVID-19. <https://www.who.int/publications/i/item/who-manifesto-healthy-recovery-covid19>

[Resilient Water Infrastructure Design Brief, World Bank](#)

This working paper focuses on incorporating resilience into the engineering design of drinking water and sanitation infrastructure. <https://openknowledge.worldbank.org/handle/10986/34448>

[Risk Assessments for WASH, SWA](#)

This tool and its proposed methodology set out an approach for conducting risk assessments for the WASH sector covering a wide range of hazard groups affecting the sector, as well as climate change related risks in more detail. <https://www.sanitationandwaterforall.org/tools-portal/tool/risk-assessments-wash>

[Sendai Framework for Disaster Risk Reduction 2015-2030](#)

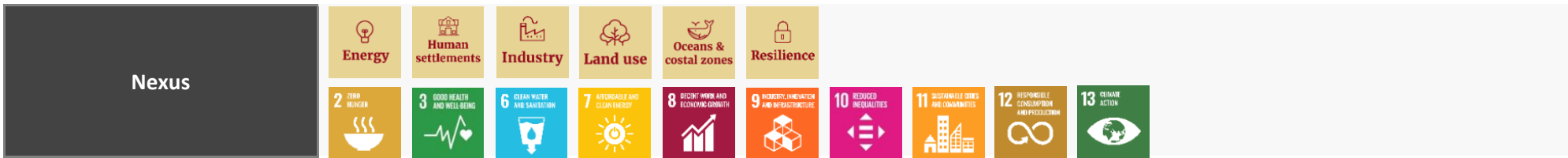
Advocates for the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries. <https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030>

<p><a href="#">The State of Climate Services 2020, WMO</a></p>	<p>Highlights progress made in Early Warning Systems implementation globally and identifies where and how governments can invest in effective EWS to strengthen countries' resilience to multiple weather, climate and water-related hazards. <a href="https://public.wmo.int/en/our-mandate/climate/state-of-climate-services-report">https://public.wmo.int/en/our-mandate/climate/state-of-climate-services-report</a></p>
<p><a href="#">Strategic Framework for WASH Climate Resilience, GWP and UNICEF</a></p>	<p>This framework seeks to advance sector thinking around WASH and climate change, focusing on the planning and execution of actions to promote climate resilience in WASH strategies, plans and approaches. <a href="https://www.gwp.org/en/WashClimateResilience/">https://www.gwp.org/en/WashClimateResilience/</a></p>
<p><a href="#">Sustainable sanitation and gaps in global climate policy and financing</a></p>	<p><a href="https://www.nature.com/articles/s41545-020-0072-8">https://www.nature.com/articles/s41545-020-0072-8</a></p>
<p><a href="#">WASH Climate Resilience – Compendium of cases, UNICEF</a></p>	<p>This document compiles case studies from across UNICEF's climate resilient WASH programming, demonstrating different methods for establishing, safe, sustainable water supply and sanitation for communities affected by climate change. <a href="https://www.unicef.org/documents/wash-climate-resilience-compendium-cases">https://www.unicef.org/documents/wash-climate-resilience-compendium-cases</a></p>
<p><a href="#">World Bank Water Data Portal</a></p>	<p>Online source for all water-related open data at the World Bank, disaggregated by country and region and organized by three interrelated pillars: Sustain water resources; Deliver services; Build resilience. <a href="https://wbwaterdata.org">https://wbwaterdata.org</a></p>

Impact  
**3**

**PRODUCE AGRICULTURE AND FOOD**

**MITIGATION & RESILIENCE**



	By 2021	By 2025	By 2030	By 2040
<b> Policymakers (national, subnational, local levels)</b>	<ul style="list-style-type: none"> <li>Enable policies for transitioning large-scale commodity production towards resilient, low carbon, agroecological, regenerative and climate-smart practices that improve the water cycle, restore ecosystem functionality, and protect soil health through prevention of water erosion and provides cleaner, less polluted water, and maximizes water efficiency in rain-fed or irrigated systems. (Land Use)</li> <li>Align national and regional agriculture policies and on the ground action using system approaches across landscapes to ensure that small-scale agriculture and food production does not enhance provisioning</li> </ul>	<ul style="list-style-type: none"> <li>Governments implement policies that transform agricultural sectors large-scale commodity production moves towards resilient, agroecological, regenerative and climate smart practices. (Land Use)</li> <li>At least 25 countries have developed national policy frameworks for transformative climate outcomes in agriculture. (Resilience)</li> <li>Realign USD 300 billion of agricultural subsidies to help build climate resilience and regenerative agriculture in 16 countries. (Resilience)</li> </ul>	<ul style="list-style-type: none"> <li>Build resilience of 300 million smallholder agricultural producers. (Resilience)</li> <li>Enable policies for circular agriculture economy by minimizing the amount of external inputs including water for agricultural production, closing nutrient loops and reducing negative impacts on the environment by eliminating discharges (i.e. wastewater) and surface runoff. (Land Use)</li> <li>Enable markets and public sector actions to incentivize climate-resilient, water-smart and low emission practices; bring 200 million farmers into appropriate markets through increased profitability and</li> </ul>	<ul style="list-style-type: none"> <li>Ensure all policies, regulation and public support provides incentives for inclusive, sustainable and resilient food and agriculture systems. (Resilience)</li> <li>Enable regulatory regime to effectively supporting regenerative, resilient and productive agriculture, production for the domestic market, and trade in agri-food products with international markets, while protecting the environment and the public. (Land Use)</li> <li>Improved rice production grows to 94-111 million hectares, mitigating 9.4-13.8 gigatons of carbon dioxide emissions.</li> </ul>

	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	<p>ecosystem services at the expense of regulating and cultural services (from ecosystems such as wetlands) and moves towards resilient, regenerative, climate-smart and water smart practices. (Resilience)</p> <ul style="list-style-type: none"> <li>• Improve agricultural practices to enhance a range of ecosystem services.</li> <li>• Align support for maintaining or improving ecosystem services by ensuring that the rural poor realize considerable benefits.</li> <li>• Improve land and water management to incorporate a better understanding of the importance and role of biodiversity.</li> <li>• Incentivize diversification in cropping patterns and an efficient use of water (managing rainwater, evapotranspiration, and reuse) to produce “more nutrition per drop” and encourage farmers to stop growing water intensive crops in water stressed areas. (Resilience)</li> <li>• Enable conditions within multilateral dialogues that lead to development of commitments (both public and private) for enhancing and mainstreaming good practices</li> </ul>	<ul style="list-style-type: none"> <li>• Align regulatory frameworks in demand countries of commodity products (e.g. soy, rice, palm oil etc.) through introducing due diligence and trade parameters including those on water management, preventing further drainage of wetlands for production and requiring re-wetting of peatlands. (Land Use)</li> <li>• Integrated drought management is part of national agricultural policy frameworks and recognises the vital role that wetlands play in storing and releasing water, resulting in coordinated land and water strategies across dryland and wetland landscapes, such as occur in the Sahel.</li> <li>• Governments establish incentives for “peat-wise” and “GHG-wise” commodities (e.g. sago, purun, rattan), and regional internal and external commodity standards are developed and operationalised.</li> <li>• Enable policies for carbon neutral and water smart certification for agricultural production. (Land)</li> <li>• Pesticide and fertilizer use is more regulated and better enforced and field practices are better monitored.</li> </ul>	<ul style="list-style-type: none"> <li>• market development. (Resilience)</li> <li>• Healthy wetlands made an integral part of 8 million ha of production systems (aquaculture, rice farming) in deltas and along coasts, indicated by # ha of land with increased productivity and # ha of land under sustainable management (no net loss of wetlands; degraded lands restored).</li> <li>• Healthy, functioning wetlands are restored and are integral to agriculture and fisheries production in floodplains of all major river systems.</li> <li>• Illegal well drilling for irrigation is reduced by 90% in arid and semi-arid zone countries.</li> </ul>	<ul style="list-style-type: none"> <li>• Policies operate along a broader livelihood agenda to increase assets of the poor, provide more voice in decision-making (while recognizing different roles based on gender, age, class, and caste, raise incomes), and reduce risk and vulnerability.</li> </ul>



	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	<p>including those on smart water management across commodity production supply chains. (Land Use)</p> <ul style="list-style-type: none"> <li>• Ensure that expansion of large-scale commodity production does not increase deforestation, land and wetland degradation, and water insecurity and pollution through eliminating pervasive fiscal incentives and subsidies, penalties for transgressors, and use of independent judicial bodies and watchdog organizations. (Land Use)</li> <li>• Adopt nature-based solutions to drive policies and regulations for the food system at all levels. (Resilience)</li> <li>• Support and scale up climate risk-informed and shock responsive social protection schemes for the most vulnerable people with agriculture-based livelihoods. (Resilience)</li> <li>• Policymakers and practitioners in all mangrove countries are aware of best practices in mangrove restoration and sustainable farming and aquaculture practice near intertidal zones.</li> <li>• Identify critical innovation areas/links with business &amp;</li> </ul>	<ul style="list-style-type: none"> <li>• Policymakers structure context-specific approaches to negotiating and crafting effective institutions and policies, recognizing the contentious political nature of reforms.</li> <li>• Policies put in place the means of getting out of poverty into the hands of poor people by focusing on water as a means to raise their own food.</li> <li>• Increase participation in markets for higher incomes through diversification and local economic growth, creating more jobs both on and off the farm.</li> <li>• Intensify agriculture by increasing water and land productivity to limit additional water use and expansion onto new lands.</li> <li>• Make decisions on water interventions more inclusive and transparent.</li> </ul>		



	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	<p>academia to improved water use in agriculture.</p> <ul style="list-style-type: none"> <li>Develop strict regulations and penalties for highly water-polluting agribusinesses. (Industry)</li> </ul>			
<b>Financial Institutions</b>	<ul style="list-style-type: none"> <li>Increase private sector investment in sustainable, low carbon, agroecological, regenerative and climate smart agriculture commodity production that improve the water cycle, including through safeguarding and restoring functioning wetland systems. (Land Use)</li> <li>Shift to investments that conserve and maintain soil health and diversity through smart water management. (Land Use)</li> </ul>	<ul style="list-style-type: none"> <li>Develop more ambitious industry and finance standards through green banks, company policies for zero agricultural land expansion, disclosure requirements including water disclosure, subsidy reform, and robust verification methods. (Land Use)</li> <li>Invest in research and development for and incentivizing the adoption of technical advances that strengthen resilience, adaptation, and mitigation as well as smart water management within the agriculture sector, that incorporates measures to restore and sustain functioning wetland ecosystems. (Land Use)</li> <li>Generate financial incentives for water-smart producers in the agricultural frontiers to foster sustainable producer behaviour. (Land Use)</li> <li>10% increase in public agricultural water investments to support rainfed agriculture.</li> </ul>		<ul style="list-style-type: none"> <li></li> </ul>



	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
		<ul style="list-style-type: none"> <li>Increase availability of funds to scale up hydroponics, vertical farming, that support both water and energy savings.</li> </ul>		
<b>Technology Providers and Innovators</b>	<ul style="list-style-type: none"> <li>Promote use of indigenous and traditional agricultural knowledge on smart water management as contemporary resilient food systems technology. (Land Use)</li> <li>Encourage compost to boost soil carbon sequestration, enrich the soil, and improve water and nutrient retention.</li> <li>Improve the overall quality of and access to agrometeorological information and early-warning systems especially those that can aid smart water management at farm, national, regional and global level. (Land Use)</li> <li>Further develop tools and methods for on farm carbon and water calculations coupling with most suitable land use or farming practices. (Land Use)</li> <li>Improve and scale up appropriate irrigation techniques to reduce water use, improve production and reduce energy use.</li> </ul>	<ul style="list-style-type: none"> <li>Capacitate risk-informed crop management systems that take water into account to strengthen resilience for large scale commodity production. (Land Use)</li> <li>Integrate ecosystem services in the small-scale farming practices. (Land Use)</li> <li>Develop and upscale tools for measuring soil moisture and health, carbon sequestration, water management (such as sensors that control irrigation systems automatically), and other positive outcomes of regenerative production. (Land Use)</li> <li>Scale up of urban agriculture with smart systems to reduce food loss, water and energy consumption.</li> <li>Advances in near-term climate prediction ensures water and agriculture managers can respond to sub-seasonal variabilities more effectively.</li> </ul>	<ul style="list-style-type: none"> <li>Increase availability of tools and methods for precision agriculture, site specific farming and land and water management practices. (Land Use)</li> <li>Mid-season drainage practice is widely adopted in rice cultivation, reducing methane emissions by 35 to 70 percent.</li> <li>Hydro-climate and meteorological data support the food security agenda.</li> <li>Local peri-urban agriculture based on treated wastewater provides 10% of the food for cities and large towns.</li> </ul>	<ul style="list-style-type: none"> <li>Further development of technology for agricultural production to meet the increasing food demand while not jeopardizing risks of climate change including water insecurity. (Land Use)</li> <li>Improved rice production grows to 94-111 million hectares, mitigating 9.4-13.8 gigatons of carbon dioxide emissions</li> </ul>

	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
		<ul style="list-style-type: none"> <li>• Satellite imagery is further developed and utilized to prevent water theft.</li> <li>• Water and carbon accounting tools are mainstreamed to support assessment of key food value chains.</li> <li>•</li> </ul>		
<b>Business and Service Providers</b>	<ul style="list-style-type: none"> <li>• Increase private sector pledges on smart water management commitments in their supply chain and incorporation of supplier data in procurement decisions. (Land Use)</li> <li>• The largest corporate consumers of agricultural commodities commit to regenerative agricultural practices that are water smart across supply chains. (Land Use)</li> <li>• Companies mainstream the application of high carbon stock, high-conservation value, and valuing water approaches by producers and the use of nature-based solutions to achieve science-based emission reduction targets. (Land Use)</li> <li>• Develop blueprint to scale up investment in climate-informed farmer advisory services and information and communication technology (ICT) platforms that</li> </ul>	<ul style="list-style-type: none"> <li>• Develop producer – consumer countries partnerships including governments, industry, farmers and civil society to accelerate sector transformations towards nature-positive, water smart models. (Land Use)</li> <li>• The largest corporate consumers source 25% of agricultural commodities from suppliers implementing regenerative agricultural practices.</li> </ul>	<ul style="list-style-type: none"> <li>• The largest corporate consumers source 50% of agricultural commodities from suppliers implementing regenerative agricultural practices.</li> <li>• Large scale companies reach the target of reducing emissions from rice paddies by 20 per cent. (Land Use)</li> <li>• Improve synthetic fertilizer production and efficiency and reduce emissions by ~180 million tons of carbon dioxide (Mt CO<sub>2</sub>) per year. (Land Use)</li> <li>• Companies include water usage in ‘green supply chain’ approaches.</li> </ul>	<ul style="list-style-type: none"> <li>• The largest corporate consumers source 100% of agricultural commodities from suppliers implementing regenerative agricultural practices. (Land Use)</li> <li>• Large scale companies reach the target of reducing emissions from rice paddies by 70 per cent. (Land Use)</li> <li>• Improve synthetic fertilizer production and efficiency and reduce emissions by ~200 million tons of carbon dioxide (Mt CO<sub>2</sub>) per year. (Land Use)</li> <li>• Ensure sustainable natural resource bases including water resources for regenerative agricultural production, particularly for smallholder farmers. (Land Use)</li> <li>• Sustainably improve crop and water productivity to feed the growing population and ensure livelihoods for small scale farmers and food producers. (Land Use)</li> </ul>



	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	<p>support smart water management. (Land Use)</p> <ul style="list-style-type: none"> <li>• Best practice approaches to mangrove restoration, sustainable aquaculture and rice agriculture and schemes for sustainable production and value chain enhancement of key wetland commodities (oysters, artisanal fisheries, salt, honey) demonstrated across sectors.</li> <li>• Strengthen the business case for scaling up enhanced rainfed agriculture among farmers and understanding of the benefits of improving soil conservation, catchment management and supporting sustainable rural livelihoods.</li> </ul>			
<b>Civil society</b>	<ul style="list-style-type: none"> <li>• . Raise awareness of the role and value of ecosystem services—through education, information dissemination, and dialogues among stakeholders, sectors, and disciplines.</li> <li>• Reduce food losses and resulting water losses in upper- and middle-income countries by 20 per cent. For more on water &amp; food waste, see “Consumption, diets, and waste” action table in Land Use Pathway. (Land Use)</li> <li>• Promotion of healthy, sustainable diets and reduction of food waste, with increased</li> </ul>	<ul style="list-style-type: none"> <li>• Land use decisions are seen as water use decisions.</li> <li>• Promote awareness of the interconnectedness of water users through the hydrologic cycle.</li> <li>• Improve inventories, assessments, and monitoring, especially of factors related to ecosystem resilience and thresholds that, once crossed, preclude a system from providing a range of services.</li> <li>• Increase level of consumer awareness concerning commodity related impacts on</li> </ul>	<ul style="list-style-type: none"> <li>• Increase local and national training systems and resources dedicated to water-smart small-scale agriculture and agribusiness.</li> <li>• Reduce food losses and resulting water losses in upper- and middle-income countries by 30 per cent. (For more on water &amp; food waste, see “Consumption, diets, and waste” action table in Land Use Pathway)</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce food losses and resulting water losses in upper- and middle-income countries by 50 per cent. For more on water &amp; food waste, see “Consumption, diets, and waste” action table in Land Use Pathway (Land Use)</li> <li>• Agriculture is understood as an ecosystem producing</li> <li>• multiple services, interacting with ecosystem</li> <li>• conservation.</li> </ul>



	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	<p>understanding of impacts on water, energy, and GHG emissions in order to identify and manage trade-offs with potential increases in associated water use.</p> <ul style="list-style-type: none"> <li>Organize consumer advocacy, using media to build awareness of the impacts of purchasing decisions on water security.</li> <li>Convene and empower national, regional small-scale networking and producers organizations to create communities of practice and resource-sharing on climate smart water management, especially those among women and indigenous farmers, pastoralists, and water managers.</li> </ul>	<p>water security in emerging markets.</p> <ul style="list-style-type: none"> <li>Promote small scale business related to agriculture and water (services supply, transformation, distribution).</li> <li>Disseminate knowledge and best practices to strengthen science-practice links on agriculture and water.</li> <li>Establish local and national training systems dedicated to water-smart small-scale agriculture and small scale agribusiness.</li> <li>Wider understanding of the damaging impact of rice farming on the environment and of the benefits of improved rice production, which involves improved soil, nutrient management, water use, and tillage practices.</li> </ul>		

## EXISTING INITIATIVES

<p><a href="#"><u>AgWater Challenge, Ceres and WWF</u></a></p>	<p>Collaborative effort to increase commitment to water stewardship from companies with large agricultural supply chains. <a href="https://www.ceres.org/our-work/water/water-and-agriculture/cereswwf-agwater-challenge">https://www.ceres.org/our-work/water/water-and-agriculture/cereswwf-agwater-challenge</a></p>
<p><a href="#"><u>Building climate resilience and adaptive capacity in Sri Lanka: The bundled insurance solution</u></a></p>	<p>IWMI's hi-tech bundled solutions in Sri Lanka which comprise climate risk insurance, agro-climatic advice and climate resilient seeds. <a href="https://www.iwmi.cgiar.org/2021/05/hi-tech-support-helps-sri-lankas-farmers-navigate-the-climate-crisis/">https://www.iwmi.cgiar.org/2021/05/hi-tech-support-helps-sri-lankas-farmers-navigate-the-climate-crisis/</a></p>
<p><a href="#"><u>Drought Monitoring and Forecasting to Enhance Agriculture Resilience and Improving Food Security in South Asia</u></a></p>	<p><a href="https://www.iwmi.cgiar.org/what-we-do/projects/show-projects/?C=998">https://www.iwmi.cgiar.org/what-we-do/projects/show-projects/?C=998</a></p>
<p><a href="#"><u>Innovation Lab For Small Scale Irrigation</u></a></p>	<p>Resilience, health and food and nutrition security for smallholder farmers in sub-Saharan Africa and South East Asia through improving access to water and fostering water management best practices. <a href="https://ilssi.tamu.edu/">https://ilssi.tamu.edu/</a></p>
<p><a href="#"><u>Risk-Informed Early Action Partnership (REAP) (UNCAS)</u></a></p>	<p>Reduce the impact of specific disaster events on agriculture and livelihood through the monitoring of major risks. <a href="https://www.early-action-reap.org/">https://www.early-action-reap.org/</a></p>
<p><a href="#"><u>Solar irrigation for Agricultural Resilience, IWMI</u></a></p>	<p>Solar Irrigation for Agricultural Resilience in South Asia (SoLAR-SA) project aims to sustainably manage the invidious water-energy and climate interlinkages in South Asia (Bangladesh, India, Nepal and Pakistan) through promotion of solar irrigation pumps (SIPs). <a href="https://solar.iwmi.org/">https://solar.iwmi.org/</a></p>
<p><a href="#"><u>Support for Smallholder Farmers (UNCAS)</u></a></p>	<p>Enhance resilience to climate shocks and extreme events for 300 million small-scale farmers, increase household incomes and food security, and reverse ecological decline.</p>
<p><a href="#"><u>Transforming Investments in African Rainfed Agriculture (TIARA)</u></a></p>	<p>TIARA, is an initiative launched by SIWI that aims to increase investments and promote rainfed agriculture as a cost-effective approach to improving agricultural productivity, climate resilience and building sustainable livelihoods across rural Africa. <a href="https://www.siwi.org/what-we-do/transforming-investments-in-african-rainfed-agriculture-tiara/">https://www.siwi.org/what-we-do/transforming-investments-in-african-rainfed-agriculture-tiara/</a></p>
<p><a href="#"><u>Water and Energy for Food</u></a></p>	<p>Initiative to increase sustainability in water and energy usage along the agricultural value chain, and scale up innovation in the water-energy-food nexus. <a href="https://we4f.org/who-we-are">https://we4f.org/who-we-are</a></p>

## FURTHER REFERENCES

<p><a href="#">Agriculture and food security</a></p>	<p>Chapter in UNESCO World Water Assessment Programme (WWAP); UN-Water. The United Nations World Water Development Report 2020: Water and Climate Change. <a href="https://www.unwater.org/publications/world-water-development-report-2020/">https://www.unwater.org/publications/world-water-development-report-2020/</a></p>
<p><a href="#">Agroforestry and Water for resilient landscapes, SIWI</a></p>	<p>This brief focuses on the role of trees for increased water security on smallholder agroforestry farms in the tropics, and opportunities to adopt agroforestry as a landscape restoration practice to make degraded lands more resilient to the consequences of climate change while reducing greenhouse gas emissions. <a href="https://www.siwi.org/publications/agroforestry-and-water-for-resilient-landscapes/">https://www.siwi.org/publications/agroforestry-and-water-for-resilient-landscapes/</a></p>
<p><a href="#">AQUASTAT- FAO's Global Information System on Water and Agriculture</a></p>	<p>Online database for information on water usage, particularly in agriculture, wastewater, and water resources generally. <a href="http://www.fao.org/aquastat">http://www.fao.org/aquastat</a></p>
<p><a href="#">Climate Smart Irrigated Rice Systems, World Bank</a></p>	<p>Applying new or enhancing existing practices and technologies, through better nutrient application and use, soil management, crop management and water. <a href="http://documents.worldbank.org/curated/en/511451622784959067/Climate-Smart-Irrigated-Rice-Systems">http://documents.worldbank.org/curated/en/511451622784959067/Climate-Smart-Irrigated-Rice-Systems</a></p>
<p><a href="#">The State of Food and Agriculture 2020: Overcoming water challenges in agriculture, FAO</a></p>	<p>The State of Food and Agriculture 2020 offers appropriate options for addressing water-related challenges in order to improve food security and nutrition and ensure environmental sustainability, in the spirit of the 2030 Agenda. <a href="http://www.fao.org/state-of-food-agriculture/en/">http://www.fao.org/state-of-food-agriculture/en/</a></p>
<p><a href="#">Water for Food, Water for Life: A Comprehensive Assessment of Water Management in Agriculture, IWMI</a></p>	<p>The Comprehensive Assessment of Water Management in Agriculture critically evaluates the benefits, costs, and impacts of the past 50 years of water development, the water management challenges communities are facing today, and solutions people have developed. <a href="https://www.iwmi.cgiar.org/assessment/files_new/synthesis/Summary_SynthesisBook.pdf">https://www.iwmi.cgiar.org/assessment/files_new/synthesis/Summary_SynthesisBook.pdf</a></p>

Impact  
**4**

**PRODUCE ENERGY**

MITIGATION & RESILIENCE



	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
<b>Policymakers (national, subnational, local levels)</b>	<ul style="list-style-type: none"> <li>Countries undertake system-scale planning for energy infrastructure that adequately considers alternative options that lessen demand on water resources and freshwater ecosystems, including green or nature-based solutions and renewable technologies. At the same time, water resources are being reallocated away from non-renewable forms of energy provision towards renewable.</li> <li>Clear and ambitious energy efficiency and renewable power policies are adopted and aligned with targets at national, state/regional, and local levels to be compatible with a 1.5°C</li> </ul>	<ul style="list-style-type: none"> <li>Double the share of sustainable renewable energy used in water extraction, supply, treatment, and reuse of water. At the same time, ensure that the level of water extraction and consumption in energy generation does not increase with a greater share of freshwater being allocated for use in renewable energy generation than fossil fuel-based generation activities.</li> <li>100 countries have targets for 100% renewable energy-based power, and the targets factor in water impacts. (Energy Pathway)</li> </ul>	<ul style="list-style-type: none"> <li>SDG7 has been achieved with universal access to affordable, reliable, sustainable and modern energy by significantly increasing the deployment of renewable energy and doubling the share of efficiency, while minimizing trade-offs that hinder the achievement of SDG 6. (Energy Pathway)</li> <li>Enabling policies are stimulating a circular economy and maximizing opportunities for more efficient use of energy and other resources such as water. (Energy Pathway)</li> <li>Cross-sectoral linkages such as in health, clean water and</li> </ul>	<ul style="list-style-type: none"> <li>Building on the Energy Pathway, universal access to sustainable power is maintained and continuously improved for social and economic development that maximizes the GHG mitigation and climate resilience synergies at the water-energy nexus and reduces climate risks through integrated planning and management of energy, water, and land use. (Energy Pathway)</li> <li>Maintain mandates for the use of hydrogen, depending on each country context, taking into account water availability, quality, and access. (Energy Pathway)</li> </ul>

	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	<p>pathway, and policies factor in water impacts of energy efficiency and renewable power. (Energy Pathway)</p> <ul style="list-style-type: none"> <li>All energy transition measures have been developed based on the principles for a just, socially balanced and fair transition, including safeguarding availability of and access to water for people and ecosystems. (Energy Pathway)</li> <li>Dedicated programmes are put in place to ensure modern energy access in critical public infrastructure including schools, health care facilities (including testing centres, laboratories and cold supply chains), water and sanitation services, and community centres. (Energy Pathway)</li> <li>Energy-health-water nexus is an integral part of economic recovery measures. Public financing is mobilised in enabling infrastructure and guiding strategic decision-making, and policy measures are designed to mobilise additional private capital. (Energy Pathway)</li> <li>Develop a pathway for green hydrogen with more research on the water impact of green hydrogen, which will inform how</li> </ul>	<ul style="list-style-type: none"> <li>Integrated energy planning (using grid, mini-grid, and off-grid technologies and taking into account of energy-water-land use nexus) are fully utilized to advance universal energy access. (Energy Pathway)</li> <li>Ensure that green hydrogen policies protect availability of and access to water for other essential social and economic uses, ensuring responsible use of water resources and promoting circular economy concepts.</li> <li>Expand policy frameworks, regulatory models, procurement processes, funding support to new geographies for green hydrogen deployment, with water assessment taken into consideration. (Energy Pathway)</li> <li>50 cities plan for an integrated water-waste-energy approach to optimize resources.</li> <li>50 countries have enacted policies for improving energy efficiency in the national urban water sector.</li> <li>Incentivise alternatives to construction of large hydropower projects such as hydroelectric dams.</li> </ul>	<p>agriculture are fully tapped into to improve livelihoods in rural and remote areas. (Energy Pathway)</p> <ul style="list-style-type: none"> <li>Renewable energy solutions contribute to adaptation strategies for other sectors, such as water and land-use. (Energy Pathway)</li> <li>Refine international certification systems to ensure that any future hydrogen supply is carbon-free and water-wise and agree to international criteria for carbon content and water assessment of hydrogen and hydrogen-related fuels and feedstocks. (Energy Pathway)</li> <li>Negative emissions technology such as Bioenergy with carbon capture and storage (BECCS) is scaled up while taking sustainable water management into account so as to avoid water stress resulting from irrigation on biomass plantations.</li> </ul>	<ul style="list-style-type: none"> <li>Next generation green hydrogen production, storage and utilization technologies, especially those that minimize impact on water, begin to emerge at scale. (Energy Pathway).</li> <li>Small hydropower systems grow to supply 994-1,136 TWh of electricity in 2050, reducing 1.7-3.3 gigatons of greenhouse gases emissions and saving between \$315-544 billion in fixed and variable operation and maintenance costs and fuel costs.</li> <li>Through active water leakage control in water-distribution networks, by 2050, reduce water losses by 38-47 percent globally by 2050, with resulting emissions reduction from pumped distribution amounting to 0.66-0.94 gigatons of carbon dioxide and saving 359,489-449,489 million meters of water.</li> </ul>





	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	<p>water scarcity and water pollution can be included in the coordination of regulations, codes and standards along the hydrogen supply chain. (Energy Pathway).</p> <ul style="list-style-type: none"> <li>• National energy policies provide incentives for improving energy efficiency in the urban water sector with the objective to reduce and report carbon emissions and improve financial and operational performance.</li> <li>• Support the development and design of US\$6 billion in new / retrofitted water infrastructure to help lower carbon emissions from the water sector and improve performance over time.</li> <li>• Governments devise plan to address leaks in water-distribution networks, especially in cities, which curbs water loss, energy use, and emissions.</li> <li>• Use existing hydropower to incentivize and grow other renewable energy technologies to develop climate smart grids and reduce new hydropower development in pristine basins.</li> </ul>			
<b>Financial Institutions</b>	<ul style="list-style-type: none"> <li>• Launch sector criteria for water-related investments including hydropower.</li> </ul>			



	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
<b>Technology Providers and Innovators</b>	<ul style="list-style-type: none"> <li>• Increase marketing of solar water heaters as supplement to conventional electric and gas boilers in homes and businesses.</li> <li>• Invest in R&amp;D for water smart renewable energy technologies and net zero industrial sites. (Industry)</li> </ul>	<ul style="list-style-type: none"> <li>• Solar irrigation is mainstreamed in 30 countries to bring lower carbon food values chains.</li> <li>• Scale up production of solar water heating to 15% of addressable market, delivering emissions reductions of 3.6 gigatons of carbon dioxide.</li> <li>• In remote communities, scale up small hydropower technology to expand electrification and replace expensive and dirty diesel generators. In urban environments, in-stream turbines can be placed within city water mains (called conduit hydropower).</li> </ul>	<ul style="list-style-type: none"> <li>• Scale up of solar water heating to 30% of addressable market, delivering emissions of 14.3 gigatons of carbon dioxide.</li> </ul>	<ul style="list-style-type: none"> <li>• 100 percent of residential and commercial users heat water through solar water heaters.</li> </ul>
<b>Civil society</b>		<ul style="list-style-type: none"> <li>• Wider understanding of benefits of small hydropower systems to capture the energy of free-flowing water, without using a dam. They can replace dirty diesel generators with clean electricity generation.</li> </ul>		

## FURTHER REFERENCES

<p><a href="#">Energy, water and the Sustainable Development Goals, IEA</a></p>	<p>Excerpt from World Energy Outlook 2018 revealing the benefits of an integrated approach to SDG 7 on energy access and SDG 6 on clean water and sanitation. <a href="https://www.iea.org/reports/energy-water-and-the-sustainable-development-goals">https://www.iea.org/reports/energy-water-and-the-sustainable-development-goals</a></p>
<p><a href="#">If the energy sector is to tackle climate change, it must also think about water, IEA</a></p>	<p><a href="https://www.iea.org/commentaries/if-the-energy-sector-is-to-tackle-climate-change-it-must-also-think-about-water">https://www.iea.org/commentaries/if-the-energy-sector-is-to-tackle-climate-change-it-must-also-think-about-water</a></p>
<p><a href="#">Irrigation of biomass plantations may globally increase water stress more than climate change, Nature</a></p>	<p>Stenzel, F., Greve, P., Lucht, W. et al. Irrigation of biomass plantations may globally increase water stress more than climate change. Nat Commun 12, 1512 (2021). <a href="https://doi.org/10.1038/s41467-021-21640-3">https://doi.org/10.1038/s41467-021-21640-3</a></p>
<p><a href="#">Thirsty Energy: Securing Energy in a Water-Constrained World, World Bank</a></p>	<p>Helps countries integrate water constraints into the energy sector and better address water and energy challenges. <a href="https://www.worldbank.org/en/topic/water/brief/water-energy-nexus">https://www.worldbank.org/en/topic/water/brief/water-energy-nexus</a></p>
<p><a href="#">The water consumption of energy production: an international comparison</a></p>	<p>E S Spang et al 2014 Environ. Res. Lett. 9 105002. <a href="https://iopscience.iop.org/article/10.1088/1748-9326/9/10/105002#erl484006s3">https://iopscience.iop.org/article/10.1088/1748-9326/9/10/105002#erl484006s3</a></p>
<p><a href="#">Water Stress Threatens Nearly Halt the World's Thermal Power Plant Capacity, WRI</a></p>	<p>Article published by WRI highlighting the growing concern over the energy sector's usage of water- even renewable energy sources. This article has links to other works and statistics on the water-energy nexus. <a href="https://www.wri.org/blog/2018/04/water-stress-threatens-nearly-half-world-s-thermal-power-plant-capacity">https://www.wri.org/blog/2018/04/water-stress-threatens-nearly-half-world-s-thermal-power-plant-capacity</a></p>
<p><a href="#">Water-Energy Nexus: Business Risks and Rewards, WRI</a></p>	<p>Article from the business perspective on the water-energy nexus, with three case studies. <a href="https://www.wri.org/publication/water-energy-nexus">https://www.wri.org/publication/water-energy-nexus</a></p>
<p><a href="#">Water-Energy Nexus: World Energy Outlook Special Report, IEA</a></p>	<p>Excerpt from World Energy Outlook 2016 on the critical interplay between water and energy. <a href="https://www.iea.org/reports/water-energy-nexus">https://www.iea.org/reports/water-energy-nexus</a></p>

Impact  
**5**

# REUSE WASTEWATER

MITIGATION & RESILIENCE



	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
<b>Policymakers (national, subnational, local levels)</b>	<ul style="list-style-type: none"> <li>All NDCs list opportunities to reduce emissions in the urban water sector through zero carbon water and wastewater management and treatment.</li> <li>Countries have set up national reporting systems for GHG emissions and mitigation in the urban water and wastewater sector in line with national GHG reporting standards.</li> <li>Countries commit to pollution abatement in wetlands and rivers as a pathway for reducing methane emissions.</li> </ul>	<ul style="list-style-type: none"> <li>All NDCs and NAPs of countries with high levels of water stress include commitments to reuse 100% wastewater as an adaptation measure.</li> <li>GHG emissions from water and wastewater utilities and other entities that treat large volumes of wastewater (e.g. industry), including through the use of energy and wastewater management are monitored and reported in national Measurement, Reporting and Verification (MRV) processes and GHG inventory processes.</li> <li>Regulatory standards for wastewater reuse are developed</li> </ul>	<ul style="list-style-type: none"> <li>Water and wastewater utilities have reached complete decarbonization and improved climate resilience through climate risk management.</li> <li>Create enabling environment for decentralized water systems where appropriate, restructuring of water institutions and policies, including an integration of planning, funding, and regulations across the currently segmented fields of water, stormwater and wastewater.</li> </ul>	<ul style="list-style-type: none"> <li>Through decentralized modular wastewater treatment process, the water sector is a net positive renewable energy and nutrient provider, and 100% of all municipal, industrial, and agricultural wastewater is treated for reuse or discharge into the environment.</li> <li>Governments improve water efficiency by 50% through demand management and water reuse and water renewal.</li> </ul>



	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	<ul style="list-style-type: none"> <li>Cities have water management plans in place that incorporate wastewater reuse.</li> </ul>	<p>and tested for different climate environments.</p> <ul style="list-style-type: none"> <li>Governments encourage replacement of inefficient water infrastructure and move to flexible and robust water systems that can anticipate and monitor changes.</li> </ul>		
<b>Financial Institutions</b>	<ul style="list-style-type: none"> <li>Institutional investors publicly support a campaign to end industrial water pollution and catalyse water reuse and recycling.</li> <li>Scale up public-private investments in water reuse/ water renewal and efficient infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>Greater investment in institutions, accountability &amp; enforcement for treatment and reuse of wastewater</li> <li>Private financial institutions are reporting the proportion of companies in portfolios that are setting water-related science-based targets for water quality.</li> </ul>		
<b>Technology Providers and Innovators</b>	<ul style="list-style-type: none"> <li>Improve data availability and model complexity on GHG emissions from biological processes in wastewater treatment plants, information that will be increasingly important as countries move towards increasing coverage of wastewater treatment.</li> <li>Collaborate with government on identifying and rolling out technologies for water reuse / water renewal, water trading, water markets etc.</li> <li>Scaling up and improving hybrid treatment methods featuring advanced blackwater treatment</li> </ul>	<ul style="list-style-type: none"> <li>Reduce energy use in sewerage conveyance, such as through gravity-based systems and increased use of distributed or decentralised systems where appropriate that reduce pumping distances.</li> <li>Achieve GHG emissions/energy savings through water efficiency in inside and outside of residential and non-residential buildings including repairing leaks within distribution systems..</li> </ul>	<ul style="list-style-type: none"> <li>Energy recovery during wastewater treatment leading to net-positive energy generation from wastewater.</li> <li>Businesses, households and governments have implemented circular water models.</li> </ul>	

	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
	<p>followed by advanced clean-water processing that convert the nutrients to less-harmful compounds or even capture them for a beneficial purpose for municipalities.</p>			
<b>Business and Service Providers</b>	<ul style="list-style-type: none"> <li>• Most impactful companies are setting and making progress against wastewater pollution and reuse targets.</li> <li>• Heavy and light industries develop and set targets to increase the usage of recycled water in all stages of production of, among others, aluminium, cement and concrete, chemicals, metals and mining, ICT and mobile, and retail. (Industry)</li> <li>• Ensure water usage, waste, and pollution are integrated into tracking and reporting of supply chain environmental data in a transparent and traceable way. (Industry)</li> <li>• Water and wastewater utilities adopt tools for GHG emissions measurement and reporting.</li> <li>• Increase public acceptance of water reuse through positive marketing campaigns.</li> <li>• Supply products for rainwater storage and harvesting for potable and non-potable uses.</li> </ul>	<ul style="list-style-type: none"> <li>• Chief Procurement Officers of the world's largest 250 companies have incentives tied to wastewater treatment and reuse.</li> <li>• 500 of the world's largest businesses treating all wastewater for reuse or safe discharge.</li> <li>• Water utility companies recover 30% of the biomass energy/biogas in wastewater.</li> <li>• Water and wastewater utilities at the national level have elaborated climate risk management plans in 80 countries.</li> </ul>	<ul style="list-style-type: none"> <li>• The proportion of untreated wastewater has been halved from 85% to 43% and water recycling and safe reuse has been substantially increased globally.</li> <li>• Tier 1 suppliers to have minimum liquid discharge wastewater treatment facilities in high polluting sectors. (Industry)</li> </ul>	<ul style="list-style-type: none"> <li>• Fully recover nutrients such as phosphorus and nitrogen from wastewater and reduce dependency on fossil-based chemical fertilisers.</li> </ul>

	By 2021 ▼	By 2025 ▼	By 2030 ▼	By 2040 ▼
<b>Civil society</b>	<ul style="list-style-type: none"> <li>• Create campaigns and educational programs to improve public perceptions about the safety of water reuse and on-site wastewater management, reversing current “out of sight, out of mind”, toward acceptance of "toilet to tap".</li> <li>• Boost transparency of and publicly track corporate progress against wastewater commitments.</li> </ul>	<ul style="list-style-type: none"> <li>• Toolbox guides are developed for critical urban environments that use wastewater in creating green spaces that can also offset droughts and floods.</li> </ul>		

## EXISTING INITIATIVES

<p><a href="#">Climate Change Mitigation through Methane Recovery and Reuse from Industrial Wastewater Treatment, GEF</a></p>	<p>Increasing Myanmar's efforts towards climate mitigation by minimizing GHG emissions through the application of integrated low-emission wastewater treatments and the Transfer of Environmentally Sound Technologies (TEST). <a href="https://www.thegef.org/project/climate-change-mitigation-through-methane-recovery-and-reuse-industrial-wastewater-treatment">https://www.thegef.org/project/climate-change-mitigation-through-methane-recovery-and-reuse-industrial-wastewater-treatment</a></p>
<p><a href="#">Decentralised Wastewater Systems (BORDA)</a></p>	<p>A multi-level network of partners designs locally-tailored decentralised wastewater systems to communities. <a href="https://www.borda.org/solutions/decentralised-sanitation-systems-2/#dewats">https://www.borda.org/solutions/decentralised-sanitation-systems-2/#dewats</a></p>
<p><a href="#">Energy Performance and Carbon Emissions Assessment and Monitoring Tool (ECAM), WaCclim</a></p>	<p>Designed for assessing the carbon emissions of the urban water cycle that are within the operational boundaries of water and wastewater utilities and prepare these utilities for future reporting needs on climate mitigation. <a href="http://www.wacclim.org/ecam/">http://www.wacclim.org/ecam/</a></p>
<p><a href="#">Net Zero Routemap</a></p>	<p>The Net Zero 2030 Routemap sets out the industry's vision for how water companies, which together produce almost a third of UK industrial and waste process emissions, will play their part in tackling climate change by reaching net zero two decades ahead of the UK Government's legally binding target of 2050. By joining forces in this way, the sector expects to reduce its greenhouse gas emissions by 10 million tonnes. <a href="https://www.water.org.uk/routemap2030/">https://www.water.org.uk/routemap2030/</a></p>
<p><a href="#">NEWater</a></p>	<p>A new, 4-step system to reclaim and recycle water for urban use. <a href="https://www.pub.gov.sg/watersupply/fournationaltaps/newater">https://www.pub.gov.sg/watersupply/fournationaltaps/newater</a></p>
<p><a href="#">Organica, Veolia</a></p>	<p>New wastewater treatment option that uses resistant plants to clean the water and remove odor. It also has the appearance of a greenhouse. <a href="https://www.veolia.com/en/solutions/organica-wastewater-treatment-plants">https://www.veolia.com/en/solutions/organica-wastewater-treatment-plants</a></p>
<p><a href="#">Regulating for Citywide Inclusive Sanitation, IWA</a></p>	<p>Rallying service providers and regulators for joint action on inclusive sanitation. <a href="https://iwa-network.org/projects/regulating-for-citywide-inclusive-sanitation/">https://iwa-network.org/projects/regulating-for-citywide-inclusive-sanitation/</a></p>
<p><a href="#">Sycotm and SIAAP project on comethanisation process</a></p>	<p>Sewage sludge and the wet part of domestic waste share the same high content of organic matter and their common treatment offers interesting perspectives in terms of energy recovery and material recovery. This input mix can lead to an energy and environmental balance greater than that achieved through separate channels (methane productivity greater than 100%)</p>



<p><a href="#">Syctom and SIAAP pilot project in Manila (Philippines)</a></p>	<p>Metro Manila produces around 6,700 tonnes of household waste per day. In the absence of an efficient collection system at the scale of 17 million inhabitants, 17% of the metropolis's waste ends up in the river. A pilot project has been set up in Manila (Philippines) by two public authorities, Syctom and SIAAP, to improve the quality of the water in the Pasig River. This project enforces the phytotreatment of wastewater system piloted by the SIAAP. It is mainly a question of devising treatment methods that will reduce the quantities of untreated waste dumped into the river.</p>
<p><a href="#">Wastewater? From Waste to Resource, World Bank</a></p>	<p>Raising awareness about the wastewater challenge and demonstrate wastewater as a resource. Provides guidance on planning, management, and financing of wastewater treatment. <a href="https://www.worldbank.org/en/topic/water/publication/wastewater-initiative">https://www.worldbank.org/en/topic/water/publication/wastewater-initiative</a></p>
<p><a href="#">Wastewater Zero, WBCSD</a></p>	<p>Industry commitment to eliminate wastewater pollution and increase water reuse and recycling. <a href="https://wbcspdpublications.org/wastewater-zero/">https://wbcspdpublications.org/wastewater-zero/</a></p>
<p><a href="#">Water and Wastewater Companies for Climate Mitigation (WaCCliM)</a></p>	<p>Water and wastewater utilities can become leaders in climate mitigation, reducing greenhouse gas emissions while lowering their operational costs, improving their services to the public and protecting the environment. <a href="https://wacclim.org/">https://wacclim.org/</a></p>

## FURTHER REFERENCES

<p><a href="#">Agriculture and food security</a></p>	<p>Chapter in UNESCO World Water Assessment Programme (WWAP); UN-Water. The United Nations World Water Development Report 2020: Water and Climate Change. <a href="https://www.unwater.org/publications/world-water-development-report-2020/">https://www.unwater.org/publications/world-water-development-report-2020/</a></p>
<p><a href="#">Circular Economy: Tapping the Power of Wastewater, IWA</a></p>	<p>Presents current technologies for energy recovery from water and sludge along with promising innovations. <a href="https://iwa-network.org/learn/circular-economy-tapping-the-power-of-wastewater/">https://iwa-network.org/learn/circular-economy-tapping-the-power-of-wastewater/</a></p>
<p><a href="#">Circular Economy Pathways for Municipal Wastewater Management in India, CEEW</a></p>	<p>This practitioner's guide presents the global perception on the adoption of a circular economy pathway in the wastewater sector. It identifies relevant practices for India. It highlights critical factors that need assessment to come up with a wastewater management strategy. <a href="https://www.ceew.in/publications/circular-economy-pathways-municipal-wastewater-management-india">https://www.ceew.in/publications/circular-economy-pathways-municipal-wastewater-management-india</a></p>

<p><a href="#">Greenhouse Gas Emission and Mitigation in Municipal Wastewater Treatment Plants, IWA</a></p>	<p>Summarises the recent development in studies of greenhouse gases' (CH4 and N2O) generation and emission in municipal wastewater treatment plants. <a href="https://iwaponline.com/ebooks/book/728/Greenhouse-Gas-Emission-and-Mitigation-in">https://iwaponline.com/ebooks/book/728/Greenhouse-Gas-Emission-and-Mitigation-in</a></p>
<p><a href="#">The Sanitation and Wastewater Atlas of Africa</a></p>	<p>Flagship product of a four-year project implemented jointly by the United Nations Environment Programme, GRID-Arendal, and the African Development Bank to describe the current situation of wastewater management and sanitation across the African continent. <a href="https://www.unenvironment.org/resources/publication/sanitation-and-wastewater-atlas-africa?_ga=2.29035132.1949485277.1612376422-670453711.1612376422">https://www.unenvironment.org/resources/publication/sanitation-and-wastewater-atlas-africa?_ga=2.29035132.1949485277.1612376422-670453711.1612376422</a></p>
<p><a href="#">Sanitation, Wastewater Management and Sustainability, UNEP</a></p>	<p>The book looks beyond human health, marine environment protection and resource recovery to the many other ways that sustainable sanitation and wastewater systems can contribute to meeting the social, environmental, and economic goals of the 2030 Agenda for Sustainable Development. <a href="https://www.unep.org/resources/report/2nd-edition-sanitation-wastewater-management-and-sustainability">https://www.unep.org/resources/report/2nd-edition-sanitation-wastewater-management-and-sustainability</a></p>
<p><a href="#">Sludge to Energy: An Environment-Energy-Economic Assessment of Methane Capture from Sludge in Xiangyang City, Hubei Province, WRI</a></p>	<p>WRI assessed the extent to which the Xiangyang project achieved “3E”— environmental, energy, and economic—benefits, i.e. detoxification, stabilization, reduction, and resource recovery of sludge. <a href="https://www.wri.org/research/sludge-energy-environment-energy-economic-assessment-methane-capture-sludge-xiangyang-city">https://www.wri.org/research/sludge-energy-environment-energy-economic-assessment-methane-capture-sludge-xiangyang-city</a></p>
<p><a href="#">Water and Circular Economy, Ellen MacArthur Foundation</a></p>	<p>This white paper explores the common characteristics, ideas and approaches between Circular Economy Initiatives being implemented by organisations and Water System Management in its most holistic sense. <a href="https://www.ellenmacarthurfoundation.org/assets/downloads/ce100/Water-and-Circular-Economy-White-paper-WIP-2018-04-13.pdf">https://www.ellenmacarthurfoundation.org/assets/downloads/ce100/Water-and-Circular-Economy-White-paper-WIP-2018-04-13.pdf</a></p>