

State of Climate Services

2024



WORLD
METEOROLOGICAL
ORGANIZATION

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This is a supplement to the WMO State of the Global Climate 2024 report.

Key Messages



There has been substantial progress in terms of improving climate services capacity in the last five years. The number of National Meteorological and Hydrological Services (NMHS) delivering advanced climate services has nearly doubled, from 8 in 2019 to 15 in 2024. Similarly, the number of NMHSs providing full-capacity services increased from 11 to 17.



A significant number of NMHSs in Asia and Africa have shown remarkable progress in enhancing their climate services capacity levels between 2019 and 2024.



Most NMHSs provide climate services across the five priority sectors of the Global Framework for Climate Services (GFCS). According to 2024 data, 90% of NMHSs offer climate services for agriculture, while 88% provide support for the water sector.



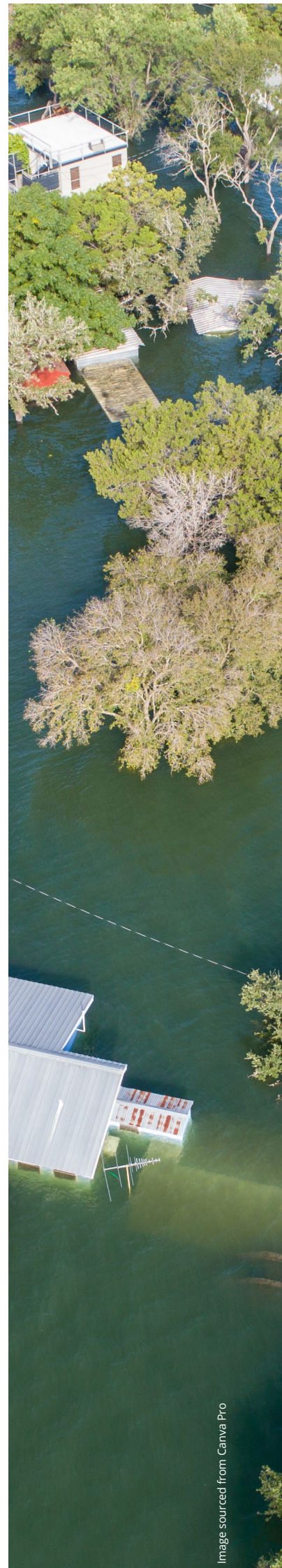
Despite improvements, significant gaps still remain globally in climate services. Tailored climate products addressing impacts on marginalized groups remain limited, observing network coverage is critically low (especially) in the Least Developed Countries (LDCs) and Small Island Developing States (SIDS), and fewer than 20% of NMHSs have assessed socioeconomic benefits of their services, with major shortfalls in Africa and South America. In Africa, 15% of NMHSs operate at a “less than basic” capacity, while globally, only 14% deliver advanced climate services.



Regional cooperation is a key enabler for the successful development, delivery, and use of climate services. In 2024 there were 26 designated World Meteorological Organization (WMO) Regional Training Centres (RTCs) serving as hubs for educating and equipping NMHS personnel with the necessary competencies and knowledge to develop and deliver weather, climate, and hydrological services.



There is more to be done if we want to keep the long-term global average surface temperature increase well below 2 °C above pre-industrial levels and pursue efforts to limit it to 1.5 °C to avoid the worst consequences of climate change. Of the 63 billion US dollars (USD) being spent on climate adaptation, nearly a third goes towards climate-informed investments, with a small portion (estimated at about USD 4 billion to USD 5 billion) of that explicitly supporting climate services and early warning activities. However, despite an overall increase, the continued investment is not necessarily translating into support for building NMHSs' capacities. [See the Investment section of the 2024 State of Climate Services.](#)



Introduction

This supplementary material complements the State of the Global Climate 2024 Report by examining and documenting the climate service capacities of WMO Members to cope with and mitigate the impacts of climate variability and climate change.

It assesses climate service capacity gaps and needs, particularly those relating to supporting adaptation and mitigation efforts (for additional information, please refer to the [2024 State of Climate Services report](#)).

Climate services are essential to help countries, stakeholders, and communities make informed climate-smart

decisions based on the best available scientific data, information, and knowledge.

They greatly contribute to effective early warning services and serve as a bridge between climate knowledge and action, ensuring that adaptation and mitigation strategies are not only responsive but also data-driven.

Climate services empower nations to prepare, adapt, and build resilience against climate variability and climate change impacts.



Image sourced from Canva Pro

Data and Methods

The WMO collects self-reported data from its Members, represented by NMHSs, to assess progress in climate service implementation and identify areas for support. This assessment is guided by the [GFCS](#). It follows a methodology developed by WMO intergovernmental-appointed experts from the WMO technical commissions and regional associations, as approved at the sixty-eighth session of the WMO Executive Council (2016) and the nineteenth session of the World Meteorological Congress (2023).

The report evaluates the climate service capacities of 179 Members (93% of the total) as of June 2024, including all LDCs and 64% of SIDS. Data from 2019 and 2024 have also been used to track progress over five years, covering the 83 Members that provided data both in 2019 and 2024. NMHSs assess their capacities through a survey covering six functional areas: governance, basic systems and observations, user interface, capacity development, provision and application of climate services, and monitoring and evaluation of socioeconomic benefits.

Capacities are classified as basic, essential, full, or advanced (see Table 1 of the [Guidelines For National Meteorological And Hydrological Services On Capacity Development For Climate Services](#)).

Quality assurance procedures based on WMO and ISO standards were applied in an initial list of 14 selected Members, focusing on climate services aspects. Additional validation was done through the WMO Regional Offices, [Working Groups on Climate Services](#), Regional Association Experts Teams on Climate Services, and the Country Hydromet Diagnostics performed in 20 Members in 2023/2024 (also summarized in the [Hydromet Gap Report 2024](#)). Established in 2024, the WMO Expert Team on Capacity Development for Climate Services is mandated by the WMO Commission for Weather, Climate, Hydrological, Marine, and Related Environmental Services and Applications to further verify and validate the climate services capacity levels.

Climate Policy and Action sections are based on analyses of Nationally Determined Contributions (NDCs) submitted to the United Nations Framework Convention on Climate Change (UNFCCC) as of December 2024.

Note: Percentages presented in this report are calculated based on the total number of WMO Members globally (193) and within each region: Africa (53), Asia (34), South America (12), North America, Central America, and the Caribbean (22), South-West Pacific (22), and Europe (50).



Image sourced from Canva Pro

Climate Services Dashboard



Why is it important to connect the dots?

Launched in 2024, the upgraded [WMO Climate Services Dashboard](#) is a useful and informative tool to track and assess global climate service capacities. This interactive platform helps decision-makers, countries, and development partners by offering valuable insights into climate policy, service capacities, and investment trends. It helps align resources and strategies to enhance global climate action.

Key features of the WMO Climate Services Dashboard are:

- Climate Policy Insights: Tracks how climate services are integrated into the NDCs.
- Climate Service Capacities: Evaluate the ability of NMHSs to deliver essential climate services to support climate action across sectors.
- Investment Trends: Monitors funding directed towards climate service projects.
- Country-specific page: Provide detailed information on national priorities, capacities, and funding trends.

This tool supports climate action by tracking progress against the [Global Goal on Adaptation](#) and enhancing climate services across sectors such as agriculture, health, energy, and disaster risk reduction. It complements other WMO dashboards, including the [EW4ALL Dashboard](#), which tracks the advancements in early warning systems; the [WMO Hydrology Dashboard](#), which provides more insights into hydrological observation, forecasting, and governance of National Hydrological services; and the [WMO Energy Dashboard](#), which provides insights in the integration of climate information into energy planning and decision-making.

Global Overview

Climate Services Capacities

As of 2024, 33% of NMHSs provide climate services at an “essential” level, and approximately one-third of WMO Members have advanced their capacities to “full” or “advanced” levels, see Figure 1, where co-production with stakeholders ensures that services are relevant and actionable for better-informed decision-making.

There has been substantial progress in terms of climate services capacity in the last five years. The number of NMHSs delivering advanced climate services has nearly doubled, from 8 in 2019 to 15 in 2024.

Similarly, the number of NMHSs at the “full” climate service capacity level has increased from 11 to 17. During this period, the number of NMHSs only offering basic climate services has almost halved, while those providing climate services below basic levels have decreased from 4 to 2 (see Figure 2). These trends indicate stronger national capabilities and a greater emphasis on tailored demand-driven climate services.

Countries across Africa and Asia have made strides in advancing their capacity boosted by targeted adaptation funding - a positive development considering the heightened vulnerability to extreme weather and climate change.

See [the State of the Climate in 2024 Extreme Events Supplement](#) for more information.

Strengthening climate services in these regions is critical as it enhances preparedness and adaptive responses to extreme weather events, shifting rainfall patterns, rising temperatures, and rising sea levels in coastal regions. (Further regional insights can be found in the dedicated sections for each Region).

However, there is room for improvement, particularly in:

- The co-design and co-development of tailored climate service products, which is lagging for all the regions. These include gaps in recognizing the specific impacts of climate-related risks for children, women, people with disabilities, and other marginalized social and livelihood groups.
- Despite progress in Africa, 15% of NMHSs in the region are at the “less than basic” level of climate services capacity.
- Significant gaps still exist in the coverage of observing networks, most notably in LDCs and SIDS, which are only collecting and internationally exchanging 9% of mandated Global Basic Observing Network (GBON) data.
- Less than 20% of NMHSs reported that they have conducted socioeconomic benefit (SEB) assessments of their weather, climate, and hydrological services over the last 10 years, with the largest gaps identified in Africa and South America.

Climate Policy and Action

NDCs are central to countries' adaptation and mitigation commitments under the Paris Agreement.

A 2024 [analysis](#) by the Secretariat of the UNFCCC of submitted NDCs found that 92% of the 136 Parties with an adaptation component identified the need for research, climate data collection, and monitoring to support evidence-based decision-making. Water, agriculture and food security, ecosystems and biodiversity, health, and disaster risk reduction are prioritized in NDCs as sectors critical for adaptation, given their vulnerability to climate change impacts.

Tailored climate services are essential for mitigating risks and fostering sustainable development within these sectors.

Data shows that most NMHSs provide climate services for these key sectors. For example, 90% of NMHSs offer services for agriculture, and 88% support the water sector (see Figure 3).

However, significant gaps remain in the provision of tailored climate services for socio-economic sectors across all regions (see Figure 4), hindering efforts to manage climate-sensitive risks effectively.



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GLOBAL SNAPSHOT – CLIMATE SERVICES

Figure 2: Climate services capacities for 2019 and 2024, based on the 83 NMHSs that responded in 2019 and updated their data in 2024

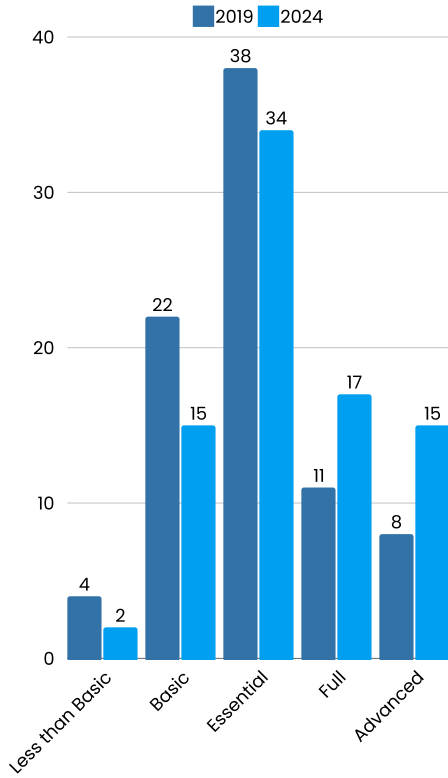


Figure 1: Overall Climate Services 2024

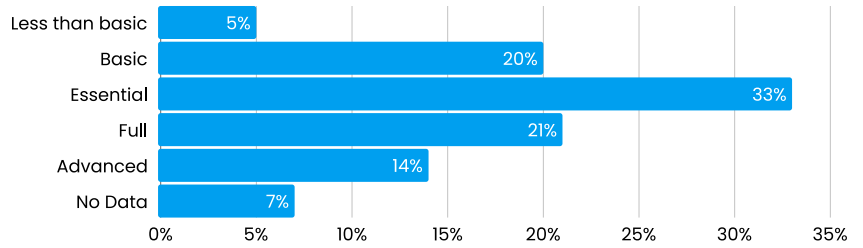


Figure 3: Percentage of NMHSs Providing Climate Services

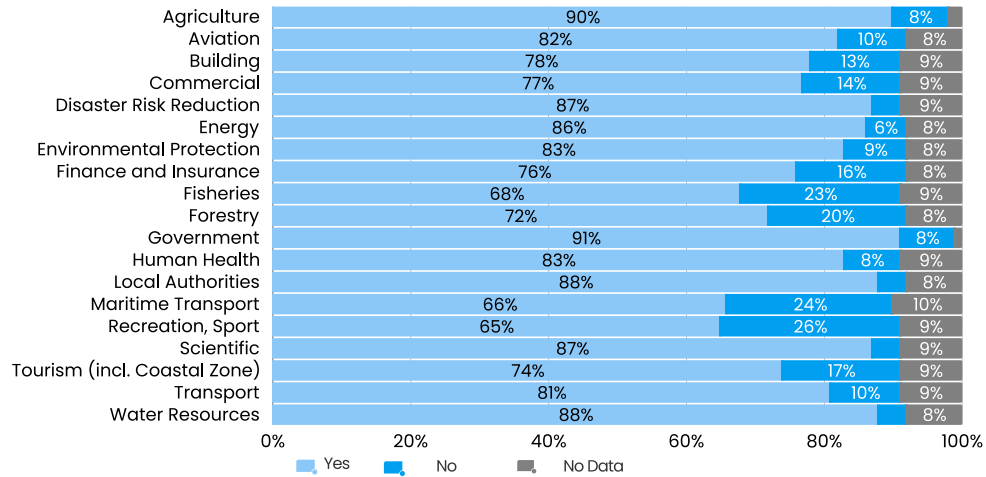
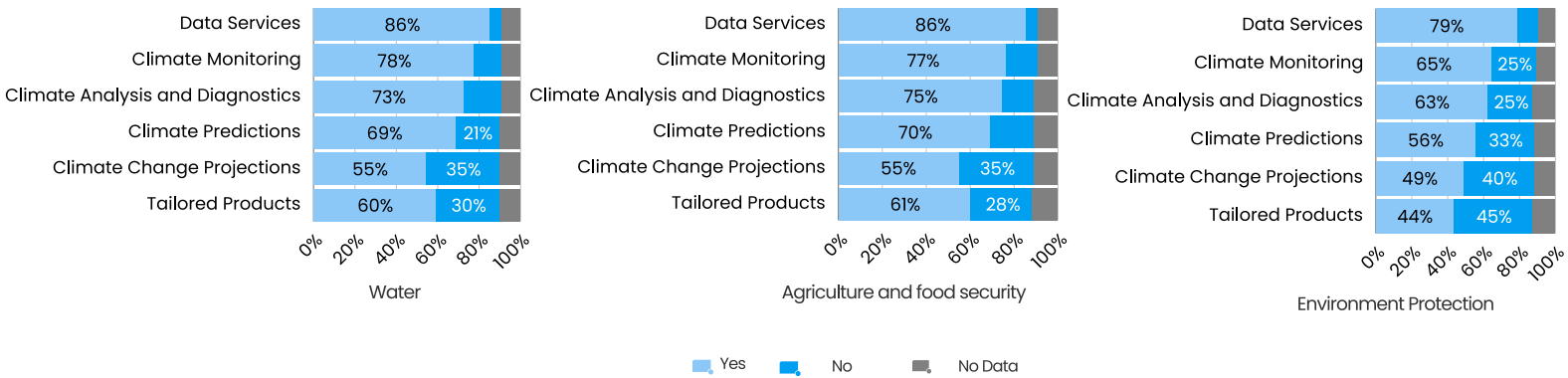


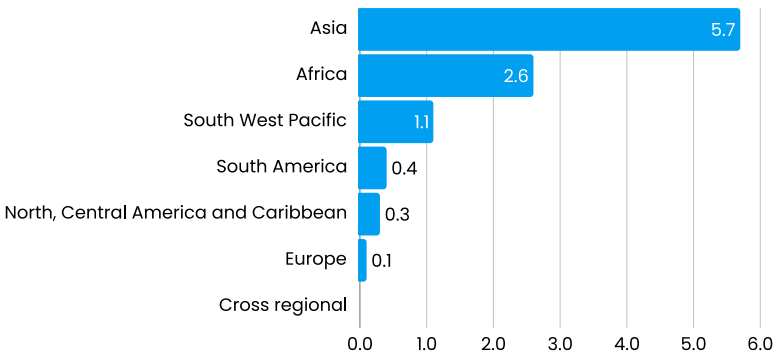
Figure 4: Percentage of NMHSs Providing Climate Service Products to the Sector Identified as a Priority for Adaptation in the NDC (Ordered Left to Right)



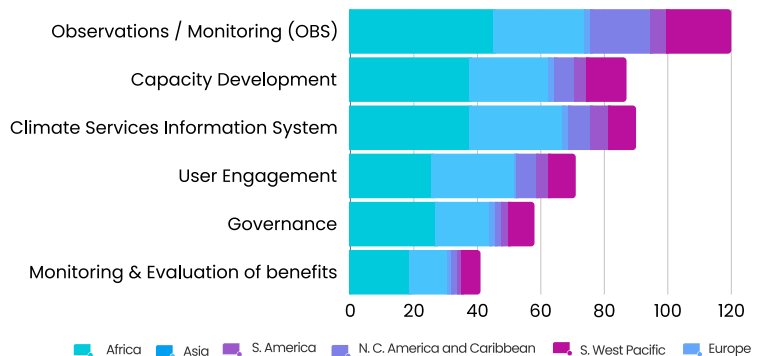
Multilateral Development Bank Investments in Climate Services, 2019–2024

Source: Global Observatory for EWS Investments

Climate Services Portfolio Including Co-Financing- Per Region in Billion USD

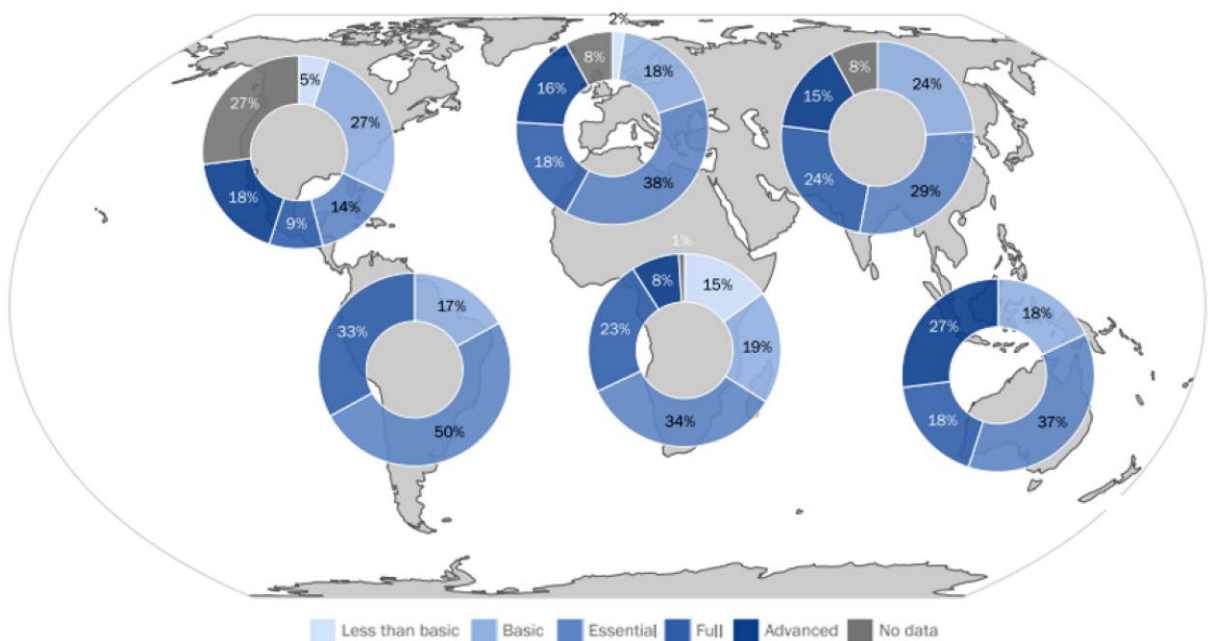


No. of Projects Per Value Chain Component



Regional Overview

The regional sections showcase the overview of the climate services capacities and progress across the [six WMO regions](#) (Africa; Asia; South America; North America, Central America, and the Caribbean; South-West Pacific; and Europe), highlighting key achievements, challenges, opportunities, and areas for further improvement.



Africa

Climate Services Capacities

As of 2024, 31% of African NMHSs provide full or advanced climate services, enabling co-production and the development of tailored products to meet regional needs. However, over one-third of NMHSs still operate at a basic or less-than-basic level, underscoring the critical need for increased investment and capacity-development (see Figure 5).

Between 2019 and 2024, the number of NMHSs delivering essential-level climate services has increased from 8 to 11, signaling an upward trend in the ability to provide climate services. At the same time, the number of NMHSs operating at only a basic level has dropped from 8 to 3 (see Figure 6), indicating positive progress in strengthening foundational capabilities.

For example, by leveraging regional collaboration and financial acumen, Seychelles is working towards advancing its own climate services and supporting its neighbors' (see – [case study on Seychelles](#) in the [2024 State of Climate Services report](#)).

Despite these improvements, the number of NMHSs providing climate services at full or advanced capacity levels remains limited. Between 2019 and 2024, only one NMHS has achieved an advanced level, restricting the ability to sufficiently provide sector-specific co-developed tailored products essential for climate-responsive planning (see Figure 8).

Despite the improvement observed in the last 5 years, there is still room for improvement in the following areas:

- **Observation and Monitoring Gaps:** Only 39% of African NMHSs possess full or advanced observation and monitoring capabilities, constraining the accuracy of climate forecasting and projections.
- **Capacity Development:** 15% of African NMHSs still operate below the basic level, highlighting the urgent need for investment in institutional strengthening and workforce development.
- **Monitoring and Evaluation:** Only 17% of African NMHSs monitor and evaluate climate services' socio-economic benefits at full/advanced level, limiting the ability to assess the socio-economic impact of climate services.
- **Sector-Specific Projections and Tailored Products:** Significant gaps exist in the availability of long-term climate projections for essential sectors. For instance, 36% of NMHSs lack climate projections for agriculture, 38% for water, and 51% for public health. Additionally, many NMHSs do not provide tailored products to support climate adaptation efforts in these sectors (see Figure 8).

Closing these gaps will require increased investment, regional collaboration, and strengthened capacity-development efforts to ensure climate services effectively support policy and decision-making processes.

Climate Policy and Action

Most WMO Members from Africa (98%) have highlighted the importance of climate services for climate action in their NDCs.

Activities include expanding observation networks, improving predictive modeling, and enhancing real-time data dissemination to strengthen decision-making are among the actions included in the African NDCs.

The prioritized sectors for adaptation include agriculture, water, public health, ecosystems, forestry, and disaster risk reduction, for which NMHSs play a crucial role in delivering climate services to those sectors (see Figure 7).

Although NMHSs provide climate services to key priority sectors outlined in NDCs— including agriculture and food security (94%), water (92%), and ecosystems (87%)— substantial gaps remain in climate projections and sector-specific products (see Figure 8) see also [UNFCCC report](#). Strengthening these services is vital to ensuring Africa’s resilience to climate variability, advancing adaptation measures, and fostering sustainable development through informed climate action strategies.



Image sourced from Canva Pro

AFRICA SNAPSHOT – CLIMATE SERVICES

Figure 6: Climate services capacities for 2019 and 2024, based on the 21 NMHSs that responded in 2019 and updated their data in 2024

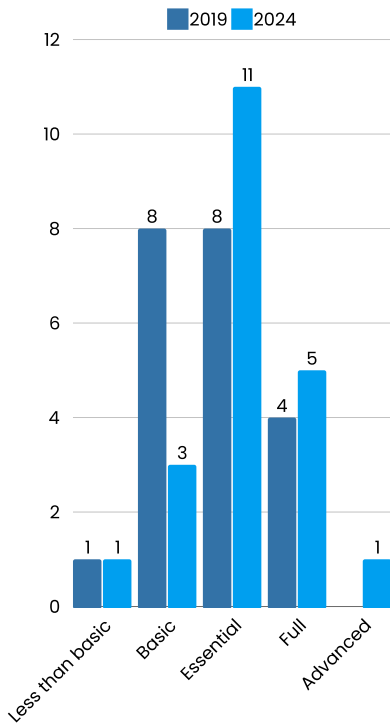


Figure 5: Overall Climate Services 2024

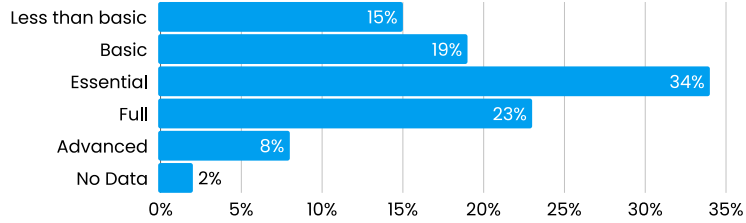


Figure 7: Percentage of NMHSs Providing Climate Services

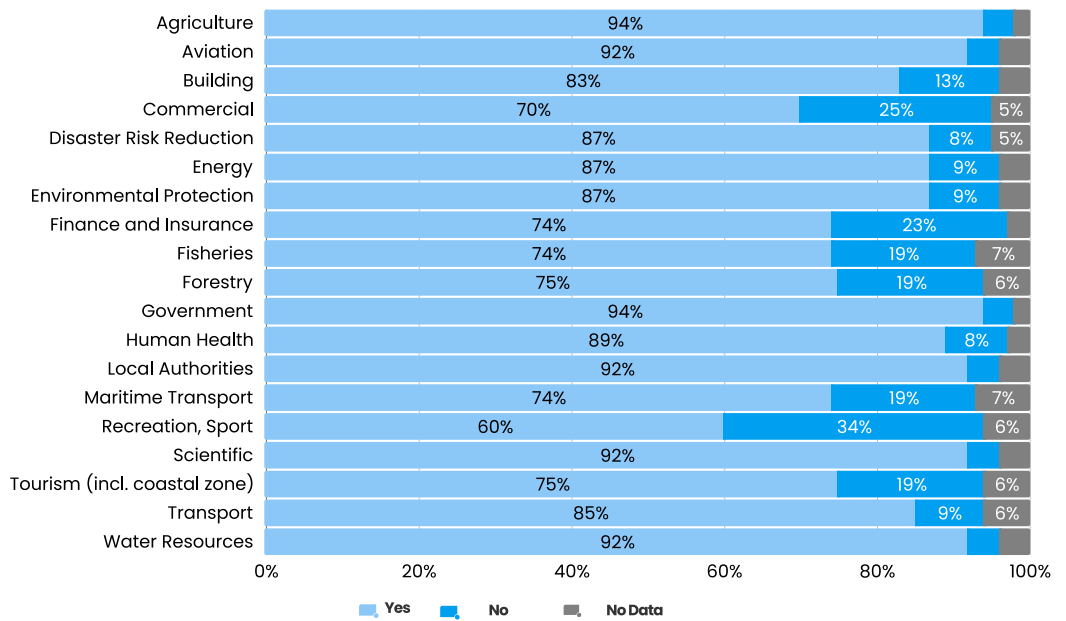
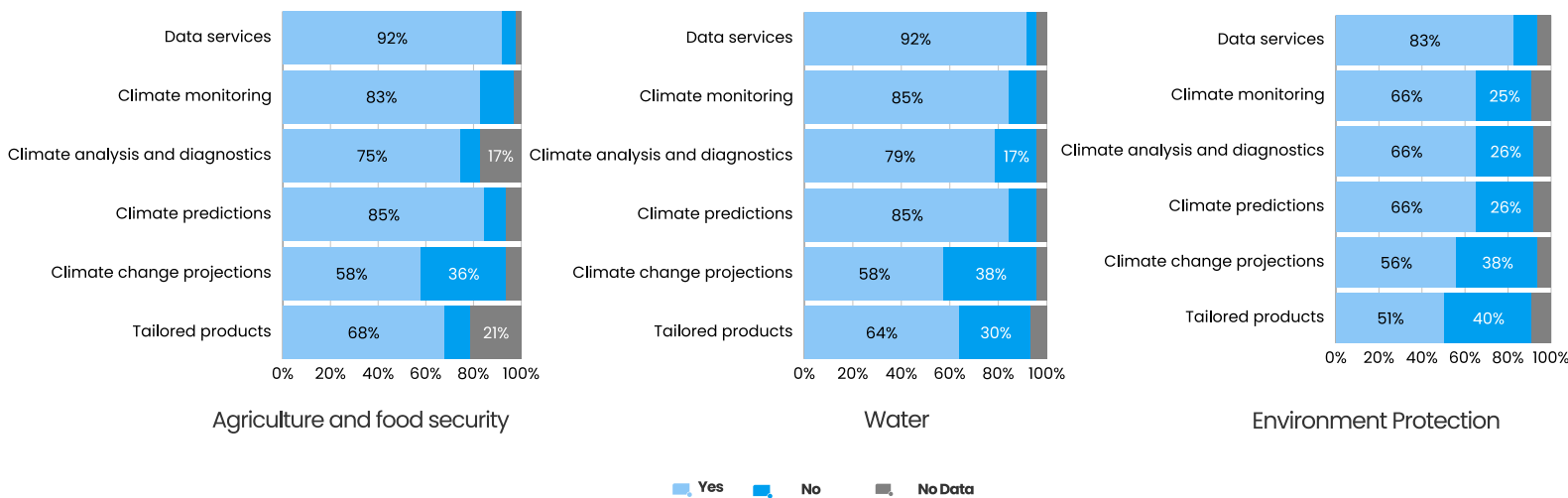


Figure 8: Percentage of NMHSs Providing Climate Service Products to the Sector Identified as a Priority for Adaptation in the NDC (Ordered Left to Right)



Asia

Climate Services Capacities

As of 2024, 39% of NMHSs in the region provide climate services at a full or advanced level, facilitating co-production and the development of customized climate products tailored to national and regional priorities. These services are essential in supporting key sectors such as agriculture, water management, disaster preparedness, and public health. However, over 20% of NMHSs still operate at a basic level, reflecting the need for enhanced technical capacity and infrastructure development (see Figure 9).

Additionally, 59% of NMHSs engage users at a full or advanced level, ensuring collaborative development of climate services with policymakers, businesses, and local communities. This engagement is critical for enhancing climate adaptation efforts, particularly in sectors like agriculture and disaster preparedness.

Over the past five years, the region has made noticeable improvements.

Key developments include a significant reduction in the number of NMHSs operating at the essential level, decreasing from eight in 2019 to four in 2024.

Furthermore, there has been a substantial increase in the number of NMHSs providing climate services at full capacity, rising from one in 2019 to five in 2024 (see Figure 10).

The Cambodia case study highlights the importance of ongoing training and capacity development and the value of involving-

communities early in the process to ensure ownership and effective use of the early warnings and climate information (See the [Cambodia case study – 2024 State of Climate Services](#) report).

Despite these improvements, there is still room for advancement in several key areas:

- **Monitoring and Evaluation Gaps:** Only 15% of NMHSs conduct thorough socio-economic assessments of climate services at full/advanced level, limiting their ability to demonstrate tangible benefits and secure long-term sustainability.
- **Capacity Development:** More than 20% of NMHSs still operate at a basic level, emphasizing the need for targeted investment to enhance technical capabilities and service delivery.
- **Sector-Specific Climate Services:** Significant gaps exist in providing tailored climate change projections and products. For example, 44% of NMHSs do not offer projections for agriculture, while 50% lack tailored climate products, affecting farmers' ability to adapt to changing climate.
- **Energy Sector Readiness:** Climate change projections remain underutilized in energy infrastructure planning and operations, with 56% of NMHSs not integrating these projections into the power grid and renewable energy assessments.
- **Public Health Support:** A considerable gap exists in health-focused climate services, with 65% of NMHSs lacking tailored climate services for disease prevention and response and heat stress (see Figure 12).

Climate Policy and Action

Asian countries have recognized the importance of climate services in their national adaptation strategies, with 74% incorporating them into their NDCs.

This reflects a regional commitment to strengthening meteorological, hydrological, and marine observations, climate forecasting, and research to mitigate the impacts of extreme weather events.

Priority sectors in Asian NDCs include water resources, agriculture, public health, energy, and disaster risk reduction, where climate services play a crucial role in supporting adaptation and resilience.

Notably, a significant share of NMHSs provides services for these key sectors: water (85%), agriculture (85%), energy (88%), and health (82%) (see Figure 11).



Image sourced from Canva Pro

ASIA SNAPSHOT – CLIMATE SERVICES

Figure 10: Climate services capacities for 2019 and 2024, based on the 16 NMHSs that responded in 2019 and updated their data in 2024

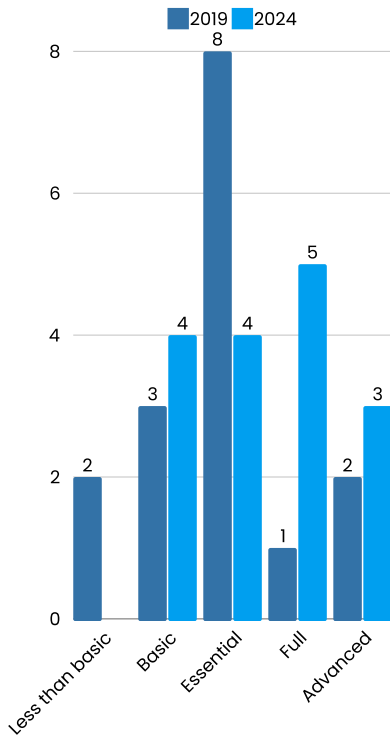


Figure 9: Overall Climate Services 2024

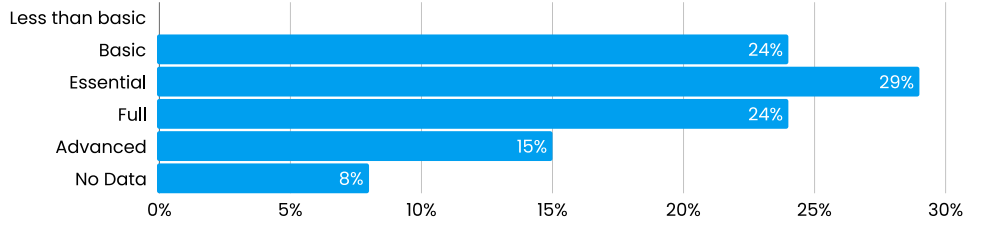


Figure 11: Percentage of NMHSs Providing Climate Services

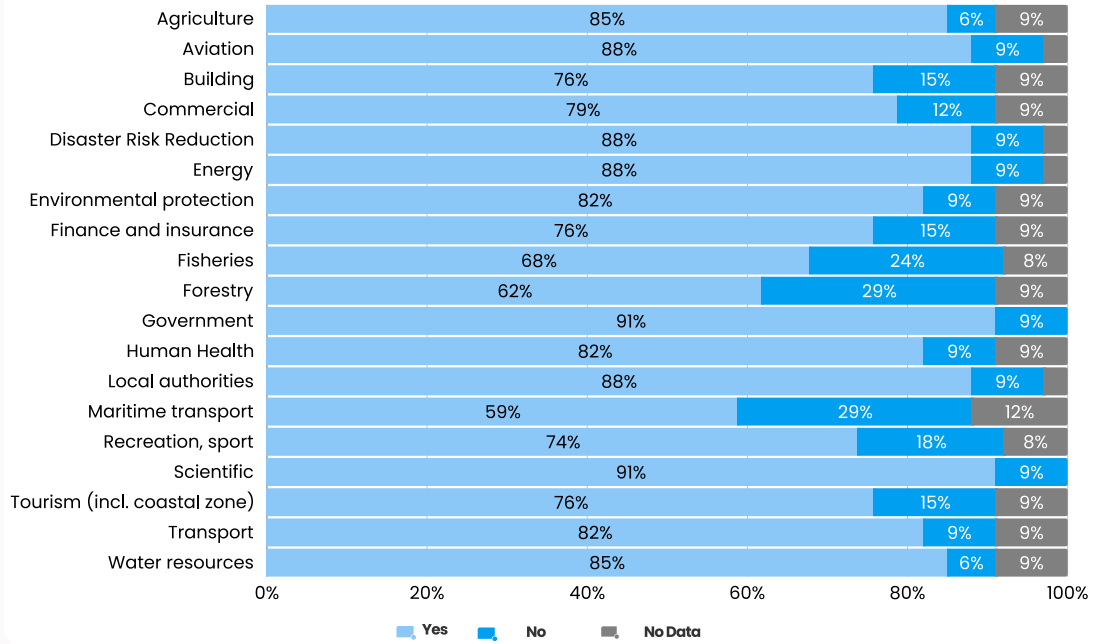
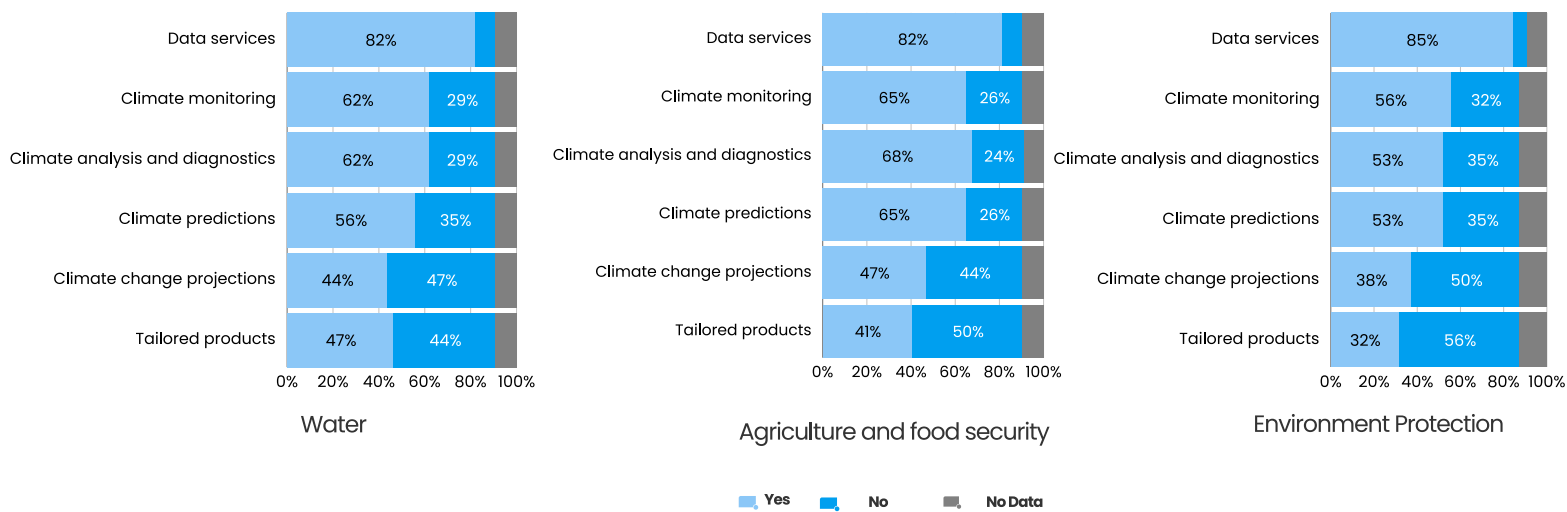


Figure 12: Percentage of NMHSs Providing Climate Service Products to the Sector Identified as a Priority for Adaptation in the NDC (Ordered Left to Right)



South America

Climate Services Capacities

As of 2024, 67% of NMHSs in South America operate at either a basic or essential level, focusing on core tasks such as data collection, preliminary forecasting, and fundamental climate monitoring. In contrast, about one-third of NMHSs function at full capacity, enabling them to produce specialized climate products and services that meet the needs of decision-makers in critical sectors like agriculture, disaster management, and water resources (see Figure 12).

Furthermore, 58% of NMHSs actively engaging user communities at a full level and 33% delivering actionable climate information.

Between 2019 and 2024, improvements have been modest. NMHSs providing services at full capacity increased from 0 in 2019 to 2 in 2024, whereas those offering basic or essential services remained unchanged, and the number of advanced-service providers declined. Persistent challenges—such as high staff turnover and limited resources—have hindered further progress (see Figure 13). Strengthening regional collaboration, enhancing technical training, and fostering partnerships with key sectors will be pivotal in advancing climate services.

The example of Argentina shows how improved collaboration through the NFCs, improved user engagement/understanding of user needs, and external investments contributed to the progression of climate services in Argentina (see the [Argentina case study](#) – [2024 State of Climate Services](#) report).

Despite these developments, there is still room for improvement in the following areas:

- 75% of NMHSs lack long-term climate projections needed by farmers to manage erratic rainfall, droughts, and shifting growing seasons. Without reliable projections, agricultural stakeholders cannot develop effective adaptation strategies.
- 75% of NMHSs do not offer comprehensive climate projections for hazard assessments, and 58% lack customized products to improve disaster preparedness and response.
- Despite the region's dependence on natural ecosystems such as the Amazon rainforest for carbon sequestration, water regulation, and biodiversity conservation, 67% of NMHSs do not provide climate projections for environmental conservation. Additionally, 42% lack targeted climate services products to support ecosystem-based adaptation strategies (see Figure 16).
- Monitoring and evaluation of the socio-economic benefits of climate services is an area that needs improvement. Currently, only 8% of NMHSs in the region conduct thorough monitoring and evaluation (M&E), which highlights a missed opportunity to demonstrate the socio-economic benefits of climate services and attract investment.

Addressing these gaps is critical to safeguarding South America's biodiversity and bolstering resilience in the face of deforestation, land-use changes, and increasing climate variability.

Climate Policy and Action

South America has demonstrated a strong commitment to integrating climate services into national adaptation efforts. According to the Climate Services Dashboard, 95% of NMHSs in the region that have submitted NDCs include climate services in their plans.

Most NMHSs also offer support for priority sectors—namely, agriculture, water management, and disaster risk reduction (see Figure 15).

Nonetheless, substantial sector-specific gaps remain in climate projections and tailored forecasting, curtailing the effectiveness of climate services for managing climate-related risks (see Figure 16).

Going forward, enhanced coordination among NMHSs, strategic public and private investments, and robust monitoring and evaluation frameworks will be indispensable.

By tackling these challenges, South America can more effectively develop, deliver and use climate services to foster sustainable development, protect its rich ecosystems, and bolster resilience against a rapidly changing climate.

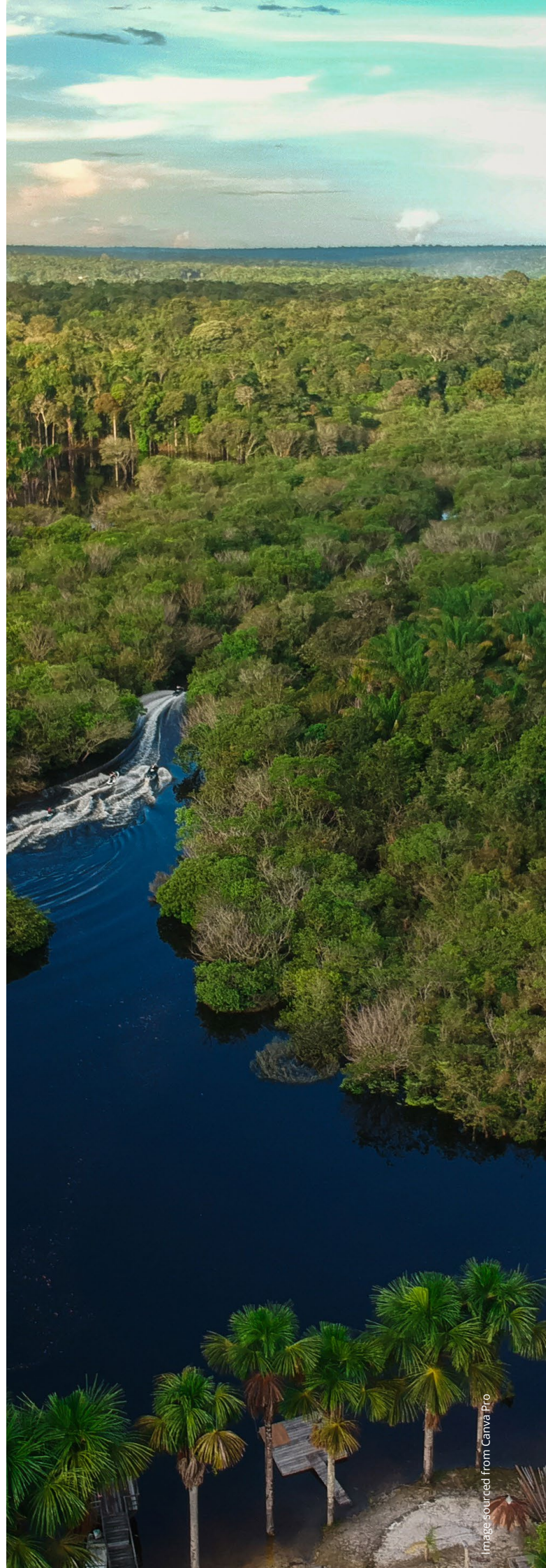


Image sourced from Canva Pro

SOUTH AMERICA SNAPSHOT – CLIMATE SERVICES

Figure 14: Climate services capacities for 2019 and 2024, based on the 8 NMHSs that responded in 2019 and updated their data in 2024

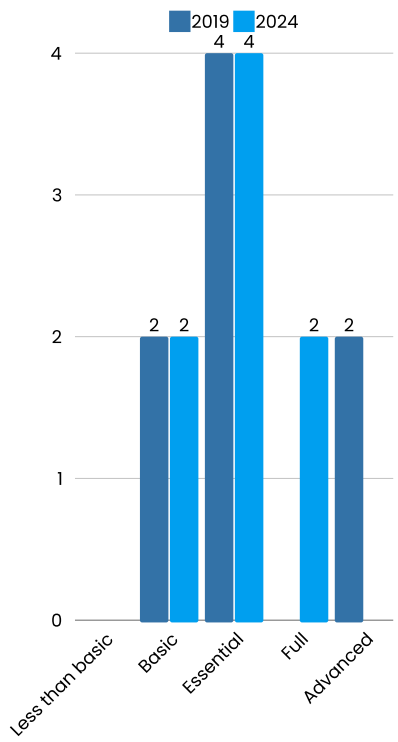


Figure 13: Overall Climate Services 2024

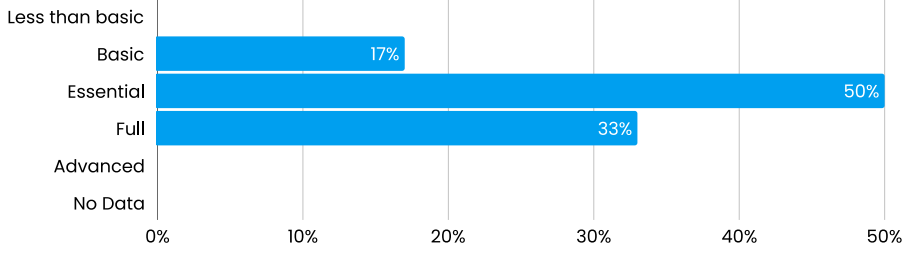


Figure 15: Percentage of NMHSs Providing Climate Services

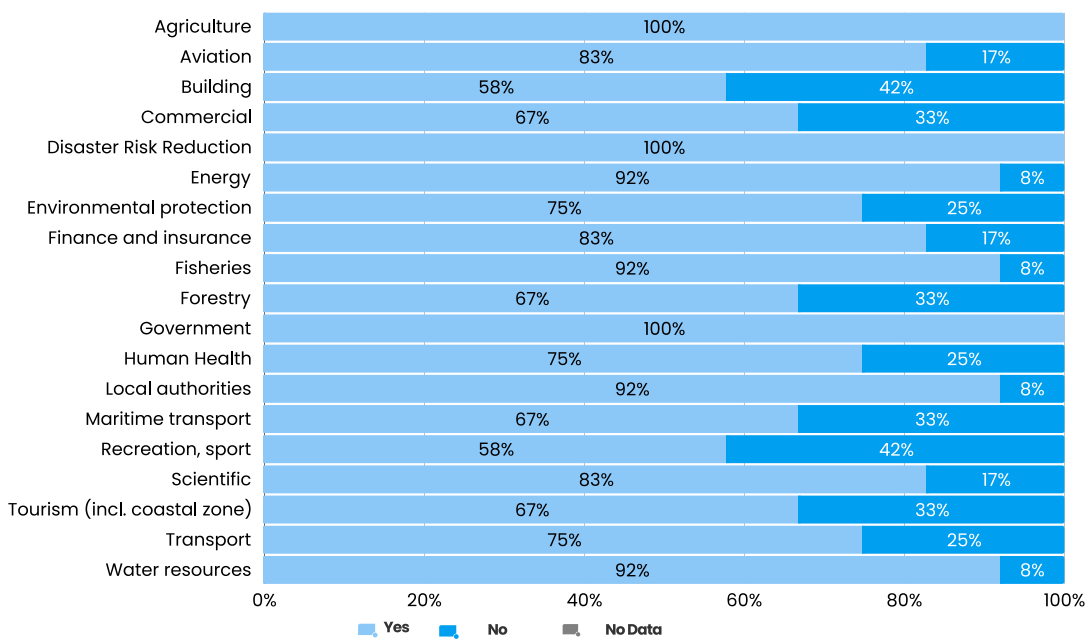
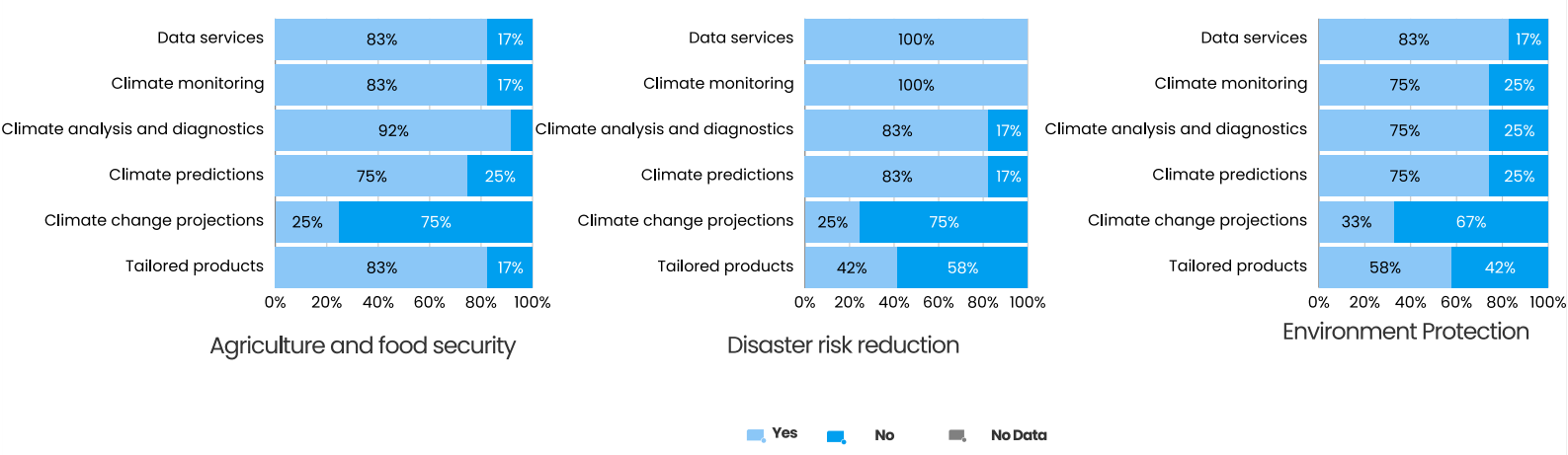


Figure 16: Percentage of NMHSs Providing Climate Service Products to the Sector Identified as a Priority for Adaptation in the NDC (Ordered Left to Right)



North America, Central America and the Caribbean

Climate Services Capacities

The 2024 assessment for North America, Central America, and the Caribbean NMHSs shows that 27% of NMHSs are currently delivering full or advanced climate services, enabling the co-production and development of tailored products aligned with national and regional needs. However, 41% of NMHSs continue to function at a basic or essential level (see Figure 17), illustrating the varying degrees of progress across the region.

Furthermore, the overall delivery of climate services remains limited. Currently, only 36% of NMHSs provide climate information at full or advanced levels, while observation and monitoring capabilities are underdeveloped—just 32% of NMHSs have achieved full/advanced proficiency in these areas. Furthermore, 28% of NMHSs maintain robust user engagement processes providing these services at a full/advanced level, reflecting an ongoing need for outreach and collaboration with decision-makers, communities, and private-sector partners.

For example, [the Barbados case study](#) shows what can be achieved through dedication, user engagement, and a commitment to innovation (i.e., new 3D printing technologies to address gaps in the existing observing networks).

Monitoring and evaluation (M&E) of socio-economic benefits is notably weak; only 5% of NMHSs conduct comprehensive impact assessments. Without such data, it is difficult to demonstrate the value of climate services and secure sustained investment.

Nevertheless, the region has witnessed a notable shift in its climate services landscape between 2019 and 2024, with the number of NMHSs delivering advanced climate services rising from none in 2019 to three in 2024. At the same time, NMHSs providing only basic or essential-level services have declined, underscoring incremental improvements in capacity-development (see Figure 18).

However, there is room for improvement, particularly in:

- Strengthening Observation and Monitoring to facilitate high-resolution forecasting, projections, and predictions.
- Enhancing Socio-Economic Benefit Evaluations of climate services to attract and justify increased funding.
- Expanding user engagement so that tailored products meet the needs of diverse stakeholders, including farmers, water managers, and healthcare providers.

Climate Policy and Action

NMHSs in North America, Central America, and the Caribbean have increasingly recognized the role of climate services in their NDCs.

According to data from the Climate Services Dashboard, 67% of NDCs from the region explicitly include climate services, underscoring a growing commitment to reliable observation networks, user-focused engagement platforms, and research capacity.

As climate change impacts—such as hurricanes, sea-level rise, and extreme precipitation events—become more frequent and severe, governments are integrating climate services deeper into adaptation and resilience strategies.

Key sectors prioritized in NDCs include water, agriculture and food security, health, and disaster risk reduction sectors for which NMHSs provide climate services (see Figure 19). However, gaps still exist. For example, 36% of NMHSs still lack climate change projections essential for agricultural risk assessments and drought monitoring, leaving rural livelihoods vulnerable to weather extremes (see Figure 20).

By enhancing M&E frameworks, building technical capabilities, establishing long-term partnerships, and strengthening climate projections and predictions, the region can bolster its capacity to deliver precise, relevant climate services. These measures will be vital for protecting communities, sustaining critical sectors, and fostering a more climate-resilient future.



NORTH AMERICA, CENTRAL AMERICA AND THE CARIBBEAN SNAPSHOT – CLIMATE SERVICES

Figure 18: Climate services capacities for 2019 and 2024, based on the 7 NMHSs that responded in 2019 and updated their data in 2024

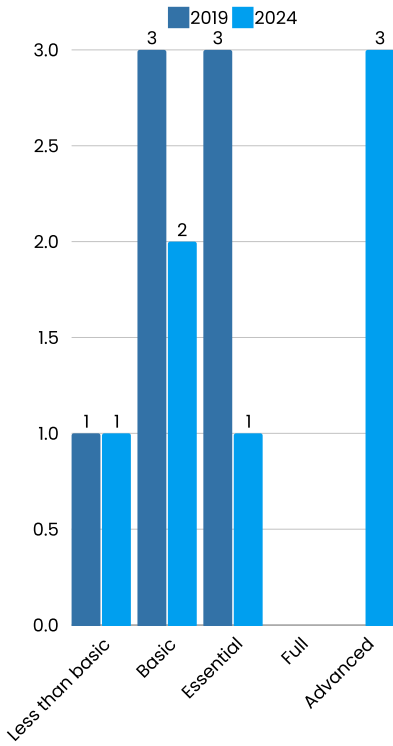


Figure 17: Overall Climate Services 2024

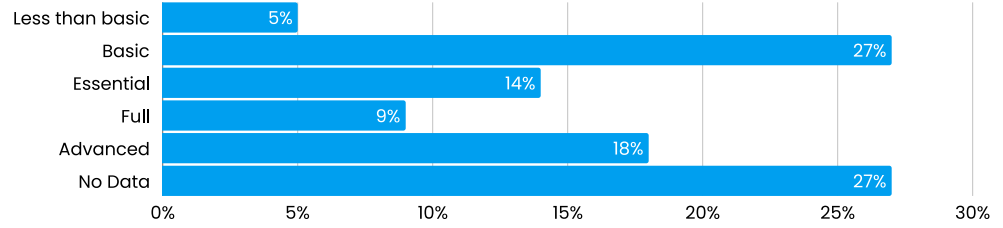


Figure 19: Percentage of NMHSs Providing Climate Services

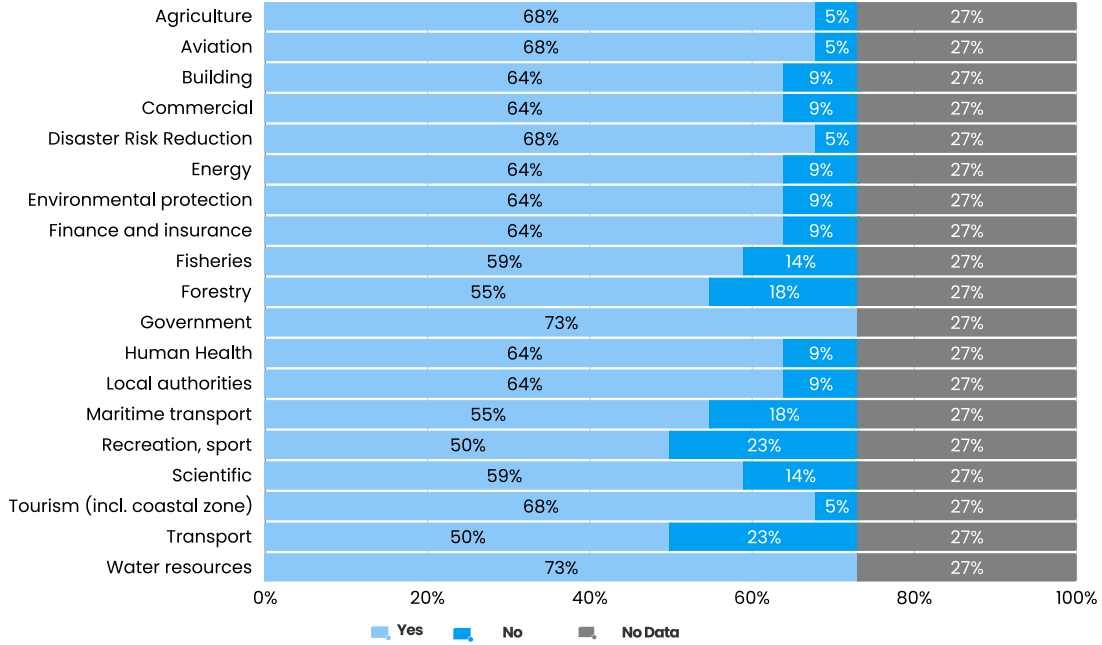
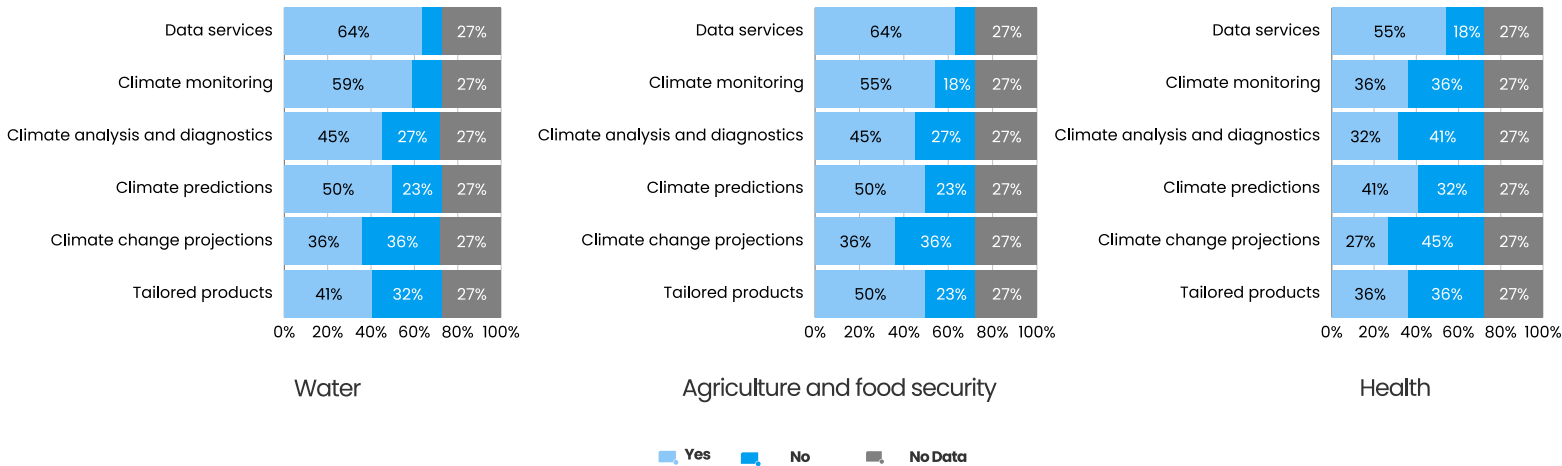


Figure 20: Percentage of NMHSs Providing Climate Service Products to the Sector Identified as a Priority for Adaptation in the NDC (Ordered Left to Right)



South -West Pacific

Climate Services Capacities

The 2024 assessment shows that 27% of NMHSs in the South-west Pacific provide advanced climate services, while, at the same time, 54% of NMHSs remain at a basic or essential level, indicating varying degrees of development (see Figure 21).

User engagement data reveals that 45% of NMHSs work with stakeholders at an advanced level, demonstrating a growing emphasis on collaborative climate service delivery. Yet, observation and monitoring capabilities still require further enhancement, with only 27% of NMHSs achieving advanced-level capacity.

Moreover, just 5% of NMHSs conduct comprehensive socio-economic benefit evaluations of their climate services, making communicating value to potential funders challenging.

Between 2019-2024, the region has shown measurable progress. The number of NMHSs providing advanced climate services rose from one to three, highlighting successful investments in technical training and data-driven decision-making. At the same time, NMHSs operating at solely a basic or essential level dropped from three to two, reflecting an overall strengthening of core meteorological infrastructure (see Figure 22).

[The Australia case study](#) documents how cooperation on a national scale, on a regional scale, as well as on a global scale is of vital importance for improvement, advancement and progression in its climate services and national resilience against the effects of climate change (see Australia case study – [2024 State of Climate Services](#) report).

Nevertheless, disparities remain, underscoring the need for sustained capacity- development and investment, particularly in;

- **User Engagement:** Strengthening partnerships with stakeholders—including government agencies, community groups, and the private sector—can facilitate the co-production of relevant climate services and encourage broader adoption.
- **Observation and Monitoring:** Expanding observational networks and improving data quality will enhance forecasting accuracy, early warning capabilities, and overall climate resilience of vulnerable communities.

Climate Policy and Action

The South-West Pacific region prioritizes climate services within national strategies, driven by pressing climate-related risks such as rising sea levels, intensifying cyclones, coastal erosion, and ocean acidification and warming.

These threats pose serious concerns for coastal communities, agriculture, biodiversity, and infrastructure resilience, making timely and accurate climate services vital for safeguarding livelihoods.

Most NMHSs in the region provide climate services to core sectors, including agriculture, water management, and coastal zone protection.

These sectors are also highlighted as priority areas for adaptation in the NDCs (see Figure 23). As the region continues to enhance its capacities in expanding climate service provision, it is important to prioritize sector-specific services. Currently, there is a lag in these areas, indicating potential for further improvement (see Figure 24).



Image sourced from Canva Pro

SOUTH-WEST PACIFIC SNAPSHOT – CLIMATE SERVICES

Figure 22: Climate services capacities for 2019 and 2024, based on the 6 NMHS that responded in 2019 and updated their data in 2024

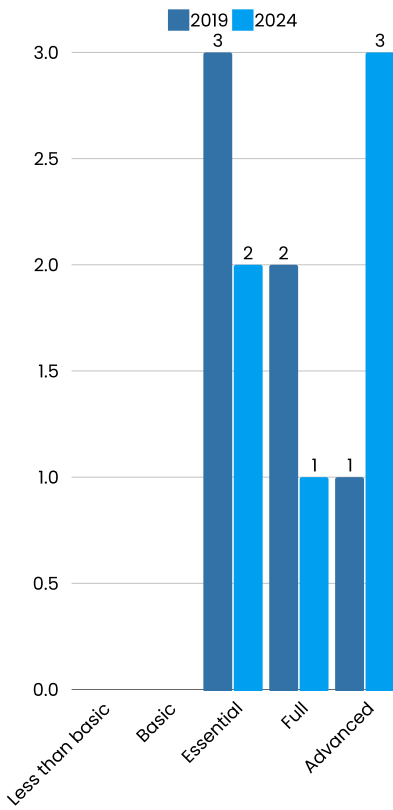


Figure 21: Overall Climate Services 2024

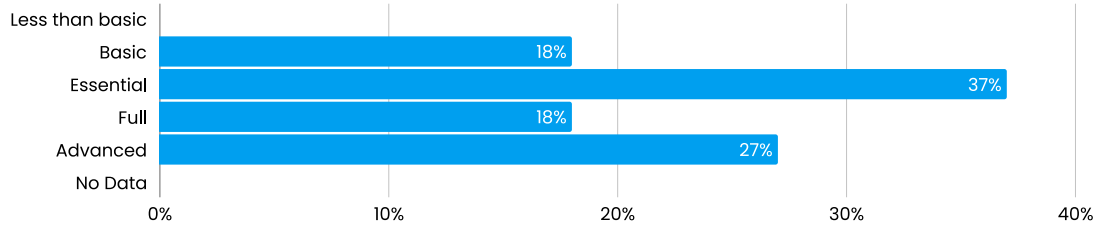


Figure 23: Percentage of NMHSs Providing Climate Services

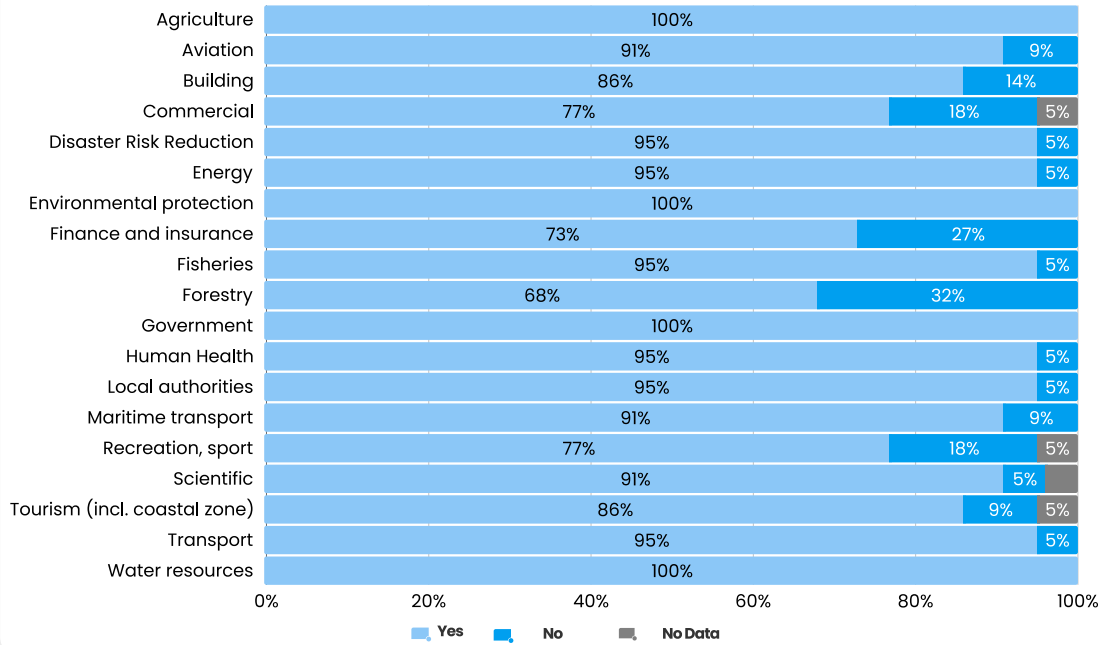
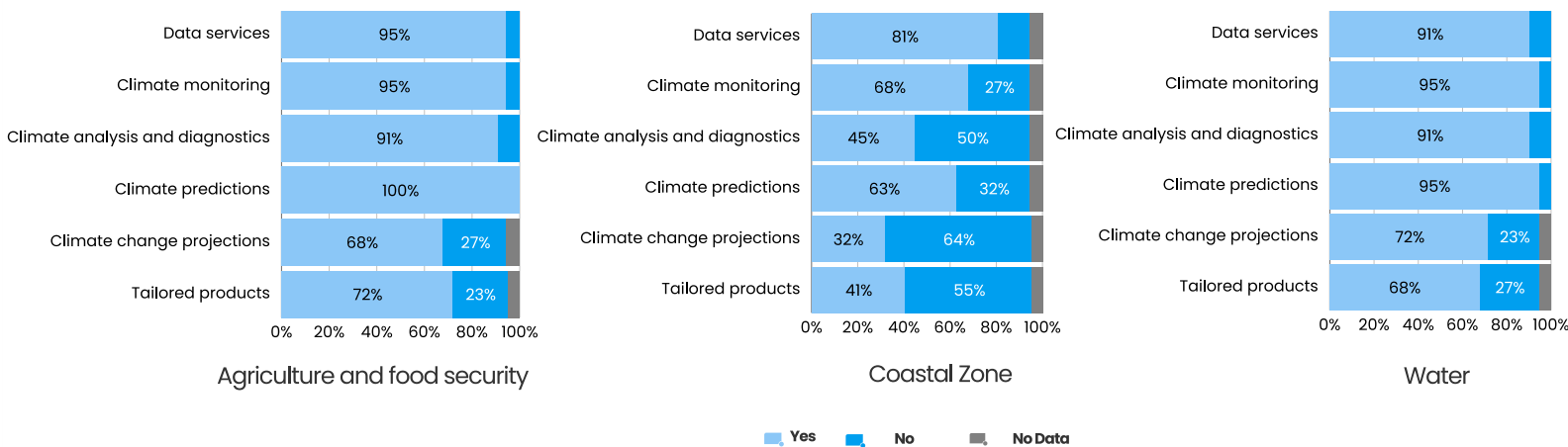


Figure 24: Percentage of NMHSs Providing Climate Service Products to the Sector Identified as a Priority for Adaptation in the NDC (Ordered Left to Right)



Europe

Climate Services Capacities

According to 2024 data, 34% of European NMHSs offer full or advanced climate services, supporting strategic priorities and enabling co-developed solutions for climate adaptation across various sectors. Nonetheless, 56% continue to operate at a basic or essential level (see Figure 24), revealing the region's diverse range of service quality.

Over the past five years, Europe has significantly improved its climate service delivery capabilities. The number of NMHSs providing advanced climate services has risen from three to five, indicating a commitment to more sophisticated and comprehensive climate data analysis and processing. In contrast, those providing services at a basic or essential level have decreased from six to four (see Figure 26), showcasing a shift towards more robust and proactive climate management strategies.

This shift in service quality highlights Europe's increasing emphasis on data-driven decision-making, which is crucial in addressing the complexities of climate change and its impacts.

User engagement remains pivotal in ensuring that climate information meets the needs of stakeholders. However, based on the 2024 data, only 30% of NMHSs engage with users at an advanced level, aligning meteorological products more closely with decision-makers in government, the private sector, and local communities.

[The Ireland example](#) shows how the alignment of demonstrated demand (driven by sectoral and municipal adaptation/climate action plan mandates),

sound planning (the [Met Éireann strategy](#) emphasized the need for internal reorganization and coordination), and sufficient resources (funds received from the government's National Development Plan) can lead to significant advances in climate services ([2024 State of Climate Services](#)).

However, observation and monitoring capabilities still lag. Only 14% of NMHSs have achieved an advanced level of service delivery, including collecting, analyzing, and sharing observational data. Meanwhile, 38% of NMHSs provide monitoring and evaluation (M&E) of socio-economic benefits derived from climate services at a less than basic level, indicating that comprehensive assessments of service outcomes are not yet standard practice.

Key areas for further improvement include;

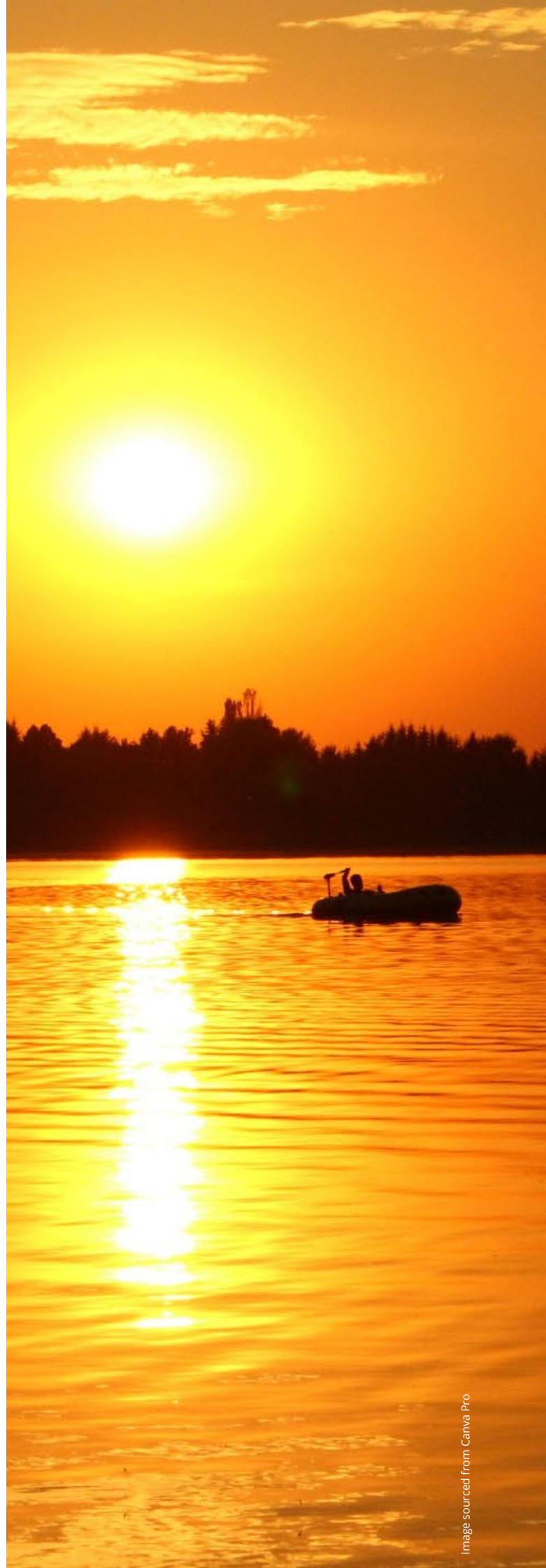
- **User Engagement:** While a portion of NMHSs excels at advanced collaboration, broader outreach remains necessary to embed climate information into local planning and economic policymaking. Targeted engagement strategies can help stakeholders—from farmers to city planners—apply meteorological data effectively.
- **Monitoring and Evaluation:** With 38% of NMHSs providing limited M&E, systematic reviews are crucial for highlighting the socio-economic benefits of climate services. Enhanced evaluation practices will attract sustained investment and guide the refinement of operational protocols.
- **Observation and Monitoring:** Only 14% of NMHSs maintain advanced observation and monitoring systems, leaving significant room for growth. Improved networks and cross-border data sharing will help to further enhance forecast and projection and bolster climate resilience.

Climate Policy and Action

Despite rising threats from heatwaves, flooding, droughts, and wildfires, only about 12% of European NDCs explicitly integrate climate services into their adaptation strategies.

This underscores the need for deeper inclusion of climate services in their NDCs to fully enable science-based climate action. Many NMHSs provide climate services to key adaptation priority sectors such as agriculture and health (see Figure 27).

Although most NMHSs provide climate services to key sectors, gaps still exist (see Figure 28).



EUROPE SNAPSHOT – CLIMATE SERVICES

Figure 26: Climate services capacities for 2019 and 2024, based on the 25 NMHSs that responded in 2019 and updated their data in 2024

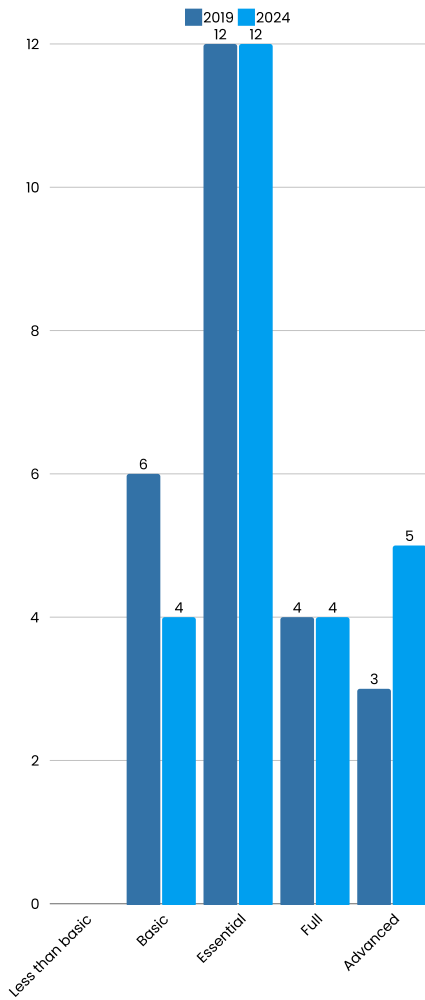


Figure 25: Overall Climate Services 2024

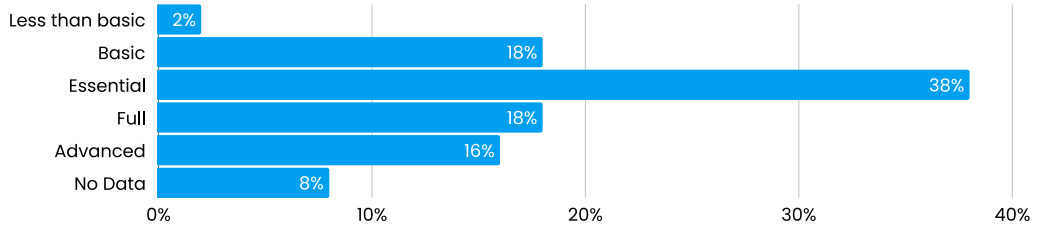


Figure 27: Percentage of NMHSs Providing Climate Services

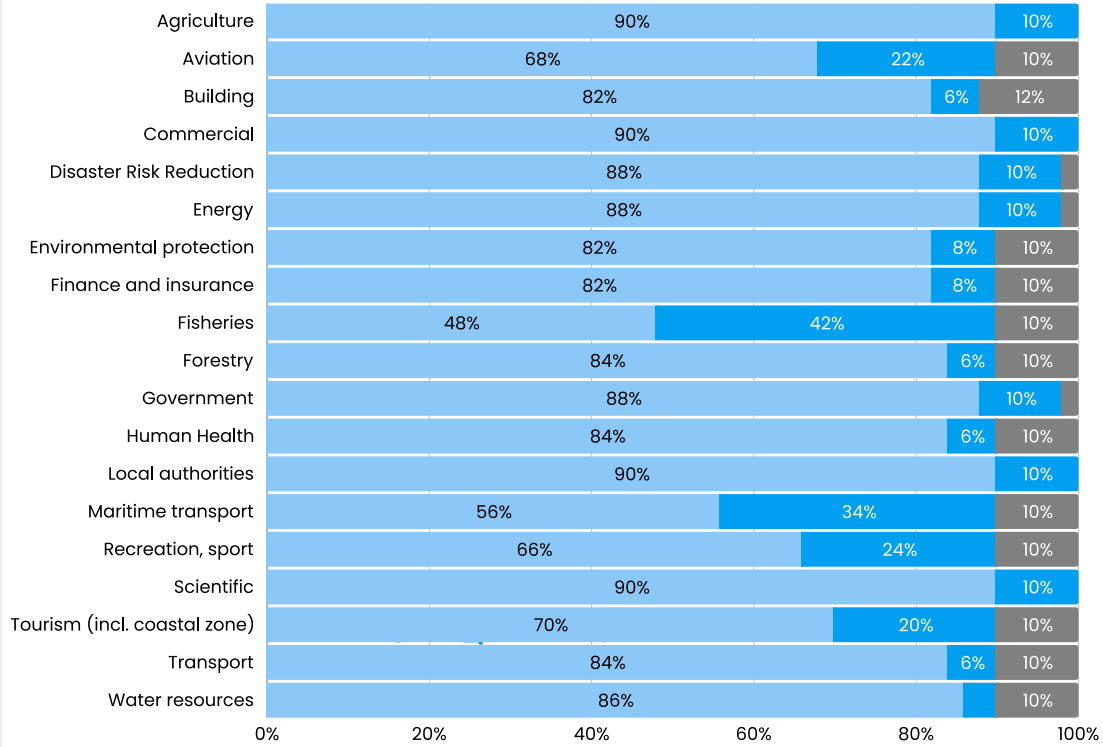
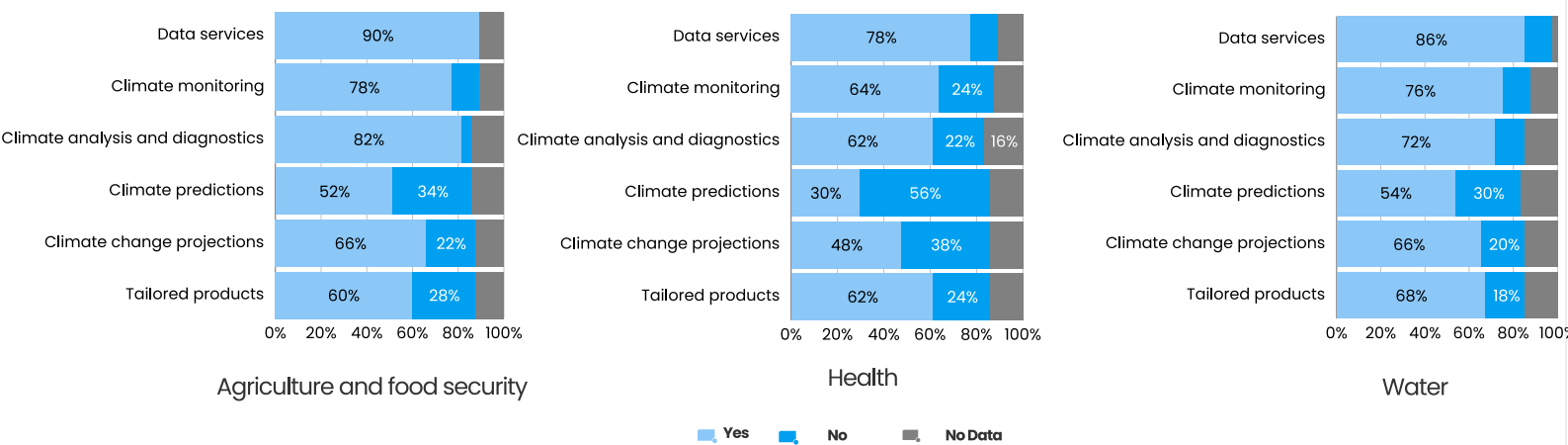


Figure 28: Percentage of NMHSs Providing Climate Service Products to the Sector Identified as a Priority for Adaptation in the NDC (Ordered Left to Right)



Way Forward

The 2024 assessment of climate services by WMO Members highlights significant advancements in capacity development. Nevertheless, challenges remain, as highlighted in the global and regional sections.

- There is an urgent need for increasing efforts for collaboration and resource mobilization for sustained, systematic observation, especially for closing the GBON gap, as is being supported by the Systematic Observations Financing Facility (SOFF).
- There is a need to promote regional cooperation approaches, building on the sharing of resources, experiences, and lessons learned that Members are already doing.
- All climate action investments need to be science-driven so that they can show the causal links between current or expected climate impacts and how the proposed interventions and investments effectively address those impacts.



Image sourced from Canva Pro

Examples of climate services

What are climate services

Climate services are the provision of climate data, information, and knowledge to assist decision-making.

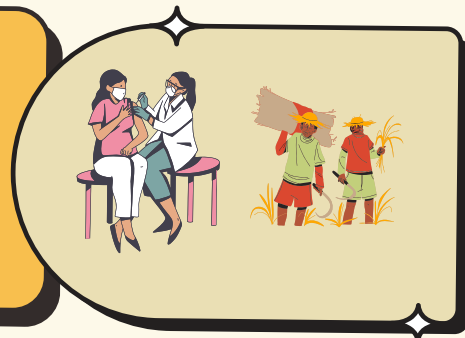


Climate services require appropriate engagement between the recipient of the service and its provider to co-produce services that can support specific decision-making processes, along with an effective access mechanism to enable inclusive communication and timely action.



Example of applications

- Should I plan a vaccination programme in my region based on likely impact of forecast seasonal rainfall?
- Do I need to plant drought-resistant seeds next season based on the likely impact of forecast rainfall and temperature



- How much wind and solar resources can we expect to get in various areas in the coming months, seasons, and years to establish and operate new renewable power plants?
- Will our children's access to schools be affected by extreme rainfall or drought? Will we need to reschedule the school day and school year to account for heatwaves?



- Is our city's infrastructure resilient to projected changes in extreme rainfall under a changing climate?
- How might sea level rise impact coastal communities and infrastructure in the coming decades and what investments are needed to adapt?

