Disaster Medicine, Telemedicine & Integrated Vector Management

Epidemic prevention, warning and response

Medical use of space technology

Bridging the gap between the medical and space communities

Disaster Medicine, Telemedicine & Integrated Vector Management

Epidemic prevention, warning and response

- Information requirements to monitor risk of disease outbreak
- Satellite communication in support of surveillance
- Integration of space technologies with health information systems
- Ways to use EO in health warning and response systems

Disaster Medicine, Telemedicine & Integrated Vector Management

Medical use of space technology

- Potential of space-based communication for medical treatment in a disaster
- Requirements for mapping and navigation systems to support medical response
- Overcoming drawbacks in use of space technology

Disaster Medicine, Telemedicine & Integrated Vector Management

Bridging the gap between the medical and space communities

- Enhancing knowledge sharing and collaboration between space, disaster, and medical communities
- Role of UN-SPIDER
- Increasing capacity of the health community to use space-based technologies

Our “last mile”

Strengthening Health Information Systems

Integrating Space Technology

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Enhancing surveillance of existing and emerging diseases

Preparing for and responding to emergencies and natural disasters

Planning for future impacts on health service infrastructure

Epidemic diseases

SARS

Cholera, Somalia, 2000

Rapidly evolving threats posed by emerging pandemic and epidemic prone diseases

- SARS
- Avian Flu

Epidemic-prone diseases that are known risks

- meningitis
- rabies
- Cholera
- yellow fever

… endemic diseases

Long term interventions

- malaria,
- leprosy,
- guinea worm,
- lymphatic filariasis,
- polio,
- Onchocerciasis
- etc

Diseases that are new or re-emerging

- AIDS
- Tuberculosis
- etc

… industrial accidents, bioterrorism

Accidental or intentional release of

- biological,
- chemical,
- nuclear agents increasing concern …

… Health Impacts of Natural Disasters and Climate Change

- Extreme air temperature and air pollution contribute to deaths from cardiovascular and respiratory disease
- Floods, drought and contaminated water compromise hygiene, increase diarrheal disease, increase vector-borne diseases
- Decreasing crop yields stress food supply and contribute to malnutrition and under-nutrition increasing severity of infectious diseases
- Increased frequency and severity of storms destroys homes, communities and lives
- New challenges for control of infectious diseases

Photo: Jacob Dall/Danish Red Cross

… weakened public health infrastructure

- Collapse of public health infrastructure
- Ineffective vector control programmes (e.g. Chikungunya)
- Development of antimicrobial resistance (e.g. XDR-TB)
- Increasing burden of chronic diseases due to our changing lifestyles

There is a need for coordinated response for health security

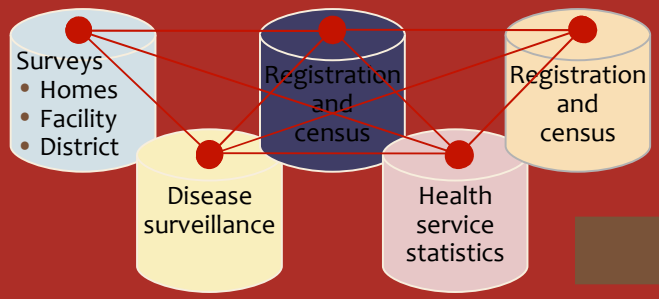
Public health problems cross many sectoral boundaries

Coordinated action, collaboration and cooperation between governments, private and public sector, media and individuals is required

No single institution or country has all the capacities to respond to public health emergencies

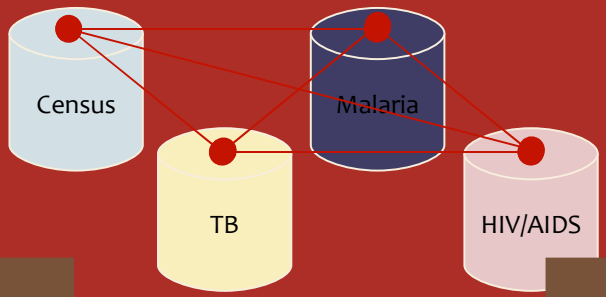
The vision: interoperable /interconnected tools and systems

Across district mediated initiatives



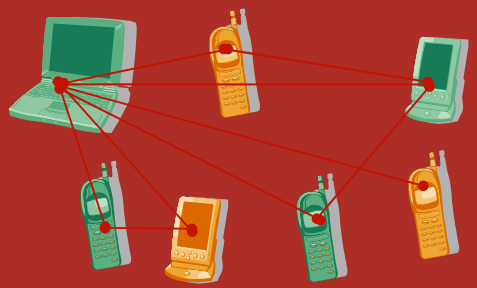
Across geographies

Across programs

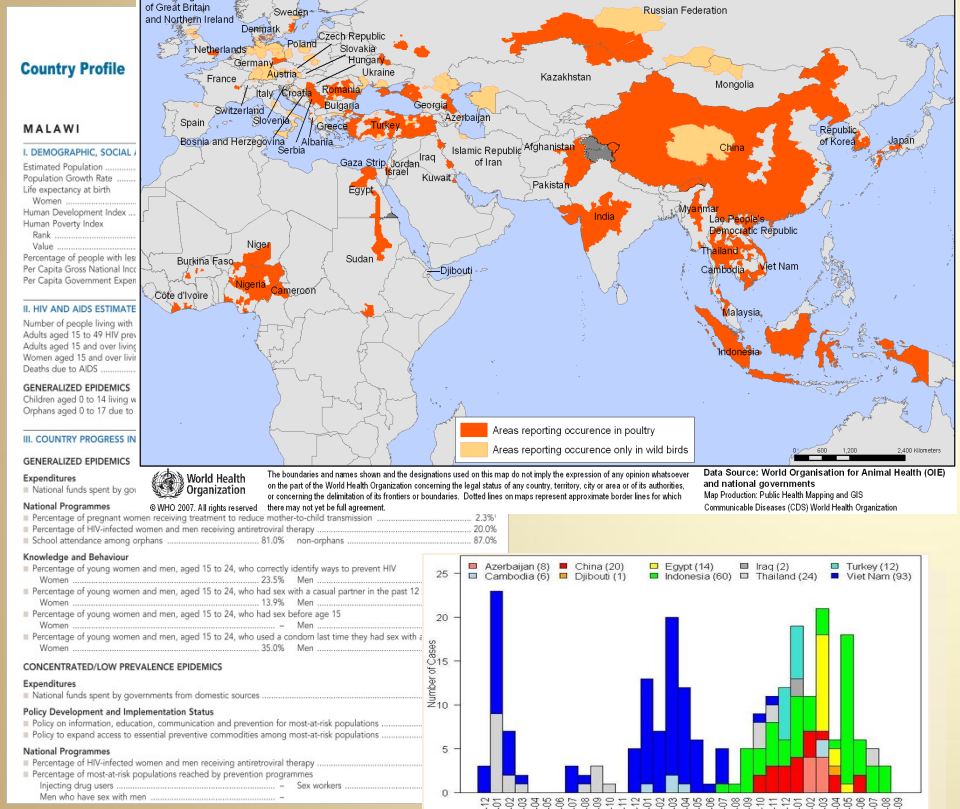


Across points of care

Across technologies



Tools and data for better decision making



- Reliable information – essential for public health action
- This is particularly true when we need to allocate scarce resources
- Especially urgent in the case of an outbreak, epidemic or other public health risk
- Decision makers at all levels need access timely, reliable information

Mapping public health resources

Surveillance and response capacity

- Early warning and detection systems (information, communications etc)
- Human resources (rapid investigation teams, surveillance officers,
- Equipment and drugs (PPEs, sampling materials, drugs, stockpiles)

Health services

- Hospitals, clinics, pharmacies, laboratories, blood banks etc

Partners

- Who's doing what and where (NGOs, government, private)

Basic infrastructure and risks

Local transport networks

- Roads, airports, ports, security concerns

Basic utilities

- Water supply, electricity, communications, etc

Social services

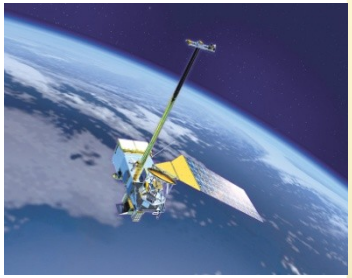
- Schools, feeding centres, etc

Define, collect and assemble data

Remote field level

Country level

Regional level



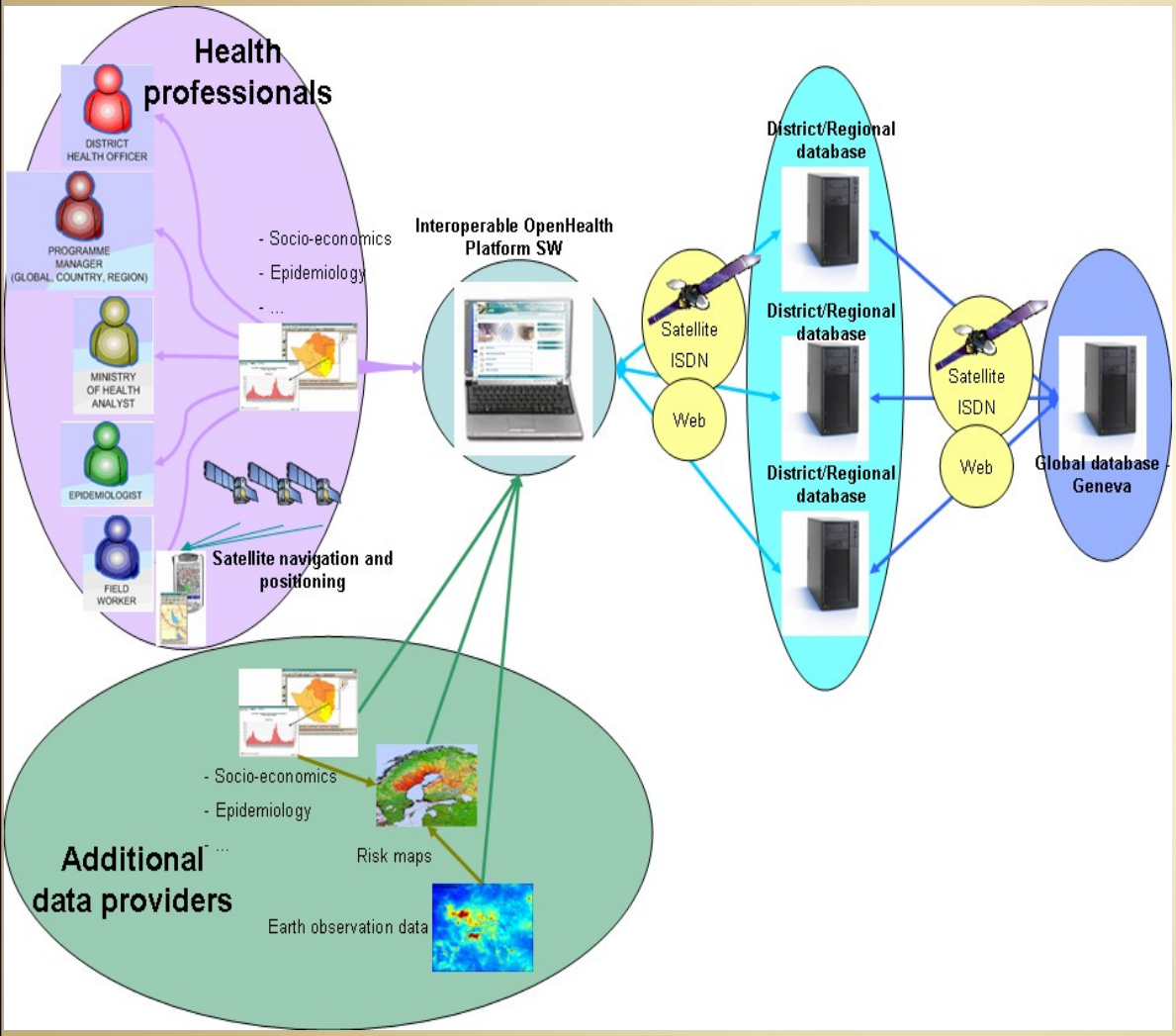
Global level

Multi source: integrate data from different sources using different data collection methodologies

Multi sector: consolidate vital data from different sectors

Multi level: disseminate data across different geographic levels

"OpenHealth" … putting it all together

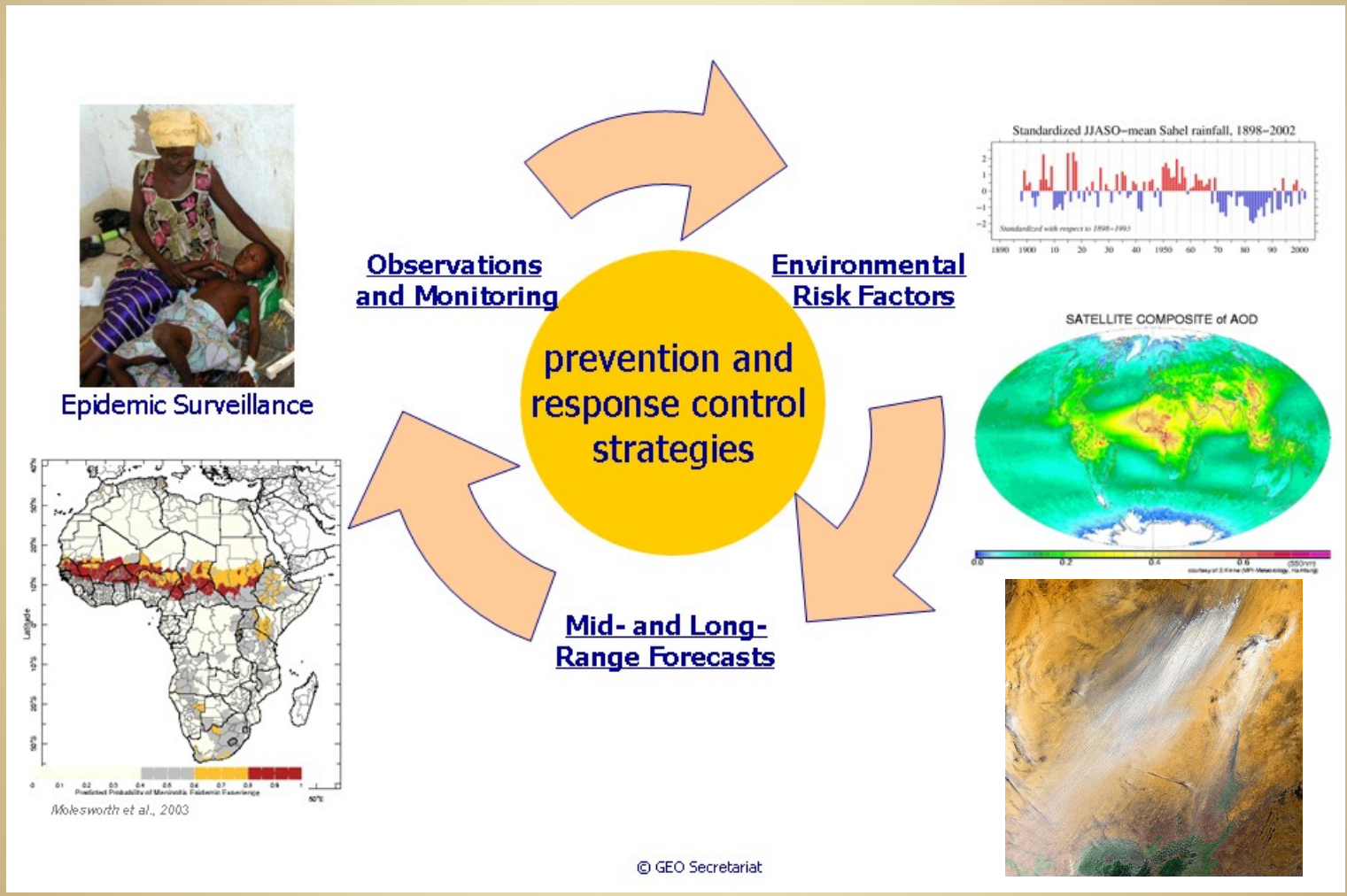


A standards-based platform for integrating public health data and applications

Suite of interoperable tools for data collection, management, analysis transfer and decision making

Supporting wide range of applications- disease surveillance, district health management, early warning, monitoring and evaluation

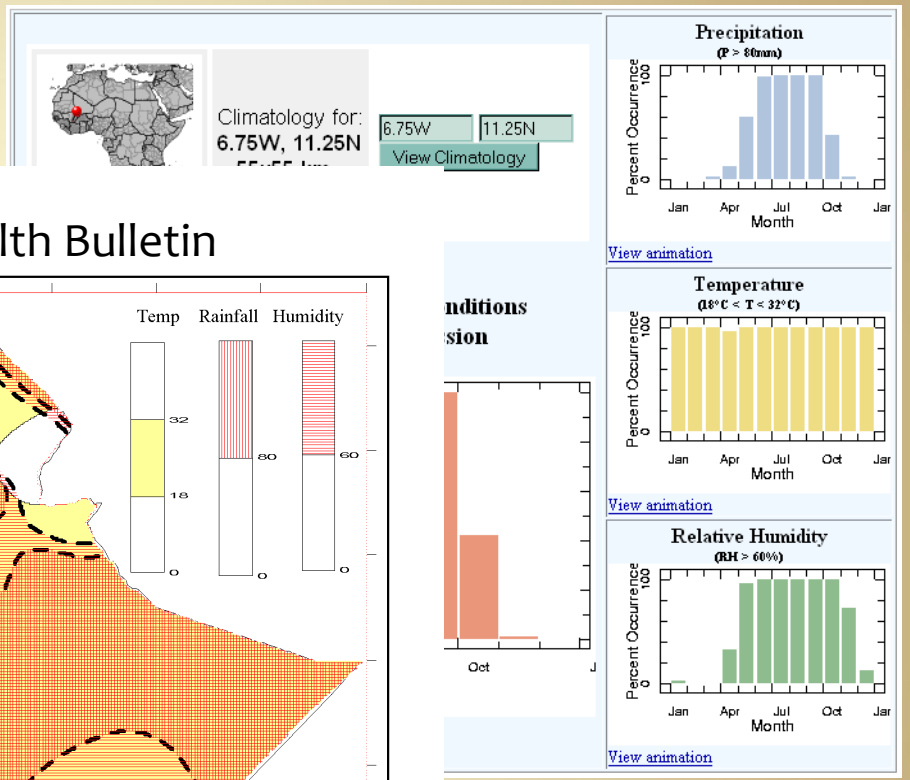
Meningitis Environmental Risk Information Technologies (MERIT): a joint effort of WHO, GEO and partners

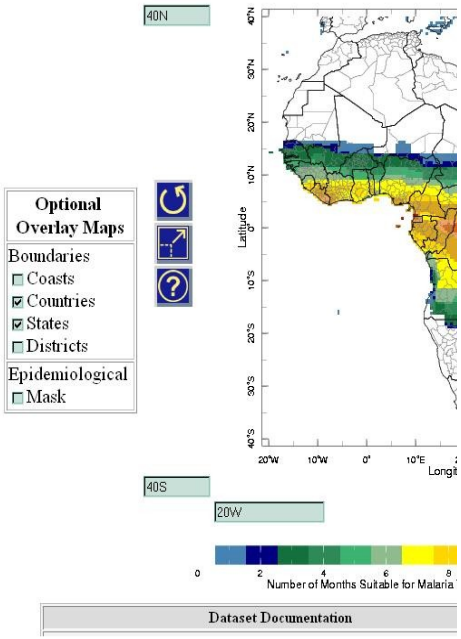


Climate and Seasonality of Endemic Malaria

Climate suitability for endemic malaria

- = 18-32°C + 80mm + RH>60%





Ethiopia Monthly Health Bulletin

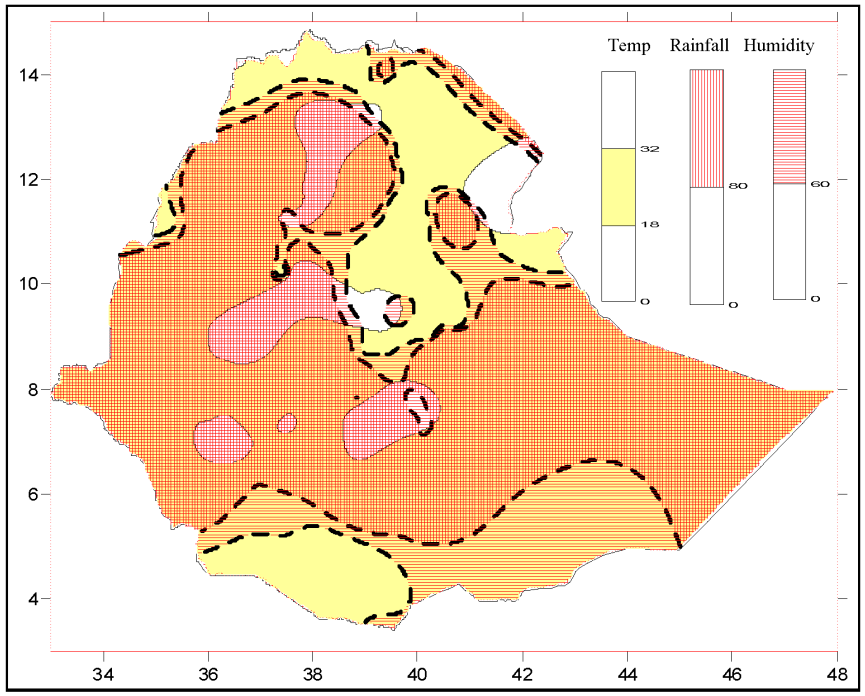
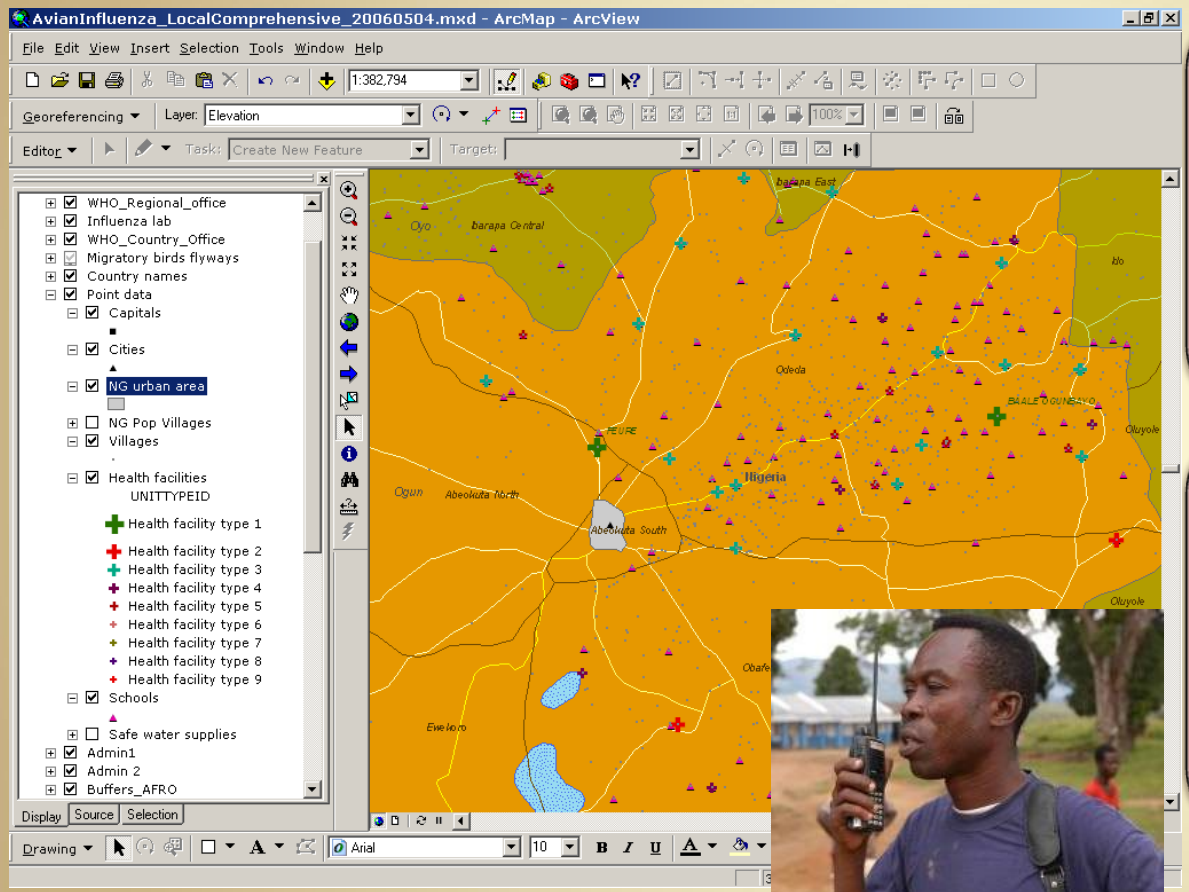


Fig 4. Combined temperature, rainfall and humidity conditions during May 2008. Areas under square patterns with yellowish background are assumed to satisfy favorable climatological conditions for spread of malaria.

http://iridl.ldeo.columbia.edu/maproom/.Health/.Regional/.Africa/.Malaria/.CSMT/

Outbreak alert and response

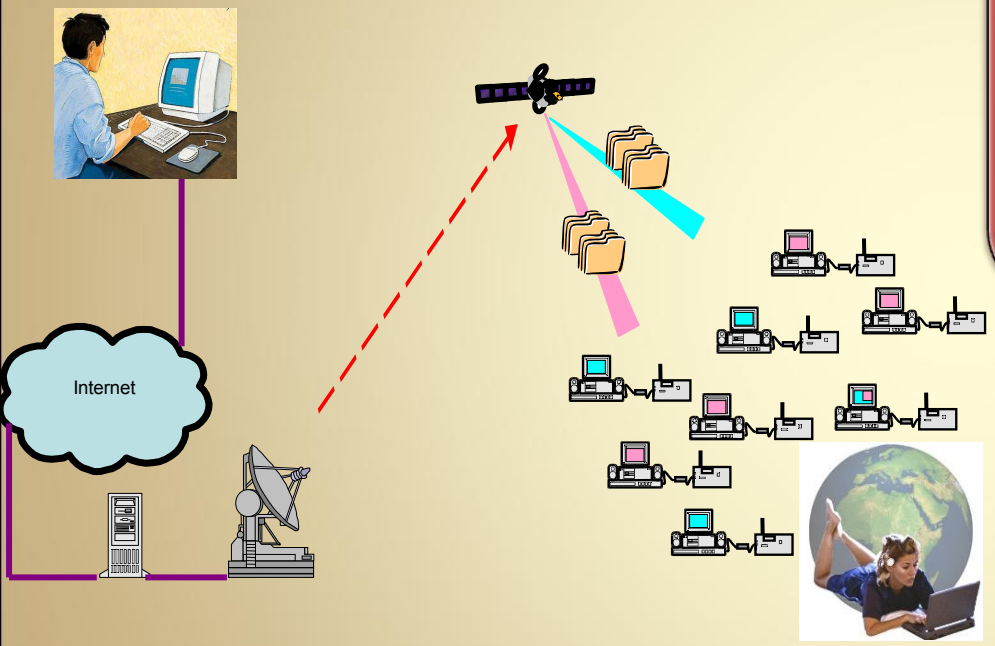


Avian influenza H5N1, 2003 - 2007

Monitoring spread in relation to population density, risk groups, communication lines, environment and other risk factors

Identifying health services, medical laboratories, schools, workplaces, warehouses, transportation services, to support an outbreak response

Satellite telecommunications



Integrated telecommunication technologies and solutions that can support:

- Rapid data transfer for outbreak alerts (district, laboratory)
- Data synchronization from district to country and global levels
- Data broadcasting (instructions, alerts)

Needs

Primary remote sensing and satellite derived data for initial risk assessment

- High-resolution maps of urban areas and population settlements
- High-resolution maps for outbreak investigation and risk assessment

Improved operational risk maps for environment dependent diseases (yellow fever, dengue, meningitis, malaria, plague, rift valley fever...)

- NDVI, land cover, land use, water bodies, land and sea surface temperature, moisture, dust, etc.

Satellite telecommunication: for rapid transfer of data

Core capacity strengthening at national level and local levels for interpretation, use and decision making

International cooperation

- on standards and interoperable tools and systems for data collection, analysis, early warning, forecasting etc
- Tools and methodologies for early warning and forecasting

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