

One UN Common Approach to Early Warning for Environment



UN
environment
programme



Mission: Protect all developing countries with EWE services, and together with EW4ALL, to minimize risks of disasters from the triple planetary crisis

Why Early Warning for Environment?

1. Examples of Air pollution impacts:

- Loss of lives: > 6.7 million people/year, 91% of those premature deaths occurred in low- and middle-income countries (WHO,2022)
- 99% of people on the planet breathe polluted air (WHO,2022)
- Economic loss: \$ 8.1 trillion, equivalent to 6.1% of Global GDP (WB Report 2022- The Global Health Cost of PM2.5 Air Pollution)

2. The key numbers on nature and biodiversity loss are below:

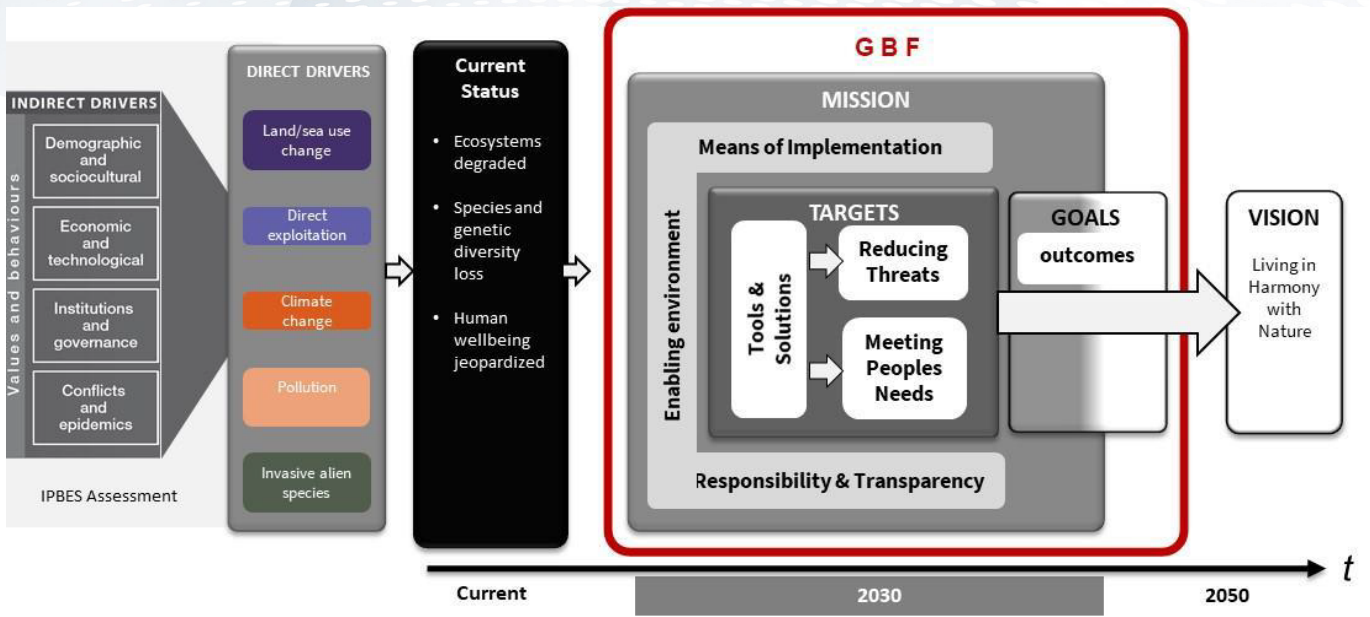
2.1 Facts about the nature crisis: We are experiencing a dangerous decline in nature, and humans are causing it:

- We are using the equivalent of 1.6 Earths to maintain our current way of life and ecosystems cannot keep up with our demands. (Becoming Generation Restoration, UNEP)
- One million of the world's estimated 8 million species of plants and animals are threatened with extinction. (IPBES)
- 75 percent of the Earth's land surface has been significantly altered by human actions, including 85 percent of wetland areas. (IPBES)
- 66 percent of ocean area is impacted by human activities, including from fisheries and pollution. (IPBES)
- Close to 90% of the world's marine fish stocks are fully exploited, overexploited or depleted. (UNCTAD)
- Our global food system is the primary driver of biodiversity loss with agriculture alone being the identified threat 24,000 of the 28,000 species at risk of extinction. (Chatham House and UNEP)
- Agricultural expansion is said to account for 70% of the projected loss of terrestrial biodiversity. (CBD)

2.2 Impacts of nature loss and degradation: Nature loss has far-reaching consequences. Damaged ecosystems exacerbate climate change, undermine food security and put people and communities at risk.

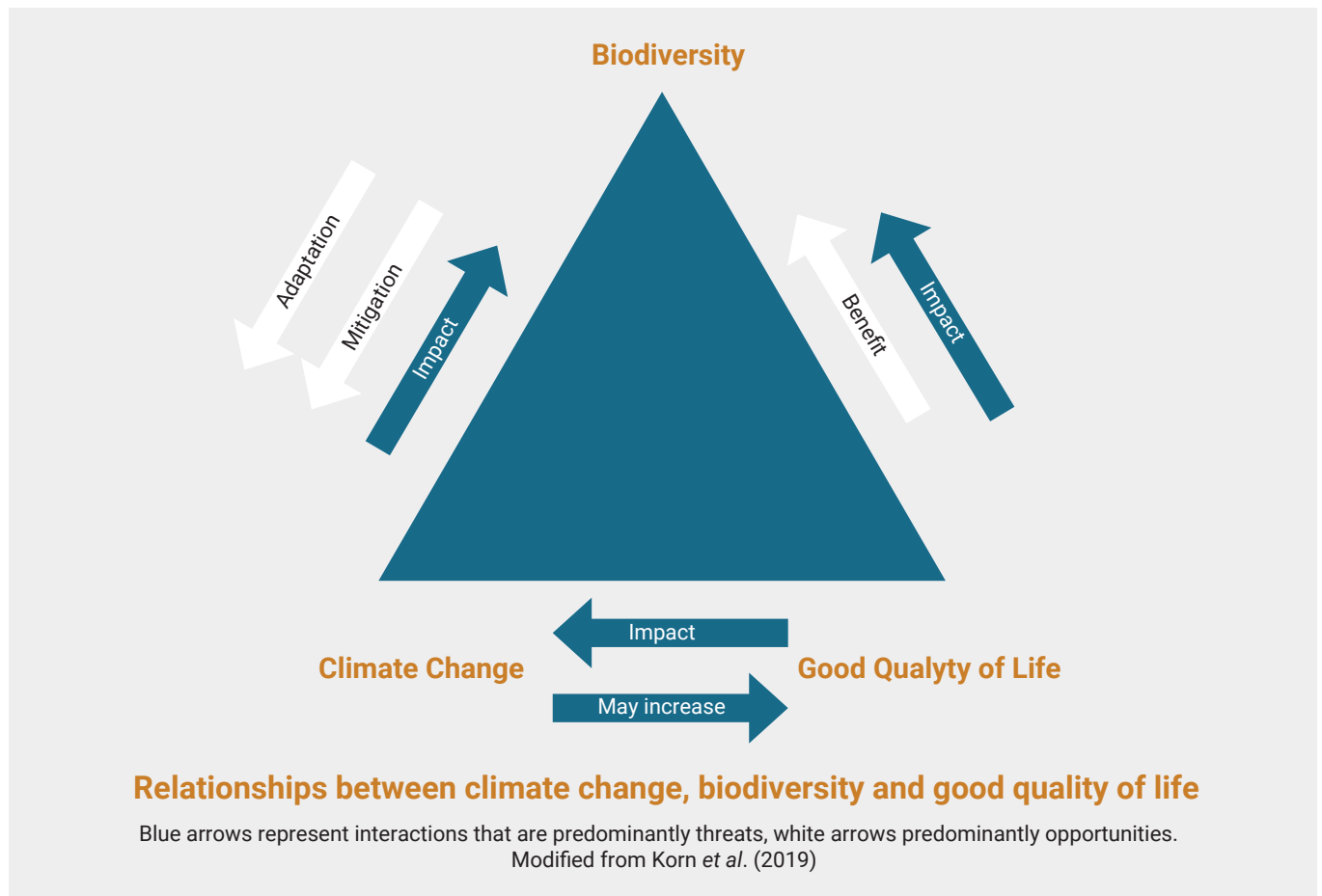
- Around 3.2 billion people, or 40 percent of the global population, are adversely affected by land degradation.
- Up to \$577 billion in annual global crop production is at risk from pollinator loss.
- 25 percent of global greenhouse gas emissions are generated by land clearing, crop production and fertilization.
- Development is putting animals and humans in closer contact increasing the risk of diseases like COVID-19 to spread. About 60 percent of human infections are estimated to have an animal origin.
- 100-300 million people are at increased risk of floods and hurricanes because of coastal habitat loss.
- Declines in nature and biodiversity at current trajectories will undermine progress toward 35 out of 44 of the targets of SDGs related to poverty, hunger, health, water cities, climate, oceans and land.

GBF Biodiversity Framework (23 Targets)



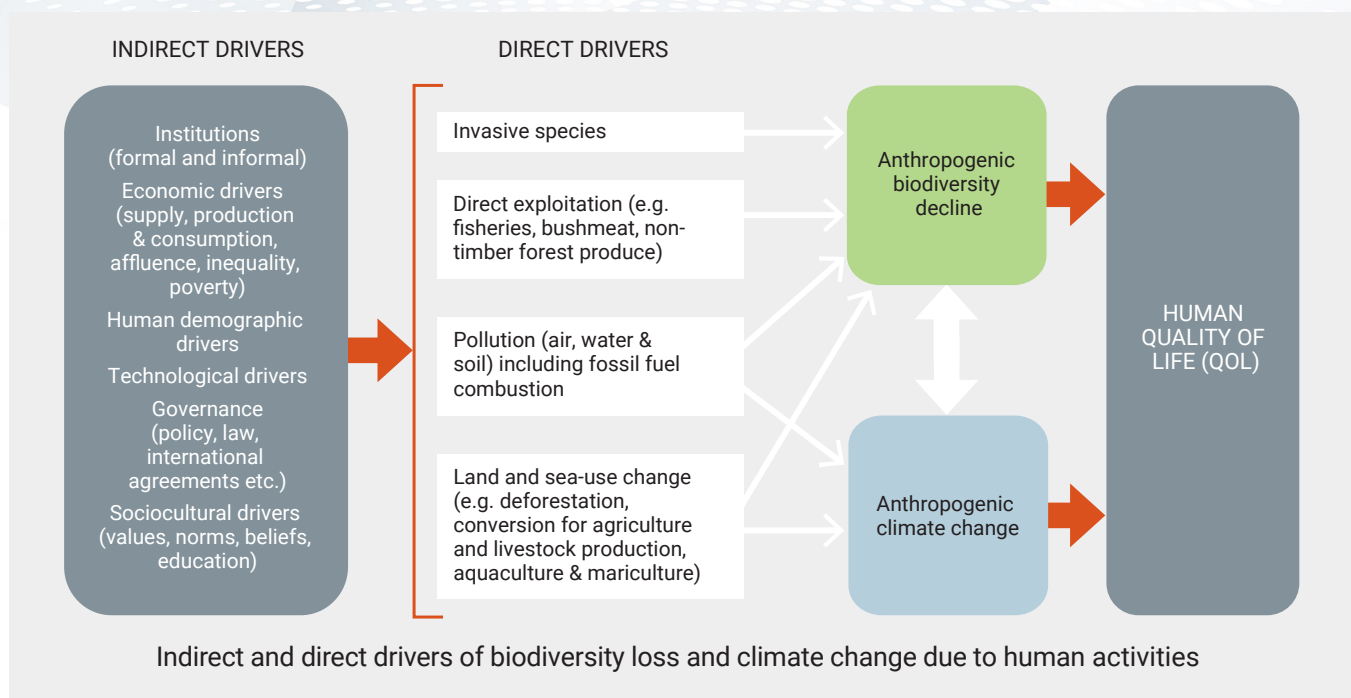
Source: GBF Framework

Interlinkage between biodiversity and climate with human activities and well-being



Source: IPBES-IPCC co-sponsored workshop report on biodiversity and climate change
Source: Thematic of the overall structure and scope of biodiversity and climate change

Climate change and biodiversity loss share common underlying drivers and both impact people's quality of life



Source: Thematic of the overall structure and scope of biodiversity and climate change.

1. There are few places on the planet where the threat of biodiversity loss is more evident than the Amazon, which is being destroyed by **record levels of deforestation** despite being home to **one-third of the planet's species** – the greatest concentration of biodiversity on Earth.

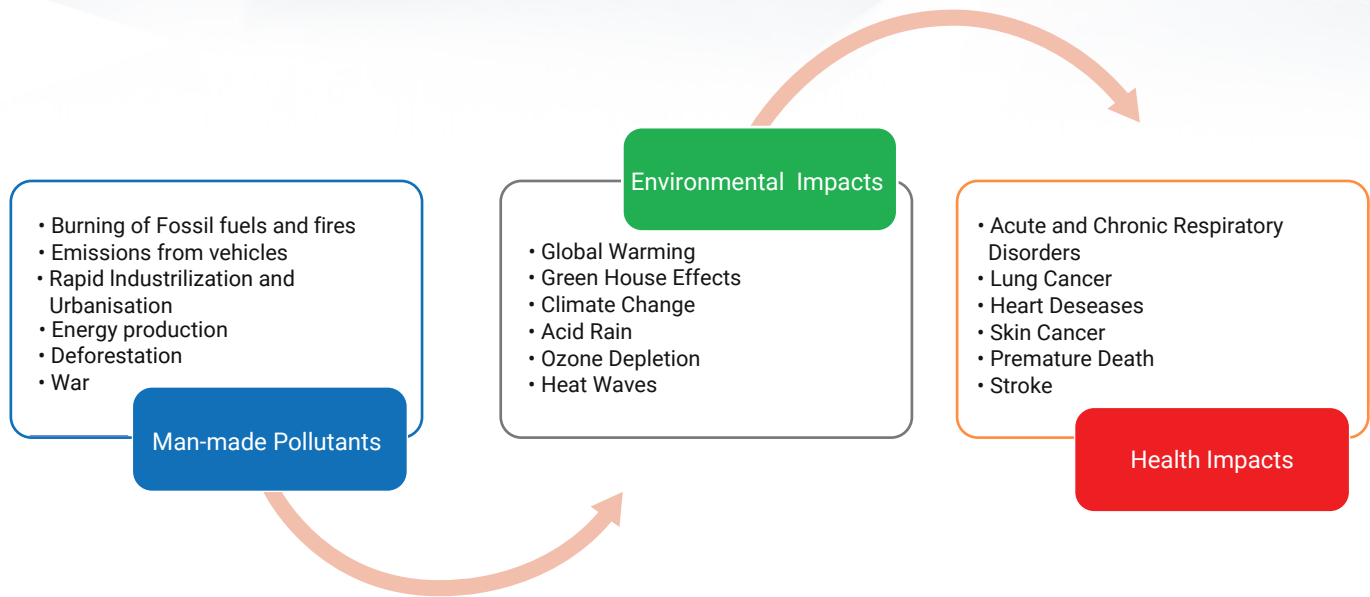
Because habitat destruction brings humans and wildlife into closer contact, it dramatically increases our risk of exposure to **“zoonotic spillover,”** which occurs when pathogens – bacteria or viruses that cause disease – jump from animals to humans. In fact, more than **75%** of emerging infectious diseases in humans are caused by pathogens that originally circulated in animals, leading to **millions of deaths** each year. According to some estimates, as many as **1.6 million viruses** are contained within mammals and birds across the globe, some of which could be deadly if or when they become transmissible to humans.

2. Today, according to the UN, **one-third** of the planet's land is degraded, making it harder to feed a global population that recently surpassed **8 billion**. Restoring biodiversity could also slow down climate change by storing carbon dioxide from the Earth's atmosphere. Land and ocean ecosystems currently **absorb 60% of human-caused emissions**.
3. Species extinction and habitat destruction also mean forfeiting the untapped potential of our natural world to yield new medicines for treating health problems. In fact, **70% of all cancer drugs** today are natural or bio-inspired products. And scientists are still discovering new species each year, including a **fungus that can eat plastic**.
4. Coastal and marine ecosystems like mangroves, sea grasses, and wetlands store far more carbon than terrestrial forests, sometimes up to 10 times as much,” says Susan Ruffo, the UN Foundation's Senior Advisor for Ocean and Climate.
5. Islands play an outsized role in the planet's biodiversity, hosting 20% of the Earth's species despite taking up less than 4% of its surface area, according to Dr. Shobha Maharaj, a climate scientist and lead author for the latest report of the Intergovernmental Panel on Climate Change. The Caribbean, for instance, is home to **10% of the world's coral reefs** and approximately 1,500 species of fish and marine mammals. These “island-endemic” species are especially vulnerable to habitat destruction, pollution, and environmental changes. In fact, Dr. Maharaj says **80% of known species extinctions** have occurred on islands. Yet there is a troubling absence of data from these places, Dr. Maharaj says, often as a result of inadequate investment and resources.

How does Early Warning for Environment Work?

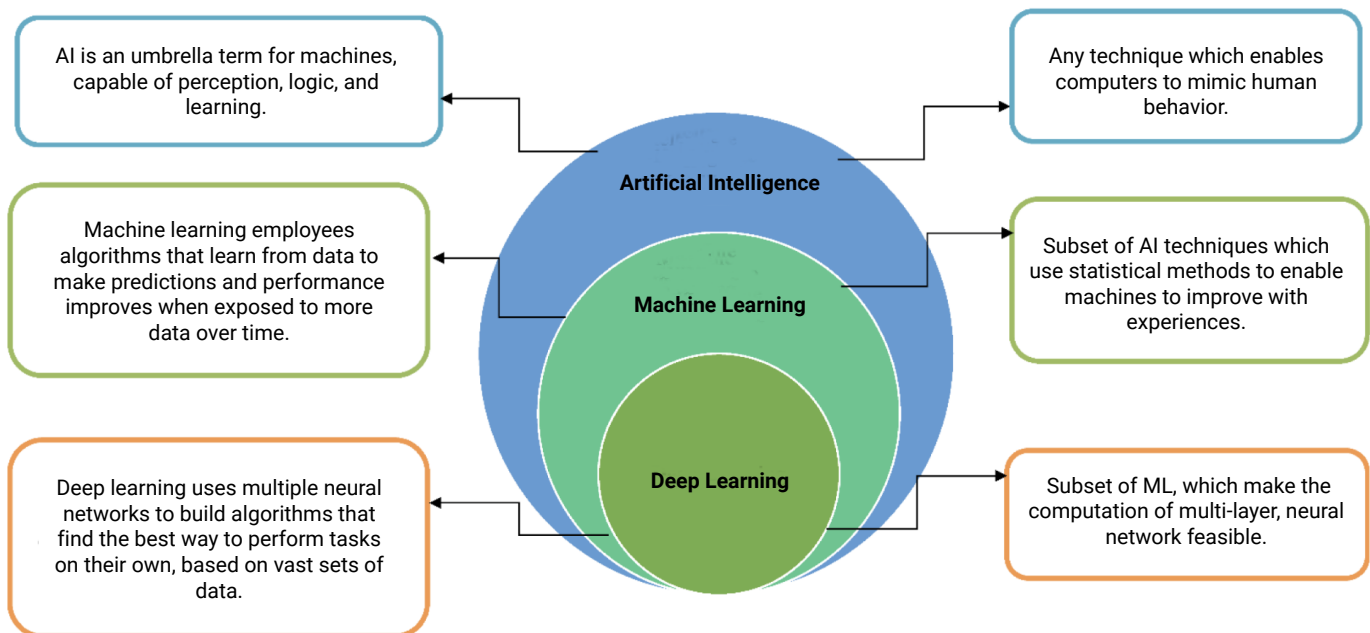
Examples of Air pollution

Potential Relationship between Man-made Pollutants, Environmental Impacts and Health Impacts



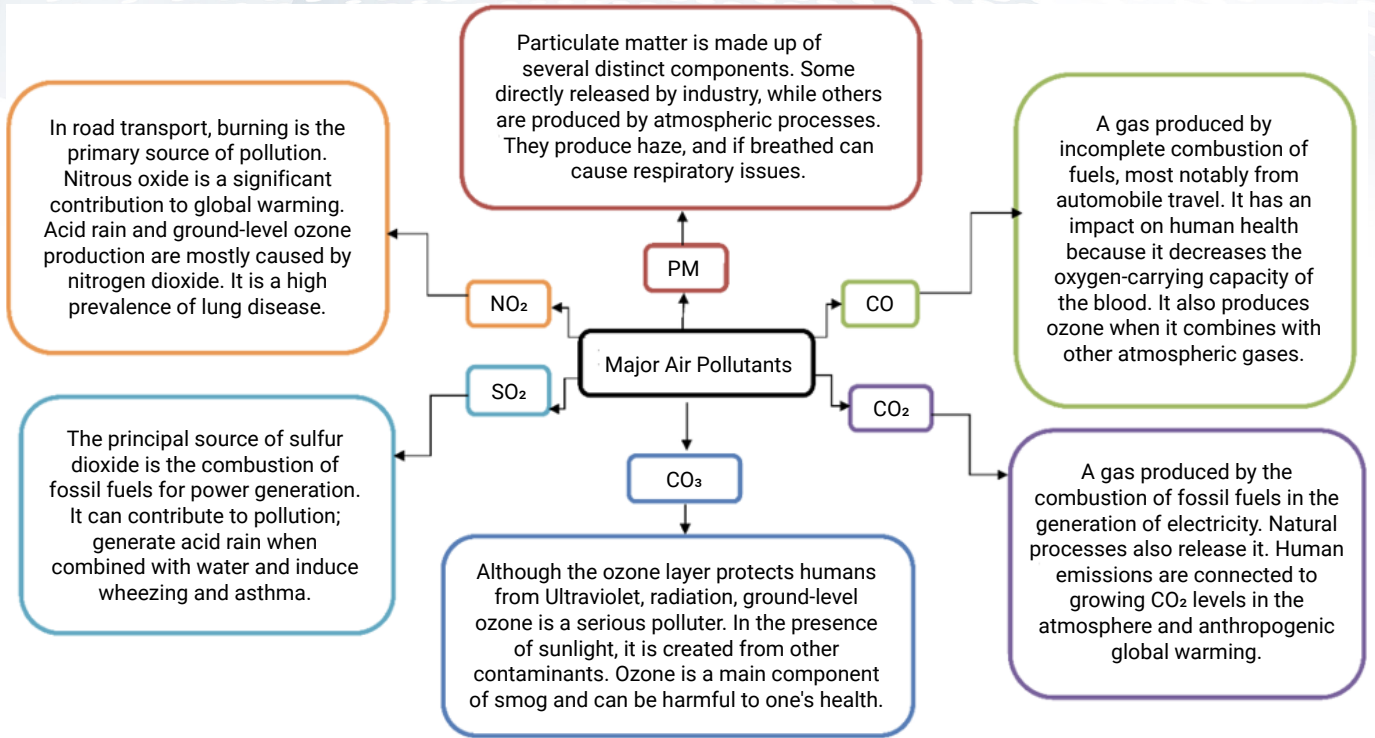
Source: Artificial Intelligence Technologies for Forecasting Air Pollution and Human Health: A Narrative Review

Relationship between Artificial Intelligence, Machine Learning and Deep Learning



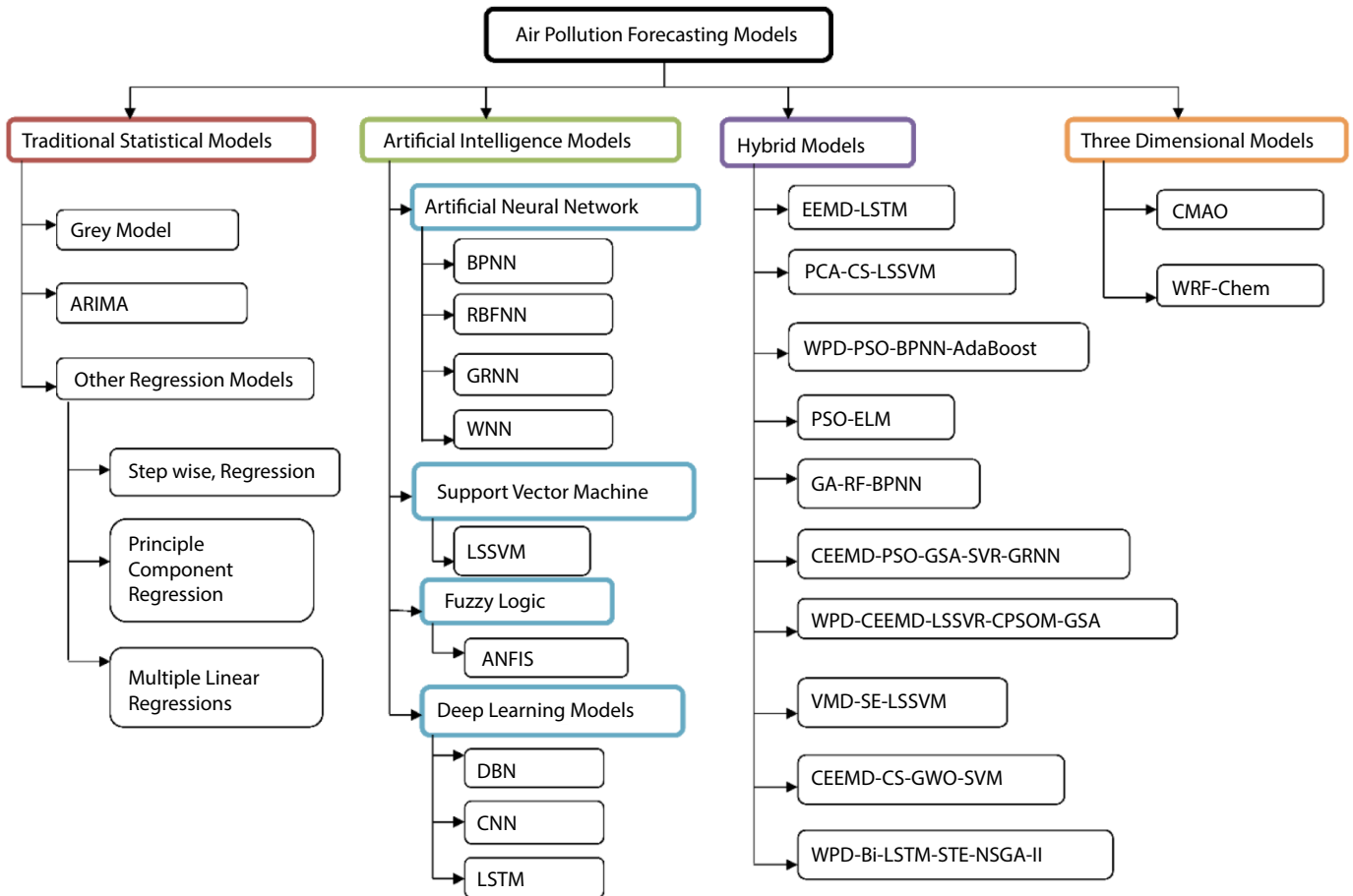
Source: Artificial Intelligence Technologies for Forecasting Air Pollution and Human Health: A Narrative Review

Major Air Pollutants and their Sources and Effects

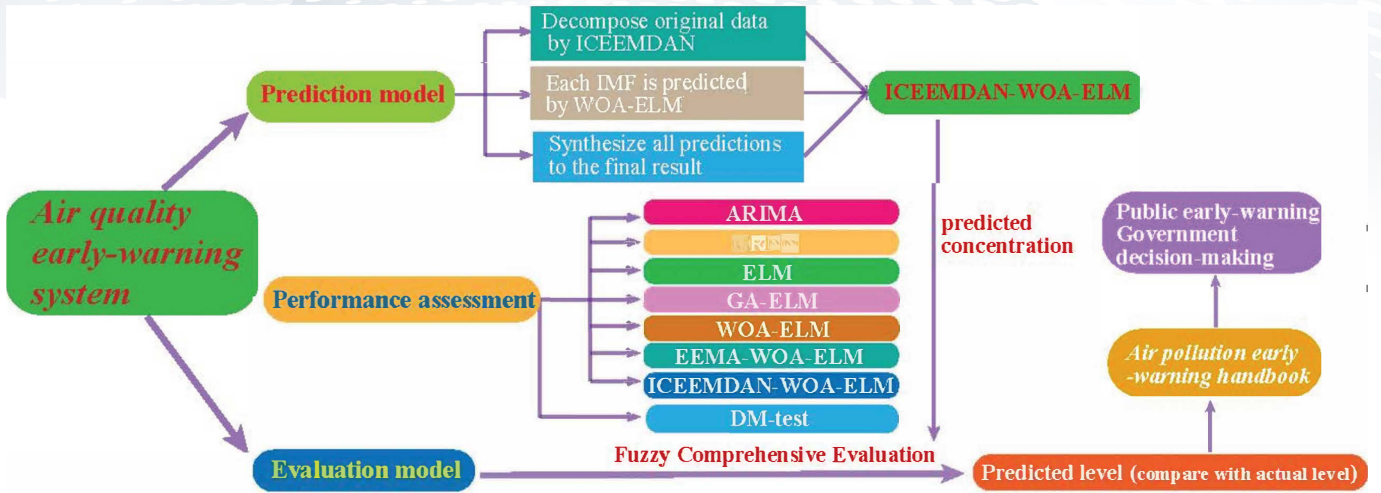


Source: Artificial Intelligence Technologies for Forecasting Air Pollution and Human Health: A Narrative Review

Different Methods of Air Pollution Forecasting

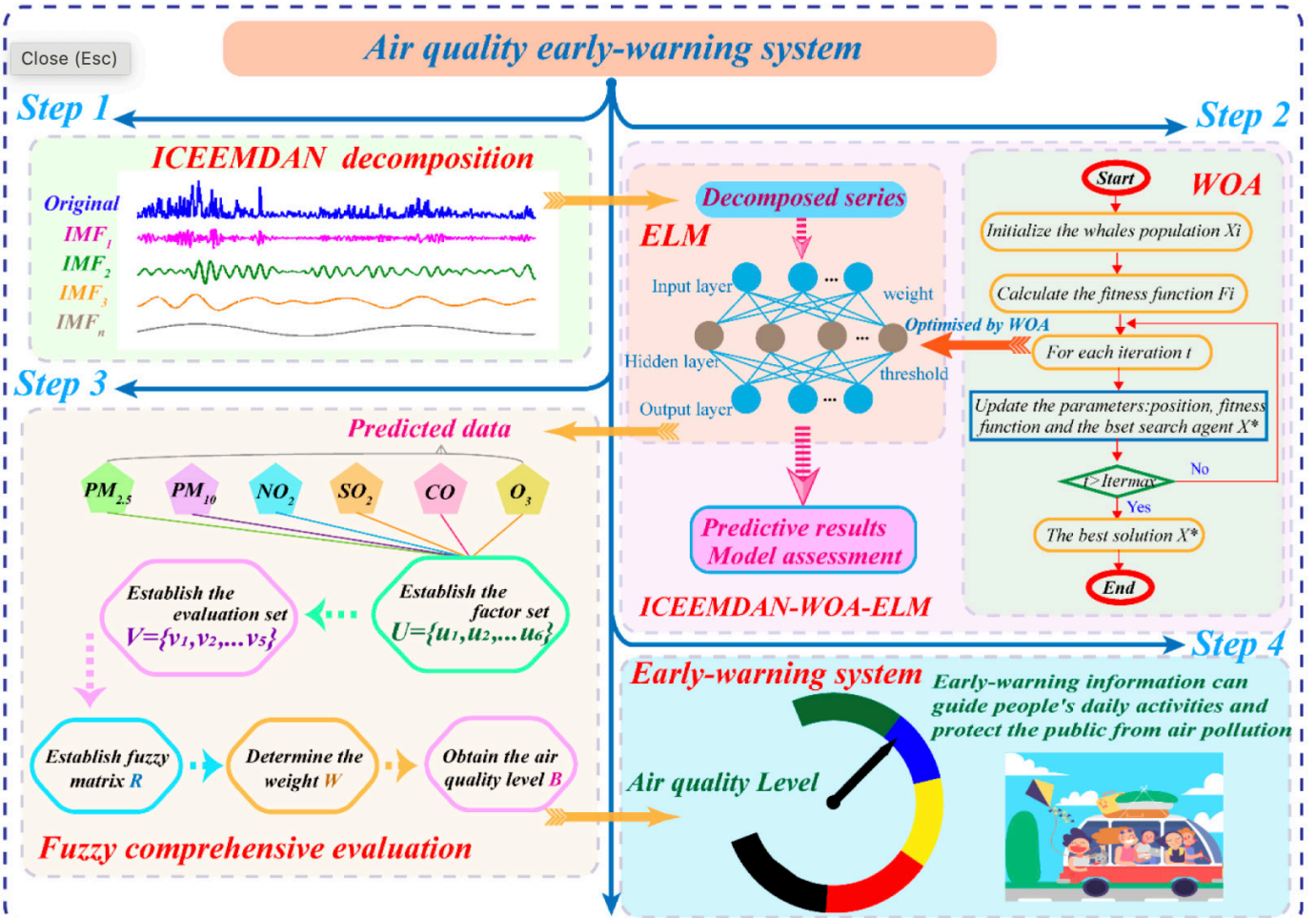


Examples of Air Quality Early Warning System



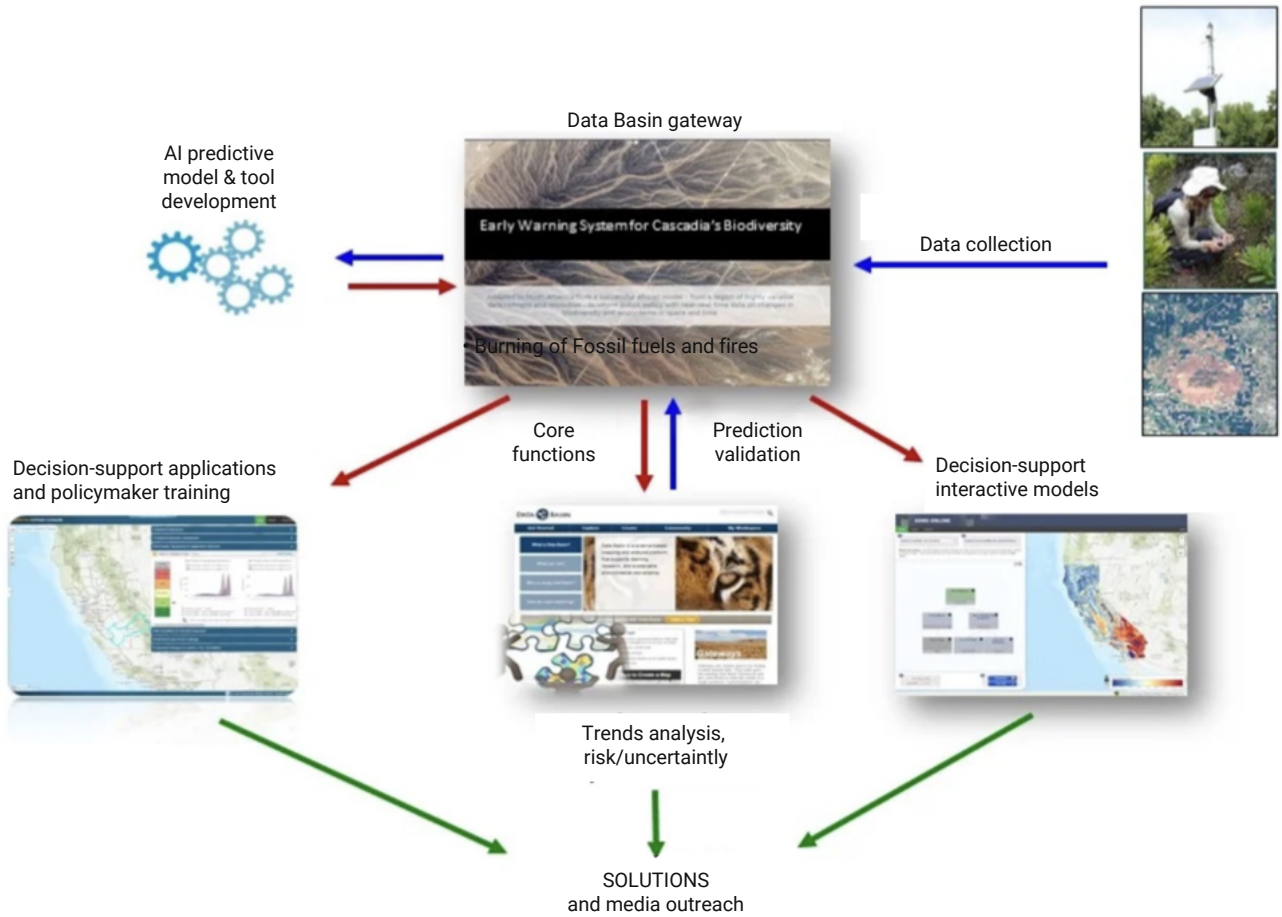
Source: Graphical Abstract - A Novel Air Quality Early-Warning System Based on Artificial Intelligence

Examples of Air Quality Early Warning System - Proposed System

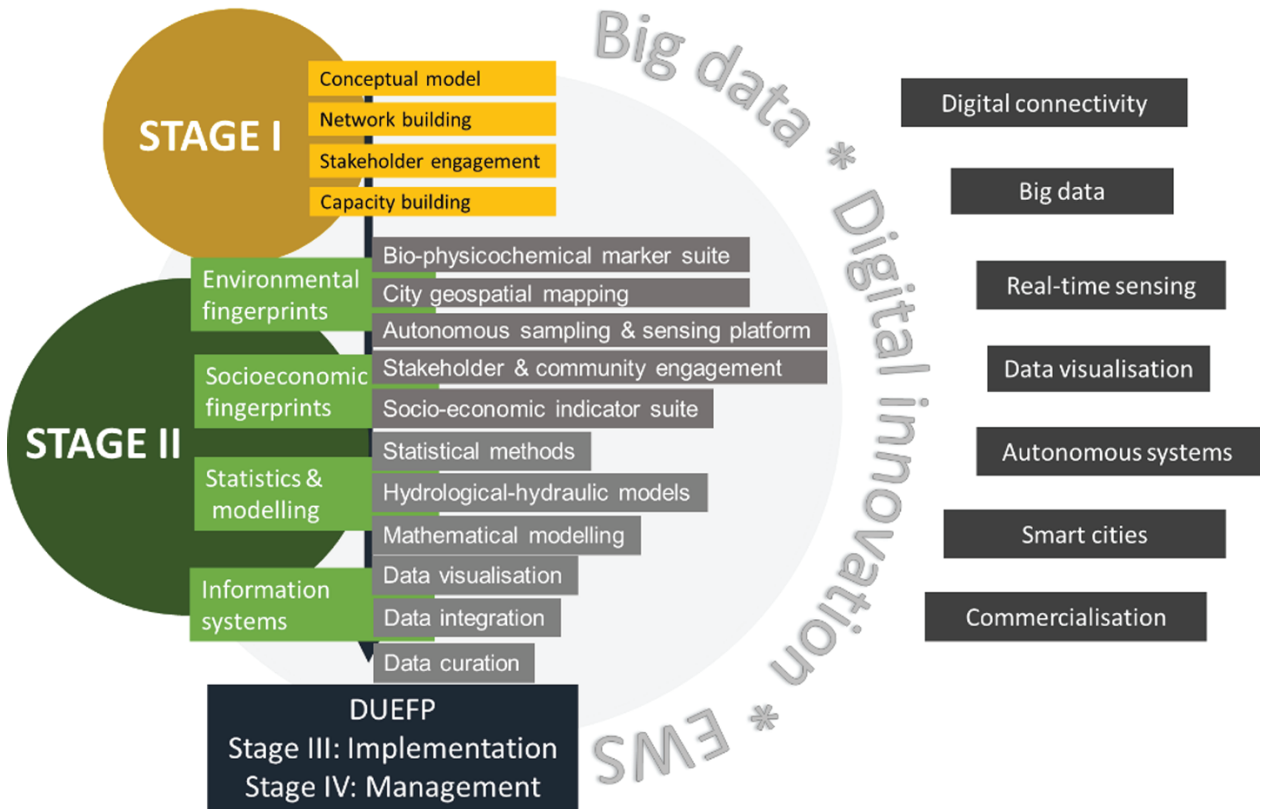


Source: Graphical Abstract - A Novel Air Quality Early-Warning System Based on Artificial Intelligence

Example of Early Warning for Biodiversity



Examples of EWE - A Phased Approach

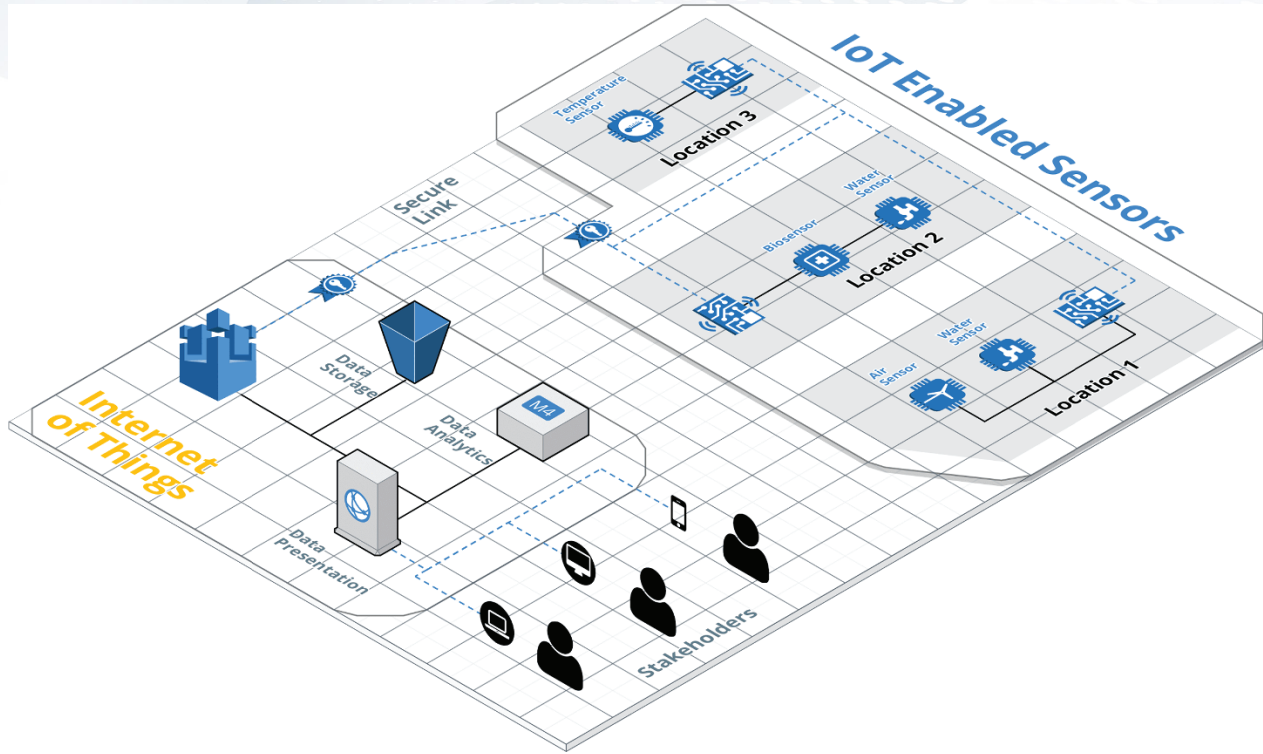


Hazard forecasting and early-warning system for health risks, a four-stage approach

Source: Graphical Abstract - A Novel Air Quality Early-Warning System Based on Artificial Intelligence

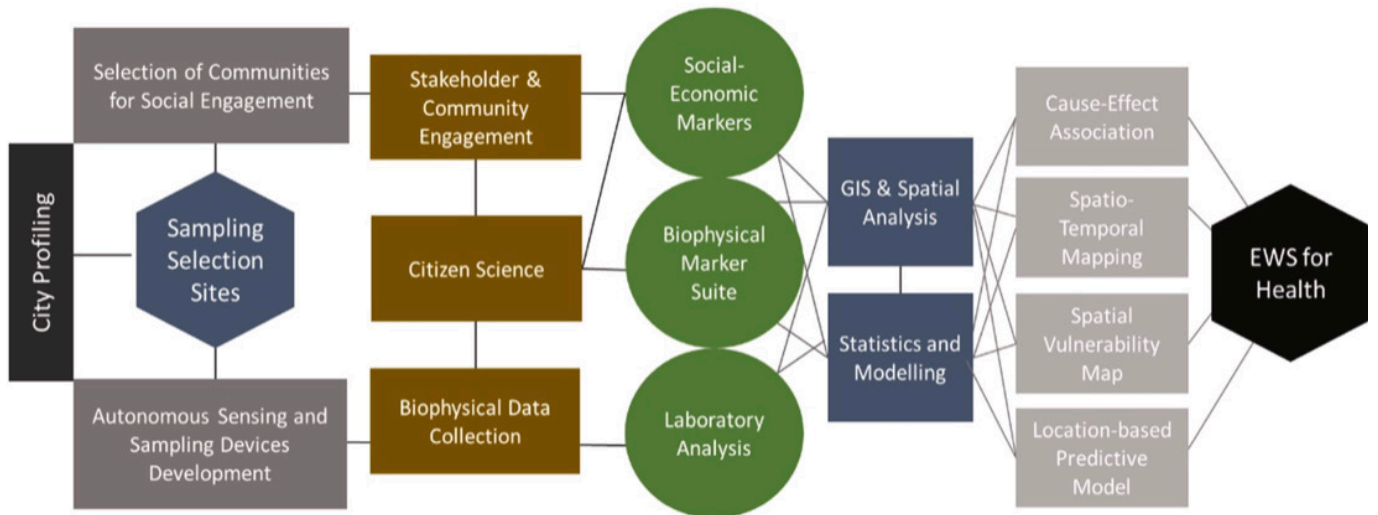
Example of digitalized Early Warning for Environment

Intersection with Early Warning System



Environment fingerprinting platform for public, environmental health diagnostics and hazard forecasting based on Internet of Things sensors and utilizing the cloud for distributed data storage and analytics

Example of Geospatial Early Warning for Environment



Framework for DUEF data collection Geospatial Modeling

Source: Graphical Abstract - A Novel Air Quality Early-Warning System Based on Artificial Intelligence

How do we get there?

- Broader consultations at UNEA6, with governments, private sectors, development agencies, philanthropies, NGOs, IGOs etc., to gauge critical inputs and a variety of needs to pave the way for further deliberations.
- Concept and proposal development for pilot projects at global, regional and national levels, taking into account the ongoing activities of EW4ALL at different levels, to leverage the shortage of data and services on pollution prevention and avoidance of nature loss, also taking into account the progress of SDG implementation.
- A high-level conference, to bring together ministers, heads of UN agencies, leaders of science, technology, business communities and civil society to reach a consensus and raise awareness. It will also create opportunities for resource mobilization and partnership building.

Actions by Partners of EWE (Implementation steps)

- Define national EWS targets on pollution or biodiversity loss based on the global or national EWE gap analysis.
- Develop national EWE gap analysis and national contribution plan.
- Install the digital infrastructure for EWE on pollution and biodiversity loss from the national, regional and global levels, based on priorities of defined areas.
- Working together with EW4All, to extend the EWS from climate change to pollution, and biodiversity loss based on countries' needs and data analysis.



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 40 UN Agencies in the ECOSOC UN Geospatial Network



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OTHER ONE GLOBAL PARTNERSHIP PARTNERS

| UNEP GRID-Geneva | UNEP GRID-Warsaw | GRID-Sioux Falls | GRID-Nairobi | GRID-Azores | Environment Agency - ABU DHABI | RADJ | 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 |

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Transforming the lives of People, Places and Planet