Geo-dataset and Global health facility locator

Dr Ramesh S. Krishnamurthy
World Health Organization

JAXA Symposium for data applications of earth observation satellites 2015
- Earth observation for decision-making in people's lives -
Date: November 2 (Mon), 2015 (14:30-17:30)
Venue: Tower Hall, Roppongi Academyhills

World Health Organization

Outline

- World Health Organization
- Example of use of geospatial information
- Geodataset and global health facilities locator

About the World Health Organization

World Health Organization

About the World Health Organization

- the directing and coordinating authority for health within the United Nations
- responsible for providing leadership on global health matters, shaping the health research agenda, setting norms and standards, articulating evidence-based policy options
- provide technical support to strengthen their health systems and in reaching health-related targets of the overall SDGs
- the World Health Assembly is the decision making body of WHO

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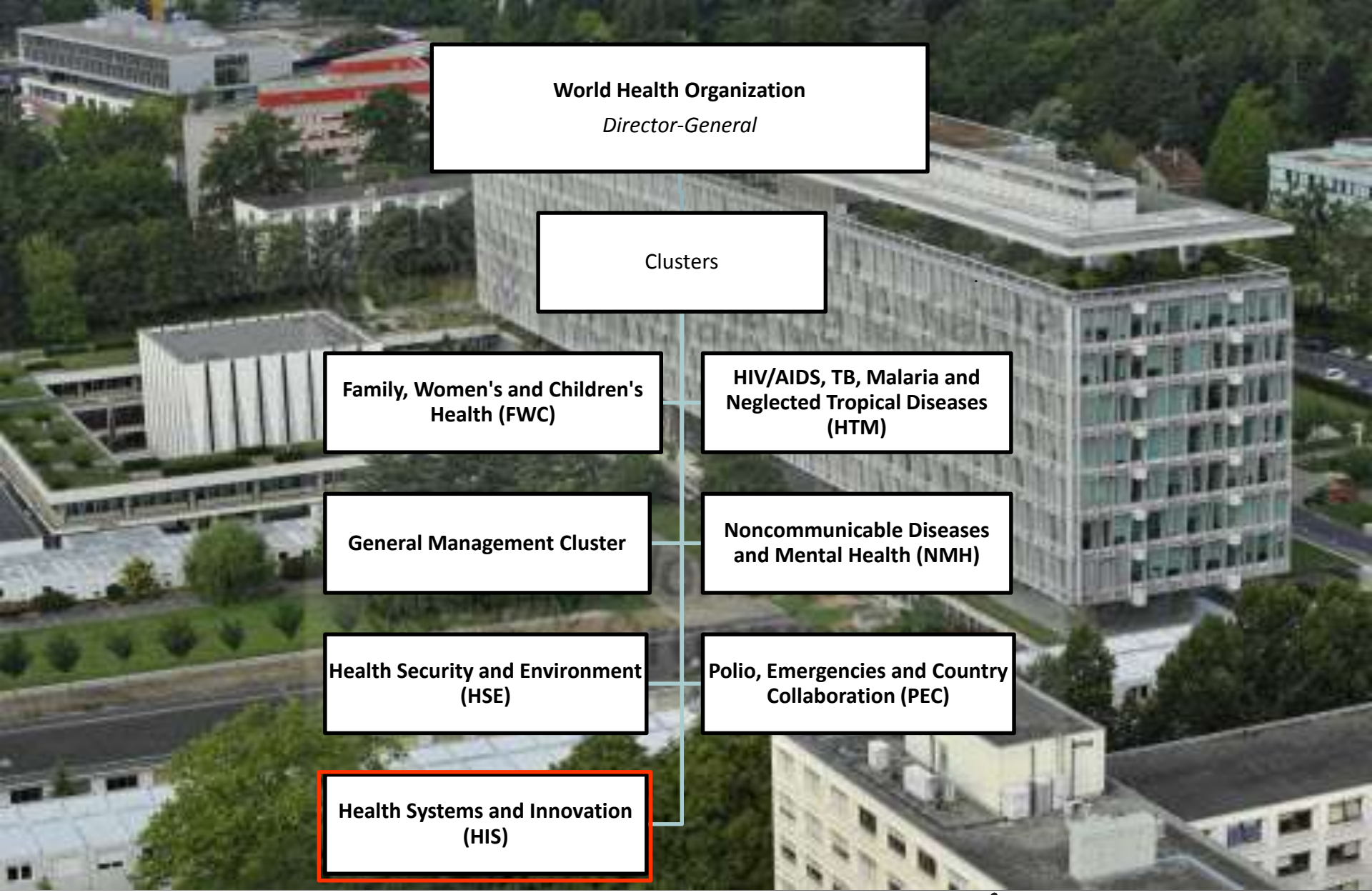

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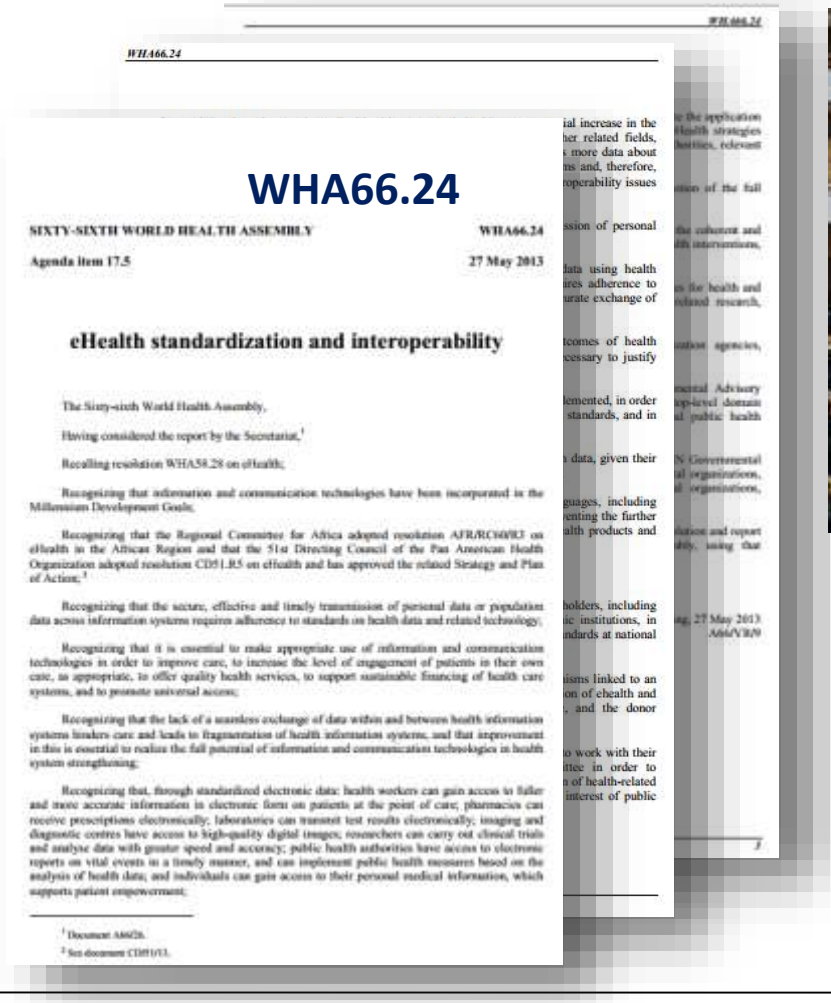
Milestones - eHealth and Health Information Systems



WHA66.24

SIXTY-SIXTH WORLD HEALTH ASSEMBLY — WHA66.24

Agenda item 17.5 — 27 May 2013

eHealth standardization and interoperability

The Sixty-sixth World Health Assembly,

Having considered the report by the Secretariat,[1]

Recalling resolution WHA58.28 on eHealth;

Recognizing that information and communication technologies have been incorporated in the Millennium Development Goals;

Recognizing that the Regional Committee for Africa adopted resolution AFR/RC60/R3 on eHealth in the African Region and that the 51st Directing Council of the Pan American Health Organization adopted resolution CD51.R5 on eHealth and has approved the related Strategy and Plan of Action;[2]

Recognizing that the secure, effective and timely transmission of personal data or population data across information systems requires adherence to standards on health data and related technology;

Recognizing that it is essential to make appropriate use of information and communication technologies in order to improve care, to increase the level of engagement of patients in their own care, as appropriate, to offer quality health services, to support sustainable financing of health care systems, and to promote universal access;

Recognizing that the lack of a seamless exchange of data within and between health information systems hinders care and leads to fragmentation of health information systems, and that improvement in this is essential to realize the full potential of information and communication technologies in health system strengthening;

Recognizing that, through standardized electronic data: health workers can gain access to fuller and more accurate information in electronic form on patients at the point of care; pharmacies can receive prescriptions electronically; laboratories can transmit test results electronically; imaging and diagnostic centres have access to high-quality digital images; researchers can carry out clinical trials and analyse data with greater speed and accuracy; public health authorities have access to electronic reports on vital events in a timely manner, and can implement public health measures based on the analysis of health data; and individuals can gain access to their personal medical information, which supports patient empowerment;

[1] Document A66/28.

[2] See document CD51/13.

Recognized the value of adoption of standards for interoperability and strengthening

Health information systems

Source: **http://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_R24-en.pdf**

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Recent example 1
Use of geospatial information in pubic health

Field operations related to Ebola Viral Disease

Source: Krishnan, WHO/PEC, 2015

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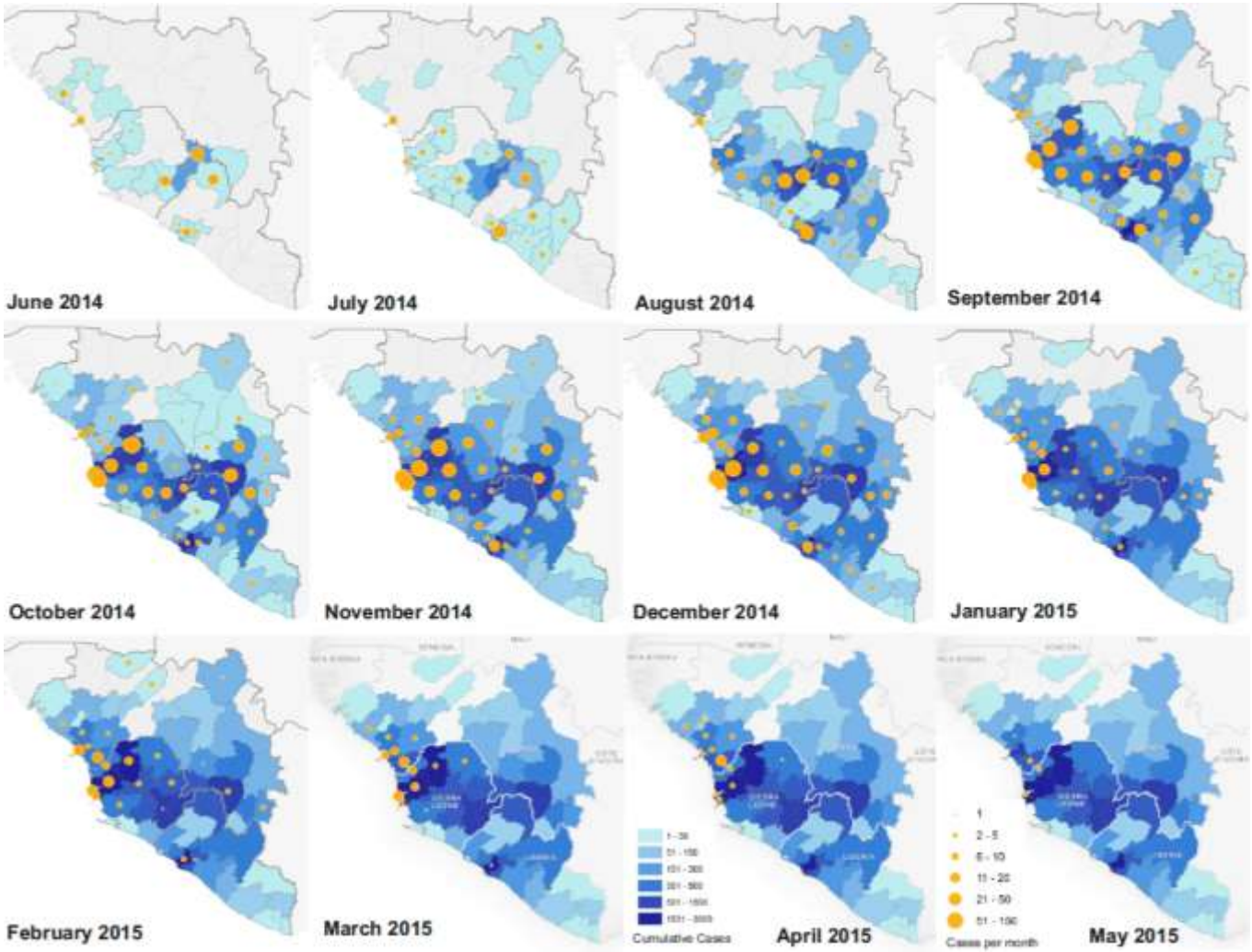
Journey of map through the Ebola crisis



Source: Krishnan, WHO/PEC, 2015

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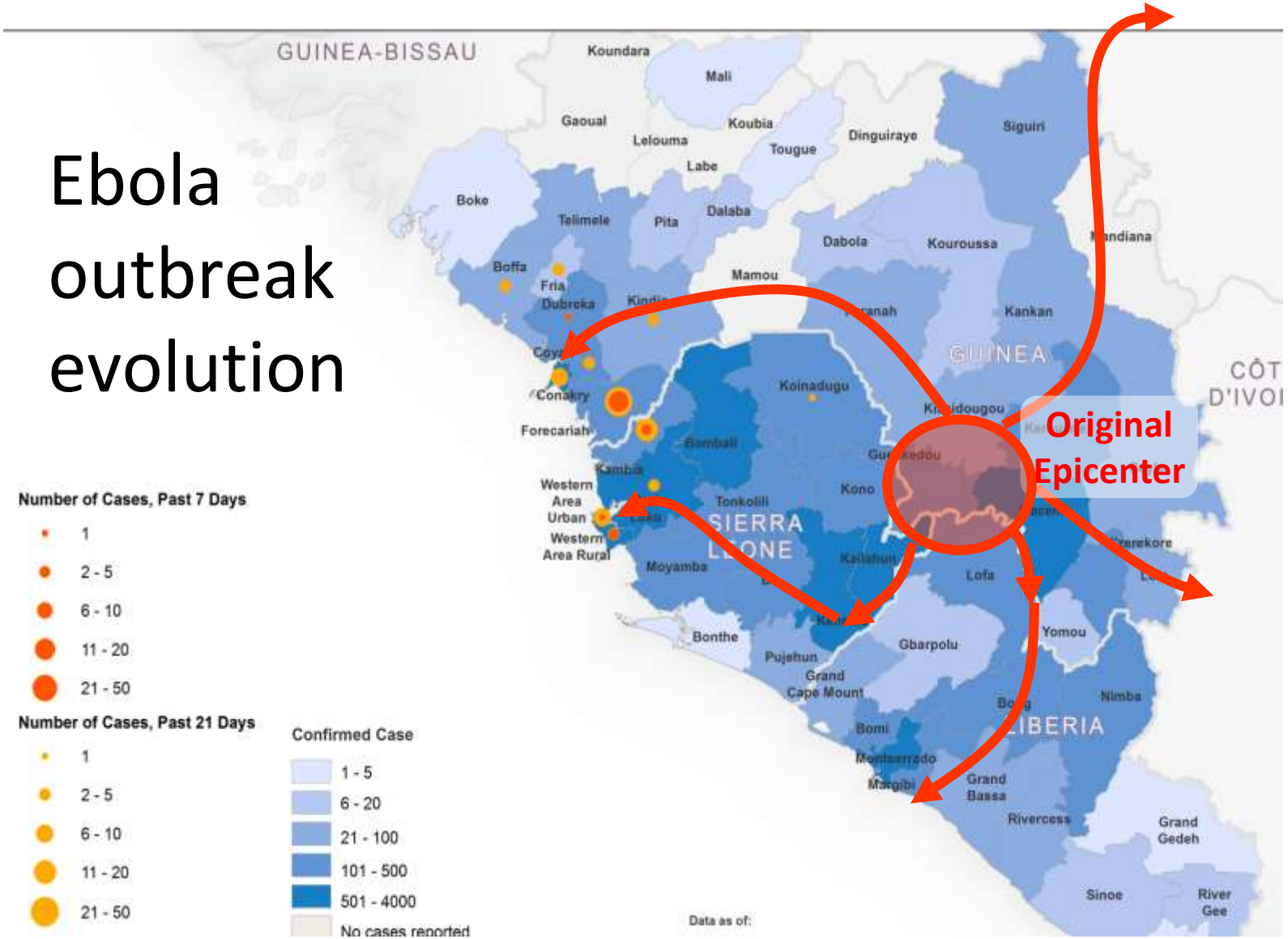
Ebola outbreak evolution



Source: Krishnan, WHO/PEC, 2015

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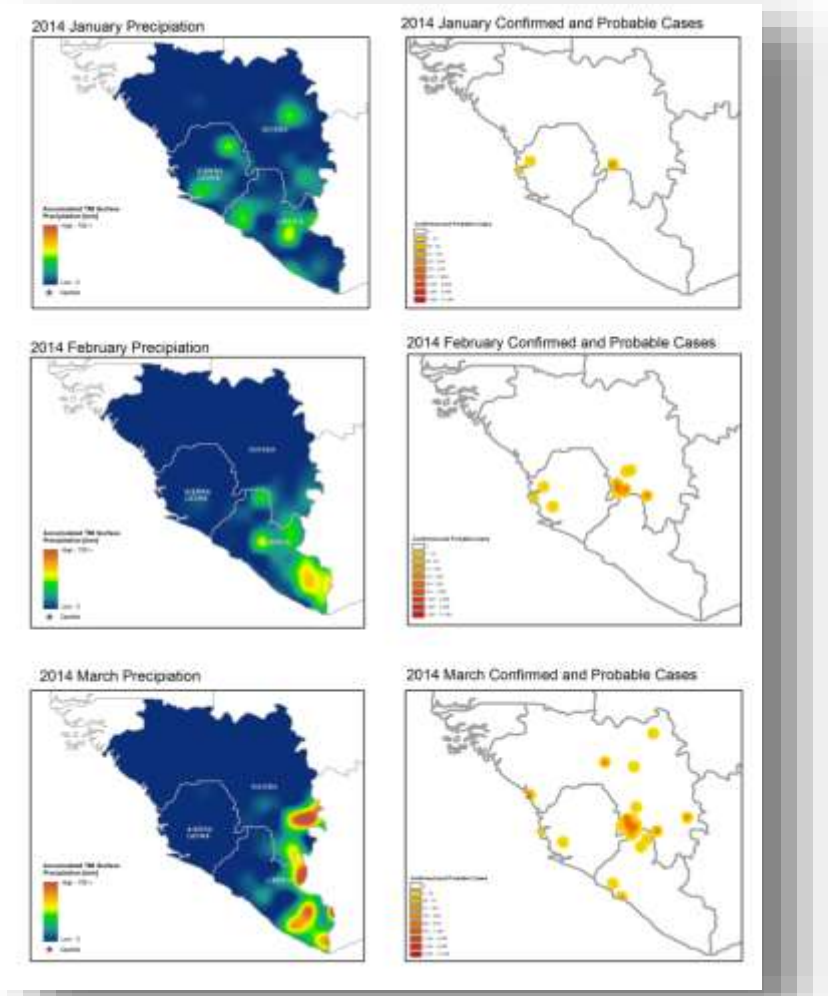
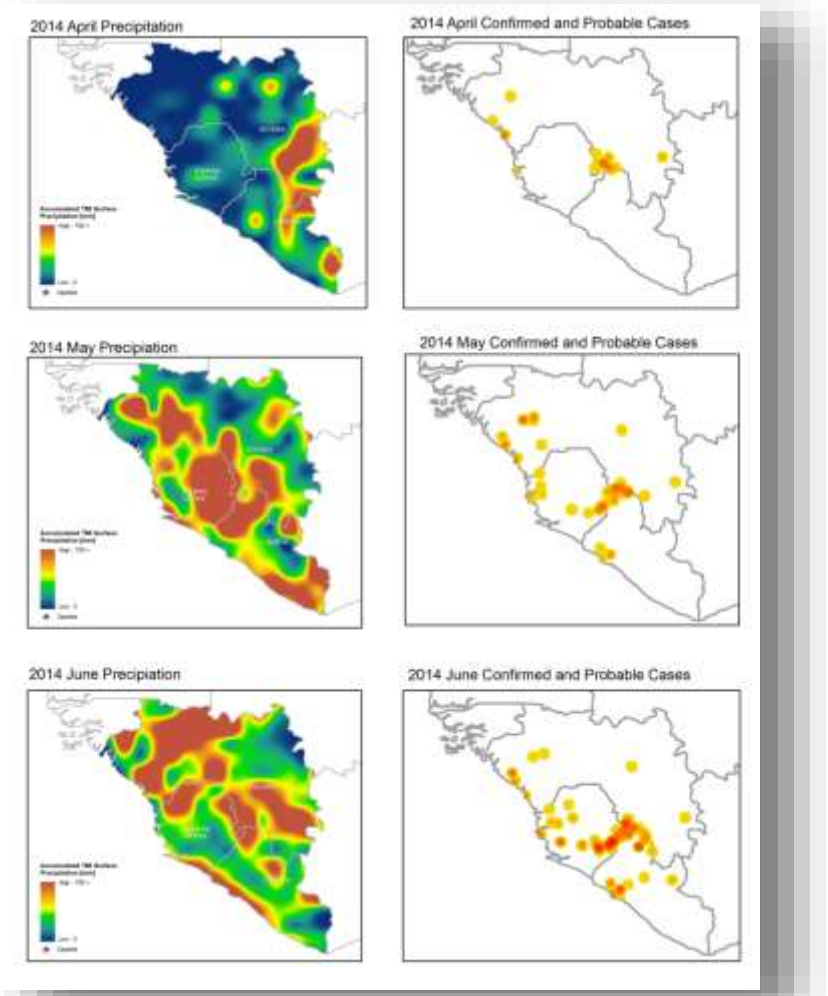
Ebola maps





Study to see if there is correlation between cases and the rainfall

Source: Krishnan, WHO/PEC, 2015

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Recent example 2
use of geospatial information
in pubic health

Polio eradication

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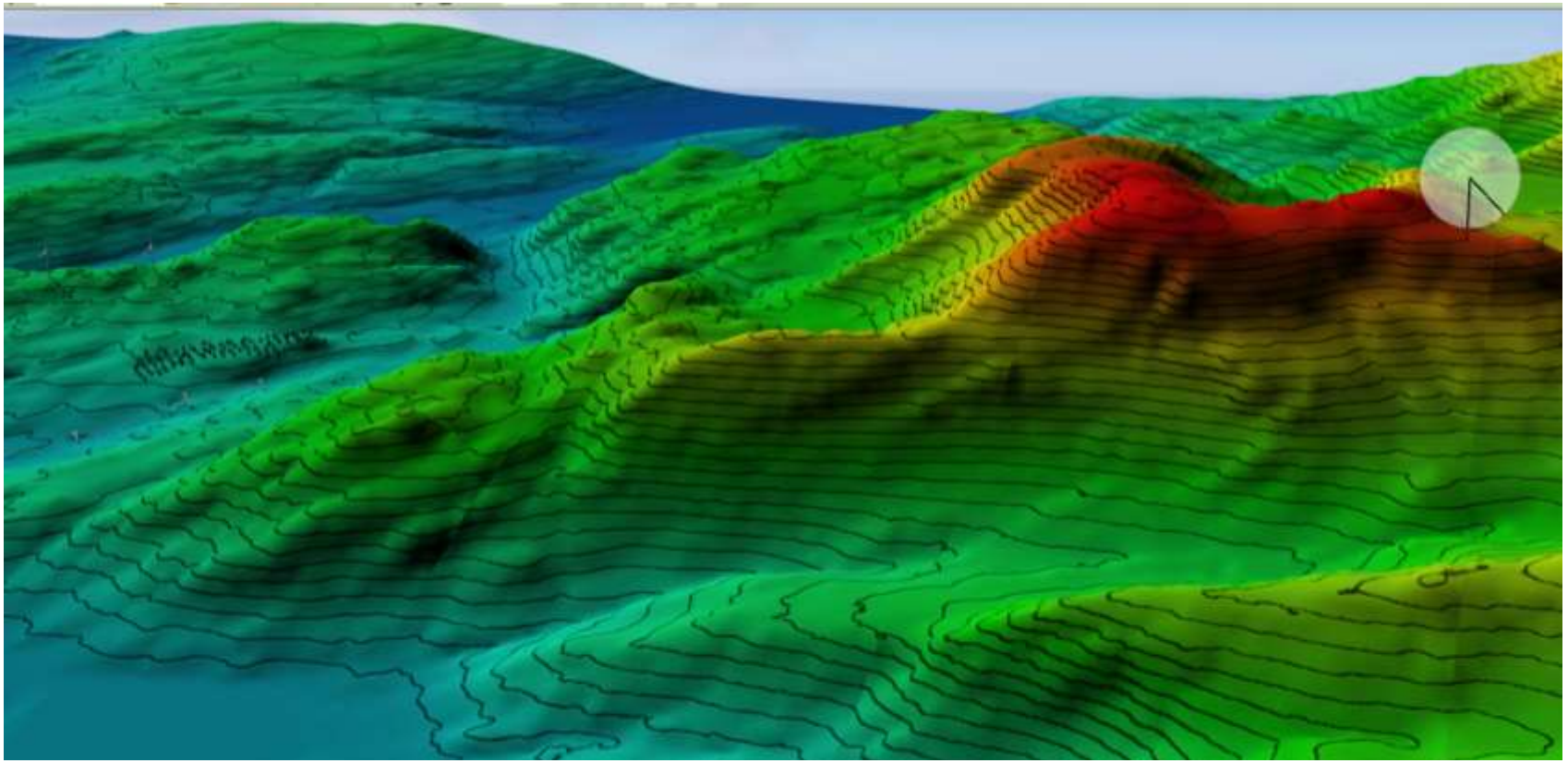
Need for accurate Digital Elevation Model (DEM) data to determine the location of surveillance sites in specific geographic areas

Environmental Surveillance Site Assessment

- catchment area size, location and population estimates



Digital Elevation Map (DEM) layers can detect changes in elevation based on the resolution. For 30 meter resolution, the contour lines are spaced 30 meters apart.

Source: Okayasu and Takane, WHO/PEC, 2015

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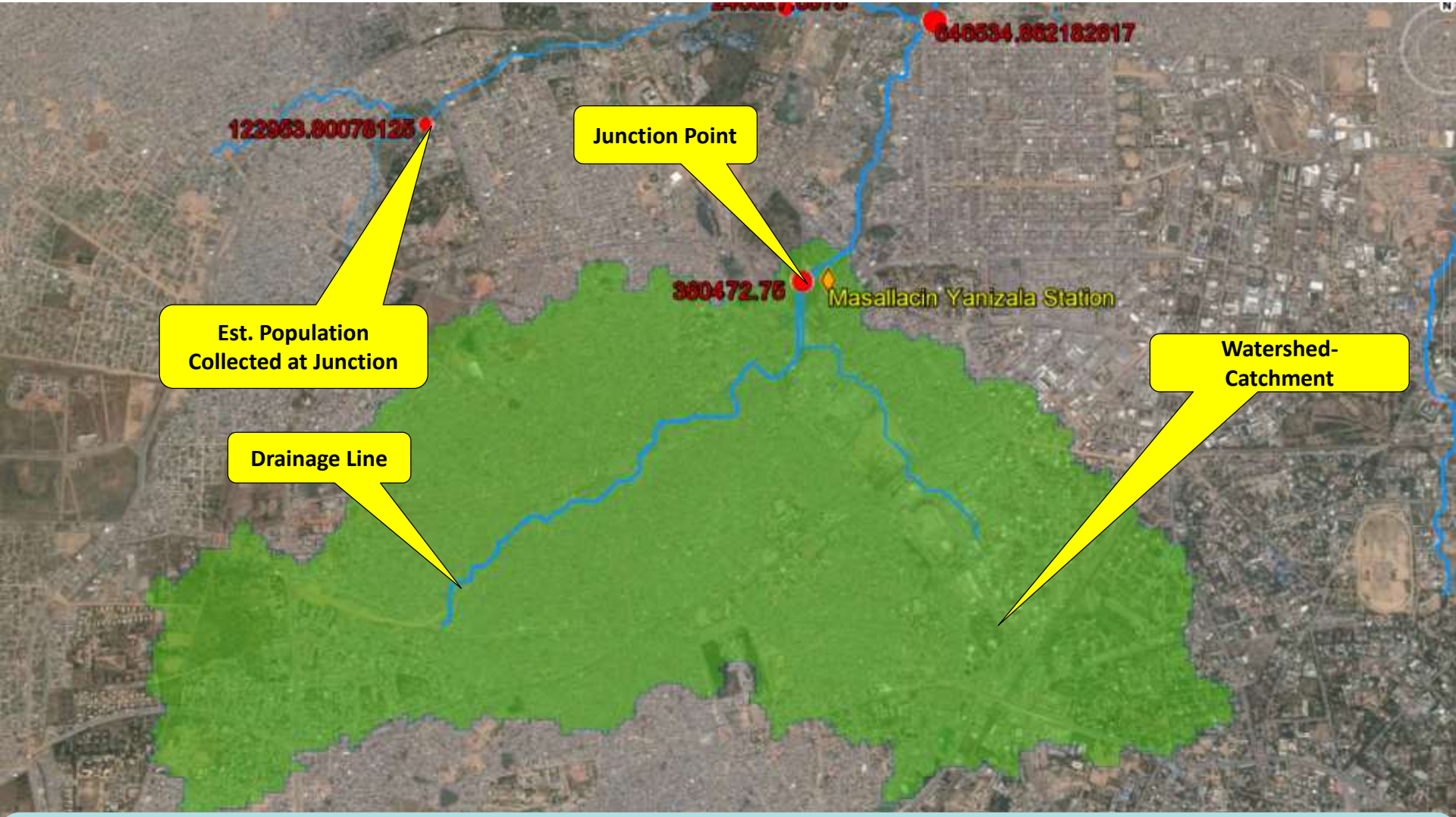

Analysis of elevation enabled the better selection of environmental surveillance sites

Source: Okayasu and Takane, WHO/PEC, 2015

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Geodataset and Global Health Facility Locator

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Context

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Goal

In cooperation with Member States, Intergovernmental and Non Governmental Organizations, UN OOSA and Space Agencies, WHO would facilitate the development of a country-specific **Geo-dataset** and a **Global health facility locator**

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Global Health Facilities Locator

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DATA MANAGEMENT

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Global Health Facilities Locator

Country	WHO Region	Facility Type	Facility Name	Facility Ownership	Address/Geocode

GPS Location	Satellite Image	Geodataset	Nearest Airport	GMT Offset	Weblink to Facility

Telemedicine Capacity	Space Agency Contact	Community Asset Description

Country Ministries of Health + WHO Validation

Country/Regional Space Agency

Community Managed Data

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Global Health Facilities Locator

1	COUNTRY	WHO REGION	FACILITY TYPE	GPS LOCATION	Approx. Address	Approx. North	Approx. Eas
11109	Cambodia	WHO/SEARO	pharmacy	105.28483,11.2621938	NH1, Neak Loeang, Cambodia	11.2624261	105.2845
11110	Cambodia	WHO/SEARO	pharmacy	104.9357576,11.5320125	AH1, Cambodia	11.5318149	104.9358
11111	Cambodia	WHO/SEARO	pharmacy	104.9351031,11.5318996	AH1, Cambodia	11.5316964	104.935
11112	Cambodia	WHO/SEARO	pharmacy	104.9308969,11.5669198	Blvd Samdach Sothearos, Phnom Penh, Cambodia	11.5672423	104.9306
11113	Cambodia	WHO/SEARO	pharmacy	104.7832122,10.9884444	22, Takeo, Cambodia	10.9890339	104.7791
11114	Cambodia	WHO/SEARO	pharmacy	104.9251815,11.5576448	Senei Vinnavaut Oum, Phnom Penh, Cambodia	11.5574501	104.9251
11115	Cambodia	WHO/SEARO	pharmacy	104.9352455,11.5319295	AH1, Cambodia	11.5316964	104.935
11116	Cambodia	WHO/SEARO	pharmacy	104.936171,11.5316797	363, Cambodia	11.5315481	104.9363
11117	Cambodia	WHO/SEARO	pharmacy	104.9349075,11.5313434	369, Cambodia	11.531295	104.9349
11118	Cambodia	WHO/SEARO	pharmacy	104.9357685,11.5314236	367, Cambodia	11.5314448	104.9356
11119	Cambodia	WHO/SEARO	pharmacy	104.9353155,11.5306682	630, Cambodia	11.5308246	104.9354
11120	Cambodia	WHO/SEARO	pharmacy	103.8805771,13.3592892	National Highway 6, Siem Reap, Cambodia	13.3594093	103.880
11121	Mexico	WHO/PAHO	clinic	-98.2092381,19.3196565	Las Margaritas 5, Industrial Buenos Aires, 90800 Chiautempan	19.31966	-98.208
11122	Mexico	WHO/PAHO	hospital	-105.2222611,20.6229265	Río de La Plata 304, López Mateos, 48340 Puerto Vallarta, JAI	20.6233745	-105.2215
11123	Mexico	WHO/PAHO	hospital	-105.2318328,20.6383592	Viena 120-SAUTOBA?O, Díaz Ordaz, 48310 Puerto Vallarta, J.	20.6386124	-105.2317
11124	Mexico	WHO/PAHO	hospital	-105.244716,20.6619641	Carretera Federal 200, Isla Iguana, 48333 Puerto Vallarta, JAL,	20.66248	-105.2447
11125	Mexico	WHO/PAHO	hospital	-100.3503265,25.7159463	José Eleuterio González (Gonzalitos), Mitras Norte, 64320 Mor	25.7156117	-100.349
11126	Mexico	WHO/PAHO	hospital	-100.3495986,25.6887912	UANL Madero, UANL Campus Ciencias de la Salud, Mitras Ce	25.688969	-100.3497

- **Source: OpenStreetMap.org (data license: OpenStreetMap is *open data*, licensed under the Creative Commons Attribution-ShareAlike 2.0 licence (CC BY-SA); Special Recognition: Dr. Markus Neteler and his team, Fondazione E. Mach, Italy**

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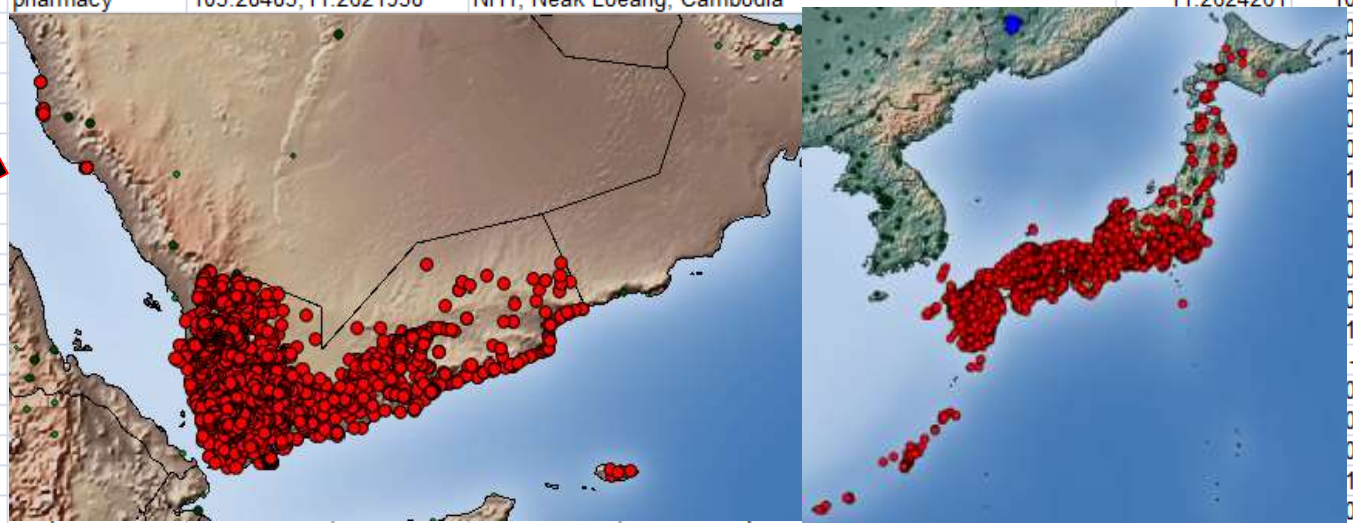
11111	Cambodia	WHO/SEARO					104.935
11112	Cambodia	WHO/SEARO					04.9306
11113	Cambodia	WHO/SEARO					04.7791
11114	Cambodia	WHO/SEARO					04.9251
11115	Cambodia	WHO/SEARO					104.935
11116	Cambodia	WHO/SEARO					04.9363
11117	Cambodia	WHO/SEARO					04.9349
11118	Cambodia	WHO/SEARO					04.9356
11119	Cambodia	WHO/SEARO					04.9354
11120	Cambodia	WHO/SEARO					103.880
11121	Mexico	WHO/PAHO					-98.208
11122	Mexico	WHO/PAHO					05.2215
11123	Mexico	WHO/PAHO					05.2317
11124	Mexico	WHO/PAHO					05.2447
11125	Mexico	WHO/PAHO					100.349
11126	Mexico	WHO/PAHO					00.3497

SAMPLE VISUALIZATION INTERFACE



- **Source: OpenStreetMap.org (data license: OpenStreetMap is *open data*, licensed under the Creative Commons Attribution-ShareAlike 2.0 licence (CC BY-SA); Special Recognition: Dr. Markus Neteler and his team, Fondazione E. Mach, Italy**

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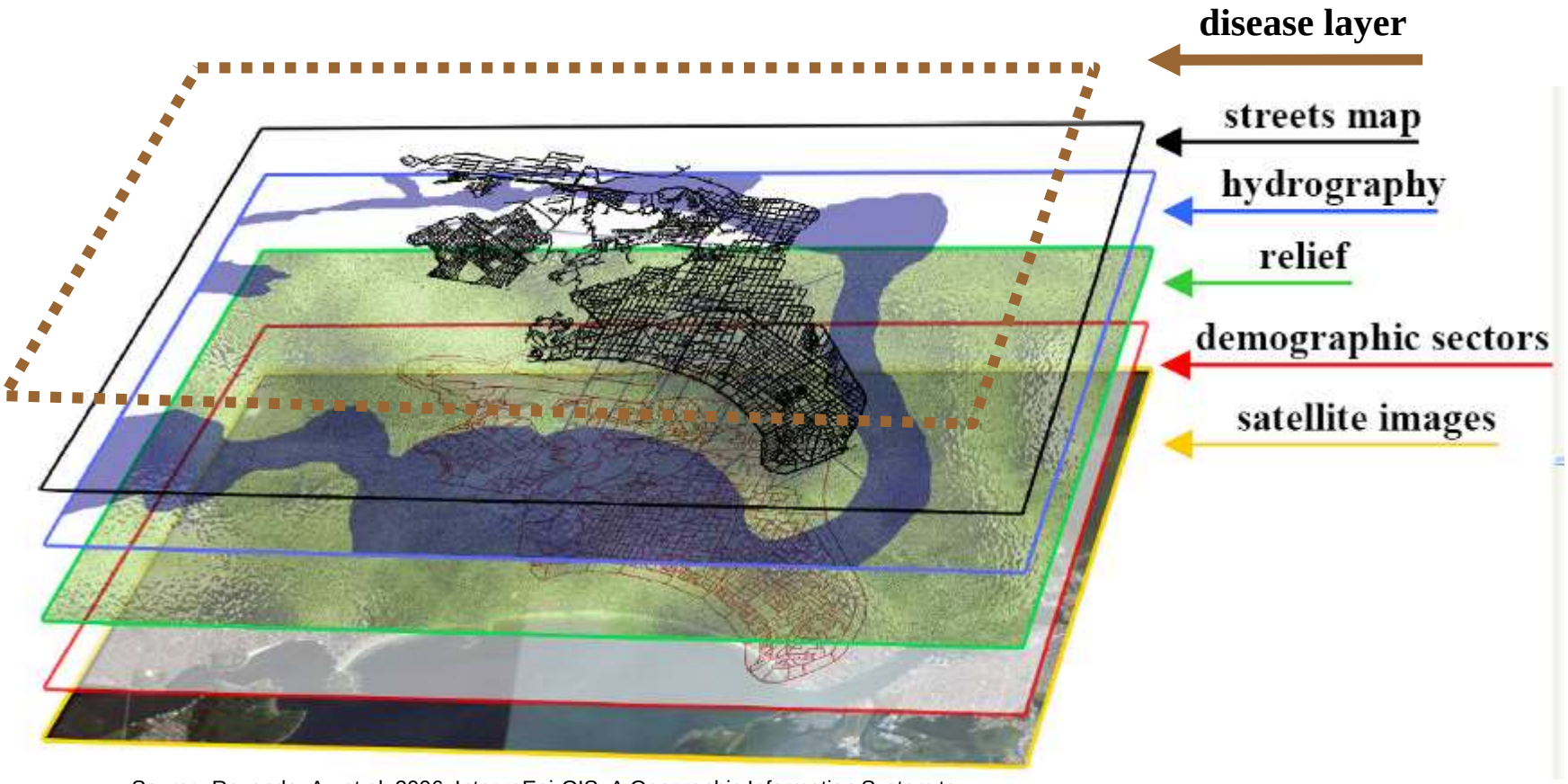
Use of GIS and Remote Sensing



Source: Rezende, A., et.al. 2006. IntegraEpi-GIS: A Geographic Information System to Visualize and Analyze the Spatio-Temporal Patterns of the Spread and Control of Epidemics.

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Dataset Requirement Matrix

for deriving Minimum Data Set of WHO's EMD information platform

Data set required to	Prevention	Preparedness	Response	Recovery
Data from External sources (National EOC/situation reports, HMIS, routine disease specific active/passive surveillance/ notification systems)			**Data from WHO Internal sources** (EMS, GSM, GORON, GHO, SHOC Reports, WR Roster, Deployment Roster, Oracle Financial System)	
Exhaustive List of disease/ conditions list *(ICD)*		**List of donor and partner agencies**		
Health facilities (all types and levels)		**Health workforce** (all cadre)		
Essential Medicine				**Medical devices**
Satellite Imagery (various types and resolutions)				**tely sensed data** itation, terrain and topology)
Geographic I				**e maps**
Transportation assets (Airport locations, transportation hubs, Road network maps)			**Country-specific Population Data** (/sub-national level; projections, census, actual)	

Example:

- **5m-resolution DEM data**
- **PRISM B/W image, 2.5m resolution.**
- **AVNIR-2 color image, 10m resolution.**

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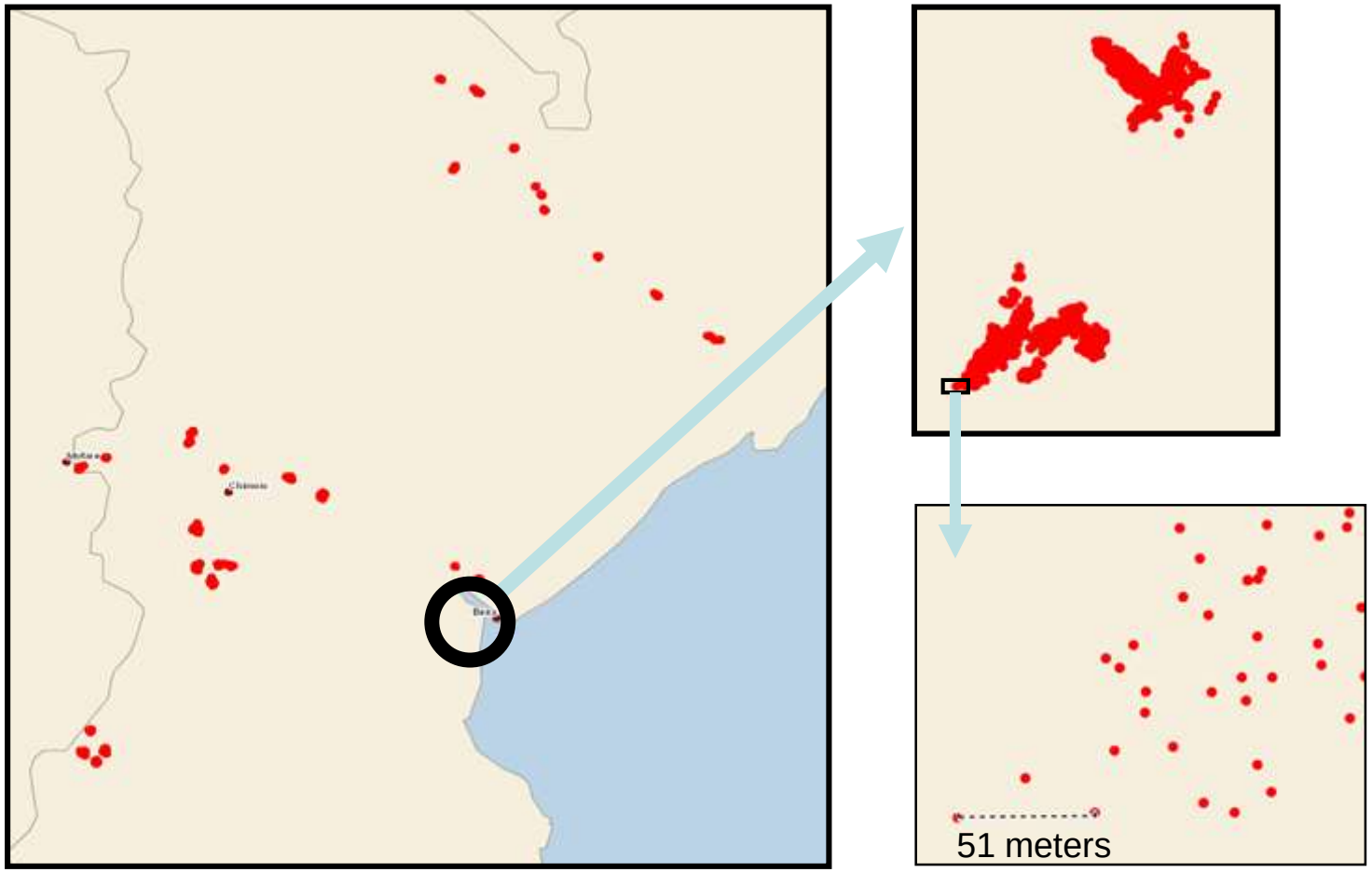
Use of GIS and Remote Sensing



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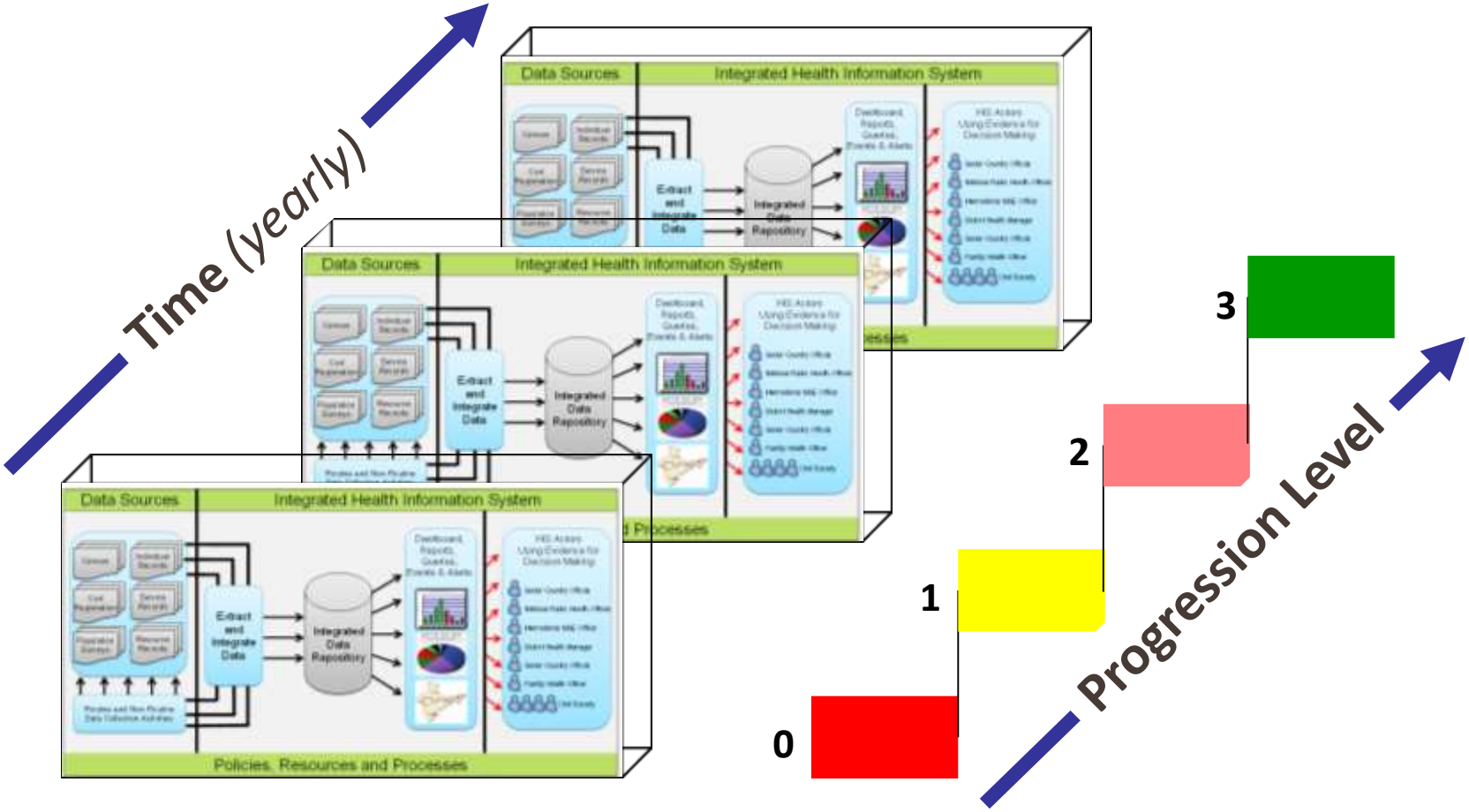
Measuring Implementation Progress Over Time

Figure depicting Countries at Various Levels of HIS Maturity



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Potential Space Technology Applications to Global Health Facilities Locator

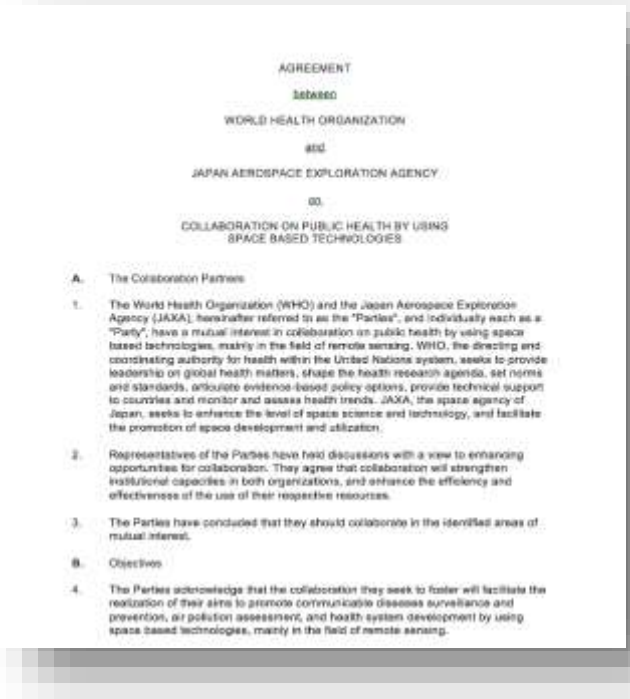
- Linking *GPS Location, remote sensing imagery, thermal maps, weather data, GIS shape files,* to all Health Facilities
- Developing advance *visualization tool* for tele-epidemiology, telehealth, and health emergency response
- Linking Health Workforce (Human Resources) and Health Commodities data
- Link information on Public Safety and other Public Health and Emergency Management entities

Potential Users

- Federal and State Ministries of Health; Local Governments and authorized bodies
- Intergovernmental and Non Governmental Organizations
- United Nations System
- Communities-at-large

Way forward

- Designing health information platform to facilitate public health emergency response and monitoring of routine health information
- Establishing data sharing agreements with partners



AGREEMENT

between

WORLD HEALTH ORGANIZATION

and

JAPAN AEROSPACE EXPLORATION AGENCY

on

COLLABORATION ON PUBLIC HEALTH BY USING SPACE BASED TECHNOLOGIES

A. The Collaboration Partners

1. The World Health Organization (WHO) and the Japan Aerospace Exploration Agency (JAXA), hereinafter referred to as the "Parties", and individually each as a "Party", have a mutual interest in collaboration on public health by using space based technologies, mainly in the field of remote sensing. WHO, the directing and coordinating authority for health within the United Nations system, seeks to provide leadership on global health matters, shape the health research agenda, set norms and standards, articulate evidence-based policy options, provide technical support to countries and monitor and assess health trends. JAXA, the space agency of Japan, seeks to enhance the level of space science and technology, and facilitate the promotion of space development and utilization.

2. Representatives of the Parties have held discussions with a view to enhancing opportunities for collaboration. They agree that collaboration will strengthen institutional capacities in both organizations, and enhance the efficiency and effectiveness of the use of their respective resources.

3. The Parties have concluded that they should collaborate in the identified areas of mutual interest.

B. Objectives

4. The Parties acknowledge that the collaboration they seek to foster will facilitate the realization of their aims to promote communicable diseases surveillance and prevention, air pollution assessment, and health system development by using space based technologies, mainly in the field of remote sensing.

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