

World Environment Situation Room

Global Environmental Data Strategy - Big Data Platform on the Environment
for Sustainable Development, Peace and Security and Humanitarian Action



United Nations

A Global Initiative

“... The availability of quality, accessible, open, timely and disaggregated data is vital for evidence based decision-making and the full implementation of the 2030 Agenda and realization of its ambitions of leaving no one behind ...”

Progress towards the Sustainable Development Goals – 2020
Report of the Secretary-General

Big Data and Science for Green Solutions

Science is fundamental for UN Environment’s role as a global United Nations agency for policy and action on the Environment and its foundational mandate to keep the Environment under review. In today’s times of transition from industrial societies to knowledge societies, policy and action on the environment is dependent upon the capacity of countries, regions and globally, to collect, manage and deliver Big Data. The United Nations Secretary-General raises, at the highest level, in his latest report of 2018, on progress towards the Sustainable Development Goals, “... The availability of high-quality, timely and disaggregated data is vital for evidence-based decision-making and to ensure accountability for implementation of the 2030 Agenda...”

Environmental policies at the global, regional and country levels depend on the timely and reliable availability of useful and integrated geospatial, earth observation and remote sensing, real-time satellite imagery data, information and knowledge. However, the availability of data is not sufficient.



The Big Data Initiative supports Environmental Foresight through analysis of data, mapping trends, creating scenarios and identifying emerging issues on a permanent basis, at the frontier of environmental knowledge. Foresight provides a systemic process, to highlight a hotspot of environmental change, to feature an emerging science topic or provide early warning for identifying the future environmental trends. The Big Data revolution for achieving the Sustainable Development Goals can only be realized by Big Science.

Tackling Big Data and Science challenges requires innovative partnerships with private sector (technology), and active engagement of our Global Resource Information Database (GRID) networks as well as scientific collaborating UN Environment centres of excellence worldwide (capacity and human capital). The provision of Big Data and Big Science, create the foundation for Green Solutions, with impact on billions of people, on the ground, effective solutions for big challenges and priorities on the Environment, from Pollution to Biodiversity and Climate Change.

Big Data improves the lives of billions of people around the world and impacts countries and regions towards the achievement of sustainable development.

UN Environment 'Acting as One'

"... to demonstrate how UN Environment Programme of Work 2018 – 2021 integrates the 2030 Agenda using its Strategy to support data collection, analysis and reporting. The UN Environment Live (now World Environment Situation Room) initiative provides baseline data and monitors progress against the Goals ..." "Undertake a digital transformation transition to prepare for the delivery of the "Digital Transformations" subprogramme..."

UN Environment Executive Director
and Under-Secretary-General of the United Nations
Compact report, 2018



Integrating a Variety of Types of Environmental Data

**Geospatial,
Technology and
Knowledge
Platforms**

**Multilateral
Environmental
Agreements,
SDGs and
Environment
Statistics**

**Scientific
information
on the
Environment**

World Environment
Situation Room

Environment Live
(Open data and forecasting)

Indicator Reporting Information
Systems

Geospatial information
systems

SDG
Reporting and
International Obligations

Building national capacity on
environment statistics and
economic environmental accounting

Indicators informing policy -
SDG policy briefs, data use
and analysis, and
Open -Data Databases

Providing access
and use of scientific
information for developing
countries

Library and knowledge services

Knowledge management tools
and services

Network partners e.g. Online
Access to Research on the
Environment



**Global Environmental
Outlook, Scientific
Assessments and
other Thematic
Assessments**

**Citizen Science
and Private
Environmental
Data**

**Strategic
Foresight
Green and
Emerging
Challenges**

**Global
Environmental
Monitoring
Systems**

Global
Environment Outlook

Global Chemical Outlook

Natural Resources Outlook
and Factsheets

Frontiers

Emissions Gap Report
and more

Data for the Future

Horizon scanning, Scenario
building, Modelling

Supporting decision- making
and action

Preparedness and
prevention

Global
Environmental Monitoring
Systems on Water

Air Quality Monitoring

Monitoring Land and
Biota Systems

Monitoring the oceans

Private
institutions, business
and other non-
governmental organizations

Citizen Science Data with
relevance in e.g. environment
and health, such as the
Global Mosquito Alert
Consortium, or City
planning

Harnessing Data to Impact on People, Countries and our Planet

Supporting timely decision making, using geospatial data for identifying Hotspot's (hope spots) of climate change, policy actions and decision making



MapX technology is being used as a geospatial engine for the World Environment Situation Room

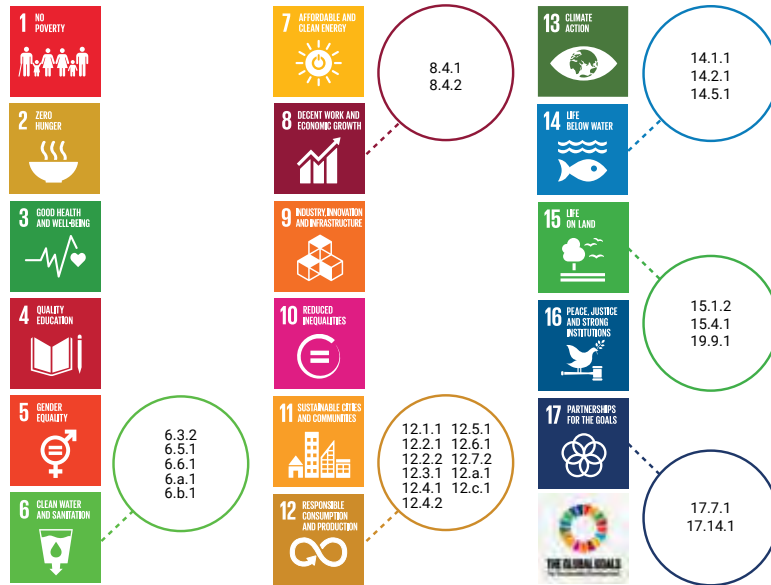
The World Environment Situation Room will be able to interact with all usual data standards and formats. Earth Observation data can be coming from in situ stations, remote sensing (satellites sensors, aerial photos or drones), field measurements (surveying), statistics data coming from reporting, census and other surveys. Other geospatial data, coming from models and interpolated data. It will also include 10,000 e-publications. This information can help to communicate vital information to user groups through geospatial information, maps, reports, and other means.

Indicators informing policy - Sustainable Development Goals Policy Briefs, Data Use and Analysis, and World Environment Situation Room Database

At the regional and global level, scientists, policy analysts, decision-makers, donors and the public rely on consistent, reliable, up-to-date information for guiding research, preparing assessments, developing regional and global approaches for sustainable development, facilitating policy action, allocation of funds and keeping informed on the state and trend of the environment. In order to promote data use, UN Environment plays a key role in providing easy access to a wealth of data and information needed to support and enable implementation of the environmental dimension of the 2030 Agenda through the functionality of World Environment Situation Room. Data visualization tools, including maps, charts and other graphics, also support users in understanding and using environmental data.

Harnessing Data to Impact on People, Countries and our Planet

Achieving the Sustainable Development Goals



UN Environment has the formal mandate as custodian for 26 Sustainable Development Goals Indicators



*Sustainable Development Goals:
Synergies with Multilateral Environment Agreements
and Internationally Agreed Goals*

One third
of all food
produced
globally is
wasted

This food
could feed
2 billion people



Online Access to Research on the Environment (OARE) for Developing Countries

Set up by the United Nations Environment Programme in 2006 together with Yale University and major scientific publishers, OARE provides access to a collection of up to 11,500 scientific journals, 27,000 e-books, 40 databases and other information resources in 118 countries. OARE helps bridge the knowledge gap between developing countries and the industrialized world, and build the capacity of researchers and experts to facilitate the development of science-driven policies for a sound management of the environment.

Harnessing Data to Impact on People, Countries and our Planet

Global Environmental Monitoring Systems

Water Quality Monitoring

The Global Environment Monitoring System (GEMS Water) provides the world community with sound data on fresh water quality to support scientific assessments and decision-making on the subject.

Spatial-temporal patterns of global water quality



Citizen Science

Initiative Empowers National Networks, Stakeholders and Governments to Generate and Access Real-time Data and Tools through UN Electronic Platform, World Environment Situation Room. A new alliance of citizen-science organizations and UN Environment was launched in April 2018 in an effort to escalate the global fight against mosquito-borne diseases, responsible for killing close to 2.7 million people annually. Overall mosquito-borne cases are estimated at 500 million every year, according to figures released by the World Health Organization (WHO).

Harnessing Data to Impact on People, Countries and our Planet

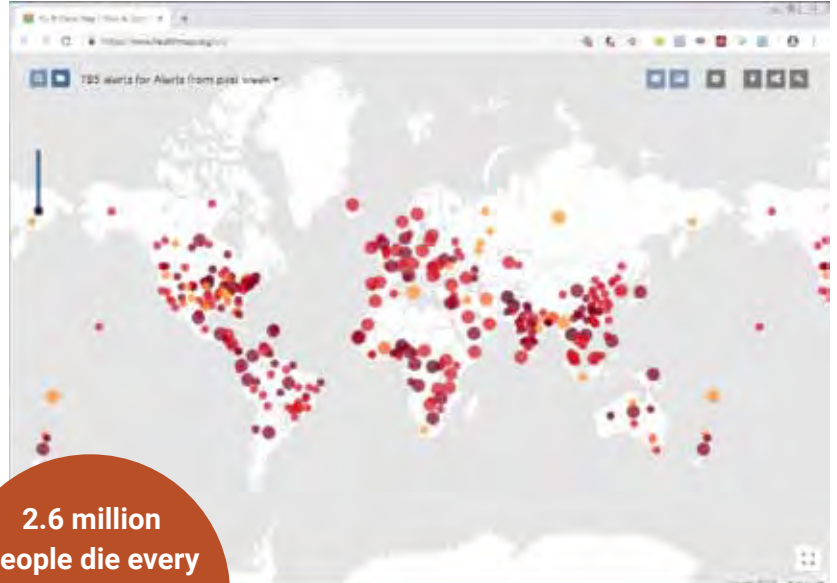
Global Environmental Monitoring Systems

Air Quality Monitoring

The Global Environmental Monitoring System for Air Pollution, commonly referred to as GEMS/AIR, is an urban air pollution monitoring and assessment program. It has evolved from a World Health Organization (WHO) urban air quality monitoring pilot project that started in 1973.

**700,000 children
below 15 years
old die every
year due to air
pollution**

**2.6 million
people die every
year because of
mosquito related
diseases**



The new initiative, launched under the name 'Global Mosquito Alert', brings together thousands of scientists and volunteers from around the world to track and control mosquito borne viruses, including Zika, yellow fever, chikungunya, dengue, malaria and the West Nile virus. It is the first global platform dedicated to citizen science techniques to tackle the monitoring of mosquito populations.

Harnessing Data to Impact on People, Countries and our Planet

Foresight Briefs - Analysis of Emerging Issues, Early Warning, Constructing Scenarios and Building our Future

Foresight Analyses and the World Environment Situation Room

The World Environment Situation Room provides the UN Member States open access to information and knowledge on the environment at the global, regional and national levels. It supports Environmental Policy through Foresight, Outlooks and Assessments and providing Capacity Building for countries to achieve the Goals of Agenda 2030 and Sustainable Development. The World Environment Situation Room provides up-to-date information for citizen science, communities of practice and impact stories and case studies on the environment and people. It is impacting people and livelihoods across countries, regions and the world.



Current Foresight Brief

Foresight Briefs to be published in 2021

- Nature-based solutions for urban challenges
- People livelihood and cities
- Working with nature to cool climate through soil, plants and water: Cooling the climate through forests
- Arctic Sea Ice
- Global resource and material consumption: The role of circular economy approaches

Harnessing Data to Impact on People, Countries and our Planet

Foresight Briefs - Analysis of Emerging Issues, Early Warning, Constructing Scenarios and Building our Future



Saving Lake Faguibine



Marine plastics litter and microplastics



The changing Aral Sea



Lake Urmia: Signs of recovery



Emerging sponge cities



Hacking economics for people and planet



Smoke-haze: A trans-boundary air pollution issue in Southeast Asia



Faith for earth



Revisiting ocean acidification, food security and ourearth system



Alternatives for the use of glyphosate



We are losing the "Little things that run the world"



Environment, climate change and security



The potential of carbon sequestration in the soil



Building a digital ecosystem for the planet



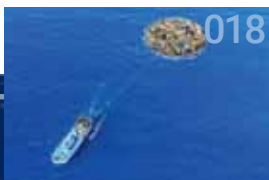
Growing popularity of alternate food systems for environment and health



Seagrasses, the forgotten ecosystems



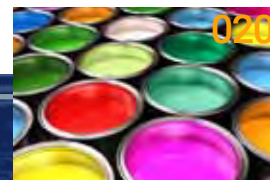
Challenges for the growth of the electric vehicle market



Unveiling plastic pollution in oceans



Blockchain technology and environmental sustainability



The need to eliminate lead paint globally



Food loss and waste in the Sustainable Development Goals' nexus



Desert locusts' upsurges: A harbinger of emerging climate change induced crises?



Food loss and waste in the Sustainable Development Goals' nexus

<https://wesr.unep.org/foresight>

Integrating Data and Environmental Priorities and Thematics into a Single Framework

Pollution

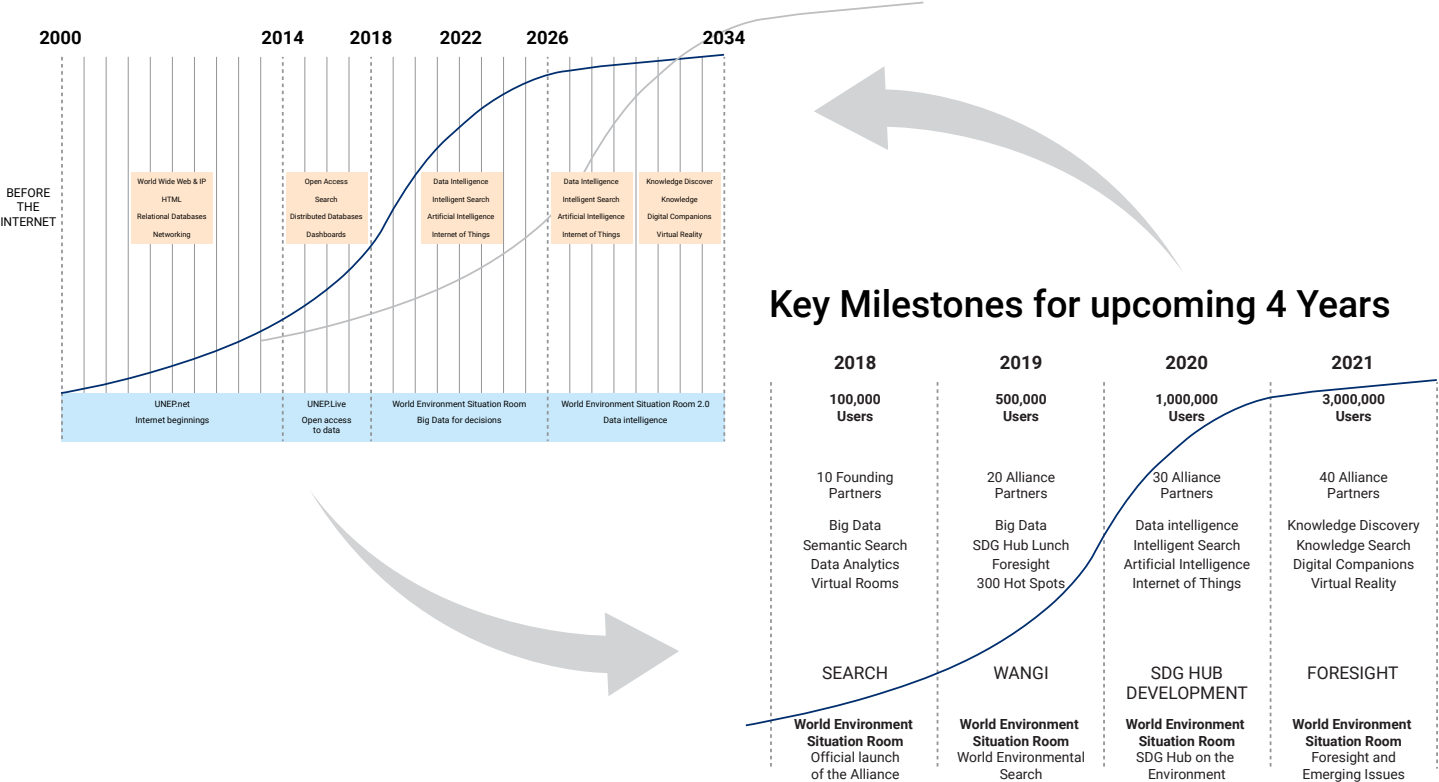


The different types of data are integrated within a conceptual data framework which can be broad enough to work across environmental topics, priorities and the overall achievement of Agenda 2030 and the Sustainable Development Goals.

The platforms integrate Global Environment Monitoring Systems for water quality, air pollution, biota ecosystems and land as well as the oceans.

UN Environment Data Vision, Strategy and Action Plan

Long-Term Sustainability



It should be underlined that the Big Data Initiative is an integral part of a long-term process for the provision of environmental data and related services. The various cycles of the evolution of this process intertwine to give rise to a strategic approach for the use of modern technology, such as artificial intelligence, digital companions and the Internet of Things but as well as novel transformation pathways for the organization and access and use of environmental information.

The diagram summarizes the long-term process as well as provides a substantive strategic vision for the future.



World Environment Situation Room

The World Environment Situation Room implements the Big Data Initiative. The project is global with overarching environmental policy relevance and impact. It includes geo-referenced, remote-sensing and earth observation information integrated with statistics and data on the environmental dimension of sustainable development. The themes of the Global platform cover complementary dimensions for Global Green Solutions for the Environment. It targets country policy makers, top environmental policy makers, the environmental scientific community, business and interested citizens. The platform is essential as a knowledge instrument to support progress on delivering the environmental dimension of Agenda 2030 for Sustainable Development.

Demonstration Projects around the World

The World Environment Situation Room will be implemented in different cities, countries and regions. These platforms facilitate in transforming data into information products and services which can be used by non-data experts. The on-line platforms provide access to near-real time information, allowing any willing stakeholder to explore data, visualize trends and use these data-based products to support action toward sustainable development. The platform automatically processes data to transform them into products such as images, maps, graphs (with trends), tables in a format which is easy to use by mainstream software.

The user enters a user-friendly interface, which provides access through thematic, geographic or product-type filters:

- Geographic: global, continent, country, selected study area
- Thematic: ocean, soils, energy, water, climate, biodiversity, atmosphere, pollution, forests
- Product-types: satellite imagery, maps, graphs, tables and data

This will include physical spaces for demonstrating the World Environment Situation Room in China (Shenzhen), New York, Geneva and Nairobi as well as other countries and regions worldwide.



'Wangi', our Global 'Digital Companion' for the Environment

Darwin Wangari, known as 'Wangi' uses the best available technology of human computer interaction, big data, artificial intelligence, Internet of Things and data analytics to be a digital companion on accessing and using the World Environment Situation Room

Wangi is a mobile App, providing information and knowledge on the Environment anywhere, anytime.

Wangi can learn with user preferences to personalize their experiences, searching information, navigating the Situation Room or assisting on new information available in the World Environment Situation Room about specific topics of interest.



'Wangi' is UN Environment's 'Digital Companion', gender-balanced and truly global personality supporting and advising users finding information, navigating the Situation Room, and personalizing their experience and interface.



MapX Architecture - Geo-spatial Technology and Engines



Geospatial data powered by the World Environment Situation Room

The innovative MapX platform will power the geospatial datasets of the World Environment Situation Room. MapX was developed by UN Environment and partners to help environmental stakeholders map and monitor the environment and the sustainable use of natural resources using the best available scientific data, frontier technologies and open source software solutions.

The platform offers a cloud computing architecture that aggregates a range of planetary data from trusted sources into a single online work space for analysis, visualization and sharing. The goal of MapX is to offer simple access to key data that is needed by stakeholders for environmental planning, decision-making and monitoring at any scale. MapX is the first non-commercial global public good platform being co-designed by technical expertise together with citizens of planet earth.

The core mission of MapX is:

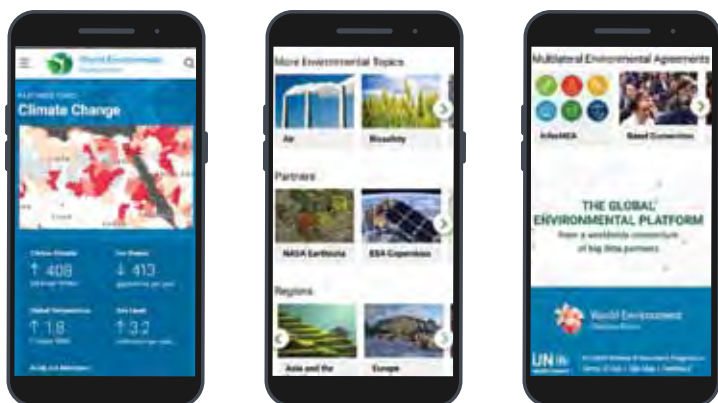
- To contribute to global sustainability and transparency by offering the possibility to share open, trustworthy data on natural resources and environmental change;
- To increase the capacity of policy makers and citizens to access and analyze maps for evidence-based dialogue, policymaking and impact monitoring; and
- To be an impartial hub for trusted geospatial data backed by the neutrality of the United Nations as part of the emerging ecosystem for planetary data.



A Distributed Platform on Big Data on the Environment



Always on *mobile architecture* providing transparent access and use to environmental data



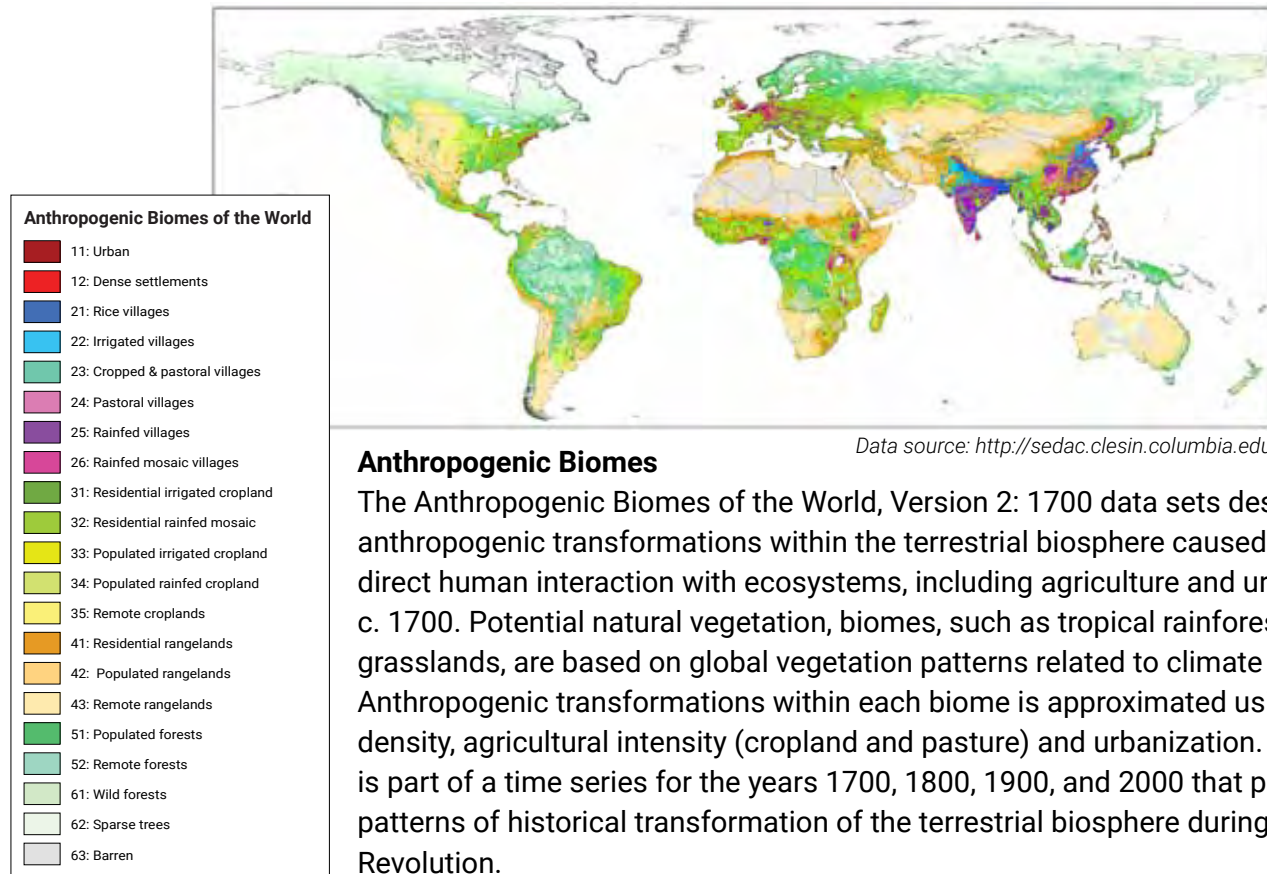
UN Environment 'Acting as One'

"Digital technologies are disrupting business as usual and providing all stakeholders a voice in the management of natural resources."

Former UN Environment Executive Director and Under-Secretary-General of the United Nations



Impact on World Biodiversity



Anthropogenic Biomes

The Anthropogenic Biomes of the World, Version 2: 1700 data sets describes anthropogenic transformations within the terrestrial biosphere caused by sustained direct human interaction with ecosystems, including agriculture and urbanization c. 1700. Potential natural vegetation, biomes, such as tropical rainforests or grasslands, are based on global vegetation patterns related to climate and geology. Anthropogenic transformations within each biome is approximated using population density, agricultural intensity (cropland and pasture) and urbanization. This data set is part of a time series for the years 1700, 1800, 1900, and 2000 that provides global patterns of historical transformation of the terrestrial biosphere during the Industrial Revolution.

Source: SEDAC

Key features of MapX - One of the Geospatial engines powering the World Environment

MapX offers an easy-to-use toolkit with the following features:

1. SPATIAL DATA CATALOGUE providing the best available spatial data.
2. Collaborative, private PROJECT WORKSPACE to securely share your data.
3. DATA DOWNLOADING AND REPORTING to integrate maps and data into reports and other platforms.

World Environment Situation Room is powered by several technologies including MapX, ArcGIS and others

4. DATA DASHBOARDS for monitoring indicators.
5. ANALYTICAL TOOLS including time sliders and overlays.
6. STORY MAPS to support outreach and communications.
7. IMPARTIAL DATA based on UN Environment's peer review and validation process.

Implementation Plan of WESR – CCA: Towards a Global Environmental Data Strategy

Operational Objectives:

Objective 1: Phase 1 – Make available an initial core set of basic data and analytics on environmental SDG indicators, where already available, for all the UN System and for all UN Member States. Engage with UN Country Teams and UN Resident Coordinators in at least 15 pilot countries to enhance the WESR platform and tailor it to the needs and priorities of UN RCs in support of the UN CCA and UNSDCF. Organize regional consultations in two regions to share the WESR and to enhance, validate and tailor the platform to further meet UN System country-level needs in each region and country within 18 months from signature.

Objective 2: Phase 2 - Refinement of the data and analytics on environment on the WESR country pages, including through bringing in national level data products. Engage with UN Country Teams and UN Resident Coordinators in an additional 20 countries to pre-deploy support for the CCAs. Provide continued support to the initial 15 pilot countries supported in Phase 1. Organize regional consultations in two regions to share the WESR and to enhance, validate and tailor the platform to further meet UN System country-level needs in each region and country within 24 months from signature.

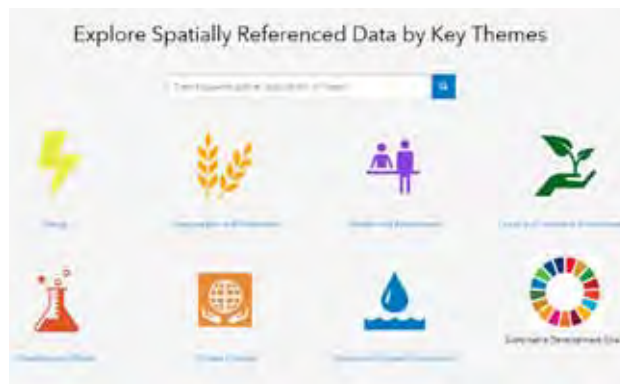
Implementation Plan of WESR – CCA: Selected Countries in the 5 Regions



Digital transformation From Data to Action in support of SDGs: UNEP’s World Environment Situation Room for Common Country Analysis (CCA) as a cornerstone of the UN Reform.



Sustainable Development Goals Hub on the Environment



Indicator Reporting Information System - UN Environment partnership with Environmental Agency of Abu Dhabi



SDG Hub on the Environment

The decision to support the Big Data Initiative, based upon a distributed model to access information, was a fundamental one. The success of a Big Data programme depends on the inclusion of a business partnership model, integrating a variety of institutions as well as technologies and models for organization and access to data.

Through financial and in-kind contributions, as well as expertise, competence and technology infrastructure and services in their own areas of expertise, world partners contribute to the research, development and impact of this Programme and initiatives. Starting with the initial core of 7 GRID Centers network, and growing solidly to a global partnership of around 40 data and knowledge centers distributed worldwide.

One Global Partnership



A Consortium of international partners, from the private sector, non-governmental organizations and public and international institutions, endorses the long-term development of the World Environment Situation Room.

The World Environment Situation Room is a high quality and impact platform. It is global with overarching environmental policy relevance and impact. Encompassing a variety of technologies, it includes geo-referenced, remote-sensing and earth observation information integrated with statistics and data on the environmental dimension of sustainable development. The themes of the Global platform cover complementary dimensions for Global Green Solutions for the Environment. It targets country policy makers, top environmental policy makers, the environmental scientific community, business and interested citizens. The ecosystem of platforms has a completely distributed architecture and is essential as a knowledge instrument to support progress on delivering the environmental dimension of Agenda 2030 for Sustainable Development.



**Harnessing Data to Impact on
People, Countries and our Planet**

World Environment Situation Room



Other One Global Partnership Partners

<http://data.unep.org>