International Platform on Adaptation Metrics

IPAM's second submission

to the UAE-Belem Work Programme on Indicators

July 31, 2024

The International Platform on Adaptation Metrics is a platform of collective efforts from several experts around the world. This submission has been prepared with the contribution of 39 IPAM Members (alphabetical order): Karim Anegay, Hikma Bachegour, Riad Balaghi, Lorenzo Chelleri, Ken Chomitz, Mimoun Chourak, Srijita Dasgupta, Hamidou Diawarra, Ahmed Rachid El Khattabi, Mohammed ElGabry, Nega Emiru, Iskander Erzini Vernoit, Ira Feldman, Paul Forte, Alex Godoy, Laura Helmke Long, Igwebuike Ijeoma, Sudan Legro, Tashina Madappa, Francesco Musco, Indu K. Murthy, Patricia Mwangi, Vittore Negretto, Lucy Njuguna, Andreea Nowak, Marta Olazabal, Idowu Ologeh, Driss Ouazar, James S. Phiry, Filomena Pietrapertosa, Bertrand Reysset, Samraj Sahay, Imane Saidi, Karl Schultz, Ousmane Seidou, Joel Smith, Joana Talafre, Charles Tonui, Rosita Yocgo.

Executive summary

The International Platform on Adaptation Metrics (IPAM) presents this submissionto the UNFCCC in response to the call for information on existing indicators for measuring progress towards the targets referred to in paragraphs 9-10 of decision 2/CMA.5. As a global network of 128 experts from 38 countries, IPAM focuses on developing and promoting robust climate adaptation metrics.

We propose three key attributes for adaptation metrics: clear identification with climate change adaptation, wide applicability, and scalability/comparability/aggregability. IPAM has developed approaches such as the Adaptation Metrics Mapping Evaluation (AMME) Framework to support comprehensive evaluation of adaptation metrics.

Our sectoral committees on Cities, Water, and Agriculture provide insights on existing indicators, methodological challenges, and gaps in these critical areas. The Cities Committee's systematic review reveals regional disparities and a need for standardized frameworks in urban adaptation metrics. The Water Committee emphasizes the importance of considering various scales, risks, and types of interventions in water-related adaptation indicators. The Agriculture Committee highlights the need for outcome and impact indicators to assess long-term effects of adaptation actions in the agricultural sector.

IPAM recommends adopting a systematic approach to evaluating indicators based on the proposed criteria of identification, applicability, and scalability. We advocate for developing more outcome-focused indicators, particularly in the agriculture and water sectors, and addressing the methodological challenges and data gaps identified in urban adaptation metrics. It is crucial to consider the interconnections between different thematic areas when developing indicators.

We stand ready to engage our expertise throughout the UAE-Belém work programme to ensure scientifically robust and practically useful indicators for the Global Goal on Adaptation. This submission underscores IPAM's commitment to advancing the development and application of effective adaptation metrics to support global climate resilience efforts.

Background

"The SBSTA and the SBI invited Parties and non-Party stakeholders, including relevant constituted bodies, United Nations organizations and specialized agencies, and other relevant organizations from all geographical regions, to submit via the submission portal by 31 July 2024 information on existing indicators for measuring progress towards the targets referred to in paragraphs 9–10 of decision 2/CMA.5 in use at the local, national, regional and global level, including, if available, information on associated methodologies and data readiness for such indicators, as well as identified gaps and areas for which the development of new indicators may be needed."

From **https://unfccc.int/documents/639575**

IPAM's response to this call for submissions was the formation of an IPAM member working group to jointly draft a submission based on existing material prepared prior to COP 28 and a first submission to UNFCCC for the UAE Belém work programme on indicators submitted in March 2024.

The submission is primarily based on these three documents (https://www.adaptationmetrics.org/policy-papers):

- *IPAM STATEMENT ON ADAPTATION METRICS FOR GLOBAL GOALS*
- *IPAM submission to the UAE-Belem Work Programme March 2024*
- *THEMATIC TARGETS AND INDICATORS FOR THE GLOBAL GOAL ON ADAPTATION (GGA): PERSPECTIVES FROM THE INTERNATIONAL PLATFORM ON ADAPTATION METRICS (IPAM)*

Further background has been drawn from the IPAM document:
ASSESSMENT OF GGA OPTIONS IDENTIFIED IN THE UNFCCC COMPILATION AND SYNTHESIS DOCUMENT.

Introduction to IPAM

IPAM is a global network focused on climate adaptation metrics. It connects experts, policymakers, and practitioners to facilitate the co-design of adaptation metrics, develop innovative approaches, instruments, and tools and promote capacity building, research exchange, and data enhancement for effective climate adaptation finance and policy.

After four years, it has 128 experts from 38 countries and 16 member organizations across 4continents.

IPAM develops frameworks like AMME, organizes its work through committees and task groups, contributes to UNFCCC processes, and hosts global webinars.

All its resources are available at **www.adaptationmetrics.org.**

Purpose of this submission

The purpose of IPAM's submission is to provide insights to the UAE-Belem Work Programme from a wide variety of IPAM members convened to prepare this note. It focuses on a combination of:

- Perspectives on approaches to evaluating and developing adaptation and resilience indicators, reflected in "IPAM Statement on Adaptation Metrics for Global Goals" of Principles' and the approach we tested and reported on in our Submission to the UAE-Belem Work Programme of March 2024 focusing on IPAM's experience assessing indicators for the GGA.

- Our thematic experiences and a policy paper on "Thematic Targets and Indicators for the Global Goal on Adaptation". These experiences relate to three of thethematic targets of the UAE Resilience Framework: water, agriculture, and cities.

IPAM's mandate is to advance metrics and metrics development that are based on scientifically robust foundations and encourage the UAE-Belem Work Programme to embrace and adapt these insights.

Principles for evaluating indicators from the IPAM Statement of Principles

Adaptation metrics as they relate to global targets should have the following attributes:

Identification and alignment with Climate Change Adaptation: Adaptation metrics need to clearly demonstrate progress on adapting to climate change and that implemented adaptation measures are reducing human and ecosystem vulnerabilities. This can be achieved in two main ways:

a) **Reducing exposure or sensitivity:** Metrics should show how systems are becoming less exposed or less sensitive to climate risks. For example, a metric tracking the percentage of coastal infrastructure retrofitted to withstand sea-level rise and storm surges would demonstrate reduced exposure. Similarly, a metric showing increased drought-resistant crop varieties adopted by farmers would indicate reduced sensitivity to changing precipitation patterns, particularly droughts.

b) **Enhancing adaptive capacity**: Metrics should capture improvements in systems'ability to proactively respond to climate impacts. For instance, a metric measuring the percentage of the population with access to early warning systems for extreme weather events would indicate enhanced adaptive capacity. Another example could be tracking thenumber of cities with comprehensive climate adaptation plans, showing increased preparedness for future climate impacts.

Wide applicability: Adaptation metrics should be applicable across all nations, particularly in developing countries, using data that can be readily collected, while accounting for differing national contexts, data environments, and capacities. For example, a metric like "percentage of agricultural land under climate-resilient practices" could be widely applicable as it can be tailored to different agricultural systems and climate risks across countries. However, the specific practices considered "climate-resilient" might vary based on local contexts. Where appropriate, international organizations such as the UNFCCC Secretariat, UNDP, UNEP, and donor nations should provide technical and financial assistance to enable all countries to be able to develop, record, and report metrics. This could involve capacity building workshops, development of standardized data collection methodologies, and financial support for establishing national adaptation monitoring systems.

Scalable, comparable, and aggregable: Adaptation metrics should, where possible, be applicable at different scales ranging from global to local - even household - levels in some cases. They should allow for comparison across different locationsand scales and be aggregable so results can be summed up at national, sub- continental, continental, and global levels and disaggregated from global and continental to national and sub-national scales.

For instance, a metric like "percentage of population with access to climate-resilient water supply" could be:

- **Scalable:** Measured at household, community, city, regional, and national levels.
- **Comparable:** Allow comparison between different cities or countries.
- **Aggregable:** Data from individual communities could be summed up to give national figures, and national data could be aggregated to regional or global levels.

Another example could be "economic losses avoided due to adaptation measures." This metric could be calculated for individual projects, aggregated to sector or national levels, and even to global scales, allowing for comparison of adaptation effectiveness across different contexts.

Approaches to assess adaptation metrics

IPAM has developed and tested a variety of approaches to assess climate change adaptation metrics.

- A comprehensive starting point to evaluating metrics may incorporate approaches from IPAM's ***Adaptation Metrics Mapping Evaluation Framework (AMME)*** to support and evaluate development of adaptation metrics and metrics frameworks.

The AMME Framework was developed in response to a need for a framework for assessing the relevance of indicators to their intended purpose. It differs from other frameworks in not being focused on a particular set of indicators or being tied to a specific field of interest. Instead, it sets out a set of criteria against which to judge available indicators - whatever the focus of interest - and assist in identifying relevant gaps in their coverage. The Framework is both comprehensive in its consideration of metrics and at the same time, has a capacity for encompassing future developments in metrics and evaluation practices not yet defined or recognised.

AMME Framework application entails considering the challenges that the metrics are to address, key 'aspects' of metrics (purpose, stakeholder engagement, stakeholder capacities, data and information, and evaluation and good practice) applied against three 'lens' considerations common to all adaptation projects (stakeholders and their needs, systems, and information for decision making). The Framework has been applied in a variety of thematic and scalar contexts, adapted to meet the challenges of the metrics development and/or evaluation remit.

- IPAM tested one specific approach to evaluating the Global Goals targets, using the three climate change adaptation metric attributes identified in IPAM's ***Statement of Principles*** (discussed above) to assess possible adaptation metrics.

We assessed the extent to which an agriculture water metric (economic water use productivity) could demonstrate progress on climate change adaptation, is widely applicable, and is scalable, comparable, and aggregable. We found that it can be used to demonstrate progress on adaptation, is widely applicable, but has challenges on producing comparable and aggregable results. This analytic approach can be applied to compare how well many possible metrics meet the three proposed criteria.

- A further consideration is how the 11 targets of the UAE Resilience Framework can be ***understood to relate to each other***.
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There are considerable overlaps between the thematics (i.e., between water, agriculture, and health as inputs and outputs to each other), and between the steps of the planning cycle. Further, there isa risk that indicators between targets could duplicate each other or conflict. Care must be taken toconsider the targets not on their own, but holistically.

There is value in considering output and outcome metrics that could communicate important information between thematics. One approach forwarded is the **Higher Ground Foundation's** climate Vulnerability Reduction Credit (VRC™) that can be applied, where sufficient data is available and impact analysis can be performed, to adaptation efforts in any thematic area.

Sets of thematic analyzed indicators

IPAM includes sectoral committees for Cities, Agriculture, and Water — corresponding to three of the Targets referred to in paragraph 9 of decision 2/CMA.5. The work accomplished by these sectoral committees on the analysis of the indicators is well aligned with the requirement of this submission of providing information on indicators and identifying gaps for which development of indicators may be needed for each of the respective Targets.

- **Insights from the IPAM Cities Committee**

IPAM Cities Committee has taken up Systematic Review of scientific literature with the objective to characterize the current state of indicators and metrics proposed by the academic community to measure urban adaptation to climate change (Olazabal et al., 2024) [1]. The definition of appropriate frameworks for such characterization of adaptation indicators and metrics has been identified as a major challenge. Following a definite protocol for systematic review, more than 130 publications have been reviewed and more than 900 indicators and metrics (including indices) extracted from these publications. Both the publications and the indicators and metrics have been characterized.

The findings of the review suggest a regional disparity with strong focus of empirical work in Europe and Asia, flooding and heatwaves remain the most addressed climate impacts, lack of theoretical foundations; imbalance, or disciplinary dominance of few in contribution to this field; identified indicators tend to be defined in generalist or ambiguous ways and lack units of measurement; indicators tend to focus on process rather than on outcomes and results; a persistent focus on addressing formative aspects of adaptation (i.e. diagnoses and identification of needs and capacities) as well as summative aspects (i.e. what happens during or after implementation). These preliminary findings point to a field in the early stages of development, lacking standardized frameworks, and a need to move beyond outputs and toward outcomes.

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[1] Olazabal, M., Mansur, A. V., Sahay, S., Helmke-Long, L., Granceri, M., Villaverde, A., Garmendia, L., Aboagye, P. D., Sharifi, A., Asamoah, O., Mwangi, P., Lewis, W., Izaola, B., Murtagh, E., & Feldman, I. (2024). Current indicators and metrics challenge effective urban climate adaptation. Research Square, Preprint. h**ttps://doi.org/10.21203/rs.3.rs-3981396/v1**

The work identified the gaps and highlighted the methodological challenges related to existing or proposed urban indicators and development of these indicators. Additionally, it provides a pool of existing urban indicators used by scholarly communities. This caters to the need of the GGA target related to the cities, infrastructure, and human settlements, and overlapping dimensions of the other targets related to water, health, poverty eradication and livelihood. The findings also contribute to the requirement of the targets related to the dimension of the iterative adaptation cycle (Para 10 of decision 2/CMA.5). This serves as a major learning for the development of indicators for UAE Belém Work Programme on Indicators.

Given the complexity involved, it is not easy to decide on the 'best set of urban adaptation indicators.' This would require a systematic approach of evaluating the indicators based on set criteria. The three criteria for assessment of the indicator, as mentioned above, that IPAM has come up within its submission to the work programme can be used for the same.

- **Insights from the IPAM Water Committee**

The IPAM Water Committee, based on expert's view and an understanding of the literature (not a systematic review), came up with a wide sample of indicators for water-related adaptation spanning the four stages of the adaptation policy cycle, means of implementation as well as outcomes. The scale is of paramount importance (Plot, Local, Watershed, Territory, Boundaries). This, however, is more indicative than being exhaustive. The work provides the following as an indicative basis for categorizing and understanding water-related adaptation metrics and indicators –

Scale of measurement: Water adaptation indicators cover a range of scales, from local (e.g. plot of land) to national-level management to regional (e.g. watershed) and territory. This variety of scales is essential to cover the full spectrum of water management. For the purposes of the GGA, high- level indicators will be important, but aggregations should not mask important distributional considerations.

Type of risks addressed: The main risks addressed by water adaptation indicators are water scarcity, droughts, floods, water quality, and impact on aquatic ecosystems. It is essential to continue and expand monitoring of these risks, while considering the inclusion of other potential risks as well.

Mode of adaptation intervention: The most assessed types of water adaptation are programmes such as flood management, water harvesting/storage, source protection, land use planning, water use efficiency and infrastructure protection. Flood management for water harvesting can be an asset. Other aspects, however, such as human health protection, technological innovation, means of implementation (governance, finance, capacity building, technology transfer), must also be considered.

Economic and governance criteria: Economic indicators, focusing on the profitability of essential investments in water management and infrastructure, as well as governance indicators measuring the effective implementation of adaptation measures in the water sector.

Type of level of assessment: In assessing water adaptation interventions, a distinction may be drawn between indicators at the level of (i) Inputs (including activities, labor, capacities and technical expertise, finance and funds, equipment, and technology, i.e. enabling factors), (ii) Outputs (covering the products, capital goods and services which result from development interventions, per the OECD DAC), (iii) Outcomes (likely or achieved short-term and medium-termchange and effects of intervention outputs, per the OECD DAC), and (iv) Impacts (positive and negative, primary, and secondary, long-term effects produced by development interventions, per the OECD DAC). Adaptation indicators on water are often of the "input" and "output" type, but it is essential to develop more "outcome" type indicators for the impacts of water adaptation measures.

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[1] Nowak, Andreea; Njuguna, Lucy; Crumpler, Krystal. How can governments engage in adaptation tracking? A protocol for assessing national adaptation policies, 17 November 2023, PROTOCOL (Version 1) available at Protocol Exchange [https://doi.org/10.21203/rs.3.pex-2399/v1]
[1] Nowak, Andreea; Njuguna, Lucy; Crumpler, Krystal, 2023, "Adaptation elements in African Nationally

Insights from the IPAM Agriculture Committee

Based on expert consultations and a preliminary review of available literature (not a systematic review), IPAM Agriculture Committee also came up with a wide sample of indicators for agriculture-related adaptation measures spanning the four stages of the adaptation policy cycle, means of implementation as well as outcomes, not being exhaustive. The findings of the effort made in this regard suggest the presence of numerous resources on indicators already in use or to be used by stakeholders promoting adaptation in the agriculture sector [1][2]. Multiple frameworks and methodologies have been developed to assess adaptation at different scales,including in the context of the GGA. There is, however, still a lack of comprehensive review of thestate of adaptation metrics in this sector, which critically hinders a holistic understanding of the gaps and needs for measuring, monitoring and reporting of adaptation actions under the different UNFCCC frameworks. Data (both in terms of quality and availability) is also a key challenge at field and national levels, which usually is the key challenge to draw accurate conclusions or track progress.

So far, metrics formally documented likely represent a fraction of the metrics currently in use by development partners, project implementers, public institutions, private sector partners, andthe scientific community. Moreover, the challenge lies in the incomplete understanding of metrics' purposes and applications to specific contexts and scales, hindering their effective utilization and limiting their potential for creative integration within the GGA framework. A more detailed understanding is critical for informed decision-making on what should be measured,when, how, and by whom, as well as what aspects and experiences can be leveraged in the context of building the framework for the operationalization of the GGA.

The IPAM Agriculture Committee notes the different axes for categorizing indicators for agricultural adaptation and underscores the significance of adhering to key principles in designing agriculture-focused adaptation frameworks and metrics, particularly crucial in the broader context of national and global adaptation tracking. The different axes by which indicators may be categorized:

Determined Contributions (NDCs) and National Adaptation Plans (NAPs)", https://doi.org/10.7910/DVN/VK3CP9, Harvard Dataverse)

Scale of Measurement: Agricultural indicators span a wide range of scales, from the individual field or local farm or household to the regional, sectoral, or national level. This diversity of scales is essential to account for the various dimensions of agriculture, whether it be crop management at the farm level or the planning of agricultural policies at the national or regional scale. Adaptation in agriculture must be relevant at all these scales to be effective. Nevertheless, since most countries will not be in a capacity to report comprehensively micro level indicators even though they are relevant, further progress is needed to select a set of aggregable indicators which can inform the GGA process.

Type of Hazard Addressed: The primary hazards relevant to agriculture adaptation indicators include heavy rainfall, heat stress, droughts, floods, crop/animal diseases, disruptions in plant phenological cycles, as well as food insecurity. Assessment of these hazards/risks is important to better understand how agricultural practices can be adapted to face these challenges.

Modes of Adaptation Intervention: Types of agricultural adaptation interventions include technical efforts at improving crop resistance to climatic conditions, developing more efficient irrigation techniques, soil management for water conservation, and promoting crop diversity to enhance food security. However, it is also necessary to include adaptation interventions targeted at unblocking means of implementation such as access to financial services (grants, funds, loans, insurance) for farmers, technological innovation and transfer to improve agricultural productivity, and capacity building and coordination among stakeholders in the agricultural sector.

Types of level of assessment: There is a predominance of input and output indicators relative to outcome indicators in the agricultural space, which can be explained by the need to assess the initial situation and immediate results of adaptation interventions. There is a need to further develop outcome and impact indicators to assess the medium- to long-term impacts of adaptation actions, particularly on farmers' wider wellbeing and resilience and the sustainability of the agricultural sector. As in other sectors, emphasis in the agricultural sector is often put on inputs/outputs as indicators to measure progress; outcome indicators for adaptation, in many cases, can only be informed while/after the stress is occurring, and therefore (given year-to-year climate variability of stress) do not offer the opportunity for consistent annual reporting.

Cross-sectoral analysis: Interconnections and synergies

The thematic areas of Cities, Water, and Agriculture are deeply interconnected in the context of climate change and adaptation. Recognizing and leveraging these interconnections can lead to comprehensive and effective adaptation strategies and metrics. This section explores how indicators across these sectors might overlap or complement each other, highlighting the potential for integrated approaches to adaptation measurement.

Urban-Agricultural nexus: Cities and agriculture are inextricably linked through food systems, land use, and resource management. Urban expansion often occurs at the expense of agricultural land, while cities rely heavily on surrounding rural areas for food production. Climate adaptation indicators that bridge this divide could include:

1. **Urban food security metrics:** Measuring the percentage of a city's food supply sourced from climate-resilient local agricultural systems.
2. **Urban agriculture indicators:** Tracking the area and productivity of urban farming initiatives as adaptation measures.
3. **Peri-urban land use change metrics:** Monitoring the conversion of agricultural land to urban uses and its impact on both urban resilience and agricultural productivity.

Water-Agriculture interface: Water availability and management are critical for agricultural productivity, especially in the face of changing climate patterns. Indicators that capture this relationship include:

1. **Agricultural water use efficiency:** Measuring crop yield per unit of water used, reflecting both water conservation and agricultural productivity.
2. **Irrigation system resilience:** Assessing the percentage of irrigation systems adapted to projected climate changes.
3. **Watershed management effectiveness:** Evaluating how upstream land and water management practices affect downstream agricultural water availability.

Urban Water management: Cities face unique water challenges related to supply, stormwater management, and wastewater treatment. Indicators that link urban development with water management could include:

1. **Urban water reuse rates:** Measuring the percentage of treated wastewater reused for urban landscaping or agriculture.
2. **Green infrastructure coverage:** Assessing the area of urban land utilizing nature-based solutions for stormwater management.
3. **Water-sensitive urban design adoption:** Tracking the implementation of design principles that integrate water cycle management with urban planning.

Integrated Ecosystem Services: Recognizing that cities, water systems, and agricultural areas are part of larger ecosystems can lead to holistic adaptation indicators:

1. **Ecosystem-based adaptation coverage:** Measuring the area under ecosystem-based adaptation practices that benefit multiple sectors.
2. **Biodiversity in productive landscapes:** Assessing species diversity in agricultural and urban green spaces as an indicator of ecosystem health and resilience.
3. **Blue-green corridor connectivity:** Evaluating the continuity of waterways and green spaces from rural to urban areas, supporting both biodiversity and human well-being.

Economic and Social integration: Socio-economic factors often bridge sectoral divides and can provide valuable cross-cutting indicators:

1. **Climate-resilient livelihood diversification:** Measuring the diversity of income sources in climate-vulnerable communities across urban and rural areas.
2. **Adaptive capacity index:** Developing a composite indicator that assesses the ability of communities to adapt to climate changes, incorporating factors from all three sectors.
3. **Climate migration and resettlement:** Tracking population movements driven by climate factors across rural and urban areas, and the effectiveness of adaptation strategies in both origin and destination areas.

- **Global South perspective: Adaptation metrics in developing countries**

Developing countries face unique challenges and opportunities in implementing adaptation metrics. Many struggle with data availability and quality due to resource constraints, necessitating a focus on metrics that use readily available data and support for capacity building in data systems. Limited financial and human resources can hinder metric implementation, highlighting the need for cost-effective metrics that provide maximum insight with minimal input.

The prevalence of informal economies in many developing countries poses challenges for traditional metrics. Metrics should account for informal adaptation actions and include qualitative assessments to capture these realities. Additionally, developing countries often face multiple, intersecting vulnerabilities beyond climate change, calling for holistic metrics that consider broader development contexts.

Large rural populations dependent on agriculture require specific attention, necessitating a balance between urban and rural metrics, with emphasis on

smallholder and subsistence farming systems. Simultaneously, rapid and often unplanned urban growth creates unique adaptation challenges, requiring metrics for adaptation in informal settlements and rapidly growing urban areas

Indigenous and local knowledge systems play crucial roles in adaptation strategies in many developing countries. Metrics should recognize and value these traditional adaptation practices. Significant capacity building may be required for effective metric implementation, suggesting the inclusion of metrics tracking progress in building institutional and human capacity for adaptation.

Lastly, adaptation efforts must be viewed through the lens of climate justice. Incorporating equity-focused metrics to assess the distribution of adaptation benefits and track international support is crucial.

Recommended approaches to assessing indicators:

IPAM's analysis of adaptation metrics across various sectors and contexts underscores the complexity and importance of developing robust, globally applicable indicators. Based on ourfindings, we propose the following actionable recommendations for the development and use of adaptation indicators:

1. **Adopt a unified framework:** Implement the Adaptation Metrics Mapping Evaluation (AMME) Framework as a standardized approach for assessing and developing adaptation indicators. This will ensure consistency and comparability across different sectors and regions.

2. **Prioritize outcome-focused indicators:** Shift emphasis from input and output indicators to those that measure medium and long-term adaptation outcomes. This is particularly crucial in the agriculture and water sectors to assess the lasting impacts of adaptation actions.

3. **Enhance data collection and management:** Invest in improving data availability, quality, and accessibility, especially in developing countries. Support capacity building for national statistical offices and promote the use of innovative data collection methods, such as remote sensing and citizen science.

4. **Integrate cross-sectoral perspectives:** Develop indicators that capture the interconnections between cities, water, and agriculture. This approach will provide a more comprehensive understanding of adaptation progress and highlight potential synergies or trade-offs between sectors.

5. **Ensure global applicability:** Design indicators that are relevant and applicable across diverse contexts, from least developed countries to advanced economies. Consider variations in data availability, resource constraints, and local priorities when defining global indicators.

6. **Incorporate equity and vulnerability:** Develop indicators that explicitly address equity considerations and capture the adaptation progress of the most vulnerable populations. This includes disaggregating data by relevant social and economic factors.

7. **Leverage technology and innovation:** Promote the use of cutting-edge technologies, such as artificial intelligence and big data analytics, to enhance the accuracy and efficiency of adaptation measurement and reporting.

8. **Foster participatory approaches:** Engage local communities, indigenous peoples, and diverse stakeholders in the development and implementation of adaptation indicators to ensure relevance and buy-in.

9. **Align with existing frameworks:** Ensure coherence between adaptation indicators and other relevant global frameworks, such as the Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction.

10. **Support capacity building:** Invest in training and knowledge sharing to build capacity for indicator development, data collection, and analysis at national and sub-national levels, particularly in developing countries.

11. **Promote flexible and adaptive indicators:** Develop indicators that can evolve over time to reflect changing climate risks, adaptation strategies, and improved scientific understanding.

12. **Establish a global knowledge platform:** Explore the benefits and drawbacks to formation of adaptation indicator definitions and creation of a centralized repository for adaptation indicators, methodologies, and best practices to facilitate learning and harmonization of approaches across countries and sectors...

These recommendations can significantly enhance the ability of the global community to measure, monitor, and ultimately improve climate change adaptation efforts. IPAM stands ready to support the UNFCCC and member states in advancing the development and application of effective adaptation metrics. We urge decision-makers to consider these recommendations in the ongoing work to operationalize the Global Goal on Adaptation and strengthen global climate resilience.

Conclusions and statement of support to the UAE-Belém Work Programme

IPAM believes robust, scientifically valid and useful indicators are important to support the GGA and the UAE Resilience Framework's 11 targets. IPAM encourages the UAE-Belem work programme to avail itself of IPAM expertise, both as an organization through our collective interventions such as this submission, and through our members' involvement in the programme.

To this end, IPAM members have been nominated and their names have been provided in a separate submission to the UNFCCC. We anticipate collectively supporting any selected members through the IPAM.

We stand ready to engage with UNFCCC and the work programme throughout the two years.