CI and EWS and Health

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ADB's Climate and Health Initiative

EWS Investment Planning Workshop

Dr Brian Riley

September 2025

ADB's Climate and Health Initiative

OBJECTIVE

Strengthen climate and health policies and practices to deliver climate-resilient and low-carbon healthcare and supply chain systems, including OneHealth interventions

- **Knowledge Generation and Dissemination (Climate and Health Portal, Published Policy Briefs)**
- **Increased financing for climate and health measures**
- **Forging Partnerships (with WHO, WMO, others)**
- **Incubating Innovations including digital and AI tools for climate and health**
- **Capacity Building (particularly measuring GHGs and preparing decarbonisation plans, leadership course with climate and health syllabus)**
- **Championing Advocacy (including Heat and Health)**

$6.2m Technical Assistance project secured in December 2025 to support 11 DMCs with plans for more

Regional: Bangladesh, India, Indonesia, Nepal, Papua New Guinea, Solomon Islands Cambodia, Lao People's Democratic Republic, Philippines, Thailand and Viet Nam

Early Warning Systems and Climate and Health Integration

Regional Hazard Monitoring and Data Sharing

Knowledge and information sharing, common challenges and risks, cooperation on monitoring and data collection

Capacity Building and Institutional Strengthening

Hydrometeorological and relevant agencies on climate, disaster risk and EWS management

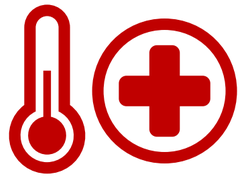
CAREC
Central Asia Regional Economic Cooperation Program

Regional database, selected indicators, common protocols, communication channels

Centralized hub for monitoring and disseminating EW information

Enhance resilience to heat risk, heat and health data integration build heatwave preparedness integrated in community-based early warning mechanisms and plans

Health and Climate Change Integration



CAREC Climate and Health Joint Action

1. EWS and heat risk integration
2. Capacity and guidelines (indicators and early warning protocols)
3. Health and climate data exchange for EWS

powered by esa in partnership with

ADB

esa

GDA Public Health

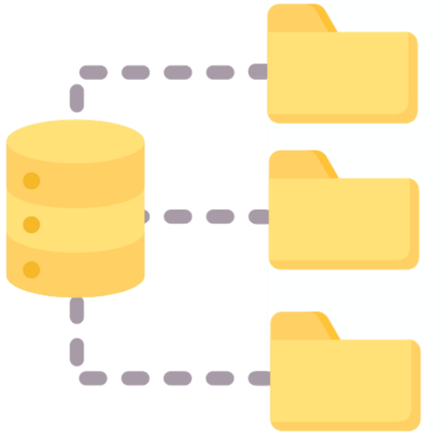
Climate-Health Data and EO Services Platform

→ THE EUROPEAN SPACE AGENCY

EOID 01: Web-based geodata visualisation information system

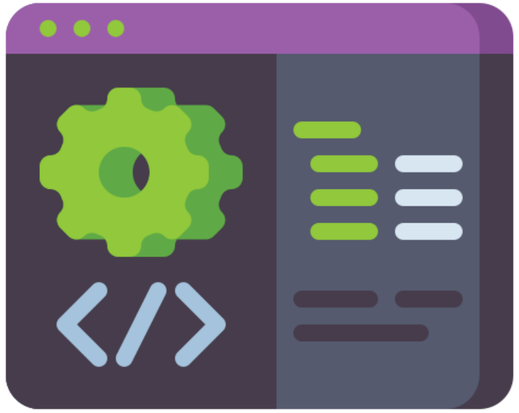
- **Expressed need:** *Online portal that integrates satellite-based insights with health-related data to support decision-making, planning, and implementation of climate-health interventions in DMCs.*
- We propose to offer in response to this need:
- Web-based geodata visualisation information system (the “platform”) that combines **multi-source data** and **information** on climate and health
- Strong emphasis on **easy onboarding** for novice users without IT, GIS or EO background
- Climate-health **data analytics**
- Customisable and adaptable to different DMCs’ needs with the potential to be **expanded/enhanced** with additional functionalities
- **Password-protection** options for safeguarding sensitive health data

Three components of the platform



Data repository (EOID 01.01)

- **Raster data** will be processed into analysis-ready data cubes and stored in a cloud-ready Zarr format
- **Vector data** will be stored in a dedicated geodatabase
- Data hosted from a **cloud service provider** (e.g., Amazon Web Service, AWS or Copernicus Data Space Ecosystem, CDSE)
- **Catalogue-type service** facilitates the data discovery and access



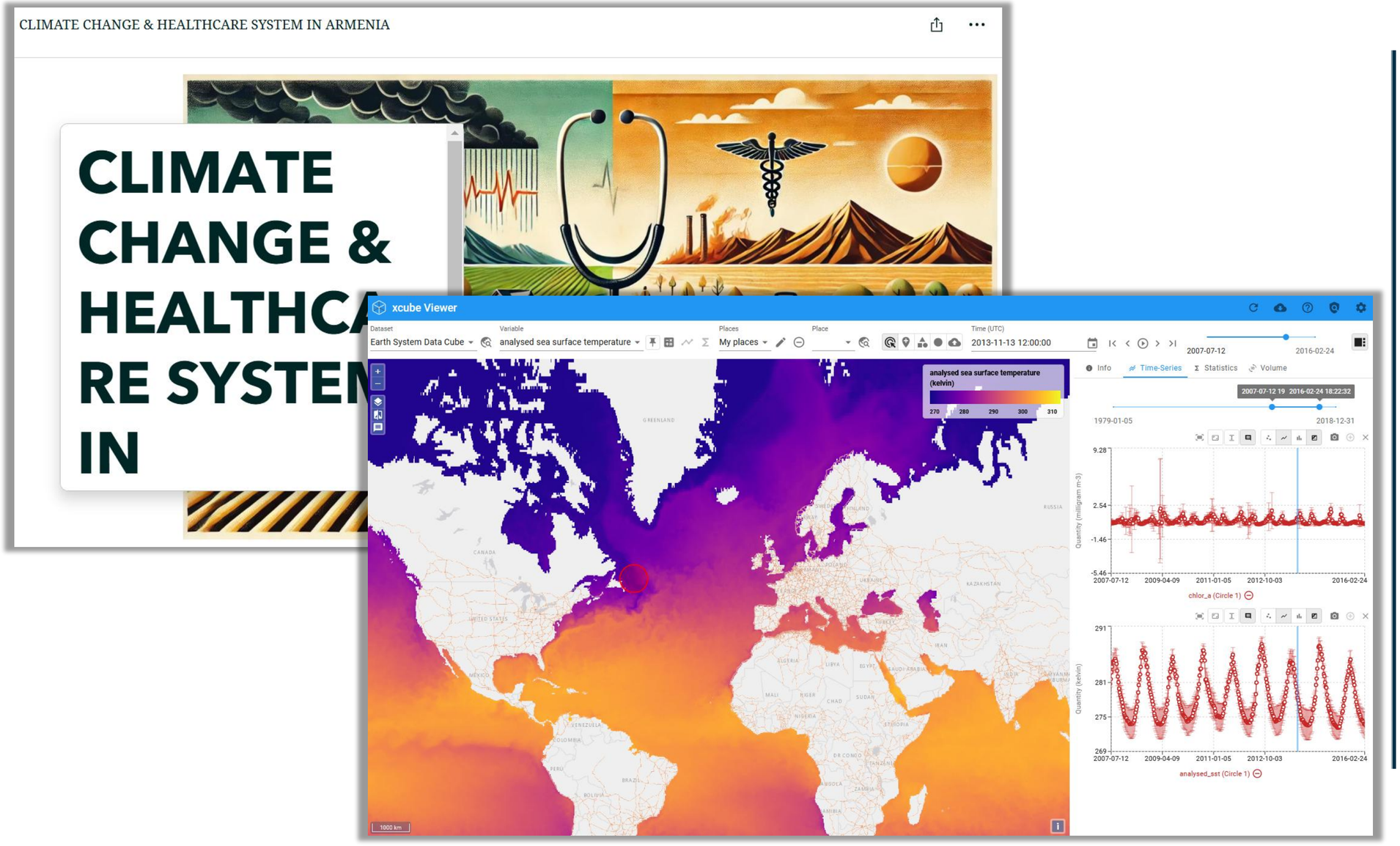
Back-end system (EOID 01.02)

- **xcube server** will be the back-end for the platform with:
  - **Catalogue interface** for publishing xcube datasets
  - **Map service**
  - **Dataset service to extract subsets** for, e.g., time series or climate analytics

Front-end system (EOID 01.03)

- **User interface** via the xcube viewer (open-source application)
- Has proven **high performance and reliability** in several operational services
- Requires:
  - xcube server instance
  - Zarr format datasets
- **Vector data** can be uploaded or retrieved from a dedicated geodatabase

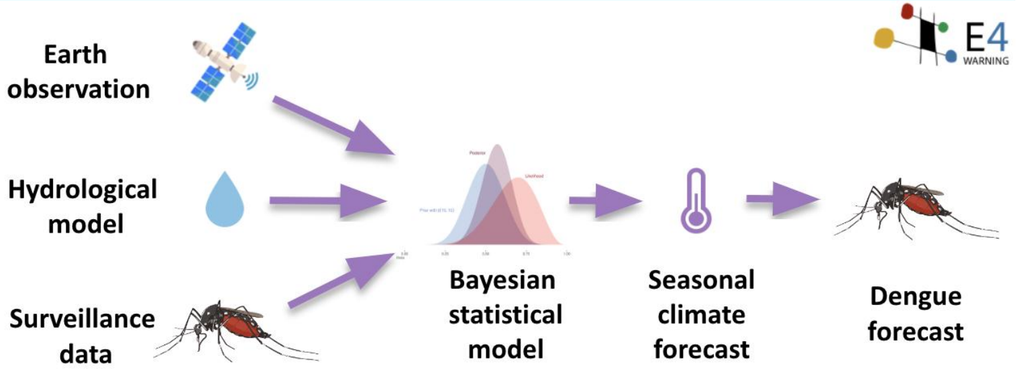
Example of a xcube viewer (fully customisable!)



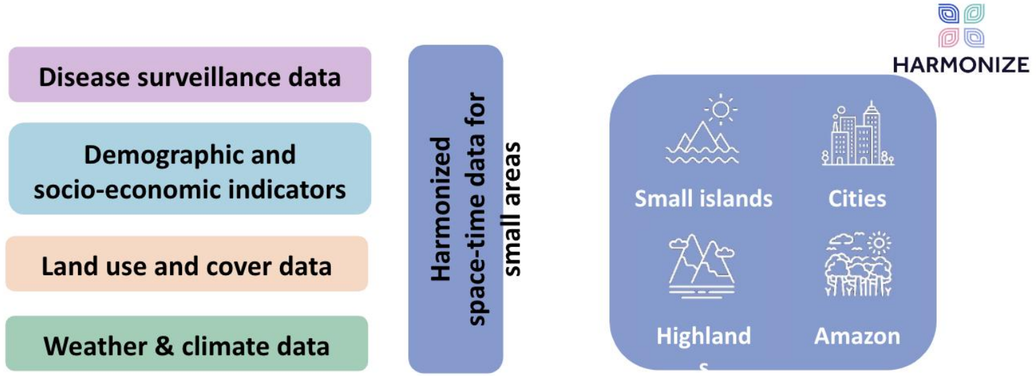
- Open-source
- User friendly
- Customisable
- Extendable
- Interactive
- Different types of data visualisation possible:
  - Maps
  - Graphs (e.g., time series, histograms, ..)
  - Animations of data images over time
  - EWS alerts
  - Summary statistics
  - Visual stories

Early Warning System for Disease Outbreak - Global Health Resilience Group Expertise

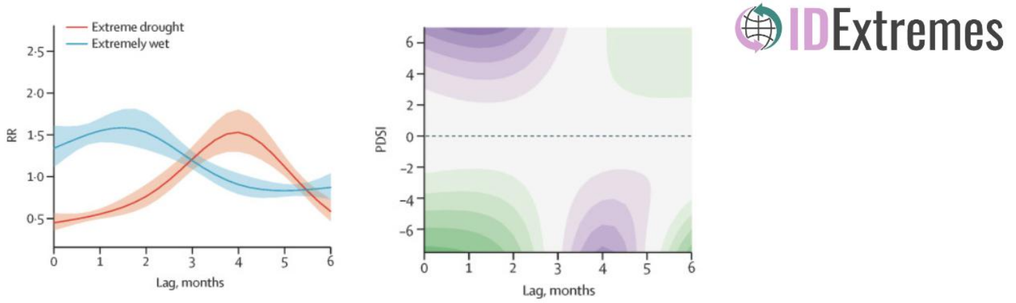
Developing early warning systems for climate-sensitive infectious diseases



Harmonizing multi-scale spatiotemporal data for health in climate change hotspots



Predicting the probability of infectious disease outbreaks given compound extreme climatic events

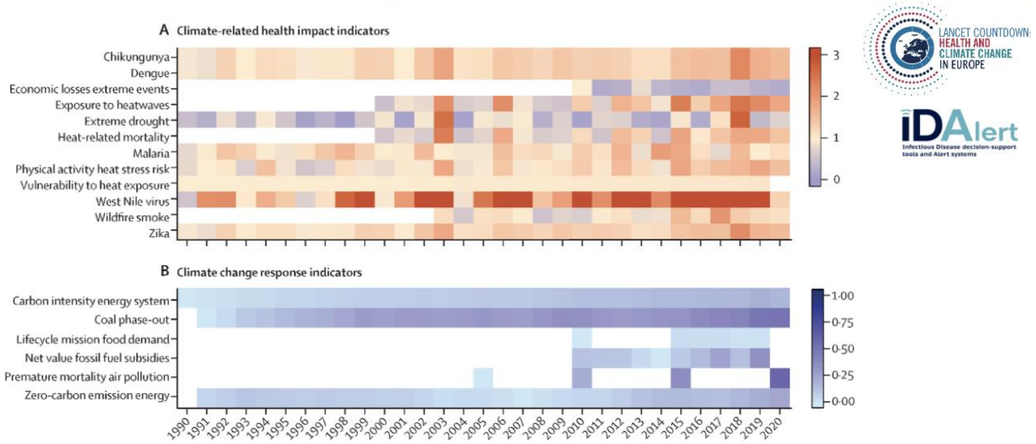


Barcelona Supercomputing Center
Centro Nacional de Supercomputación

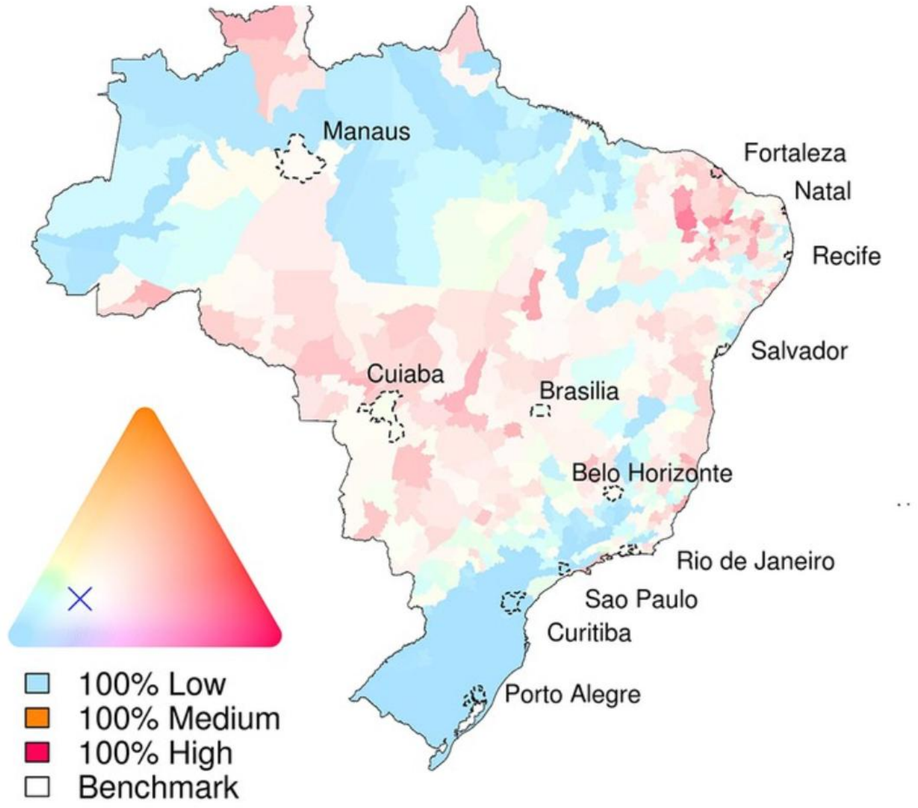
wellcome

Funded by the European Union

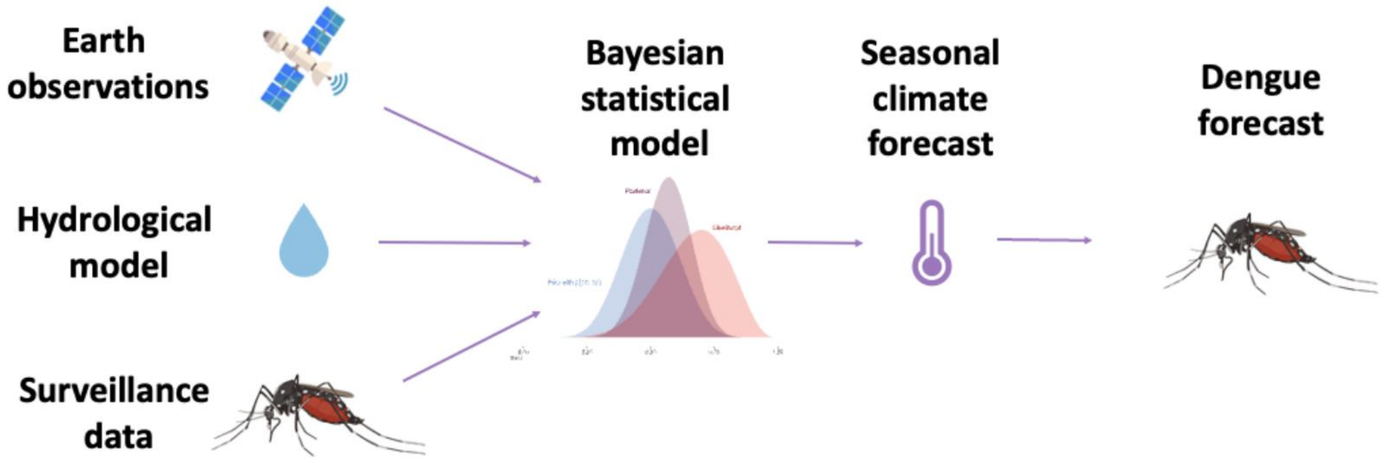
Tracking and projecting the health impacts of climate change and climate action



Early Warning System for Disease Outbreak - Developing EWS for infectious disease

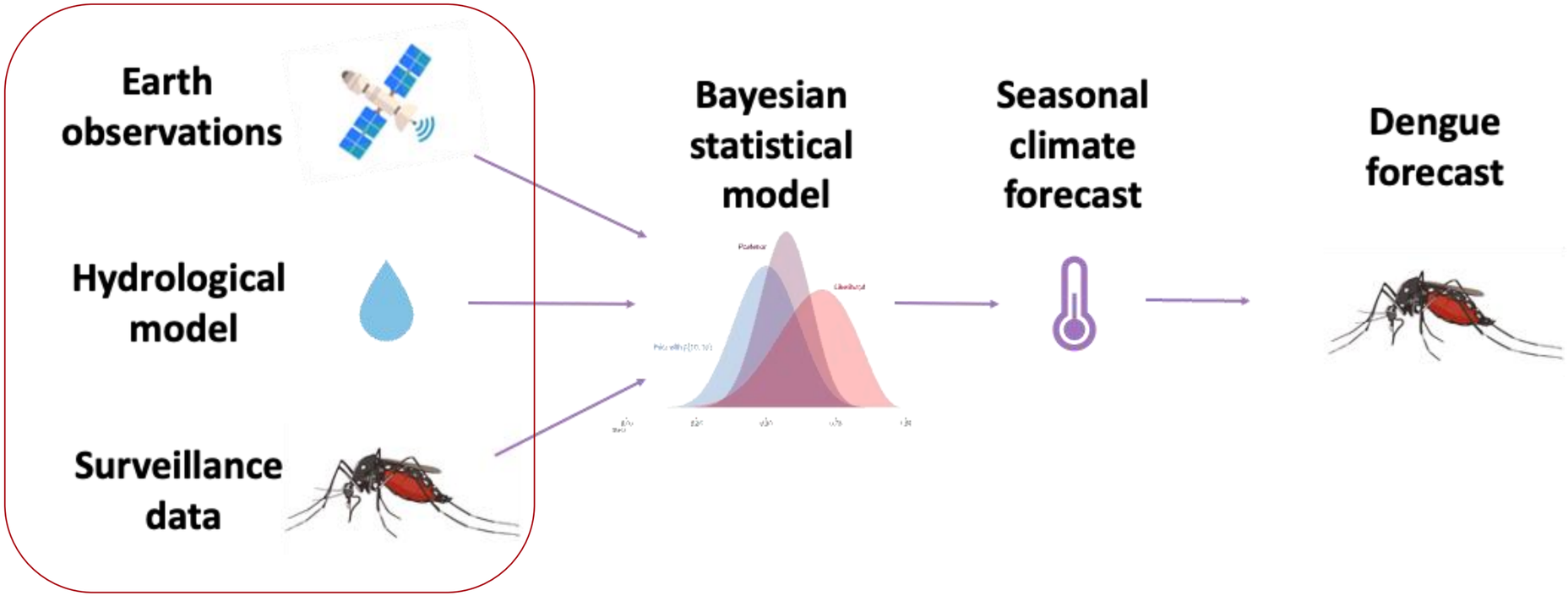


In several of our projects (e.g. **E4Warning, IDAlert**) we develop infectious disease **forecast system models** in South America, Europe and Asia.



Hereby we explore whether new data streams and district level data can improve forecasting models

Early Warning System for Disease Outbreak - Developing EWS for infectious disease



- The performance of our EWS depends heavily on the quality and spatiotemporal resolution of the data ingested. Ideally, on the epidemiological domain, **we require long term historical data** (over 15 years) of aggregated disease incidence, **recorded at weekly or monthly intervals, and disaggregated by small geographical administrative units.**

EOID 03: Early Warning System for Disease Outbreak - Developing EWS for infectious disease for ADB

- The GHR Group has extensive experience in tackling a wide range of infectious diseases, including Dengue, Malaria, West Nile Virus, Leptospirosis, and Vibriosis, among others.

- Effective mathematical modeling requires **tailoring to the specific disease and region**. Without focusing on a particular disease and a geographical context, **it is difficult to define at this stage the appropriate covariates and methodologies.**

- Modeling a well-studied vector-borne disease is fundamentally different from modeling a neglected zoonosis or a disease with airborne transmission.

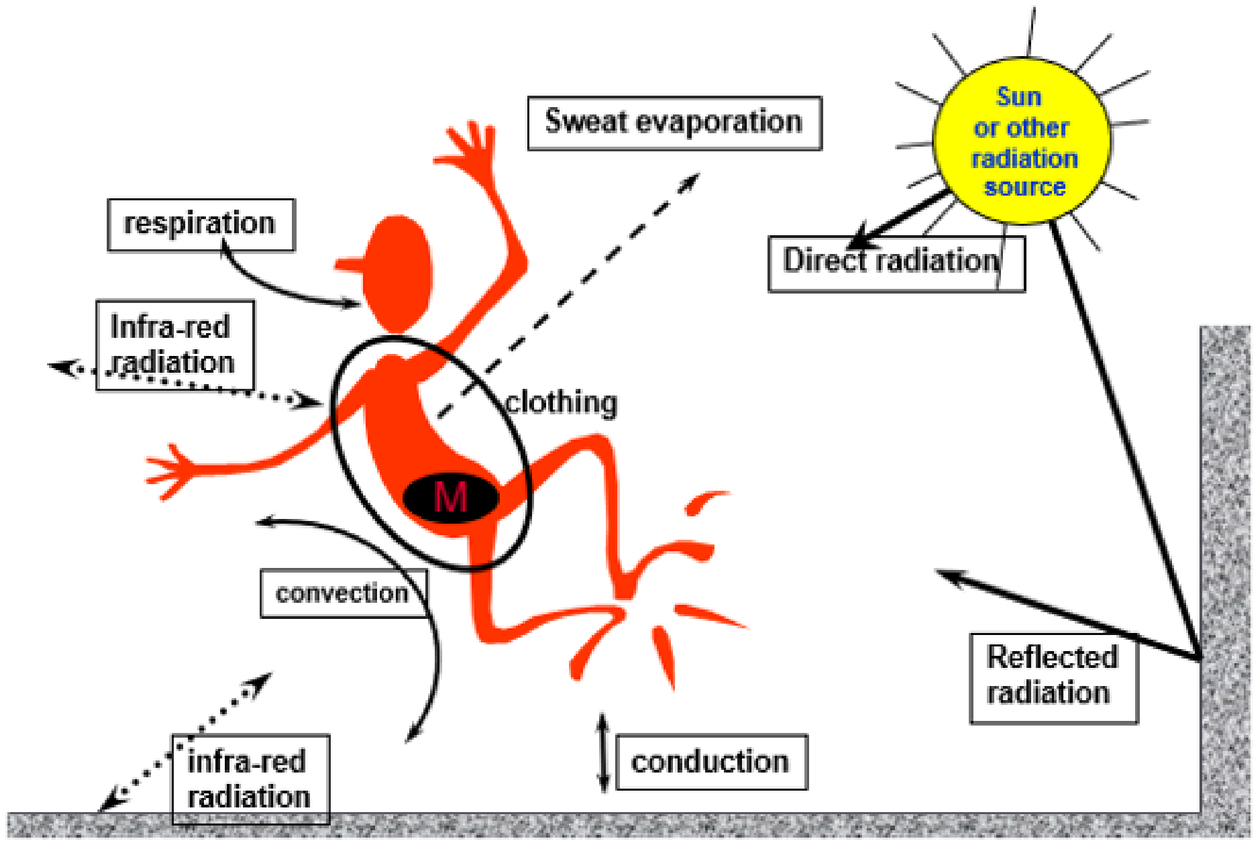
- We invite **local authorities and health agencies in Bangladesh to share their primary concerns regarding infectious diseases**. Our goal is to identify where our expertise can best support local communities and provide actionable insights.

EOID 02: Health risk estimates due to heat-stress

- **Analyze heat stress and associated health risk**

- Heat stress occurs when the body cannot regulate its temperature effectively due to:
- High air temperature
- Humidity
- Solar radiation
- Low wind speed

- Impact on human health:
- heat-related illnesses
- heat exhaustion
- heatstroke
- dehydration

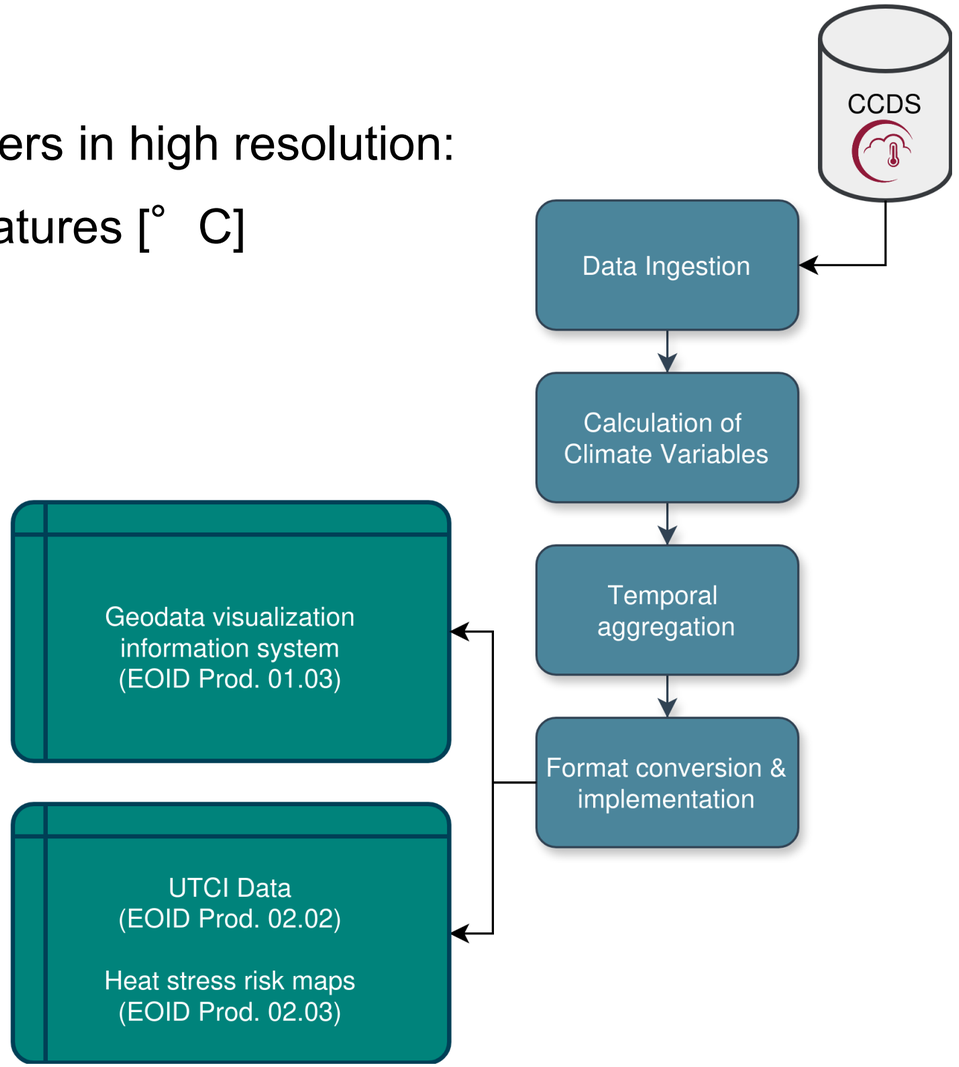


https://climate.copernicus.eu/heat-stress-what-it-and-how-it-measured

EOID 02: Health risk estimates due to heat-stress

- **EOID Product 02.01: Selected climate variable rasters**

- country-wide raster layers in high resolution:
- Daily maximum temperatures [° C]
- Total precipitation [mm]
- Relative humidity [%]
- Wind speed [m/s]



Use

Basis for further heat stress products (see EOID Products 02.02 and 02.03)

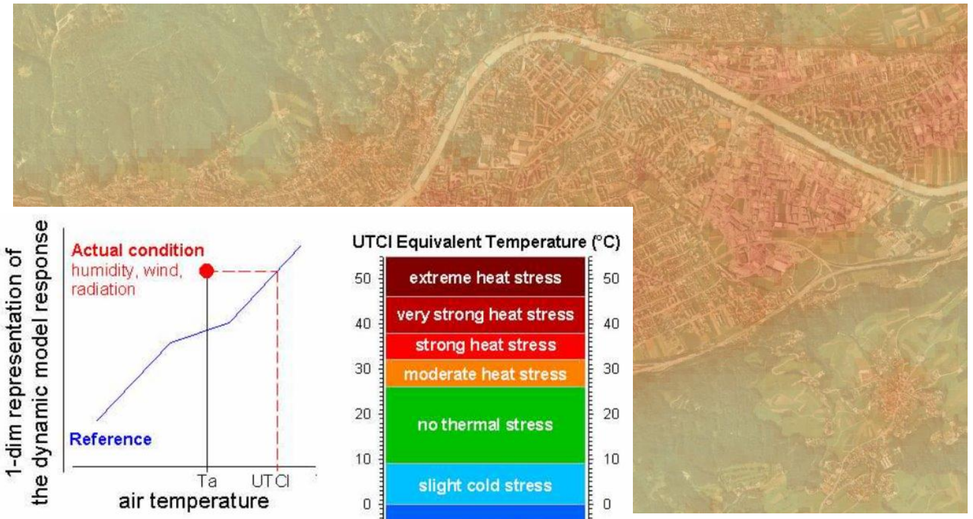
Additional information for the geodata visualization information system

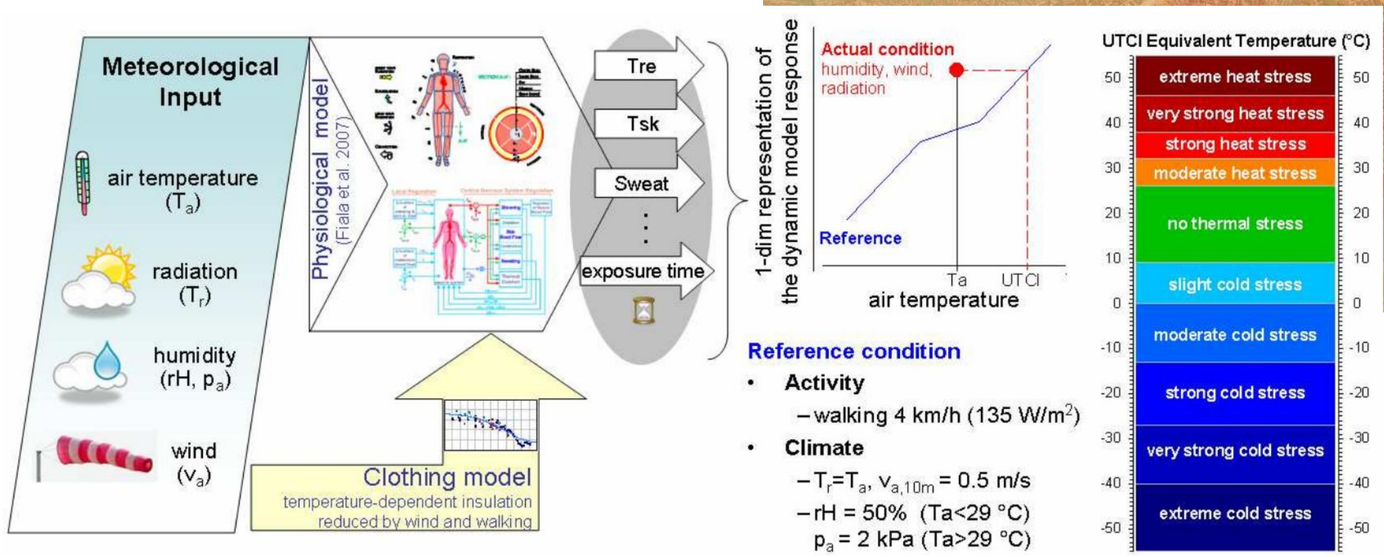
Benefit

Provides information basis on various climate variables

EOID 02: Health risk estimates due to heat-stress

- **EOID Product 02.02: Temporally aggregated and country-wide Universal Thermal Climate Index (UTCI) data**
- *UTCI: Physiological heat stress index considering temperature, humidity, wind, and radiation to classify different levels of heat stress from "no thermal stress" to "extreme heat stress"*





Bröde, P. et al. (2010). The universal thermal climate index UTCI in operational use.

Use

Time series of daily country-wide UTCI raster grids to identify heat stress hotspot areas

Benefit

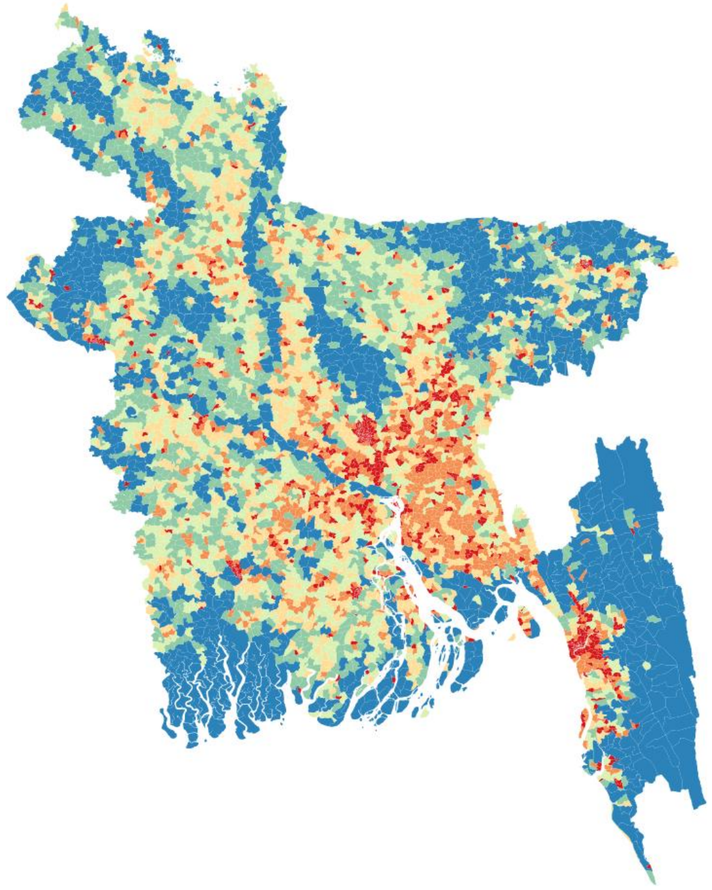
The UTCI provides an accurate representation of how the human body perceives and responds to the thermal environment

EOID 02: Health risk estimates due to heat-stress

- **EOID Product 02.03: Heat stress risk maps**

- Combination of climate data, UTCI and land cover information with information on vulnerable population:

- Population density
- Vulnerable groups
  - People with chronic illnesses
  - Elderly
  - Pregnant women
  - Young children



Use

GIS-based visual representation of high-risk zones for vulnerable groups

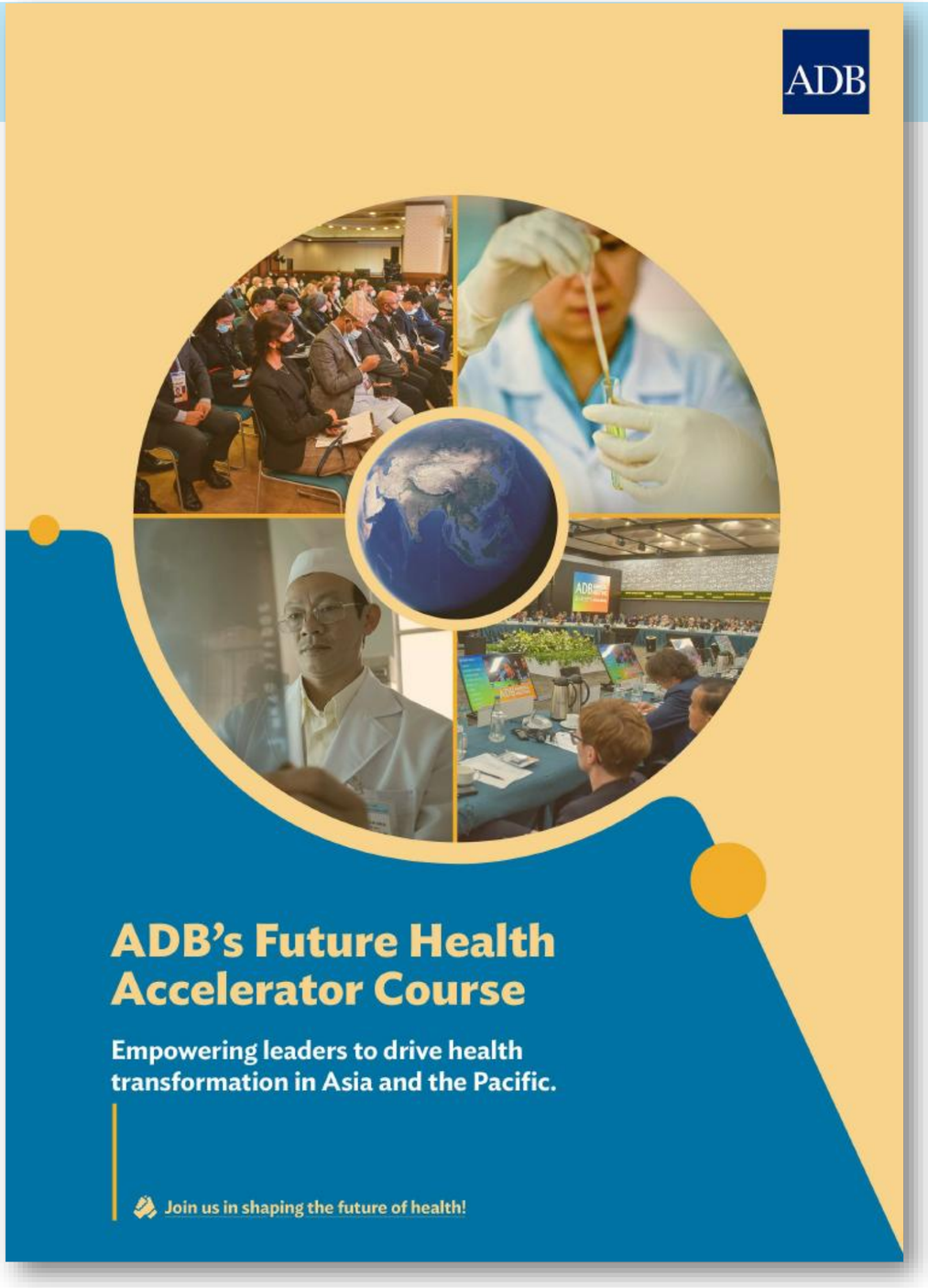
Benefit

Provides information basis for adaptive measures to reduce risk

Helps to effectively allocate aid in case of heat-stress

Accelerator course: Healthcare decarbonization

- **Purpose**: Empower leaders to drive health transformation in Asia & the Pacific.
- **Focus Areas**: Climate change & One Health
- **Key Features**:
  - Immersive, actionable learning
  - Peer-to-peer collaboration & communities of practice
  - Regional focus with global best practices
  - Networking with ADB experts & peers
- **Participants**: Nominated leaders, policymakers, specialists, and innovators from ADB's Developing Member Countries.
- **Timeline**:
  - Cohort 1: Manila, July 2025 Virtual & in-person sessions aligned with ADB's INSPIRE Forum
  - Cohort 2: close 2025 deep dive learning



End