UAE-Belém Adaptation Indicators: **Infrastructure and Human Settlements**

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1. Introduction

Infrastructural systems and human settlements (IHS) are frontline battlegrounds in society's fight against climate change. They are severely impacted by climate change leading to widespread and pervasive losses and damages across key sectors (e.g. water, food, transport, health and energy) which affect economic activity and development aspirations. However IHS also offer a critical near-term, global scale opportunity to advance climate resilient development. The Intergovernmental Panel on Climate Change's Sixth Assessment Report (AR6) describes climate resilient development as "the process of implementing mitigation and adaptation together in support of sustainable development for all". Considering climate change impacts and risks in the design, planning and management of IHS is critical for resilience and enhancing human well-being, particularly for poor and vulnerable communities.

The development of indicators for tracking this adaptation action and progress in IHS is important in enabling effective monitoring and evaluation and a stated requirement (see 2/CMA5) in the review of the overall progress of Article 7 of the Paris Agreement: i.e. the Global Goal on Adaptation (GGA). Indicators, if well designed, should facilitate learning for successful, equitable and effective adaptation measures, and signal when and where additional action may be needed (for example during a period of temperature goal overshoot).

They should consider the intersection of climate and non-climate hazards which magnify damage in IHS, and the need for all adaptation actions to take into consideration local / regional differences and planetary limits. For greatest impact they should be embedded in capacitated, resourced, enabling governance systems, monitor outcomes as well as outputs and assess means of implementation. The process used by the IHS experts focused on fulfilling these criteria in the identification of appropriate GGA indicators.

The sections that follow build on this foundation by examining key considerations for indicator development, including systemic risk, governance, equity, and the practical application of adaptation tracking across diverse IHS contexts.

2. Summary of the Approach Used

The development of the IHS adaptation indicators was guided by the agreed thematic target: "Increasing the resilience of infrastructure and human settlements to climate change impacts to ensure basic and continuous essential services for all, and minimizing climate-related impacts on infrastructure and human settlements." The process was aligned with the relevant criteria outlined in Decisions 2/CMA.5 and 2/CMA.6, and all indicators were assessed for consistency with the overarching objectives of the Global Goal on Adaptation.

The approach combined expert judgment, literature review, and some initial stakeholder engagement. Inputs and insights were drawn from organisations including UN-Habitat, the GlobalABC Adaptation Hub, United Cities and Local Governments (UCLG), and Dr Peter Best. Multiple thematic meetings were held, both online and in person, including during the Bonn and Baku sessions.

The IHS experts have drawn on the extensive master list of potential indicators and terminology, as well as insights from the mandatory workshop, incorporating and refining those considered most relevant to the context of infrastructure and human settlements. Iterative expert group discussions explored ideal IHS outcomes and addressed the inherent complexities of systemic, multi-level adaptation. At this stage, external peer review has not yet been conducted.

3. Challenges in IHS Indicators

Developing effective indicators for IHS involves navigating a series of inherent challenges. First, these systems are characterised by complex dynamics and deep interlinkages across sectors such as energy, transport, housing,

water, and health. Adaptation actions in one domain can create unintended consequences in another, requiring indicators that are sensitive to systemic interactions and feedback loops.

Second, the multi-scalar nature of governance—spanning national, subnational, and local authorities—creates interdependencies that complicate the attribution of outcomes and the design of clear metrics. This is particularly difficult for slow-onset events (e.g., sea-level rise, salinisation) and systemic risks that accumulate over time or manifest across scales.

4. Key Adaptation Considerations

Throughout this initial development of the IHS adaptation indicators the experts explored a number of key considerations. These include (but are not limited to):

a. **The sustainable development agenda:** Climate resilience and adaptation interventions need to simultaneously advance the sustainable development agenda. This is particularly important in the Global South. For example, adaptation interventions that improve quality of life, reduce inequity, and improve environmental conditions etc. are critical. This requires thinking carefully about 'adaptation for whom' in contexts of limited resources

b. **Equity and justice:** IHS decisions shape who is protected, who is displaced, and who is left behind. Indicators must reflect procedural and distributive justice to ensure adaptation investments do not reinforce existing inequalities. Gender, age, disability and indigenous considerations are often underrepresented in settlement adaptation planning. Indicators must be disaggregated to reflect how intersecting vulnerabilities affect adaptation outcomes, ensuring that no one is left behind.

c. **Informal settlements:** informal residents (or residents in poorer communities in the global South) often face a "poverty penalty," paying disproportionately high costs for essential materials like sand and cement due to inadequate infrastructure and exploitative supply chains. This financial burden not only exacerbates existing inequalities but also impedes the ability of these communities to construct durable, climate-resilient housing (Dodman et al, 2022).

d. **Temperature targets:** Adaptation should be compatible with global temperature goals (pursuing 1.5°C and the commitment to well below 2°C), avoiding carbon-intensive lock-in and not in. However, given the rising likelihood of temperature goal overshoot, indicators should also encourage adaptive strategies that are flexible and robust under higher warming scenarios.

e. **Global carbon budget:** Under a business-as-usual approach there is unlikely to be a carbon budget available to meet likely adaptation requirements. As such failure to decarbonise the materials and systems associated with IHS is likely to result in undue pressure on the rapidly shrinking global carbon budget (Amigues & Lafforgue, 2025).

f. **Tipping points:** IHS systems may fail abruptly when exposed to compound and cascading risks or thresholds (e.g. heat exceeding design tolerances, combined flooding). Indicators must account for systemic fragility and the need for buffers, redundancy, and early-warning mechanisms.

g. **Maladaptation:** Rigid, high-emissions, or exclusionary IHS implementation can lead to maladaptation—such as transferring risk, increasing inequality, or reducing flexibility. But maladaptation can also occur through poorly targeted soft interventions, such as early warning systems that are inaccessible to informal settlements or climate information that excludes Indigenous knowledge. Consideration should be given to both the intended and unintended consequences of adaptation measures (UN Habitat, 2024).

h. **Ecosystem-based Adaptation (EbA) and Nature-based Solutions (NbS):** Growing evidence supports the role of EbA and NbS—including green and blue infrastructure such as wetlands, urban forests, mangroves, and green corridors—in delivering cost-effective and multifunctional adaptation benefits. These approaches can reduce climate exposure and risk, while simultaneously enhancing biodiversity, improving human well-being, and contributing to climate change mitigation.

i. **Transition risk:** There is increasing recognition that IHS systems are vulnerable to transition risks—arising from shifts in climate-related regulation, technology, finance, and societal expectations. These risks become particularly acute under scenarios of rapid decarbonisation, which are becoming more probable due to accelerating climate feedbacks and mounting legal and investor pressure (World Bank 2021). Inadequate planning for such transitions can lead to short-term disruptions, compounded by systemic market failures (e.g. insurance withdrawal), underestimated global sensitivities, or the pursuit of high-risk interventions such as geoengineering if mitigation efforts fall short (Hansen et al 2023).

j. **Compound and Cascading risks** Where disruptions occur together or where one disruption triggers others across physical, financial, or social systems—are a growing concern for cities. Understanding these complex vulnerabilities is important for building systemic resilience (Cutter 2018).

k. **Financial systems:** Adaptation for IHS requires not only adequate funding but also a coherent financial architecture that enables long-term, equitable, and risk-informed investment. This includes integrating adaptation into national and subnational budgets, developing clear taxonomies for adaptation-aligned infrastructure, climate-related disclosures and ensuring financial instruments are accessible at the local level. Critically, climate-related risks, if unaddressed, pose systemic threats to financial stability, including credit downgrades, stranded assets, lending risk, inflation and insurance market withdrawal. Embedding adaptation within financial systems is essential not only to mobilise resources, but also to safeguard against cascading economic disruptions stemming from IHS vulnerabilities.

l. **Local focus:** There have been strong calls from those involved in IHS planning and financing for indicators that are not only globally relevant but also meaningful and actionable at the local level. Practitioners consistently emphasise that effective adaptation must be locally led, with indicators that reflect place-based realities, inform decision-making, and help unlock and direct adaptation finance to where it is most needed.

m. **Indigenous and traditional knowledge:** Indigenous and traditional knowledge systems, including long-standing environmental stewardship, local coping strategies, and place-based innovations, are essential for context-specific and culturally grounded adaptation. In many regions, especially where formal data are limited, these knowledge systems offer critical insights into climate variability, risk management, and resilience-building. Indicators should reflect not only the presence of such knowledge but also the extent to which it is respected, integrated, and applied in formal adaptation planning and implementation. Meaningful inclusion requires appropriate governance mechanisms, ethical engagement, and recognition of Indigenous rights and self-determination. (Satterthwaite et al., 2020; UNDESA, 2024)

n. **Transformative adaptation:** COP29 in Baku reinforced the importance of transformative adaptation, systemic, structural shifts that address root causes of vulnerability rather than making only incremental changes. In the context of IHS, this may mean rethinking the design of human settlements, governance, and service delivery to prioritise equity, sustainability, and long-term resilience. In the informal settlement context there is a need to consider issues such as insecure land tenure, lack of political representation, and exclusion from formal financial and service systems, and address underlying structural inequalities.

While the above considerations have been examined and discussed as much as possible in the time available, many warrant further exploration. For several of these areas, the literature and practical application remain in early stages of development. In the face of deep uncertainty, both in how climate risks will unfold and how

complex systems will respond, tracking signals becomes essential. Signals offer early warnings of stress, disruption, or emerging risk, enabling timely course correction before tipping points are reached or systemic failures cascade. This is particularly critical for life-supporting ecosystems, some of which are already operating near ecological thresholds.

If adaptation fails, particularly in the ecosystems that support human settlements, so too will mitigation. The capacity to reduce emissions depends on social stability, functioning infrastructure, and healthy ecosystems. In this context, signals are not just technical metrics—they are vital feedback mechanisms for safeguarding both adaptation and mitigation progress under conditions of deep and compounding uncertainty.

5. Means of Implementation (MoI)

Means of Implementation (MoI) is critical to the success of adaptation in IHS, yet time constraints have limited our ability to fully explore this area. We acknowledge that all components of MoI—finance, capacity-building, technology transfer, and enabling policy environments—are relevant. While financial flows remain essential, attention must also be given to the financial architecture that supports IHS adaptation, including the development of taxonomies, investment frameworks, and financing standards. Moreover, mainstreaming climate-related risk and adaptation into local governance systems—particularly asset management and land use planning—is a key enabling condition for sustained, scalable action. The table below, shared during the March 2025 Bonn workshop, outlines key MoI elements relevant to this thematic area (Table 1).

Table 1. Examples of means of implementation for IHS

Means of Implementation	Example Tools/Systems
Financial	Direct funding, debt, green bonds, adaptation trust funds, conditional transfers, climate-related financial disclosures.
Technological	GIS, digital twin cities, community risk dashboards, mobile EWS, data systems, remote sensing, smart buildings, bioengineering
Capacity	Local training centres, city-to-city peer learning, university-government partnerships, workforce accreditation programs

6. Limitations of the Current Indicator Set

Despite best efforts, limitations persist within the current indicator set, reflecting both process constraints and the inherent complexity of climate adaptation measurement. It is acknowledged that some indicators may have been unintentionally omitted, overlap with other thematic areas, or even conflict with emerging indicators from parallel streams, due to insufficient time to fully cross-reference with other thematic groups or apply paragraph 10 of Decision -/CMA.6 in a systematic way. Climate uncertainty and the evolving nature of both physical and transition risks introduce additional difficulty in ensuring indicators remain relevant across time horizons and contexts.

Due to limited time, resources, and the lack of multiple in-person meetings, this represents a streamlined and expedited version of the process we would ideally undertake to develop indicators. While every effort has been made to ensure technical rigour and relevance, the scope of engagement and depth of iteration have been necessarily constrained. In future phases, it will be essential to allow more time and resources for deeper engagement and further iterations.

The upcoming phase, focusing on metadata development, baseline framing, and methodological coherence, will require greater structural support to ensure quality and timeliness. Establishing clearer coordination mechanisms, interim milestones, and pathways for expert input will be critical to success.

Despite the challenges, this process has laid a foundation of shared purpose and technical insight. The IHS group remains committed to advancing a practical, credible, and equity-informed indicator framework that will facilitate global tracking of adaptation progress across IHS.

Metadata gaps also remain, and additional technical work is required to ensure consistency in definitions, methodologies, and data sources. At this stage, indicators have not yet been grouped by readiness level. However, the absence of immediately available data should not be seen as a reason to discard potentially valuable indicators. In fact, the inclusion of such indicators may serve as a catalyst for future data collection efforts and enhance the overall comprehensiveness of the indicator set. A strategic approach to data gathering and monitoring will be key to addressing these gaps and ensuring that the indicators evolve in line with emerging data trends.

On their own, indicators rarely provide a complete measure of adaptation— even within the specific element they address (e.g., the proportion of homes exposed to sea-level rise). This is because effective adaptation requires a systems perspective; progress is often the result of multiple, intersecting adaptation and non-adaptation actions. Focusing narrowly on a single element risks reinforcing reductionist thinking. Rather than providing definitive answers, indicators should support reasoned judgment and enable informed deduction. While targets may be appropriate for some indicators, defining meaningful and context-sensitive targets requires careful exploration of each indicator's key attributes. Taken together—especially when integrated across themes—these indicators offer a more holistic understanding of adaptation progress and gaps.

Much more work is still required to strengthen and refine the IHS indicators. Advancing this effort will benefit significantly from active, cross-thematic collaboration. In particular, convening a multi-day, in-person workshop with experts from other thematic areas would enable deeper integration, uncover interlinkages, and help avoid duplication or gaps. We believe such a process would meaningfully enhance the coherence, relevance, and practical utility of the indicators in supporting the Global Goal on Adaptation.

Importantly, the limitations noted here should not be interpreted as barriers to adoption or consideration by the parties, as existing regional and global data-sharing partnerships—such as those facilitated by UN-Habitat, the OECD, and space-based monitoring initiatives—provide viable pathways to improve availability and harmonisation over time. These collaborations will be essential in addressing data gaps and ensuring that the indicators remain flexible and adaptable to future needs.

7. Recommendations for Post-SBs Expert Work

To enhance the development of the IHS indicators prior to COP30 the following is recommended:

- Recognise that new indicators may emerge from the experts, or that these draft indicators may be refined for clarity
- Convene a multi-day, in-person expert workshop. A workshop with experts from other thematic areas would enable deeper integration, uncover interlinkages, and help avoid duplication or gaps.
- Increase the structural support, to enable deeper engagement between experts and enable a wider review of indicators (e.g. via an non-party peer review panel, and/or a expert survey of each draft indicator to support prioritisation)
- Allocate resources to develop a comprehensive metadata and indicator database.
- Develop guidance for how new indicators can be supported, even if immediate data availability is low.
- Direct specific expert work on identified limitations with as much granularity as possible.

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8. Appendices

Appendix 1: List of Indicators

The following tables list the draft indicators (**Table 2**) and sub indicators (**Table 3**). For a full description, including rationale and supporting comments please refer to the spreadsheet for IHS, and indicators coded 9e. This was provided to the Secretariat with this report.

Table 2: Draft IHS headline indicators

Indicator ID	Indicator Name
9e01	Extent of municipalities with climate change adaptation plans that explicitly integrate a consideration of the impact of Paris Agreement temperature goal overshoot.
9e05	Number of country NAPs which include temperature goal overshoot in adaptation scenarios for IHS
9e06	% of municipalities with climate change adaptation plans that integrate nature based solutions (NbS) and ecosystem based adaptation (EbA) measures (green/ blue infrastructure) to manage and reduce climate change impacts, with identified actions, targets, and resource allocations.
9e08	Proportion of NbS and EbA projects (e.g., wetlands, urban forests - green/ blue infrastructure) that have been monitored and shown to reduce at least two climate hazards (e.g., flood attenuation + heat mitigation).
9e11	Proportion of total international funding (e.g. GEF/GCF/Adaptation Fund) allocated to support natural habitat creation/restoration/management to enhance the adaptive capacity of green/blur infrastructure in cities.
9e15	Number of parties with operational, multi-hazard, climate- and community-informed early warning systems that provide timely and actionable information to inform action, preparedness and response for IHS
9e20	Proportion of local governments and /or other sub national authorities that have adopted and are implementing disaster risk reduction (DRR) strategies aligned with national frameworks fit for purpose for majority IHS, including measurable targets and resource allocations
9e24	Extent of NAPs and National Disaster Risk Reduction (DRR) strategies developed in collaboration with local municipalities and /or other sub national authorities
9e25	% of infrastructure damaged after extreme events (annual)
9e27	Proportion of the urban population of a country that is exposed to physical climate risk
9e29	Number of countries that cooperatively develop early warning systems that account for multi-country climate hazards for key infrastructure systems and settlements across neighbouring regions (proposed by Opitz-Stapleton et al, 2025)
9e30	Number of countries providing climate services that are tailored, accessible, and actionable for local decision-makers to inform urban policy, planning, and adaptation responses.
9e32	Percentage of newly constructed infrastructure adhering to climate-resilient, co-benefit-oriented design codes. E.g. % of new builds using design standards that address compound and cascading risks while delivering co-benefits (e.g., green cooling corridors).
9e34	Number of countries where publicly funded buildings are required to include climate adaptation measures

9e35	Proportion of population in formal and informal settlements with reliable access to climate-resilient basic services, including resilience to cascading climate risks.
9e41	% of adaptation finance allocated to upgrading basic services in low-income or informal areas to meet climate resilience standards
9e44	Percentage of national population residing in safe and adequate climate resilient housing (gender disaggregated) (Based on indicator suggested by LDCs)
9e45	Total number of municipalities with local ordinances (e.g. urban development plans, building permits) integrating adaptation criteria and vulnerability assessment results. (Based on GIZ/IISD, undated and Seyesi et al, 2022).
9e46	Number of settlements with locally led and co-designed informal settlement upgrading programmes that include climate change adaptation. (Based on indicator suggested by Pakistan).
9e47	% of local adaptation plans for IHS co-designed with vulnerable community groups and inclusive of traditional and indigenous knowledge
9e48	Number of countries that have included human settlements and infrastructure within their NDCs/NAPs. (Based on Wellcome Trust, undated).
9e51	Number of countries that incorporate transboundary climate and adaptation risks within NDCs/NAPs and actively report on assessment of transboundary climate and adaptation risks, implementation activities to manage these and MEL regarding their management. (proposed by Opitz-Stapleton et al 2025)
9e52	Number of countries where NAPS enable locally led adaptation (LLA), including participation of diverse stakeholders from informal and formal settlements, incorporating traditional and indigenous knowledge (proposed by Opitz-Stapleton et al, 2025)
9e53	Number of local governments that have designed, established and operationalized a system for monitoring, evaluation and learning for local level adaptation plans for IHS, including mechanisms for community participation and continuous improvement.
9e54	Number of formal local government training programs on climate change adaptation being implemented. (Based on Seyesi et al, 2022)
9e56	Proportion of countries with functional inter-ministerial/ intersectoral commissions working on adaptation for human settlements and infrastructure.
9e58	Proportion of essential infrastructure systems assessed and upgraded for climate resilience in human settlements
9e60	Proportion of population and assets in human settlements covered by insurance for climate-related events
9e68	Extent of national finance and funding available for IHS adaptation
9e75	Annual % of national or municipal recovery budget allocated to rebuilding resilient infrastructure
9e77	Proportion of a country's total debt allocated to adaptation investments in human settlements and infrastructure (Sovereign Adaptation-Debt Ratio), expressed as a percentage of total public debt?
9e78	% of national adaptation finance that is directly allocated to, or implemented through, local governments or grassroots actors for adaptation action
9e79	Existence and scope of climate-related financial stress testing by a country's central bank that includes IHS sectors
9e80	Population residing in areas expected to cross Critical-Adaptation-Threshold Exposure (CATE) (Exposure of country population to key tipping points)

9e82	Total and per-unit carbon footprint of IHS adaptation investments, disaggregated by hard (infrastructure) and soft (policy, ecosystem-based, behavioural) measures.
9e83	Change in climate-attributed loss and damage relative to historical emissions contribution per capita for human settlements and infrastructure
9e84	Amount of funding (e.g. Adaptation fund) targeted to improving resilience of informal settlements. [$]
9e85	Amount of funding (e.g. Adaptation fund) targeted to improving resilience of formal settlements. [$]
9e86	Proportion / amount of country adaptation expenditure (% of GDP)
9e87	Country annual expenditure on adaptation (aligned to each temperature point)
9e88	Proportion / number of countries who have adaptation linked to IHS in financial taxonomy
9e89	Number of financial mechanisms available to support climate change adaptation, including technical and technological options for adaptation in human settlements. (Based on Seyesi et al, 2022).
9e90	Number of countries that have adopted national and local guidelines for climate-resilient infrastructure and human settlements, including informal housing (proposed by GLOBAL ABC)
9e92	Proportion of national and sub-national urban planning/zoning frameworks that integrate climate risk and hazard exposure maps based on future scenarios (proposed by Global ABC)
9e93	Number of future climate hazards incorporated into national building codes (proposed by Global ABC)
9e95	Number of countries reporting on Tipping Points relevant to IHS in National Risk Assessments (#)
9e96	Share of large-scale infrastructure projects with climate risk assessment and adaptation measures (based on Silfwerbrand, 2023)
9e97	Number and functionality of regional and international multi-stakeholder adaptation cooperation platforms that facilitate joint planning, knowledge exchange, and implementation of adaptation actions for human settlements and infrastructure. (Based on Straatsma el al, 2020)

Appendix 2: List of Sub Indicators

Table 3: Draft IHS headline indicators

Sub Indicator ID	**Indicator ID**	**Sub Indicator Name**
9e02	9e01	Explicit inclusion of temperature goal overshoot scenarios in municipal risk assessments for IHS
9e03	9e01	Adjustment of infrastructure standards, zoning, or resilience actions based on temperature goal overshoot impacts.
9e04	9e01	Prioritisation of flexible, adaptive, or transformative measures for IHS in light of temperature goal overshoot risks and impacts.
9e07	9e06	Extent of NbS/EbA integration (e.g., specific actions defined; budget allocations; implementation underway)
9e09	9e08	Percentage of NbS and EbA projects (green/ blue infrastructure) with a monitoring system in place and participatory methods used for verification (locally led participatory monitoring).
9e10	9e08	Proportion of ecosystems (green/blue infrastructure) relevant to IHS under threat of crossing ecological tipping points (%)

9e12	9e12	Funding by habitat type (e.g., wetlands, forests, mangroves, green corridors)
9e13	9e12	Funding disbursed versus approved/pledged.
9e14	9e12	Proportion of projects with measurable adaptation outcomes linked to urban ecosystems
9e16	9e16	Existence of multi-hazard EWS systems linked to urban response plans.
9e17	9e16	Integration of climate forecasts (e.g., seasonal to decadal) into risk assessments.
9e18	9e16	Evidence of community participation in system design and implementation.
9e19	9e16	Percentage of urban population covered by EWS.
9e21	9e20	Extent of local DRR strategies aligned with national plans.
9e22	9e20	Implementation status (e.g., funding allocated, actions underway, monitoring mechanisms established).
9e23	9e20	Inclusion of marginalized communities (e.g., informal settlements) in local DRR strategies
9e26	9e26	Sub indicators include: hospitals schools (% of facilities damaged), homes (% of houses damaged), roads (% of km of roads damaged), protected areas (% of area damaged), agricultural land (% of hectares of agriculture damaged), cultural and recreation sites (% of area damaged) after extreme weather events.
9e28	9e27	sub indicators disaggregate the current and future projected exposure to flood, coastal hazards, extreme weather events, heatwaves and extreme temperatures and other other relevant climate related hazard
9e31	9e30	Number of countries with high-resolution, future-focused climate hazard maps (flood, heat, drought, etc.) publicly available at national or subnational levels (proposed by Global ABC)
9e33	9e32	Percentage of new infrastructure built to replace infrastructure that has been damaged due to climate change events adhering to climate-resilient, co-benefit-oriented design codes (ie "build back better)
9e36	9e36	% of population in formal and informal settlements with access to water infrastructure meeting recognised climate resilience standards
9e37	9e36	% of urban transport networks rated or certified for resilience to compound climate risks
9e38	9e36	% of municipal energy infrastructure with documented adaptation measures aligned to national or international resilience standards
9e39	9e36	Existence of formal resilience rating systems or adaptation standards applied to critical infrastructure at city or sub-national level
9e40	9e36	Change in service continuity during extreme climate events, disaggregated by settlement type and aligned to resilience performance benchmarks
9e42	9e41	Number/proportion of human settlements dependent on water resources at or nearing hydrological tipping points
9e43	9e41	% of population with reliable access to sufficient and potable drinking water, during and immediately after extreme climate events in human settlements (formal and informal). (Based on Donatti et al, 2019).
9e49	9e48	Number of countries that have included human settlements and infrastructure within their NDCs/NAPs with specific sectoral targets included (e.g., buildings, infrastructure, housing)? (Proposed by Global ABC)

9e50	9e48	Number of countries that have included human settlements and infrastructure within their NDCs/NAPs with progress on the adaptation strategy monitored and reported regularly (proposed by GLOBAL ABC)
9e55	9e55	Number of staff formally trained through local government programs on climate change adaptation (Based on Based on Seyesi et al, 2022).
9e57	9E56	Degree of functionality (e.g., existence of formal mandate, frequency of meetings, evidence of outputs such as joint adaptation plans, inclusion of local governments or informal settlement representative.
9e59	9E58	Disaggregated sub indicators: Electricity - % of electricity generation and distribution assets in human settlements with climate adaptation measures in place (e.g. flood-proofing, heat-tolerant transformers, microgrids) Fuel systems % of fuel supply and storage infrastructure (e.g. depots, pipelines) assessed for climate-related disruption and upgraded to resilience standards Telecommunications % of communications infrastructure (cell towers, fibre nodes, emergency broadcast systems) with redundancy and climate resilience plans Solid waste systems % of waste collection, transfer, and landfill facilities designed or retrofitted to function during extreme weather events Water and wastewater % of water treatment and sewerage infrastructure compliant with flood and drought resilience standards Health facilities % of health infrastructure with climate risk assessments and energy, water, and supply continuity plans under extreme event scenarios Transport % of key transport corridors (roads, rail, bridges) rated for climate resilience, including drainage, heat stress, and slope stability upgrades, Schools (education) and municipal buildings (eg town hall, offices)
9e61	9E60	Insurance cost as a proportion of household income
9e62	9E60	Proportion of households that are uninsured due to unaffordability
9e63	9E60	Proportion of critical infrastructure (e.g., hospitals, schools, transport, utilities) that is uninsured or underinsured
9e64	9E60	Proportion of micro, small, and medium enterprises in urban areas without access to affordable climate risk insurance
9e65	9E60	% of population in informal or underserved settlements with access to affordable, context-appropriate insurance products
9e66	9E60	Proportion of population in the global South, including Small Island Developing States (SIDS) and Least Developed Countries (LDCs), covered by climate risk insurance products
9e67	9E60	Percentage of effective climate risk insurance schemes for human settlements that are supported through public co-financing or multi-country risk pooling mechanisms, such as the African Risk Capacity (ARC), the Caribbean Catastrophe Risk Insurance Facility (CCRIF), or the InsuResilience Global Partnership
9e69	9e68	Total extent of private finance flows into relevant IHS adaptation needs.
9e70	9e68	Existence of adaptation for IHS in national financial allocation (?) taxonomies
9e71	9e68	Existence of adaptation expenditure for I&HS required in mandatory climate-related disclosures
9e72	9e68	Extent to which public and private sector finance is aligned to a corporate standard for adaptation (e.g. Climate Bonds Initiative adaptation taxonomy)

9e73	9e68	Value of adaptation expenditure by private companies disclosed in climate-related disclosures
9e74	9e68	Value of adaptation expenditure for IHS by sub-national governments disclosed in climate-related disclosures
9e76	9e75	Extent to which sovereign bonds for IHS include consideration of just transition in terms of both mitigation and adaptation
9e81	9e80	Sub indicator would include the information disaggregated by Greenland Ice Sheet, West Antarctic Ice Sheet, Arctic Sea Ice, Atlantic Meridional Overturning Circulation (AMOC), Amazon Rainforest, Boreal Forests, Permafrost, Tropical Coral Reefs, East Antarctic Ice Sheet, Monsoon Systems).
9e91	9e90	Percentage of country's essential services (e.g., health centers, schools, municipal buildings) that maintain or improve accessibility (eg transport connectivity and proximity to community) once relocated from a climate-risk area
9e94	9e93	Extent to which adaptation and future climate hazards are considered in the national building codes (proposed by Global ABC)
9e98	9e97	Existence of formal governance mechanisms relevant to IHS (e.g., MoUs, protocols, working groups) within each cooperation platform.
9e99	9e97	Degree of inclusion (e.g., participation of local governments, civil society, and marginalised communities) within each IHS relevant cooperation platform

Appendix 3: Glossary of Key Terms and Abbreviations Used

Adaptive Pathways
Planning approaches that enable flexible, staged decision-making in response to evolving climate-related risks, using trigger points to adjust actions over time.

CATE (Critical-Adaptation-Threshold Exposure)
A metric indicating the proportion of people or systems exposed to climate-related tipping points that could exceed adaptive capacity.

Climate-Related Disclosure
Formal reporting on climate-related risks, impacts, and adaptation actions, often required by financial or regulatory frameworks, such as those aligned with TCFD or climate finance taxonomies.

Compound and Cascading Climate-Related Risks
Interlinked disruptions where one climate-related event (e.g., extreme heat) triggers others (e.g., grid failure, water shortages), amplifying vulnerabilities across systems.

EbA (Ecosystem-based Adaptation)
The use of ecosystem services (e.g., wetlands, forests) to reduce climate-related vulnerability and deliver co-benefits such as biodiversity conservation and local cooling.

GGA (Global Goal on Adaptation)
The collective aim under Article 7 of the Paris Agreement to enhance adaptive capacity, strengthen resilience, and reduce climate-related vulnerability worldwide.

Green Infrastructure
Urban features like green corridors or urban forests that provide both environmental and climate adaptation benefits, including stormwater management and urban cooling.

IHS (Infrastructure and Human Settlements)
All physical and governance systems that support where and how people live, including housing, transport, utilities, and services at national to local levels.

LLA (Locally Led Adaptation)
Adaptation designed and implemented by local actors (e.g. municipalities, communities), ensuring alignment with place-based realities, values, and knowledge systems.

Maladaptation
Adaptation efforts that inadvertently increase climate-related risk or worsen social inequality.
Example: Building flood walls that protect wealthy neighbourhoods while diverting floodwaters into informal settlements.

MoI (Means of Implementation)
The financial, technological, and institutional mechanisms required to enable adaptation, including taxonomies, climate-aligned finance, and integration into planning systems.

NbS (Nature-based Solutions)
Interventions that use natural systems to address societal challenges, such as using mangroves or urban wetlands to buffer storm surges or reduce heat stress.

Overshoot (Temperature Goal Overshoot)
Periods where global temperatures temporarily or permanently exceed the Paris thresholds (1.5°C or 2°C), demanding more robust and flexible adaptation strategies.

Scenario-Based Indicators
Metrics that assess adaptation effectiveness under different future climate and development scenarios (e.g., RCP8.5, SSP3).

Signals (in adaptation)
Early warning or performance metrics that help detect emerging stress, potential tipping points, or failure risks in climate-sensitive systems.

Stranded Assets
Infrastructure or investments that lose value due to climate-related impacts or policy transitions (e.g., non-resilient coastal housing facing rising insurance costs or devaluation).

Taxonomy (Climate Finance)
A classification system that defines which investments qualify as specifically relevant to climate change (for this instance IHS adaptation), used to guide finance flows and/or regulatory compliance.

Tipping Point
A threshold in ecological or climate systems beyond which rapid, often irreversible changes occur (e.g., ice sheet collapse, monsoon disruption), often exceeding adaptation limits.

Transformative Adaptation
Structural, systemic shifts that address root causes of vulnerability—such as insecure land tenure, exclusion from finance, or fragmented governance—instead of minor upgrades.

Transition Risk
Climate-related risks arising from shifts in policy, technology, markets, or public expectations (e.g., new building codes, finance eligibility), which can impact the viability of existing IHS systems

Appendix 4: Reference List and Supporting Bibliography

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