UN environment programme

Early Warning and Data Analytics Strategy for Humanity: 2030 and beyond

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Foreword

Early Warning is a powerful tool for leveraging Humanity´s ability to think about and build the future. It provides a way to think about possible, alternative, and desired futures and scenarios. By doing so, it enables individuals, organizations, and nations to prevent, prepare for, respond, and recover from events and build a better future.

In the coming decades, and possibly until the end of the 21st century, which is a time of transition of geopolitics and the environment, Humanity is likely to face significant challenges with a more complex, unstable, and uncertain Future. Exploring the capabilities of Early Warning for People, Places and Planet, is opportune in this time of dynamic change.

UNEP is building a ONE UN Common Approach for Early Warning for Environment (EWE) to tackle the triple planetary crisis of climate change, biodiversity loss and pollution, within the umbrella of Early Warning for All Initiative. To build solutions at scale contributing to accelerate Agenda 2030 and the Sustainable Development Goals (SDGs). Focus on impacting in countries, implementing the environmental dimension of early warning throughout the risk management cycle (prevention, preparedness, response, and recovery), with a particular focus on developing countries and the most vulnerable communities (such as SIDS, but groups as the elderly and youth), saving millions of lives and property, people, places, and the Planet. Adopt a multi-stakeholder approach with a user driven strategy and build on existing Partnerships across the UN system and beyond including the private sector and citizens and civil society.

This dimension will require a systematic approach and will require the cooperation of all relevant agencies and Multilateral Environmental Agreements (MEAs) – including the Kunming-Montreal Global Biodiversity Framework, the new Global Framework on Chemicals, and the upcoming deal on plastic pollution. Each agency and MEA must be a contributor and beneficiary and support the UN Common Approaches to biodiversity and pollution – with a view to boosting the achievement of the Sustainable Development Goals.

It is a novel Early Warning approach to the Science Policy interface. It adopts a novel Early Warning approach based upon “data” and a system thinking perspective. It provides a robust and solid way to do Early Warning and Impact in Countries. It contributes to accelerate Agenda 2030 and Our Common Agenda. This is a core component of **United Nations Secretary General’s Our Common Agenda, the UN 2.0 and a decisive Humanity’s Agenda** of Our Time.

We are happy to share with you possible, alternative, and desired pathways essential for the achievement of Agenda 2030 and the Sustainable Development Goals (SDGs) and **our common future**.

Alexandre Caldas
Director of the United Nations and Chair of the ECOSOC - UN Geospatial Network
United Nations Environment Programme
Chief, Early Warning and Data Analytics Branch | Early Warning and Assessment Division

Nexus of Humanity Challenges

Leverages early warning for environment to transform people, places and the planet through Nexus Approach

Recalling the Secretary-General's statement, we are currently facing a triple planetary emergency: a climate crisis, a nature crisis, and a pollution crisis. These interconnected crises are causing significant suffering, including loss of life, job losses, increased hunger, deteriorating health, and escalating damage from disasters.

Addressing these urgent environmental issues, which threaten a sustainable future, requires recognizing that this crisis affects humanity on a global scale. It impacts not only our sustainable development but also critical humanitarian aspects such as peace, security, and human rights. These dimensions are integral to sustainable development and are deeply intertwined with the triple climate crisis. A NEXUS approach, which analyzes the interconnections between different sectors, is essential.

The NEXUS approach involves addressing each type of early warning for environment and assessment services through the five dimensions of the nexus: peace and security, sustainable development, humanitarian efforts, human rights, and international law. By leveraging data analytics and early warning systems, we can better track, prepare and respond to these interconnected crises.

Pandemics illustrate that health crises are also economic, social, and environmental issues. Therefore, there are opportunities for multilateral agreements based on a NEXUS approach to integrate the five pillars of the UN. Utilizing advanced early warning and data analytics services can help establish more agile and adaptive systems to identify and mitigate vulnerabilities, ensuring a proactive rather than reactive response to emerging threats.

A complex, uncertain and unstable Future for People, Places and Planet

Sources: *IPCC: Climate Change 2022: Mitigation of Climate Change; UN: The Sustainable Development Goals Report 2022; Internal Displacement Monitoring Centre: Global Report on Internal Displacement 2022; World Economic Forum: Climate Refugees – The World's Forgotten Victims, 2021; WHO: Air Quality Database, 2022; Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services: Global Assessment Report, 2019.*

UNEP's Strategic Goals and Priorities

Photo credit: Envato Elements / witsaruts

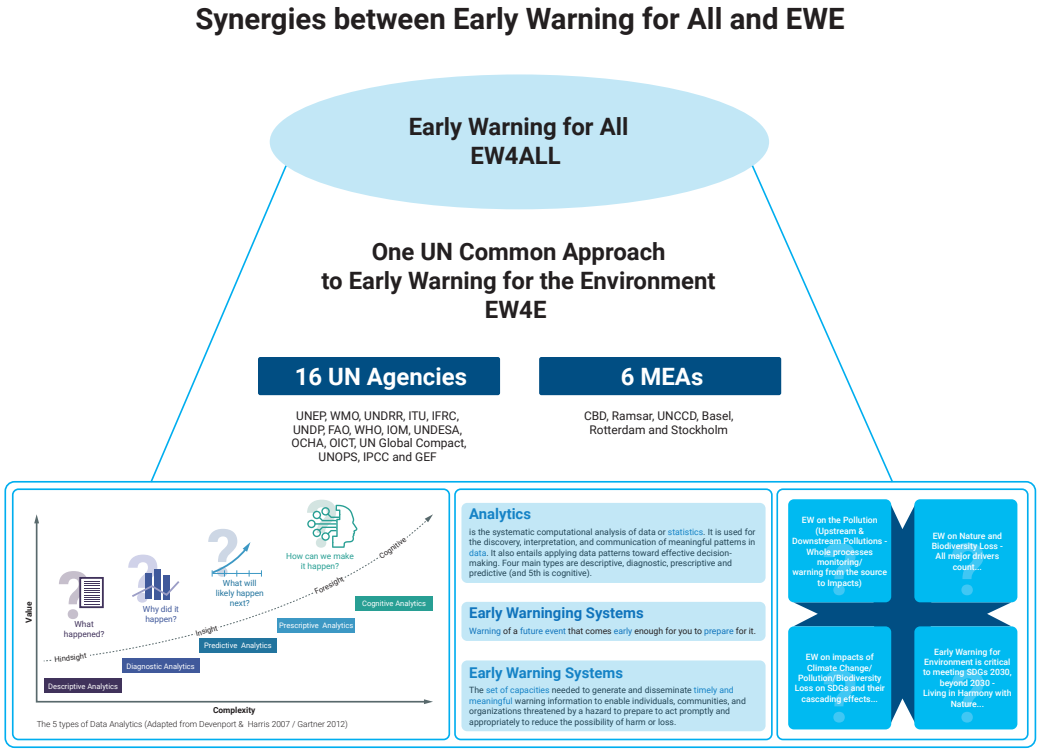
Early warning systems (EWS) are an adaptive measure for climate change, using integrated monitoring, forecasting and communication systems to help communities prepare for and manage hazardous climate-related events. A successful EWS saves lives and jobs, land and infrastructures and supports long-term sustainability and disaster risk reduction. Early warning systems will assist public officials and administrators in their planning, saving money in the long run and protecting economies and natural assets. The UN, working in diverse partnerships, has introduced the number of innovative EWS initiatives in vulnerable areas around the world. In the context of keeping the environment under review, Capacity Development encompasses the acquisition of skills and knowledge for individuals, improvements of institutional structures, mechanisms, and procedures, and strengthening of enabling conditions to develop and use environmental information and knowledge systems for data-driven environmental solutions.

Early Warning for Environment

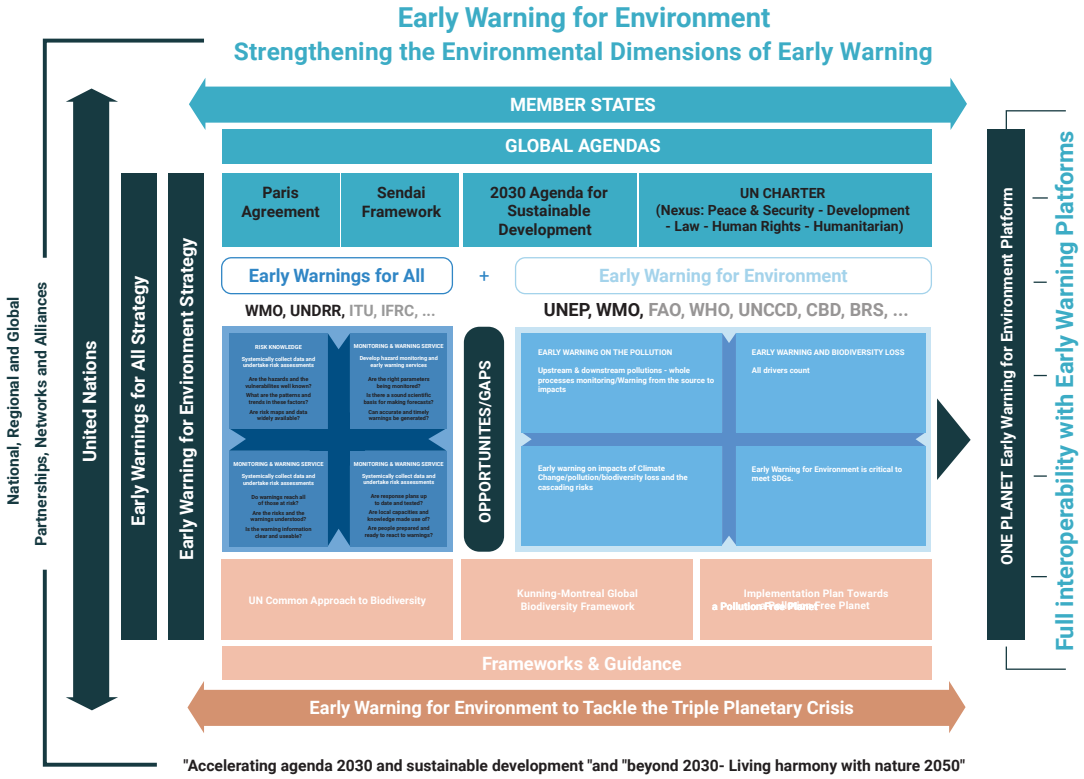
Identifying, monitoring and analysing both rapid onset multi-hazards and slow onset but continuous hazards and their interlinkages or issuing warnings of future events that come early enough for one to prepare, respond and Build Back Better. Leaving No One Behind. Saving the Lives of billions of People and preventing socio economic losses, protecting the property of the most vulnerable communities in the world.

Strengthen the environmental dimension of Early Warning towards acceleration of the achievement of Agenda 2030 and the Sustainable Development Goals (SDGs)

One UN Common Approach for Early Warning for Environment



An Integrated Framework of Services



The availability of timely, quality and disaggregated data is critical for accelerating the achievement of Agenda 2030 and the Sustainable Development Goals (SDGs). Data is fundamental for Early Warning services, particularly at the local, sub-national and national levels.

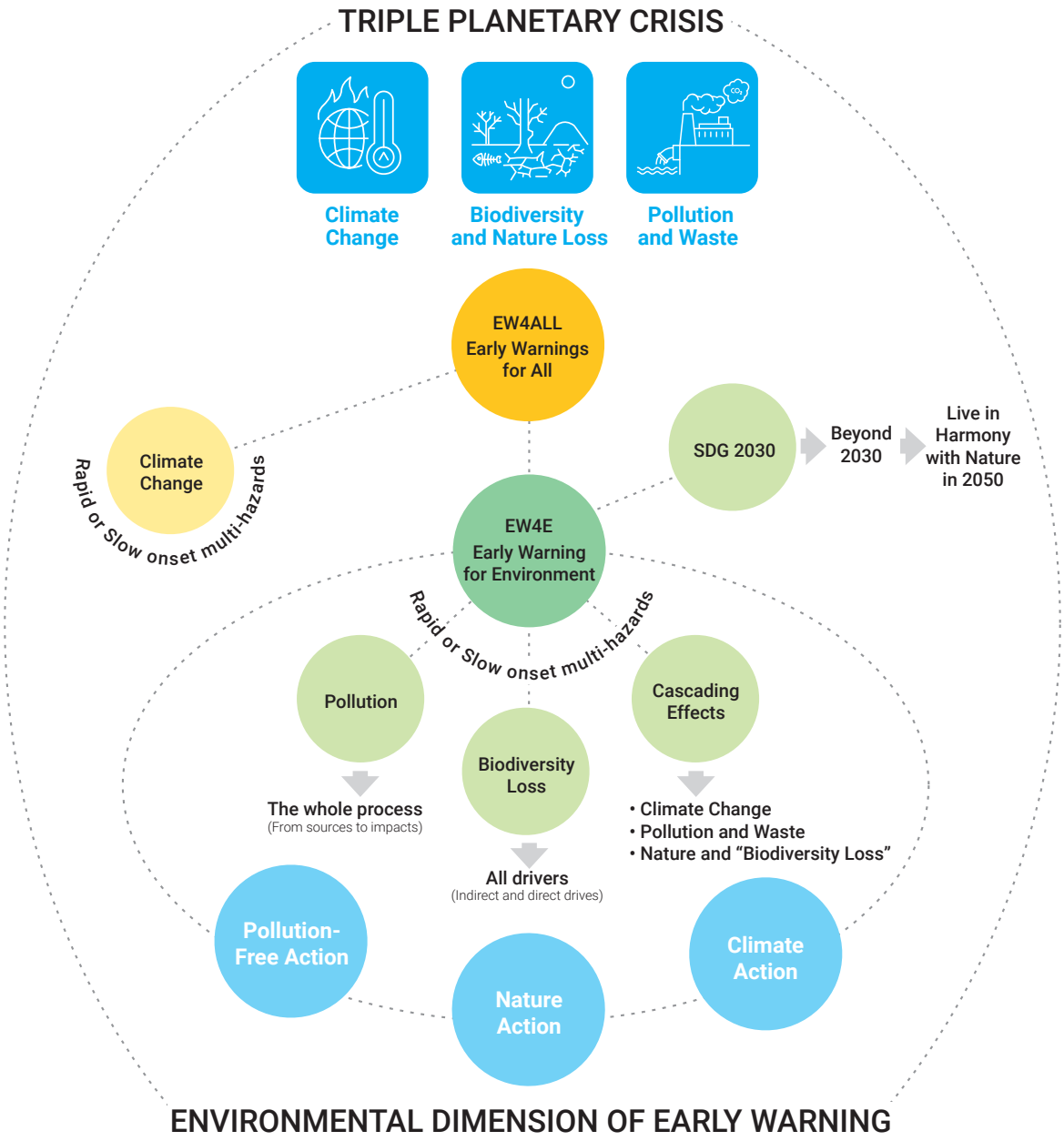
Strategic Pathway

A ONE UN Common Approach for Early Warning for Environment (EWE) to tackle the triple planetary crisis of climate change, biodiversity loss and pollution, within the umbrella of the Early Warnings for All Initiative.

To build solutions at scale contributing to accelerate Agenda 2030 and the Sustainable Development Goals (SDGs). Focus on impacting in countries, implementing the environmental dimension of early warning throughout the risk management cycle (prevention, preparedness, response and recovery), with a particular focus on developing countries and the most vulnerable communities (such as SIDS, but groups as the elderly and youth), saving millions of lives and property, people, places and the Planet.

Adopt a multi-stakeholder approach with a user driven strategy and build on existing Partnerships across the UN system and beyond including the private sector and citizens and civil society.

Saving the Lives of billions of People and preventing socio economic losses, protecting the property of the most vulnerable communities in the world



A Definition

UNEP is a science-based organization, and therefore sound science-based products and services for Member States are produced across the entire organization. The 'Early Warning and Assessment' Division (EWAD) focuses on two core foundational science functions: **early warning** and scientific assessments.

Early Warning and Data Analytics

In taking stock of the current approaches, strategies, and direction of Early Warning across the UN system (e.g. Early Warnings for All), UNEP aims to lead the provision of early warning services for the nature and pollution-free actions in the UN system while enhancing the well-established work of climate information and early warning systems. This will be done through a UNEP- and UN wide co-creation process to establish environmental early warning services that ranges from source and drivers to end-of-pipe impacts, including monitoring, data collection and analysis, and timely warnings for evidence-based decisions to avoid and reduce the impacts of environmental risks and hazards. In addition, the Branch will contribute to UNEP's environmental foresight function, led by the Chief Scientist's Office. These efforts will be complemented by capacity development for an inclusive science-policy interface using environmental information and knowledge systems at regional and country levels.

Early Warning for Environment: A short definition

Early Warning for Environment strengthens the environmental dimension of Early Warning as a critical enabler for accelerating the achievement of Agenda 2030 and the implementation of the SDGs and contribute to mitigate the impacts of the triple planetary crisis. It consists of identifying, monitoring, and analysing both rapid onset multi-hazards (with a predominant focus on climate-related risks) and slow onset but continuous hazards (which include biodiversity, nature and pollution, as well as climate change risks) and their interlinkages or issuing warnings of future events that come early enough for one to prepare, respond and recover, Building Back Better. Leaving No One Behind.

The UNEP Early Warning and Data Analytics function will harness a portfolio of five critical services **across UNEP for timely decisions** to **identify, prepare and mitigate** risks associated with a broad range of environmental issues.

The importance of improving the availability of and access to data and statistics related to the environment was recognized through the adoption / ongoing development of a range of environment monitoring frameworks and indicator tools related to biodiversity, climate change, chemicals and waste, disasters, environmental-economics, and sustainable development goals. Early Warning and Data Analytics, including geospatial technologies, applications, and services, are key enablers to accelerate the achievement of Agenda 2030 and the Sustainable Development Goals (SDGs). This is particularly relevant when at about half the way up to 2030, only 15% of the Goals have been achieved and about 48% are off-track. The well-curated data and integrated analytics arising from this work and housed in UNEP's World Environment Situation Room (WESR), will strengthen the evidence-base to guide decision-making and anticipatory action, foster transparency, and rigorous reporting, and promote mutual accountability as a contribution to multilateralism for informed and integrated sustainable development policymaking, as well as implementation and reporting.

SWOT Analysis

The SWOT analysis highlights the opportunities and challenges arising from the current operational strategy, funding strategy, and prioritized services designed for early warning and data analytics services. From the technological perspective there are also some anticipated strengths in terms of proactive risk management, data-driven decisions, improved accuracy and resource optimization. In terms of anticipated technological weaknesses data quality and integrity, the inherent complexity, expected high costs and possibility of false positives/negatives, a risk of generating false alarms or missing critical warnings. Finally, while on the more technological perspective there are also some opportunities, e.g. technological advancements, market demand with increasing awareness of the importance of risk management and data-driven decision-making, the potentialities related with Integration with IoT, combining early warning systems with IoT devices can provide real-time data and enhance monitoring capabilities and the possibility of expansion into new sectors. The opportunities come with also potential new threats, such as cyber security, regulatory changes and competition and last but not least issues related with data privacy concerns.

Strengths

- Large network of partners (16 UN Agencies and 4 MEAs)
- Strong foundational mandate: With a focus on Focus on the early warning for environment, UNEP is a leading agency in promoting environmental agendas within the UN and globally, addressing critical issues and fostering sustainable development.
- Proactive risk management: Early warning systems integrated with data analytics can foresee potential risks and threats, allowing organizations to take preventive measures.
- Data-driven decisions: The combination of early warning and data analytics facilitates informed decision-making by providing actionable insights derived from vast amounts of data.
- Improved accuracy: Advanced algorithms and predictive models can analyze historical data trends to produce highly accurate forecasts and warnings.
- Resource optimization: By predicting issues before they occur, resources can be allocated more efficiently to mitigate potential problems and optimize operational performance.

Weaknesses

- Fragmented information landscape: The datasets for national early warning systems are fragmented due to administrative boundaries. However, environmental issues transcend these boundaries and are inherently cross-border in nature.
- Lack of implementation in countries: the practice are majorly focused at the global and regional level, lack of effective approach to localize SDGs.
- Lack of sustainable funding: due to insufficient long-term policy, planning, and programming. This gap hampers ongoing initiatives and undermines efforts to effectively address issues like climate change, biodiversity loss, and pollution.
- Data quality and integrity: The effectiveness of early warning systems is heavily dependent on the accuracy and quality of the data being analyzed. Poor data quality can lead to incorrect predictions.
- Complexity: Implementing and maintaining sophisticated data analytics systems can be complex and require specialized skills, leading to a steep learning curve and potential operational challenges.
- High costs: The initial investment in advanced technology, skilled personnel, and continuous updates can be expensive for many organizations.
- False positives/negatives: There is a risk of generating false alarms or missing critical warnings, which can reduce the system's credibility and effectiveness.

Opportunities

- Increased need and social awareness: climate change, biodiversity loss, and pollution are societal challenges.
- Rising need and social awareness: Climate change, biodiversity loss, and pollution are urgent societal challenges, leading to increased public awareness and calls for sustainable solutions.
- Technological advancements: Continual advancements in machine learning, AI, and big data technologies can enhance the capabilities and accuracy of early warning and data analytics systems.
- Market demand: Increasing awareness of the importance of risk management and data-driven decision-making can create new market opportunities for early warning systems.
- Integration with IoT: Combining early warning systems with IoT devices can provide real-time data and enhance monitoring capabilities across various industries.
- Expansion into new sectors: There is potential for growth by applying these systems to new industries such as healthcare, agriculture, and smart cities.

Threats

- Lack of national integration framework: Lack of National Integration Framework: Without a cohesive national integration framework, efforts are fragmented and less impactful, missing opportunities for unity and progress.
- Rapid evolution of technology: The fast pace of technology leaves public institutions struggling to compete with innovative and efficient private platforms.
- More pressing societal challenges: Urgent societal issues, especially in peace and humanitarian aid, demand comprehensive and collaborative strategies for effective solutions.
- Cybersecurity risks: Early warning systems that rely on large amounts of data can be vulnerable to cyber-attacks, leading to data breaches and system failures.
- Regulatory changes: Evolving regulatory standards and compliance requirements could impact the implementation and operation of these systems.
- Competition: The rapid pace of technological innovation can lead to increased competition, with new entrants potentially offering superior or more cost-effective solutions.
- Data privacy concerns: Growing concerns and regulations around data privacy can limit the ability to collect and analyze data, impacting the effectiveness of early warning systems.

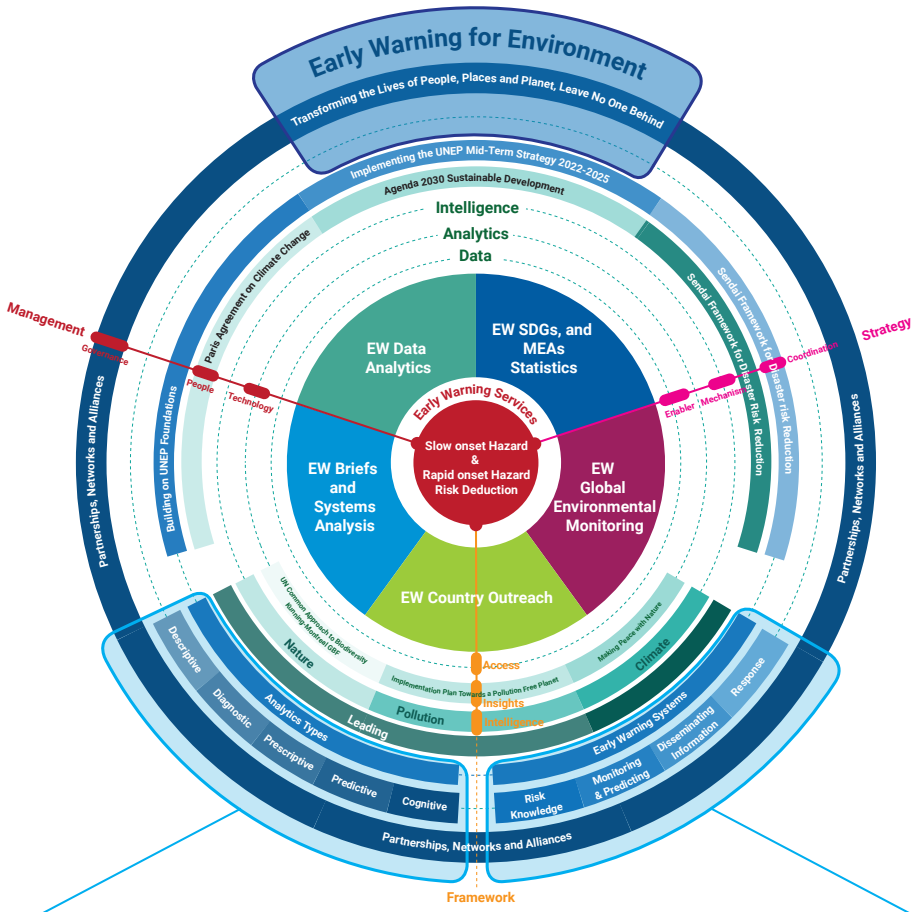
Strategic Plan and Positioning

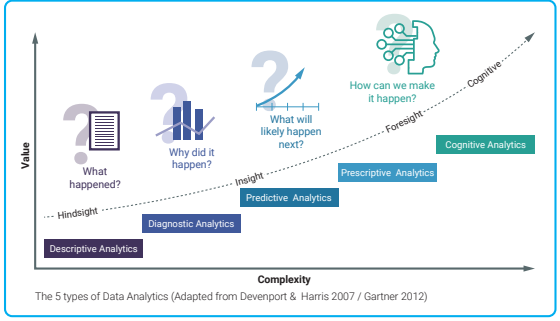
We all know the **importance of early warnings for climate change and related disasters**. Early warnings can increase resilience and adaptive capacity and reduce future loss and damage. Early warnings can save lives, livelihoods and nature's services. They protect assets that are worth far more than the costs of the systems themselves. They work.

Through our Climate Information and Early Warning Systems (CIEWS) portfolio, UNEP helps countries across the world **to increase access to high-quality weather and climate data, forecasting and multi-hazard early warning systems** that underpin evidence-based policy and early action.

UNEP is proud to be part of the UN's Early Warnings for All initiative (EW4ALL), including as a founding partner and implementer of the Systematic Observations Financing Facility (SOFF) – a partnership between WMO, UNDP and UNEP.

But while extreme weather and climate change-induced disasters are often the most dramatic and obvious events, they are not the only ones we need to predict, prepare for and head off where possible. **Alongside climate change, nature and biodiversity loss, and pollution and waste complete the triple planetary crisis**.





The 5 types of Data Analytics (Adapted from Devenport & Harris 2007 / Gartner 2012)

Analytics
is the systematic computational analysis of data or statistics.[1] It is used for the discovery, interpretation, and communication of meaningful patterns in data. It also entails applying data patterns toward effective decision-making. 4 main types are descriptive, diagnostic, prescriptive and predictive. (and 5th cognitive).rm or loss.

Early Warning
Warning of a future event that comes early enough for you to prepare for it.

Early Warning Systems
The set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities, and organizations threatened by a hazard to prepare to act promptly and appropriately to reduce the possibility of harm or loss.

Partnerships

UNEP is a co-founder, implementing entity, and co-chair of the Advisory Board of the Systematic Observations Financing Facility (SOFF) which aims to close the data gap in basic weather and climate observations that are critical to underpin better weather forecasts, early warning systems, and climate information services.

Mission Statement

In order to save lives and livelihoods as well as protect property across the whole globe, we must improve the availability of weather and climate observations from the most data sparse areas. These are vital for weather forecasts, early warning systems and climate information services. The lack of such observations limits countries' capacity to adapt to climate change and build resilience. Numerous global agreements recognize that successful action on climate mitigation, adaptation, resilience and poverty reduction depends on high-quality weather and climate services, and on the capacity to make informed decisions and take appropriate steps in light of that information. SOFF funding is a foundational investment that underpins the effectiveness and sustainability of the investments in other development and climate funds in full complementarity.

How SOFF operates

SOFF systematically addresses the persistent problem that causes missing observations by providing support through the combination of four key features:

1	2	3	4
Global approach for sustained high-quality international data exchange as a measure of success	Innovative, long-term finance for sustainable progress towards Global Basic Observing Network (GBON) compliance	Technical competencies enhanced through peer-to-peer advisory support	Leverage partners' resources for complementarity and coordinated support across the meteorological value chain

Support to countries is provided in three phases: Readiness, Investment, and Compliance. This is implemented through a close collaboration between beneficiary countries, implementing entities, and peer advisors, consisting of advanced national meteorological services.

Early Warnings for All

Warnings are only as good as the data they are built upon. SOFF is a foundational element and delivery mechanism of the UN Secretary General's Early Warnings for All initiative, specifically in support of Pillar 2 on Observations and Forecasting.

Alliance for Hydromet Development

UNEP is a founding member of the Alliance for Hydromet Development, which commits to ramp up action that strengthens the capacity of developing countries to deliver high-quality weather forecasts, early warning systems (EWS), weather, hydrological, and climate services – known for short as "hydromet" services.

Strategic Priorities

- Producing a regular Hydromet Gap Report to track progress on closing the capacity gap by 2030
- Creating an innovative mechanism to finance developing country surface-based weather and climate observations – the Systematic Observations Financing Facility (SOFF)
- Deploying a standardized tool to benchmark and assess countries' hydromet capacity gaps – the Country Hydromet Diagnostics (CHD)

ECOSOC - UN Geospatial Network, across 42 Agencies, Funds and Programmes of the UN System

Strategy: The Blueprint

BLUEPRINT

Strategic framework, orientations, design and upcoming activities of the Network (2020)

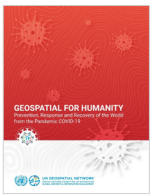
BLUEPRINT LANDSCAPE

Overview of current geospatial capacities and representatives in the UN system (2020)

Recent Publications

GEOSPATIAL IN ACTION

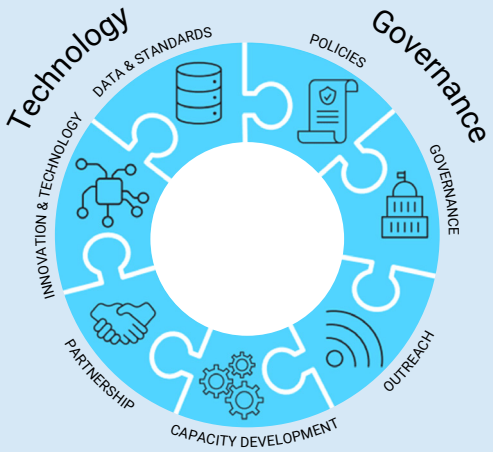
Geospatial for the SDGs: data and insights for the SDGs by the UN system (2021)



GEOSPATIAL FOR HUMANITY

Geospatial for prevention, response & recovery from COVID19 by the UN system (2021)

The Blueprint: Transformation Pathways



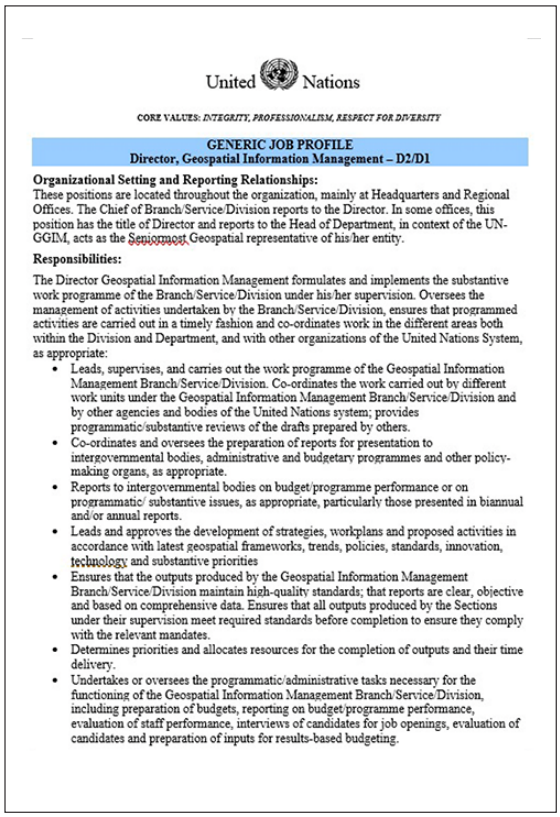
1 STRATEGY
The Blueprint

3 PRIORITIES
Governace, Technology & People

7 TRANFORMATION PATHWAYS
Data & Standards Policies, Governance, Outreach, Capacity development, Partnership, Innovation & Technology

50 PROPOSED ACTIVITIES

Enhancing Geospatial Job Profile across UN system



United Nations

CORE VALUES: INTEGRITY, PROFESSIONALISM, RESPECT FOR DIVERSITY

GENERIC JOB PROFILE
Director, Geospatial Information Management – D2/D1

Organizational Setting and Reporting Relationships:
These positions are located throughout the organization, mainly at Headquarters and Regional Offices. The Chief of Branch/Service/Division reports to the Director. In some offices, this position has the title of Director and reports to the Head of Department, in context of the UN-GGIM, acts as the Seniormost Geospatial representative of his/her entity.

Responsibilities:

The Director Geospatial Information Management formulates and implements the substantive work programme of the Branch/Service/Division under his/her supervision. Oversees the management of activities undertaken by the Branch/Service/Division, ensures that programmed activities are carried out in a timely fashion and co-ordinates work in the different areas both within the Division and Department, and with other organizations of the United Nations System, as appropriate:

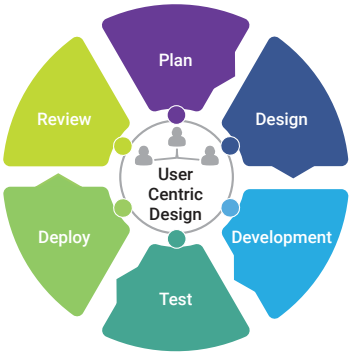
- Leads, supervises, and carries out the work programme of the Geospatial Information Management Branch/Service/Division. Co-ordinates the work carried out by different work units under the Geospatial Information Management Branch/Service/Division and by other agencies and bodies of the United Nations system; provides programmatic/substantive reviews of the drafts prepared by others.
- Co-ordinates and oversees the preparation of reports for presentation to intergovernmental bodies, administrative and budgetary programmes and other policy-making organs, as appropriate.
- Reports to intergovernmental bodies on budget/programme performance or on programmatic/ substantive issues, as appropriate, particularly those presented in biannual and/or annual reports.
- Leads and approves the development of strategies, workplans and proposed activities in accordance with latest geospatial frameworks, trends, policies, standards, innovation, technology and substantive priorities
- Ensures that the outputs produced by the Geospatial Information Management Branch/Service/Division maintain high-quality standards; that reports are clear, objective and based on comprehensive data. Ensures that all outputs produced by the Sections under their supervision meet required standards before completion to ensure they comply with the relevant mandates.
- Determines priorities and allocates resources for the completion of outputs and their time delivery.
- Undertakes or oversees the programmatic/administrative tasks necessary for the functioning of the Geospatial Information Management Branch/Service/Division, including preparation of budgets, reporting on budget/programme performance, evaluation of staff performance, interviews of candidates for job openings, evaluation of candidates and preparation of inputs for results-based budgeting.

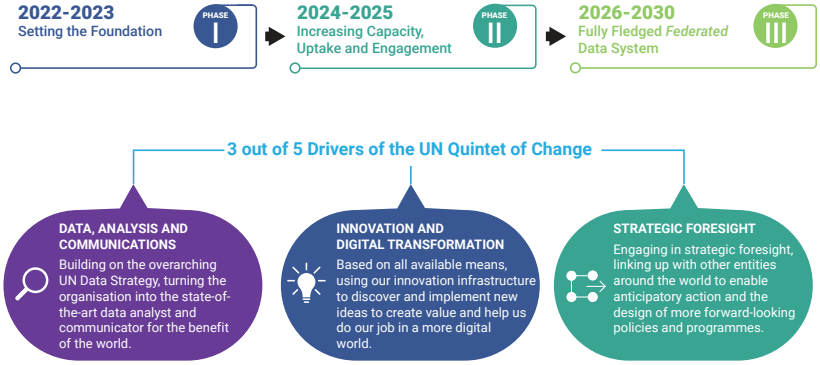
Members across the UN System

ECOSOC - UN Geospatial Network, across 42 Agencies, Funds and Programmes of the UN System

Strategic Alignment with the UN Strategy

One UN Situation Room initiative is fully aligned with the UN Secretary General' report 'Our Common Agenda', the UN Data Strategy, Strategy on New Technologies and the Roadmap for Digital Cooperation.



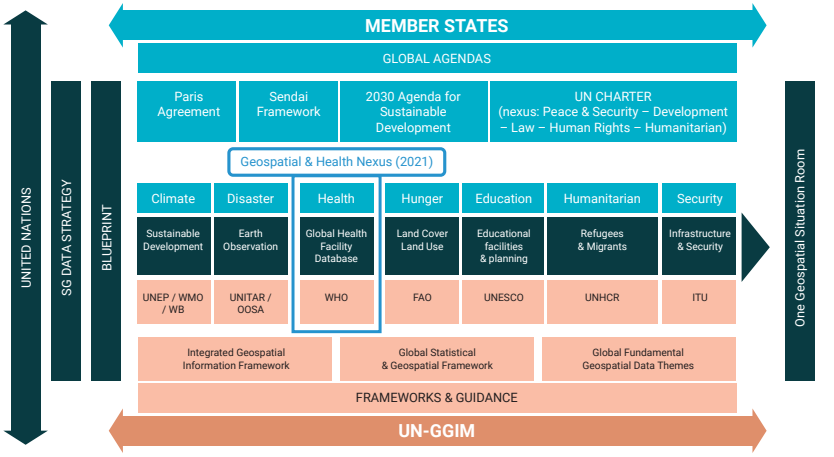


Roadmap: A Phased Approach for Implementation

A Geospatial Data Hub for the nexus of the United Nations

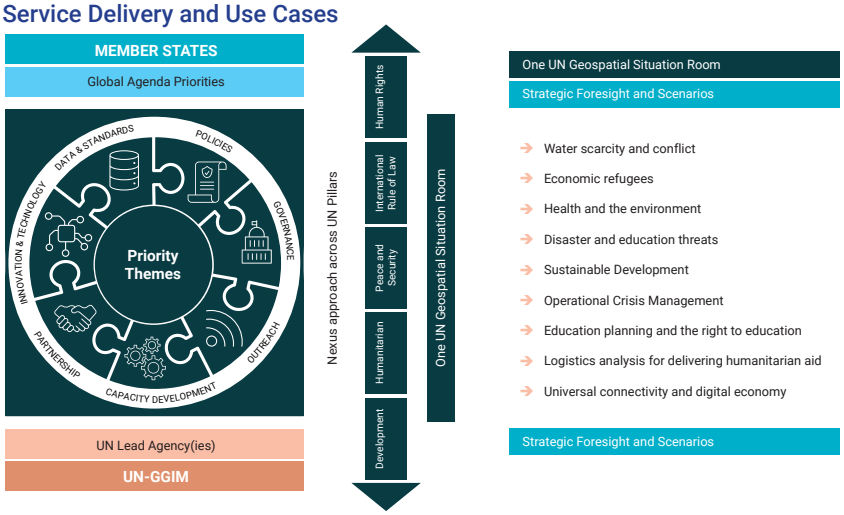
- Focus on the nexus of 5 pillars of the UN (peace and security, sustainable development, humanitarian, international rule of law and human rights)
- Builds on synergies of existing data systems and platforms across UN system (integrating geospatial, statistics and other data documents)
- Is implemented as a federated data system, with clearly identified Authoritative Data Hubs and Spokes
- Contributes directly as a USE CASE to the implementation of the SG UN Data Strategy (e.g. UN Data Hub and UN Peace and Security, UNOCC)
- Is built using a Scalable and Phased approach implementation plan

High-level Architecture and Priorities



USE CASES Stakeholders	MEMBER STATES	UNITED NATIONS	UNITED NATIONS	AGENCIES/FUNDS/ PROGRAMMES
	Facilitation/Promotion/ Technology Support Capacity development	Operations & Crisis Centre	SG Data Strategy	Coordiantion/Support Cross theme analysis

Service Delivery and Use Cases



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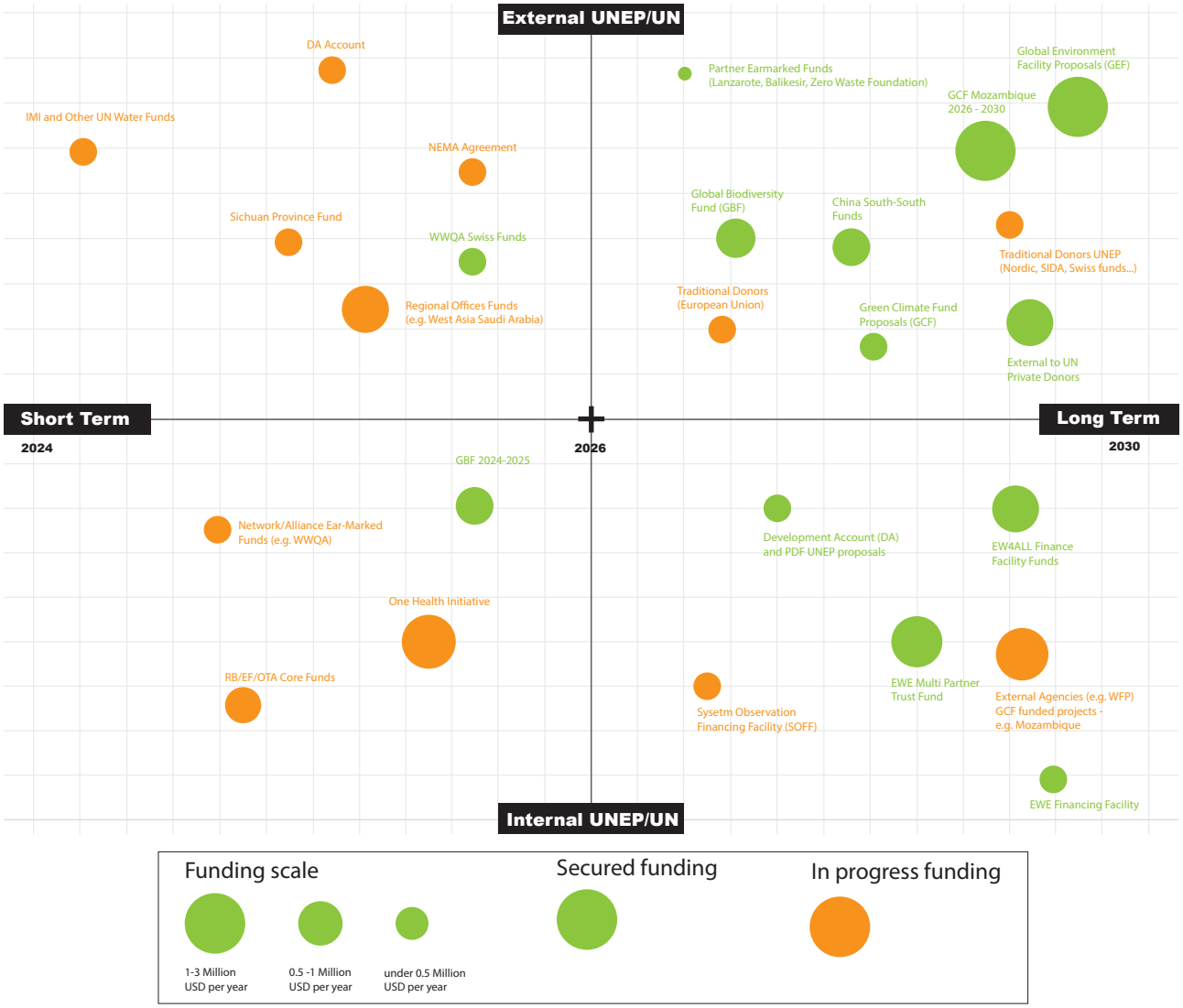
	Facilitation/Promotion/ Technology Support Capacity development	Operations & Crisis Centre	SG Data Strategy	Coordiantion/Support Cross theme analysis

Funding

The funding strategy for early warning and data analytics emphasizes securing external, long-term, and flexible funding sources. Currently, less than 3% of the core funds are allocated to the UNEP's Early Warning function. Within the Early Warning and Assessment Division, the early warning and data analytics service accounts for approximately 20% of the budget. This service operates under a sustainable and adaptive funding strategy, which not only leverages core funds but also actively pursues external partnerships through a multi-stakeholder trust mechanism as shown in the diagram below.

The Branch aims to maintain a Balance Scorecard providing a comprehensive view of its financial performance beyond its traditional ways that is followed in project/programme management. It will serve as a framework for translating Branch strategic objectives and operational objectives into a coherent set of performance measures, providing a balanced view on Branch achieving its long-term goals. The current developed scorecard represents 4 dimensions (i) Funding and Scorecard; (ii) Funding Structure Roadmap; (iii) Strategic Funding: Short term; (iv) Strategic Funding: Medium to Long term. It is expected that Balanced Scorecard will be updated regularly helping to mitigate any risk in the financial structure.

Funding landscape of Early Warning and Data Analytics Service



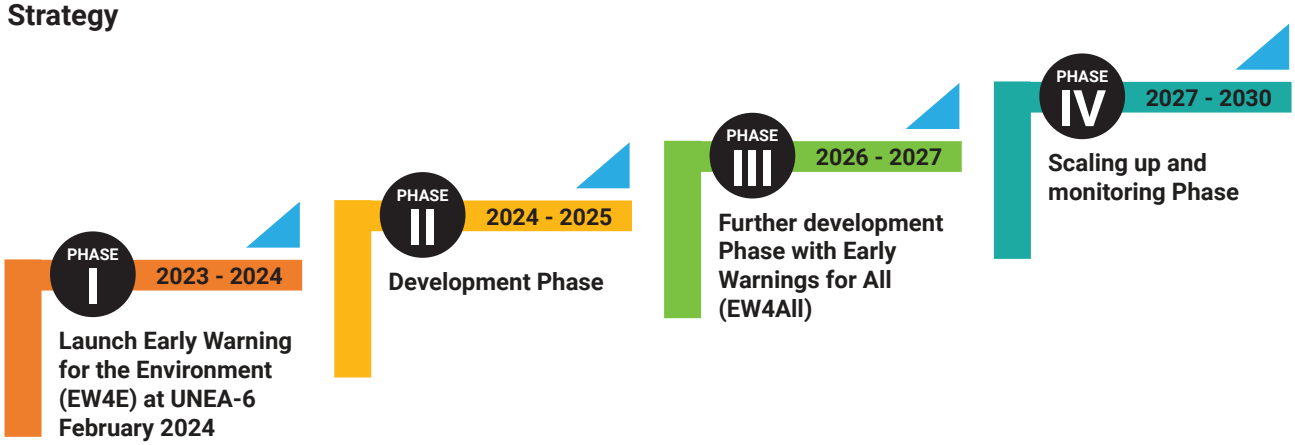
The funding landscape diagram illustrates the present funding framework for early warning and data analytics services within the division. It indicates that the current funding is transitioning from an internal, short-term model to an external, long-term structure.

Roadmap up to 2030

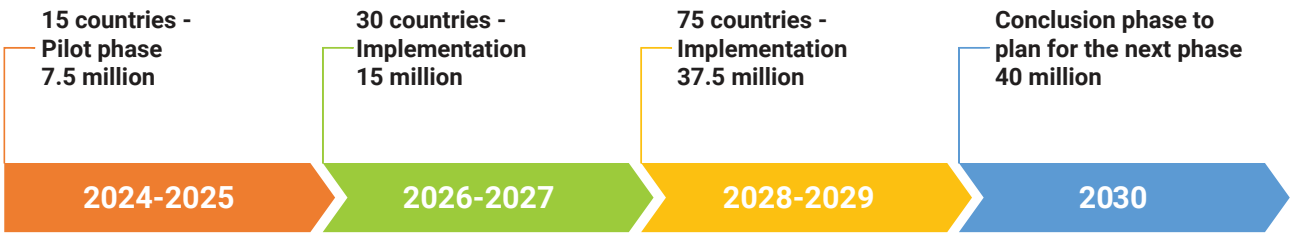
The overarching strategic goal is to strengthen the environmental dimension of Early Warning towards acceleration of the achievement of Agenda 2030 and the Sustainable Development Goals (SDGs)

- **Increase the Impact in Countries**
  30 focus countries in EW4All; 60 CCA Countries; 100+ SOFF Countries (initial focus on SIDS and LDCs); 6 Regions with GCF Climate Information and Early Warning Systems (CIEWS) investments; 2 Regions on Air Pollution Early Warning (Africa and Asia Pacific); 1 Region on Biodiversity Early Warning (Latin America and the Caribbean); One Planet EW Global, Regional, and National Platform.
- **Accelerate the achievement of the SDGs**
  Geospatial and Statistics integration and Leadership at UN level; Capacity Development on SDGs and Early Warning for Environment; Synergies on the Nexus (Development, Peace, and Humanitarian); Provision of Disaggregated Data Analytics to countries.
- **Ensure UNEP Leadership in Early Warning for Environment**
  UNEP leadership on the environmental dimension of EW4All; Leadership on Geospatial Early Warning; Leadership on Statistics for Early Warning and SDGs.

Early Warning for Environment (EWE) will be developed in four phases within the Roadmap and Strategy



Implementation: a phased approach and milestones (2024-2030-2035)
e.g., EW on Air pollution - Phase I, 2024-2030



Early Warning for Environment (EWE) will be developed in four phases within the following Roadmap and Strategy up to 2030.

Partnership and Co-creation Approach (externally and internally to UNEP)

The initiative adopts a Partnership, Co-creation approach, across 16 Agencies + 6 MEAs with one UN Common Approach to EWE.

- 16 UN Agencies: UNEP & WMO, UNDRR, ITU, IFRC, FAO, WHO, UNDP, UNSD, OICT, OCHA, and UNCT
- 6 MEAs: CBD, BRS and UNCCD
- Across UNEP, including Ecosystems Division, Industry and Economy Division, Policy and Programming Division, the Chief Digital Office, and Chief Scientist Office, and All 6 UNEP Regional Offices

The UNEP Early Warning and Data Analytics function leverages the reach of our initiatives building on Partnerships, Networks and Alliances adopting an Outward Looking Approach:

> The One UN Geospatial Network across 42 UN Agencies; The Big Data 33 One Global Partnership Network; The OARE Online Access to Research on the Environment and UN Links – UN system librarian's network; The World Water Quality Alliance; The IAEG on SDGs Implementation; The EW4All Inter-Agency Task Force; Alliance for Hydromet Development; Systematic Observations Financing Facility (SOFF); Risk-informed Early Action Partnership (REAP); The 11 Agencies and 3 MEAs of the Early Warning for Environment; and The HLCP Foresight Network.

An initial Scoping Workshop was held on the 6-7 July 2023 including participation of 4 UNEP Divisions (IED, PPD, Ecosystems Division and EWAD) with 4 external Agencies (WMO, FAO, WHO and UNEP) and 3 MEAs (CBD, BRS and UNCCD).

Internal consultation meetings across UNEP were held with the Chief Scientist Office, the Chief Digital Officer Office and IED and ecosystems Division as well as with 3 Regional offices (Europe, Affrica and Latin America and the Caribbean).

A more strategic workshop is going to be held in Geneva, at the Regional Office for Europe, on the 20-21 November with the participation of 11 UN Agencies: UNEP & WMO, UNDRR, ITU, IFRC, FAO, WHO, UNDP, UNSD, OICT, OCHA, and UNCT and 3 MEAs: CBD, BRS AND UNCCD as well as across all UNEP Divisions and Regional Offices.

In February 2024, back-to-back to UNEA 6, Member States consultations were held during the Science Policy Business Forum.

Co-creation workshops and other consultation initiatives will then follow the above presented Roadmap of implementation of the Early Warning for Environment initiative in complement to UNEP participation as implementing agency of 2 dimensions in the Early Warning for All Strategy and Implementation Plan, impacting directly in 13 of the 30 focused countries of the EW4All initiative.

Future beyond 2030

Introduction

As we look beyond 2030, the integration of advanced early warning systems and sophisticated data analytics will pave the way for unprecedented improvements in forecasting, preparedness, and response strategies. These advancements will profoundly impact countries at the national, local, and community levels, addressing critical concerns across people, places, and the planet.

National, Local, and Community Impact

At the national level, governments will leverage AI-driven predictive analytics to enhance disaster preparedness, ensuring timely resource allocation and policy formulation. This will bolster national resilience against natural calamities, pandemics, and other crises. Improved data sharing platforms will facilitate seamless coordination between government agencies and international bodies, driving effective responses to emergencies.

At the local level, municipalities and cities will adopt localized early warning systems tailored to specific risks such as floods, earthquakes, and urban heatwaves. Enhanced connectivity and IoT-enabled sensors will provide real-time data, empowering local authorities to execute precise, context-specific interventions. Community engagement apps and platforms will ensure that citizens are well-informed and can contribute to risk mitigation efforts.

At the community level, grassroots initiatives will be strengthened through access to user-friendly data analytics tools. Communities will harness this technology for climate adaptation, health surveillance, and social cohesion. Localized data will enable tailored solutions that reflect the unique needs and vulnerabilities of diverse populations, fostering resilience and self-reliance.

Impact on People, Places, and the Planet

For people, advanced early warning systems will markedly reduce mortality and morbidity associated with disasters. Public health will benefit from predictive models identifying disease outbreaks and directing preventative measures. Enhanced analytics will also support social equity, ensuring marginalized populations receive timely aid and support.

In terms of places, urban and rural areas alike will evolve into smart environments equipped with predictive capabilities. Infrastructure planning and resource management will be optimized, minimizing environmental and economic damage. Data-driven insights will inform sustainable urbanization, conserving biodiversity and enhancing the quality of life.

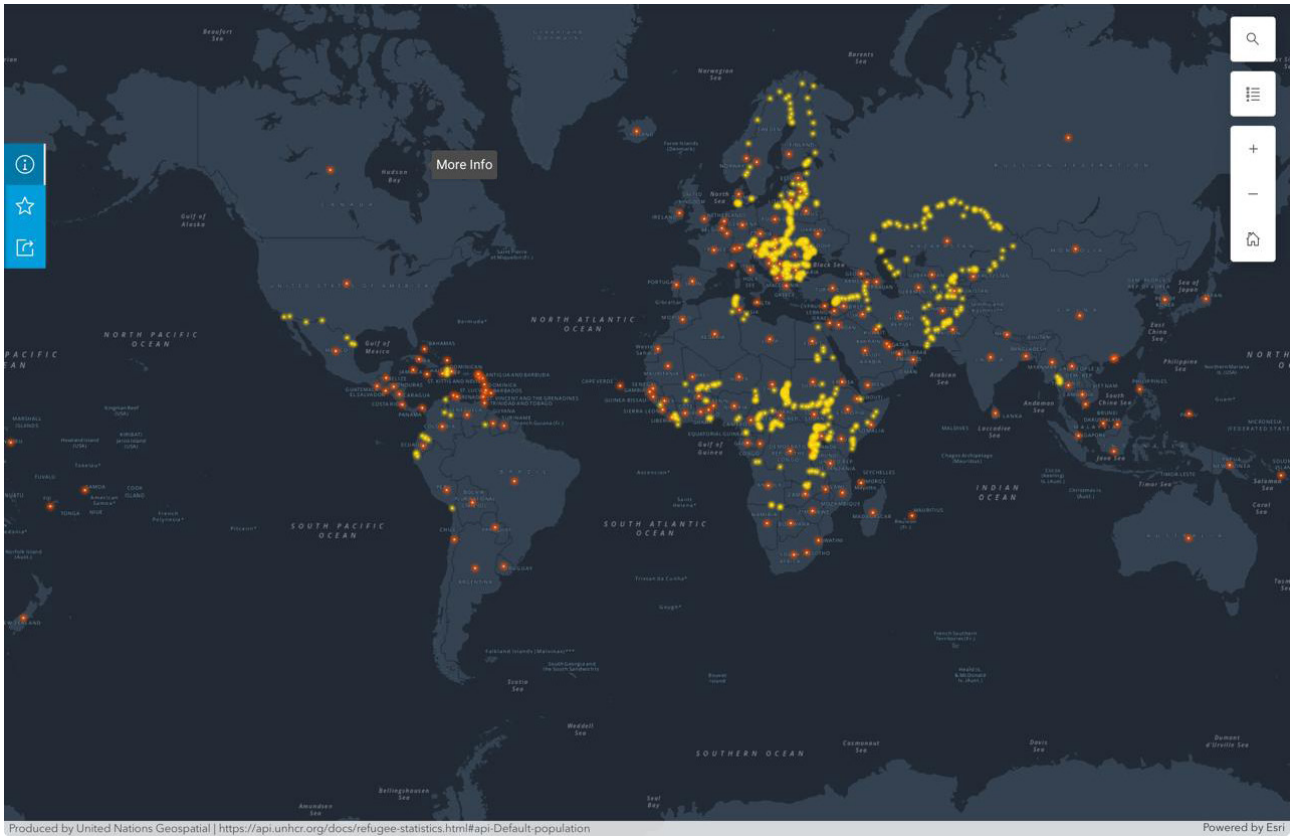
On a planetary scale, advanced data analytics will enhance environmental monitoring, aiding in the preservation of ecosystems and combating climate change. Global early warning systems will predict and mitigate transboundary environmental threats, safeguarding natural resources and promoting international cooperation.

Nexus of Peace and Security, Humanitarian Action, Sustainable Development, International Rule of Law, and Human Rights

In the nexus of peace and security, predictive analytics will identify conflict precursors, enabling preemptive diplomatic and peace building initiatives. Enhanced data collection will pinpoint sources of instability, helping international bodies to intervene before disputes escalate.

For humanitarian action, cutting-edge early warning systems will revolutionize crisis response. Predictive models will optimize logistics, ensuring swift delivery of aid. Advanced analytics will

One UN Geospatial Situation Room: One Map. One Humanity



One Map. One UN. One Humanity (depicts real time International Displaced People, IOM and UNHCR)

identify at-risk populations, directing resources to where they are needed most while avoiding duplication of efforts.

In the realm of sustainable development, data-driven insights will guide policy-making, ensuring efficient use of resources and equitable economic growth. Predictive analytics will help balance development objectives with environmental preservation, aligning with the United Nations Sustainable Development Goals.

Regarding international rule of law and human rights, big data analytics will uncover patterns of human rights violations, enabling timely interventions. Early warning systems will alert to potential abuses, while data transparency and accountability will be bolstered, promoting justice and protecting vulnerable populations.

Conclusion

The future of early warning and data analytics holds transformative potential for enhancing resilience at all societal levels. By harnessing these technologies, nations can safeguard their people, places, and the planet, while promoting peace, security, humanitarian action, sustainable development, and human rights. The integration of predictive analytics and early warning systems will be pivotal in addressing the complex challenges of the post-2030 era.

Facts and Figures

"Early Warnings For All"

Saves Lives and Protects Property through Early Warning Systems for Climate Adaptation

30% **Impact** in **Disaster Risk Reduction**

60 **Countries** in **5 Regions**

193 **Countries and** **8** **Billion lives impacted** until **2027**

6 **UNEP Divisions** involved

15 Environmental SDGs covered, including **25 Indicators** for which UNEP is the **custodian agency** and **92 Environmental Related Indicators**.

33 **Strategic foresights**

45 **Data platforms**

"Early Warning for Environment"

Tackling the **triple planetary crisis** of **climate change, nature** and **biodiversity loss, pollution** and **waste management**

100 **Millions USD** for **100 Countries protect People, Places** and **Planet**

60 **Pilot Countries** in **5 Regions**

16 **UN Agencies**

6 **Multilateral Environmental Agreements**

>16,300 **Publications** on the **Environment** supporting Developing Countries

7 **Global Environment Monitoring topics** involved

Statistics:
1719 **Indicators** for all countries and by year most of the time since 1950

70 **Data sources**

13 **Environmental topics** covered

6 **World Regions** involved

Partnerships

42 **UN Agencies in the ECOSOC UN Geospatial Network**

33 **Partners** in the **One Global Partnership** (including 8 GRID-Centers, private sector, Space Agencies, research institutes)

73 **Partners**

50 **Citizen science projects**

85 **Countries** covered by **WESR- Common Country Analysis (CCA)** and **EC-Country fiches platforms**

8 **Pillars** (topics)

406 **Unique environmental indicators** (cleared by experts)

159 **Charts, maps and graphs** per **country** (9540 total)

34 **Dashboards** for **each country** (2040 total)

193 **Countries** covered on the **WESR-Climate change**

1800 **Geospatial datasets**

26 **Multilateral Environmental Agreements (MEAs)** covered

http://data.unep.org/earlywarning

Early Warning and Data Analytics
Strategy, Policy and Action for People, Places and Planet

33 Partners in the One Global Partnership and 42 UN Agencies in the ECOSOC UN Geospatial Network

OTHER ONE GLOBAL PARTNERSHIP PARTNERS
UNEP GRID-Geneva	UNEP GRID-Warsaw	GRID-Sioux Falls	GRID-Nairobi	GRID-Azores
Environment Agency - ABU DHABI	CBAS	AiR Centre	SPREP	UNEP WCMC	Yale University
NASA	ESA Copernicus	Google	IBM	Descartes	UN System (OICT, DESA-UNSD, UN-GGIM, FAO, WMO, WHO, UNDP)
GEO	European Association Citizen Science	US Association of Citizen Science

Contact: alexandre.caldas@un.org

Transforming the lives of People, Places and Planet

UN environment programme