
Integrating sanitation and climate change in national level policy frameworks

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Sveva Lazzati
Daniel Ddiba
Biljana Macura
Sanitation and Water for All Secretariat



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Stockholm Environment Institute
Linnégatan 87D 115 23 Stockholm, Sweden
Tel: +46 8 30 80 44
www.sei.org

Author contact

Sveva Lazzati
sveva.lazzati@sei.org
<https://orcid.org/0009-0009-8969-5569>

Daniel Ddiba
daniel.ddiba@sei.org
<https://orcid.org/0000-0001-5908-6417>

Biljana Macura
biljana.macura@sei.org
<https://orcid.org/0000-0002-4253-1390>

Editing

Naomi Lubick

Layout

Tyler Kemp-Benedict

Graphics

Harry Woodrow, Mia Shu

Media contact

Ulrika Lamberth
ulrika.lamberth@sei.org

Cover photo

A man carries a squat toilet from a collapsed house in Indonesia. © Dhana Kencana / Climate Visuals

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Contents

1. Linkages between sanitation and climate change	4
2. Aims and scope	5
3. Integration of sanitation in NDCs	6
4. Integration of climate in sanitation policies	8
5. Benefits of integrating sanitation and climate policy	10
6. Recommendations to further integrate sanitation and climate policy frameworks	13
References	15

Key messages

- Progress is being made to integrate sanitation and climate change in national policy frameworks, although gaps remain. Only 2% of activities in Nationally Determined Contributions (NDCs) address climate action in sanitation systems, while less than half of the 121 countries that responded to the UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS) survey in 2021–2022 address climate-related risks in their national sanitation policies.
 - Growing awareness of climate and sanitation linkages is driving policy integration across countries, with examples presented here from Uganda, Bolivia and Jordan where these linkages are embedded in policies, as well as in countries where recent multistakeholder processes have advanced integrating policy frameworks, such as in Indonesia, Viet Nam, Togo and Malawi.
 - Aligning sanitation and climate policies creates an enabling environment for the realization of the human right to sanitation and offers numerous benefits, including enhanced effectiveness of sanitation systems, potential for reduced emissions, improved ecosystem services and increased access to climate finance.
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1. Linkages between sanitation and climate change

The linkages between sanitation and climate change are receiving increasing attention. The Climate Resilient Sanitation Coalition (CRSC)¹, formed in 2022 to address these issues, urged stakeholders to collaborate in reducing greenhouse gas emissions throughout the sanitation service chain and strengthening the resilience of sanitation systems to enhance public health globally (CRSC, 2022). International processes such as the adoption of the United Arab Emirates Framework for Global Climate Resilience at COP28, under the Global Goal on Adaptation, also reflect this necessary focus on sanitation, calling for heightened efforts towards the integration of sanitation and climate policy.

This attention stems from a robust body of evidence showing how sanitation systems, while often marginal to climate discussions, are critically affected by extreme and slow-onset events, resulting in impaired access and functionality. Beyond economic losses, these disruptions lead to increased health risks, deepened inequalities and ecosystem deterioration (Howard et al., 2016; Hyde-Smith et al., 2022). At the same time, sanitation systems contribute to greenhouse gas emissions, exacerbating climate change. Estimates show that sanitation systems account for approximately 1.3% of global greenhouse gas emissions (Ritchie & Roser, 2024), with recent trends pointing to increases in relative global contributions (Cheng et al., 2022).

Despite growing recognition, the disconnect between sanitation and climate change policy and climate action has resulted in sanitation priorities being poorly reflected in national climate policy frameworks. At the same time, sanitation policies often neglect relevant climate considerations, including adapting sanitation services to climate

¹ The CRSC includes members such as UNICEF, the University of Technology Sydney, the World Bank, the World Health Organization, the Global Green Growth Institute, WaterAid, the Green Climate Fund, the Asian Development Bank, the African Development Bank, the Sustainable Sanitation Alliance, the Stockholm Environment Institute, and other research institutions, practitioners, and funds. See more: <https://www.susana.org/community/themes/climate-resilient-sanitation-coalition>

impacts and mitigating greenhouse gas emissions (Dickin et al., 2020), though there are more recent advances in this area (see e.g. UTS-ISF, 2022). Moreover, there is growing evidence that investments in climate-resilient sanitation yield multiple benefits for climate action, as also detailed in IPCC 6th Assessment Report (IPCC, 2022). Low-carbon and resilient sanitation services have been shown to contribute to building multidimensional community resilience, reducing socio-environmental vulnerability, and lowering greenhouse gas emissions through strategies such as resource recovery and reuse via biogas production, or off-site composting (Mikhael et al., 2021).

The direct consequence of this inadequate incorporation of climate considerations in sanitation policies, and vice versa, is that opportunities for synergies between Sustainable Development Goals (SDGs) 6 and 13 are missed, while sanitation initiatives receive only a minimal portion of climate finance. The resulting lack of infrastructure and resources for resilient sanitation services curtails adaptation capacity and deepens vulnerability, a point highlighted in the IPCC's *Sixth Assessment Report*, which underscores the need for broader support to sectors vulnerable to climate impacts (IPCC, 2022).

2. Aims and scope

Past analyses by SEI researchers (Dickin et al., 2020) and the UNDP-SIWI Water Governance Facility (2023) examined how water and sanitation are addressed in the initial and updated Nationally Determined Contributions (NDCs). These analyses unequivocally concluded that there are gaps in how climate-related challenges are addressed in sanitation and that most NDCs do not include specific targets or measures pertaining to sanitation. However, these analyses focused only on NDCs, did not explore the inclusion of climate change considerations in policy frameworks for WASH (water, sanitation and hygiene), and did not delve into practical recommendations for the mutual integration of sanitation and climate change in national level policy frameworks.

Building on the previous analyses, our objective here is to discuss the extent of integration between sanitation and climate change in national level policies. We provide an update on the analysis of sanitation's inclusion in the NDCs and also cover the extent to which climate change considerations are included in sanitation plans and policies.

The findings presented here are based on descriptive statistical analysis of data from the GLAAS 2021/2022 survey and the NDC-SDG Connections tool (<https://www.sei.org/tools/ndc-sdg-connections/>). The development of this work has also benefited from collaboration with other ongoing processes for the review of NDCs and National Adaptation Plans (NAPs) to explore to what extent they address wider transboundary water resource management and water supply-sanitation issues (done by the UN Economic Commission for Europe²), as well as a review that was more circumscribed in scope by WaterAid of NDCs and NAPs and how they address WASH in the countries where WaterAid operates.³

² See UNECE (2024). *Mainstreaming water supply, sanitation, transboundary water management and cooperation into Nationally Determined Contributions and National Adaptation Plans*. https://unece.org/sites/default/files/2024-11/Action_oriented_document_Transboundary%20and%20WASH_advanced_draft_14Nov2024.pdf

³ See WaterAid (2024). *Integrating WASH into NAPs and NDCs – guidelines for best practice*. WaterAid.

After describing our analysis of country policies from NDCs and where they are progressive or lacking (sections 3 and 4), we highlight other examples of integration strategies and their observed benefits (Section 5) and provide recommendations on how climate-sanitation policy integration can be achieved in practice (Section 6). In response to the growing calls for integrating sanitation and climate policy, we provide critical insights and recommendations to advance the global implementation of integrated climate-sanitation priorities. Specifically, our findings aim to support ongoing policy processes, such as the upcoming revisions of NDCs and the formulation of NAPs, as well as countries' climate-resilient WASH initiatives and investments.

3. Integration of sanitation in NDCs

Our analysis of recent data from the NDC-SDG Connections tool, detailing all activities in the updated NDCs from 144 countries available as of 31 May 2024 (Dzebo et al., 2024a,b), confirms that sanitation priorities remain relatively marginal. Of the 8846 activities in the NDCs altogether, 607 activities relate to SDG 6 (Figure 1). Out of all SDG 6-related activities, only 168 relate to sanitation and wastewater: 36 relate to SDG 6.2, increasing access to sanitation; 122 to SDG 6.3; wastewater treatment and resource recovery; and 10 activities cover both SDG 6.2 and 6.3.

While sanitation activities constitute only a minor proportion of all NDC activities (2%), they account for more than a quarter of all SDG 6-related activities. This figure is much higher than four years ago (5% of SDG 6-related activities), from an analysis of the first round of NDCs (see Dickin et al., 2020). This could reflect increasing awareness of the importance of climate and sanitation linkages. It is important to note, however, an overall increase in the number of activities in the updated NDCs, from 6900 previously compared to 8846.

Figure 1: Overview of SDG6 related activities as a proportion of all the 8846 activities identified in the NDCs, and sanitation-related activities (SDG 6.2 and 6.3) as a proportion of the 607 SDG6 activities identified in the NDCs. Data is from 31 May 2024.



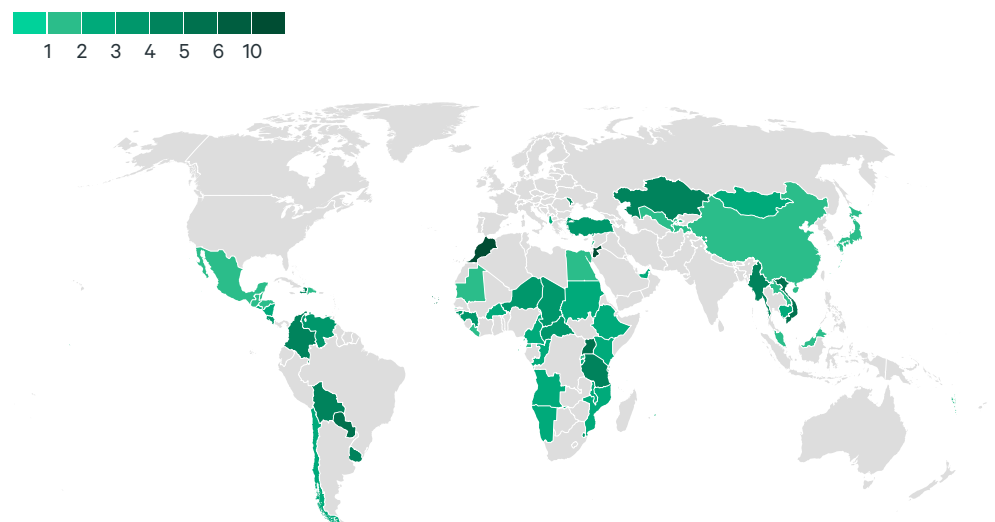
Data source: Dzebo et al. (2024b); graph created by the authors.

Within sanitation-related activities, the predominant focus is on adaptation (69% of the activities), while 19% address mitigation and 12% are cross-cutting. This indicates that the sanitation sector's ability to contribute to global emission reduction goals remains

largely overlooked at a policy level, despite ongoing initiatives such as the International Water Association’s Climate Smart Utilities (IWA, 2024).

Of the 144 countries whose NDCs are included in this analysis, only 66 countries included sanitation-related activities, spread across all continents (Figure 2). The region with the most sanitation activities across all NDCs continues to be sub-Saharan Africa, with 63 activities spread across 28 countries. However, Jordan stands out as the single country with the most climate-related sanitation activities (12 activities), followed by Morocco (10 activities). It is notable that most high-income countries still have no sanitation-related activities in their NDCs, despite the potential of interventions for climate mitigation in sanitation systems, e.g. via biogas capture and use, as well as the need to adapt sanitation systems to the impacts of climate change.

Figure 2: Geographical distribution of sanitation-related activities described in NDCs



Our analysis also indicates that the quality and detail of sanitation-related activities in the NDCs vary significantly. For instance, actions might simply state the commitment to increasing the share of the population with access to sanitation or refer to “improved sanitation” and “improved wastewater treatment” without describing the intended improvements and the steps to achieve them, nor incorporating a link to climate resilience. Where the need to mainstream climate change in national sanitation policy is acknowledged in some cases, specific plans and activities required to achieve this are missing or lack detail. To effectively address sanitation’s contribution to climate action, it is important for activities to be specific and to include baseline data and relevant indicators where appropriate, hence allowing their progress to be tracked.

Bolivia, Jordan and Uganda are examples of countries with sanitation-related activities in NDCs described in detail, with relevant targets and interventions, both for mitigation and adaptation. Specifically, Bolivia made an upfront commitment to climate-resilient and equitable sanitation systems that include adaptation and disaster risk reduction, with its NDC submitted in 2022. This is supported by detailed goals for improving sewerage and sanitation services, wastewater treatment and reuse practices, which will

also be measured through an index of integrated and sustainable water management (Ministerio de Medio Ambiente y Agua, 2021a).

Similarly, Uganda's NDC, which was submitted in 2022, includes sanitation-related climate mitigation actions for target sectors and locations, as well as the use of specific technologies. Examples include the Nationally Appropriate Mitigation Actions (NAMAs) for improving school sanitation through "bio-latrines" fitted with biogas digesters and for integrated wastewater treatment to address methane emissions from wastewater treatment through using both anaerobic and aerobic digesters, and the Planned Green Cities program to increase the efficiency of wastewater treatment in five cities and 15 municipalities (Ministry of Water and Environment of Uganda, 2022).

The NDC from Jordan (Ministry of Environment of Jordan, 2021) has cross-cutting strategies that recognize sanitation's contribution and include actions such as the expansion of wastewater treatment plants, biogas generation, and an increase in the use of non-conventional water resources. Specific adaptation actions are also detailed to improve the adaptive capacity of water utilities and contribute to overall adaptation goals. These range from planning and institutional activities, such as "conducting climate-proofing studies for existing water utilities" to user engagement and awareness activities (see Box 1 below).

BOX 1. EXAMPLES OF USER ENGAGEMENT AND AWARENESS-RAISING ACTIONS FOR SANITATION, INCLUDED WITHIN WATER, SANITATION AND HYGIENE (WASH) (MINISTRY OF ENVIRONMENT OF JORDAN, 2021):

- "Enhancing community engagement and stakeholder management approaches through WASH, to strengthen social cohesion and trust between community and water utilities in service delivery and community climate adaptation initiatives" (p. 35)
 - "Enhancing the adaptive capacity of small farmers in Jordan Valley through water user associations for increasing use of reclaimed water for irrigation purposes" (p. 36)
 - "Increasing community awareness, behavioural change and adoption of water conservation measures through WASH centred community behavioural change initiatives" (p. 36).
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4. Integration of climate in sanitation policies

For national level WASH policies, we analysed the data from the UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS) 2021/2022 survey (WHO, 2022), in which 121 countries and territories participated. This survey data indicate that less than half of all the countries surveyed address risks of climate change to water and sanitation services or the resilience of WASH systems to climate change within their urban and rural sanitation policies and plans (Table 1). Among the 24 low-income countries that responded to the survey, a higher percentage of

countries had urban and rural sanitation policies and plans that address climate risks (54%). However, this proportion is still relatively low considering that some of these countries are experiencing some of the worst impacts of climate change (IPCC, 2022). The survey did not explore how aspects of climate mitigation are addressed in water and sanitation policies, however; see Table 1.

Table 1: Percentage of countries that address climate change in their national level sanitation policies and plans.

Content of the policy/plan	Urban sanitation			Rural sanitation		
	Yes	No	No response	Yes	No	No response
Addresses risks of climate variability and climate change to WASH services (n = 121)	42%	3%	55%	40%	3%	57%
Addresses climate resilience of WASH technologies and management systems (n = 121)	37%	2%	60%	36%	2%	61%

Data source: GLAAS 2021/2022 country survey (WHO, 2022).

One possible explanation behind the relatively low proportion of countries with sanitation policies that address climate risks is that many of these policies are old and have not been updated for some decades; for example, at least six of the countries that responded to the GLAAS 2021/2022 survey have urban sanitation policies that have not been updated since 1999, with one dating as far back as 1969. This implies that these policies do not take into account how climate change impacts sanitation systems and the role of sanitation systems in building climate resilience, given the progress in knowledge in these fields since then.

However, some countries do have detailed climate considerations incorporated into the rationale and plans for improved sanitation services, and examples from the same three countries described earlier are highlighted here. For instance, addressing the impacts of climate change is central to Jordan's National Water Strategy 2023–2040 (Ministry of Water and Irrigation, 2023), the scope of which covers not just water supply but also sanitation and wastewater management. The strategy incorporates climate change resilience as one of the sector's strategic areas, including an assessment of climate change trends and impacts on sanitation infrastructure, strategic objectives for building climate resilience in wastewater infrastructure and operations, and obtaining climate finance to support implementation of adaptation actions, as well as stipulating institutional roles and responsibilities for leading efforts in adapting wastewater management to climate change.

Similarly, Uganda's policy framework stipulates a unified Water and Environment Sector Development Plan (Ministry of Water and Environment, 2017), along with a Sector Strategic Investment Plan 2018–2030 which provides detailed budget estimates to support implementation (Ministry of Water and Environment, 2018). The plan links climate and water priorities recognizing sanitation and climate change as central to social transformation and sustainable development. Concrete targets are provided and supplemented with strategies and priority interventions, including the expansion of sanitation services, wastewater treatment and safe reuse, as well as more sustainable

natural resources management. Climate adaptation and mitigation targets are included in multiple sections of the plan, and there is a priority intervention to “mainstream and harmonise climate change mitigation and adaptation aspects into relevant sector policies, strategies, programs and budgets” (p. 46).

Bolivia’s national water and environment sector plan (Ministerio de Medio Ambiente y Agua, 2021b) also integrates sanitation and climate change by promoting water management strategies that enhance the resilience of water resources, while ensuring equitable access to safe water and sanitation services, with a special focus on vulnerable groups. Key policies and guidelines explicitly centre on the sustainability of sanitation services, including the implementation of climate adaptation actions and mechanisms to improve the resilience of sanitation infrastructure, or sustainable wastewater management to protect ecosystems.

5. Benefits of integrating sanitation and climate policy

Integrating climate and sanitation policies at the national level can lead to several benefits and, ultimately, to the realization of the human right to sanitation. Specifically, by aligning climate and sanitation policies, countries could unlock numerous opportunities, which we describe below from other research: enhance the efficiency and resilience of sanitation systems, lower greenhouse gases emissions, increase community and ecosystem resilience, improve food security, and access vital climate finance to support these initiatives.

Increased efficiency of sanitation systems and services. Integrating climate considerations into sanitation policies through strategies such as optimizing resource use, reducing waste and improving infrastructure resilience, enhances the efficiency of sanitation systems. This can lead to lower operational costs, reduced environmental impact and more reliable service delivery, particularly in areas vulnerable to climate change. Efficient sanitation systems that incorporate climate-resilient technologies and approaches can potentially achieve significant improvements in energy use and resource recovery, resulting in both economic and environmental benefits (see e.g. Andersson et al., 2020).

Increased ambition to reduce greenhouse gas emissions. Countries can enhance their efforts to reduce greenhouse gas emissions by investing in climate-smart sanitation systems. These systems can mitigate emissions through resource recovery processes such as biogas production and composting, which reduce methane emissions while providing renewable energy and soil enhancers. This demonstrates the potential of circular sanitation solutions to contribute to national emissions reduction targets. Other measures such as the use of aerobic treatment technologies, the use of more energy efficient treatment approaches, and more regular de-sludging of containment facilities can also contribute to reducing greenhouse gas emissions (see e.g. Andersson et al., 2020; IWA, 2023; Moonkawin et al., 2023; UNEP & GRID-Arendal, 2023).

Increased health and community resilience. Basic services, including sanitation, are essential for community resilience. By incorporating climate considerations, sanitation systems can be designed to withstand climate impacts, ensuring that communities remain healthy and resilient in the face of climate change. For example, the World Health Organization highlights that climate-resilient sanitation infrastructure is crucial for preventing outbreaks of waterborne diseases following extreme weather events (WHO, 2019).

Increased ecosystem resilience. Sustainable sanitation practices that integrate climate mitigation and adaptation efforts help protect and restore ecosystems. For example, reducing the amount of nutrient pollution from wastewater into coastal areas can help restore mangrove ecosystems and protect coral reefs from algal blooms, hence supporting marine biodiversity. Furthermore, incorporating approaches like buffer zones and constructed wetlands can enhance ecosystem services such as water purification and flood regulation, which are vital for community well-being. Ecosystem-based approaches to sanitation have been shown to increase ecosystem resilience, particularly in areas prone to extreme weather and environmental degradation (see e.g. Wenger et al., 2023).

Increased food resilience. Climate-resilient sanitation systems can contribute to food security by supporting agricultural practices that use treated wastewater or biosolids for irrigation and soil enrichment. This approach closes the loop between sanitation and agriculture, providing nutrients and water for crops while reducing waste. Research has shown that these practices can improve food production, particularly in areas facing water scarcity and nutrient depletion (see e.g. Andersson et al., 2020; UNEP & GRID-Arendal, 2023).

Increased access to climate finance to build climate-resilient sanitation services and communities. Integrating sanitation into climate policies and vice versa positions countries to access climate finance for interventions that enhance climate mitigation and adaptation within sanitation systems. These funds can be leveraged to build and maintain resilient sanitation systems that protect communities from the impacts of climate change. For example, the Green Climate Fund (GCF) aims to fund and support water and sanitation projects that enhance climate resilience, recognizing the role that safely managed WASH services play in building overall community resilience in the face of climate change (GCF, 2023). In the interest of climate justice, climate finance is also crucial for ensuring equity, in that the costs of adopting lower-emissions and climate-resilient sanitation systems should not fall disproportionately on low-income countries or the poorest communities.

By seizing the above-mentioned opportunities, countries can ensure that their sanitation and climate policies work hand in hand to build a more sustainable and resilient future.

5.1 National and regional examples from governments and NGOs

Stakeholder engagement processes are key to national and regional collaborations to integrate climate in sanitation and vice versa. The recent *Climate Compendium* launched by SWA (see Box 2) and the UNFCCC's high-level campaign Race to Resilience (SWA, 2023) and the landscape study on urban sanitation and climate change by the University of Technology Sydney (UTS-ISF, 2022) include details of other examples, where countries are finding ways to integrate climate change and sanitation within national level planning and policy frameworks. These include:

- The government of Indonesia's work on a new framework that integrates climate resilience in water and sanitation planning and programming, and applying the framework to other subsectors as well based on the lessons learned.
- The government of Viet Nam's law on water supply and sewerage services, drafted with the support of the water sector association to integrate climate adaptation and resilience, after COP26. The process contributed to coordination of efforts from multiple stakeholders, including over 300 utilities, civil society organizations, research institutes and government agencies.
- In Malawi, a Climate-Resilient WASH Finance Strategy was developed and launched in August 2022 as one of the outputs of a coordination process with multiple stakeholders. The country has been able to access over USD 145 million since then for its water and sanitation utilities to implement programs, which among other interventions will include the rehabilitation of the sewer network and institutional development to enhance preparedness in responding to disasters and catastrophic events that affect water and sanitation services.

In Togo, Nigeria and Uganda, networks of civil society organizations have been actively gathering evidence and raising awareness about the connections between climate action and the WASH sector. Their analysis of national climate policies and documents, including NDCs and NAPs, has underscored the need to integrate WASH considerations into broader national and regional climate accountability frameworks.

- In Togo, Jeunes Volontaires pour l'Environnement (JVE) conducted the first regional study to examine climate policy documents and NDCs from 15 countries within the Economic Community of West African States (ECOWAS). The resulting report recommended ways to improve the integration of WASH within current NDCs, such as by establishing more transparent cost estimates for WASH in climate finance strategies.
- In Nigeria, the Society for Water and Sanitation (NEWSAN) examined national policy documents to evaluate the integration of climate change policies within the WASH sector. This analysis contributed to a comprehensive review aimed at strengthening policies, including setting national targets that reinforce the importance of climate action within water, sanitation, and hygiene frameworks.
- In Uganda, efforts to coordinate climate action within the water and sanitation sectors have led to the creation of a multistakeholder national WASH and Climate Task Force. This task force focuses on integrating climate-related risks into sector policies and programs, laying the groundwork for new project proposals aimed at implementing mitigation and adaptation initiatives across the country.

BOX 2. THE SANITATION AND WATER FOR ALL (SWA) PARTNERSHIP

The SWA partnership serves as a crucial platform for advancing the integration of climate and sanitation policy at both national and global levels. By facilitating high-level meetings with sector and finance ministers, the SWA provides a unique opportunity for stakeholders to discuss and align their efforts in addressing the climate crisis and its impact on sanitation. Through the SWA Mutual Accountability Mechanism, countries can commit to specific targets, share best practices, and receive support for developing robust climate-sanitation project proposals. Additionally, the establishment of Head of State Compacts under the SWA framework encourages leadership and accountability in addressing climate-resilient sanitation. These initiatives not only enhance collaboration among various actors but also foster the necessary political will to secure dedicated climate finance for sanitation, ultimately paving the way for more effective and integrated approaches to achieving climate resilience in the WASH sector.

6. Recommendations to further integrate sanitation and climate policy frameworks

Integrating sanitation and climate change in national level policy frameworks requires specificity in intended activities and interventions. Here we present a guide for national governments to use in their work on their NDCs, due for revision in 2025, as well as for stakeholders, to show how to engage with integrating sanitation and climate in national level policy.

Within national level planning and policy processes, the guiding questions in Table 2 below can be used to prompt discussions on the specifics about how exactly to integrate climate action into sanitation systems and vice versa.

The recent adoption of the framework for the Global Goal on Adaptation at COP28 (UNFCCC, 2023), which includes climate-resilient sanitation in its first thematic target, presents a unique and timely opportunity for sanitation and climate stakeholders to advance integrated policy development. COP28 called on countries to raise the ambition of their NDCs, and sanitation presents a largely untapped opportunity for many countries to achieve greater emission reductions. Beyond the analysis of NDCs discussed here, NAPs also present a critical opportunity to ensure sanitation is comprehensively integrated into national adaptation strategies moving forward. Only 59 countries have submitted their NAPs to the UNFCCC as of November 2024.⁴

⁴ See <https://napcentral.org/submitted-naps>

Table 2: Guiding questions to prompt thinking on integrating climate action into sanitation systems and vice versa

Category	Guiding questions
Assessment of climate risks	What climate risks (e.g. floods, droughts, temperature changes) are expected to impact sanitation systems?
Vulnerability and needs	Which communities or regions are most vulnerable to climate-related sanitation issues (e.g. infrastructure failure, challenges to service providers)?
Adaptation measures	What sanitation-specific adaptation measures can be implemented to strengthen resilience to climate impacts?
Co-benefits	How can sanitation interventions also contribute to other adaptation goals (e.g. health, biodiversity, ecosystem health, livelihoods, food security)?
Mitigation potential	What are the opportunities for reducing greenhouse gas emissions within the sanitation sector (e.g. through resource recovery, the use of aerobic treatment technologies, more frequent de-sludging of containment facilities, etc.)?
Institutional capacity	Are there gaps in institutional capacity or governance structures that hinder climate-resilient and low-emission sanitation implementation?
Monitoring and evaluation	How will progress on sanitation-related climate adaptation and mitigation measures be monitored and evaluated?
Financing	What financial resources are available or needed to scale up sanitation-related climate adaptation and mitigation measures?
International cooperation	How can international collaboration support the integration of sanitation into national adaptation and mitigation strategies, as well as the integration of climate action into sanitation strategies?

Note: The questions are inspired by guiding questions from the NDC 3.0 Navigator,⁵ as well as a SWA briefing note on climate action in the WASH sector (SWA, 2019).

As countries are urged to complete or update their NAPs, and are required to present revised NDCs in 2025, now is the time for sanitation stakeholders to collaborate closely with climate policymakers to ensure that the potential of the sanitation sector is fully realized and reflected in these revised NDCs. Such collaboration can help countries not only meet their current climate commitments but also push beyond them, making a significant impact on global efforts to combat climate change.

To capitalize on these opportunities, sanitation stakeholders:

- must first understand where the processes for NAP formulation and NDC revision stand in their respective countries;
- must ensure that the sector's potential for climate resilience and mitigation are fully integrated into climate and sanitation national policies and strategies, by engaging with the conveners of the NDC and NAP processes; and,
- must expand their conception – and articulation – of how sanitation simultaneously offers an opportunity for (i) effective climate action, through adaptation, mitigation and resilience; (ii) improved human health, notably through nutrition and disease prevention; (iii) stronger economic growth, by both reducing losses and generating revenues; and (iv) enhanced social equity by reducing inequalities.

Planning and programming processes in countries offer perhaps the strongest opportunity for mutual integration between climate and sanitation policies by highlighting the benefits of integrated sanitation and climate policy described above. This proactive

⁵ See <https://ndcnavigator.org/>

approach will help drive more ambitious and comprehensive climate action, positioning sanitation as a key component in achieving global sustainability goals.

Ensuring that sanitation has a more prominent role in climate action is crucial for meeting the Paris Agreement goals. Sanitation systems, often overlooked in climate strategies as described above, are not only vulnerable to climate impacts but also contribute significantly to greenhouse gas emissions (Hyde-Smith et al., 2022; Lambiasi et al., 2024). Thus, integrating sanitation considerations into climate policies, such as NDCs, is not just necessary but urgent. At the same time, sanitation policies in many countries need to be updated to incorporate climate change adaptation and mitigation measures comprehensively, and stakeholders have a prominent role in coordinating this work, even to the regional and international scales.

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Visit us

SEI Headquarters

Linnégatan 87D
Box 24218
104 51 Stockholm Sweden
Tel: +46 8 30 80 44
info@sei.org

Måns Nilsson
Executive Director

SEI Africa

World Agroforestry Centre
United Nations Avenue Gigiri
P.O. Box 30677 Nairobi 00100 Kenya
Tel: +254 20 722 4886
info-Africa@sei.org

Philip Osano
Centre Director

SEI Asia

Chulalongkorn University
Henri Dunant Road Pathumwan
Bangkok 10330 Thailand
Tel: +66 2 251 4415
info-Asia@sei.org

Niall O'Connor
Centre Director

SEI Latin America

Calle 71 # 11-10
Oficina 801
Bogotá Colombia
Tel: +57 1 6355319
info-LatinAmerica@sei.org

David Purkey
Centre Director

SEI Oxford

Oxford Eco Centre
Roger House Osney Mead
Oxford OX2 0ES UK
Tel: +44 1865 42 6316
info-Oxford@sei.org

Ruth Butterfield
Centre Director

SEI Tallinn

Arsenal Centre
Erika 14
10416 Tallinn Estonia
Tel: +372 6276 100
info-Tallinn@sei.org

Lauri Tammiste
Centre Director

SEI York

University of York
Heslington
York YO10 5NG UK
Tel: +44 1904 32 2897
info-York@sei.org

Sarah West
Centre Director

SEI US Main Office

11 Curtiss Avenue
Somerville MA 02144-1224 USA
Tel: +1 617 627 3786

Ed Carr
Centre Director

SEI US Davis Office

501 Second Street
Davis CA 95616 USA
Tel: +1 530 753 3035

SEI US Seattle Office

1326 Fifth Avenue #640
Seattle WA 98101 USA
Tel: +1 206 547 4000