

Geo-enabling Health Information Systems

UNICEF East Asia Pacific Regional Office, supported by TechNet-21, invites you to:

Learn how to geo-enable health information systems and programmes

Join us for a bi-weekly web-series starting **19 June 2024**

Demonstrate the potential of geospatial data and technologies in public health

Introduce HIS geo-enabling framework and its implementation in countries

Provide knowledge and resources to implement the HIS geo-enabling framework



Go to <https://tn21.org/UNICEF-EAPRO>
or Scan QR Code to Register

Register by: 19 June 2024

Joining any one session also permitted

6 Modules of around 2 hours each

Certificates provided on completion by UNICEF & MORU

Geo-enabling the Health Information System, programs or interventions training workshop for Asia Pacific

Welcome & opening, objectives of the workshop, introduction of the facilitator and agenda

Workshop Objectives

Disseminate operational guidance materials that can assist countries in implementing the geo-enablement process for health programs in general and the development and implementation of micro plans in particular

More specifically:

- Demonstrate the potential of geospatial data and technologies in public health
- Introduce the HIS geo-enabling framework and its implementation in countries
- Transfer knowledge, expertise and resources that will allow participants to implement the HIS geo-enabling framework in their respective country

➔ At the end of this workshop, it is expected that the participants will have a better understanding of what geospatial data and technologies can bring to public health programs and how to geo-enable their health information system in a sustainable way to benefit from this type of data and technologies

➔ This is not a GIS training

Training workshop schedule and agenda

Schedule Module 1 19 June 2024 (Bangkok 12pm / Geneva 6am / Fiji 6pm)
20 min - Welcome & opening, objectives of the workshop, introduction of the facilitator and agenda
40 min - Session 1: The geographic dimension and the potential of geospatial data and technologies in public health
30 min - Session 2: Examples of application of geospatial data and technologies in public health
30 min - Session 3: Introduction to the HIS geo-enabling framework

Schedule Module 2 3 July 2024 (Bangkok 12pm / Geneva 6am / Fiji 6pm)
15 min - Recap of Module 1 and agenda of Module 2
30 min - Session 4: In-country implementation of the HIS geo-enabling framework
30 min - Session 5: Result of the HIS geo-enablement level assessment for Asia and Pacific (priorities and challenges)
30 min - Session 6: Understand the geography of the program or intervention

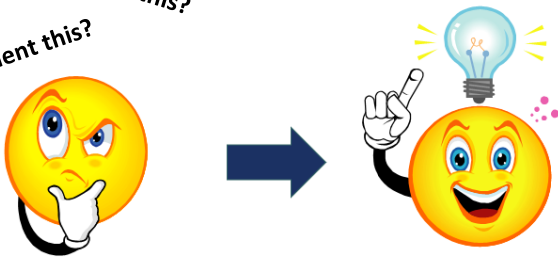
Schedule Module 3 17 July 2024 (Bangkok 12pm / Geneva 6am / Fiji 6pm)
15 min - Recap of Module 2 and agenda of Module 3
30 min - Session 7: Result of the geographic features identification performed by the participants
30 min - Session 8: Define the purpose, audience, content and format of the final products
15 min - Session 9: Identify needed hardware, software and technical expertise
20 min - Session 10: Assess the geo-enablement level of the HIS, program or intervention
30 min - Session 11: Result of the HIS geo-enablement level assessment for Asia and Pacific (9 elements of the HIS geo-enabling framework)

Schedule Module 4 14 August 2024 (Bangkok 12pm / Geneva 6am / Fiji 6pm)
15 min - Recap of Module 3 and agenda of Module 4
30 min - Session 12: Assess the availability, quality and accessibility of data and information: Introduction to the geospatial data management cycle
60 min - Session 13: Implement the geospatial data management cycle (define the terminology, data specifications and the ground reference)
15 min - Session 14: Implement the geospatial data management cycle (document the data)
45 min - Session 15: Implement the geospatial data management cycle (compile existing data, identify and fill data gaps)

Schedule Module 5 28 August 2024 (Bangkok 12pm / Geneva 6am / Fiji 6pm)
15 min - Recap of Module 4 and agenda of Module 5
30 min - Session 16: Introduction to geospatial technologies
30 min - Session 17: Introduction to Global Navigation Satellite System (GNSS)
30 min - Session 18: Introduction to Geographic Information System (GIS)
30 min - Session 19: Introduction to the concepts of registry and Common Geo-Registry (CGR)

Schedule Module 6 11 September 2024 (Bangkok 12pm / Geneva 6am / Fiji 6pm)
15 min - Recap of Module 5 and agenda of Module 6
15 min - Session 20: Define the strategy(ies) to be implemented to fill the gaps identified during the assessment
30 min - Session 21: Develop the action plan aiming at filling the gaps in the HIS geo-enabling framework
30 min - Session 22: Implement the action plan
30 min - Session 23: Assess, document and sustain the result of the action plan implementation
15 min - Session 24: HIS, program or intervention geo-enabling resources (recap and additional ones)
15 min - End of workshop

What is this?
How do I implement this?



You will receive a certificate from UNICEF if you attend all the modules

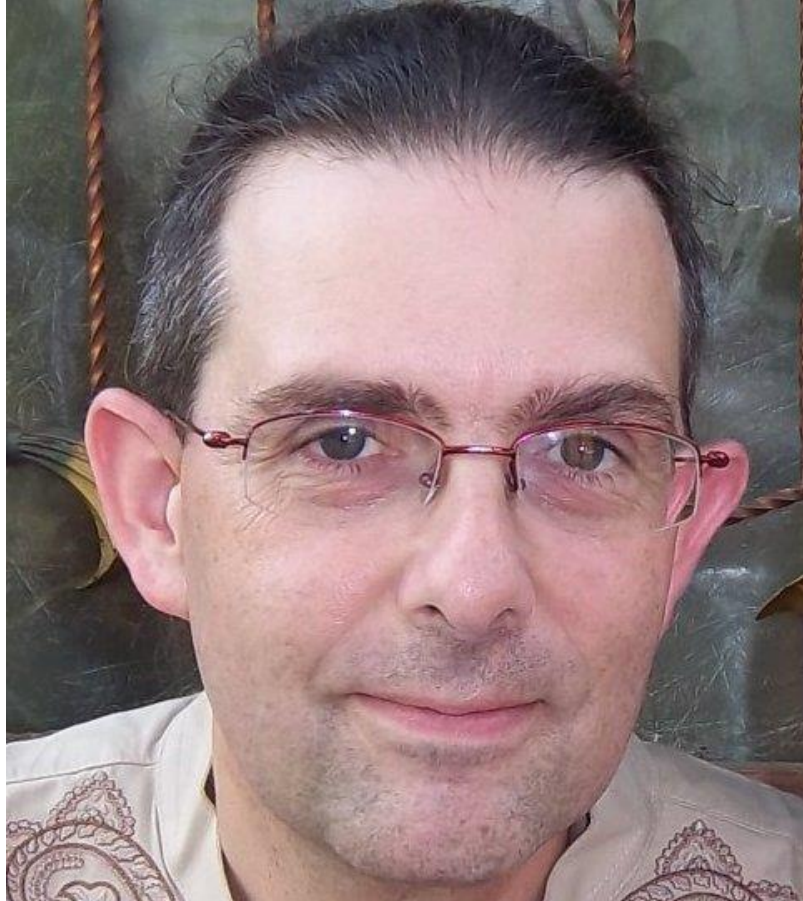
Opening remarks and regional perspective



Basil Rodrigues
Regional Adviser, Health
UNICEF EAPRO

Training workshop facilitator

Dr Steeve Ebener



Coordinator and lead for in-country technical assistance at MORU's Health GeoLab Hub.

25 years of experience advising and working with international, regional and national governmental and non-governmental organizations in the health and emergency management sector when it comes to the management and use of geospatial data and technologies.

At the origin, among other things, of the development and implementation of the HIS geo-enabling framework, the Second Administrative Level Boundaries initiative (SALB), the AccessMod tool and the Common Geo-Registry (CGR) concept.

LinkedIn profile: <https://www.linkedin.com/in/steeveebener/>

Geo-enabling the Health Information System, programs or interventions training workshop for Asia Pacific

...and beyond

Module 1 – 19 June 2024



HIS geo-enabling technical support to French-speaking African countries

Activity supported by the Global Fund and implemented in collaboration with the University of Geneva and the University Amadou Mahtar MBOU (UAM) of Dakar to help countries geo-enable their Health Information System (HIS)

Enquête pré-atelier sur l'état de géo-activation de votre département/unité

Atelier sur la géo-activation du Système d'Information Sanitaire (SIS) et l'utilisation des Systèmes d'Information Géographique (SIG) en Afrique francophone

stevee.ebener@gmail.com [Switch account](#)

Not shared

Introduction
La présente enquête a pour objectif d'obtenir une première image de la situation dans votre département/unité en ce qui concerne son niveau de géo-activation.

Ces informations serviront à orienter les discussions pendant l'atelier ainsi que le soutien technique qui sera fourni après l'atelier.

Merci de prendre le temps de parcourir le glossaire avant de remplir le questionnaire: <https://bit.ly/3Rt4t05>

N'hésitez pas à contacter Nicolas Ray (nicolas.ray@unige.ch) si vous avez des questions concernant l'enquête.

Next Page 1 of 4 Clear form

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Google Forms



Atelier sur la Géo-activation du Système d'Information Sanitaire (SIS) et l'Utilisation des Systèmes d'Information Géographique (SIG) en Afrique Francophone

6 - 10 novembre 2023
Saly, Sénégal

MORU
Tropical Health Network

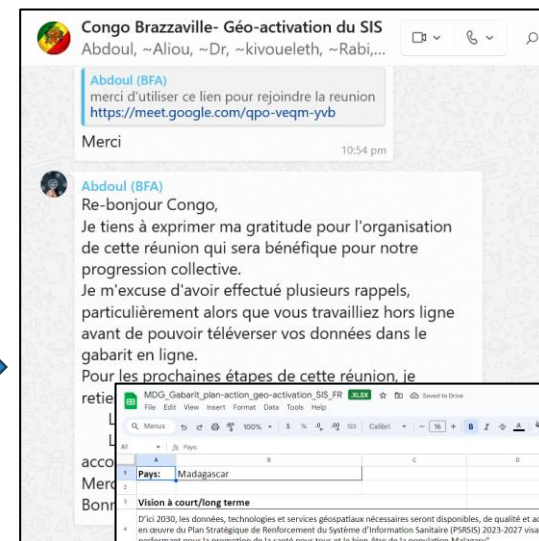
THE GLOBAL FUND

UNIVERSITÉ DE GENÈVE

HEALTH GEOLAB Hub



In French



Élément du cadre de géo-activation		BFA	BDI	CDG	CIV	GIN	MDG	MU	CAF	COD	SEN	TGO
Ces d'utilisation	SIS	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Pala	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	TB	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Listes maillresses, données géospatiales et Registre Géographique Commun (RGC) Spécifications des données, normes et protocoles	SIS	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
	Pala	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
	TB	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Capacité technique	SIS	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Pala	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	TB	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Technologies	SIS	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Pala	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	TB	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green

MDG Gabarit plan-action_geo-activation SIS_FR

File Edit View Insert Format Data Tools Help

1 Pays: Madagascar

2

3 **Vision à court/long terme**

4 D'ici 2030, les données, technologies et services géospatiaux nécessaires seront disponibles, de qualité et accessibles de manière coordonnée pour soutenir la mise en œuvre du Plan Stratégique de Renforcement du Système d'Information Sanitaire (PRSIS) 2023-2027 visant à atteindre "un système d'information sanitaire performant pour la promotion de la santé pour tous et le bien-être de la population Malagasy"

5

6 **Objectifs du plan d'action**

7 1- Combler les lacunes identifiées au niveau central pendant l'évaluation du niveau de maturité actuelle de géo-activation du SIS au travers de ses 9 éléments

8 2- Démontrez les avantages de la géo-activation du SIS au travers de l'implémentation d'un projet pilote

9 3- Développer un plan d'action commun pour tout financement pour l'extension spatiale du projet pilote au reste du pays, l'institutionnalisation des capacités techniques qui ont

10

11 **Période de mise en œuvre** Chef de projet

12

13 **Éléments 3 du cadre: Vision, stratégie et plan d'action**

14 **Situation/lacunes actuelles:** Aucune vision, stratégie et/ou plan d'action concernant la gestion et l'utilisation des données et technologies géospatiales n'ont été définies

15 **Contraintes:** Le Renforcement du Système d'Information Sanitaire (PRSIS) 2023-2027 ne mentionne pas les données et technologies géospatiales

16 **Stratégie/Résultat attendu:** Mobiliser le Sous-comité Système d'Information dans le Comité de Renforcement du Système de Santé (CRSS) pour soutenir l'implémentation de la

17 Niveau de mise en œuvre - Central

Act. #	Description de l'activité	Livrable	Groupe cible	Responsable	Date de début	Date de fin	Budget (USD)
18	Redynamiser le Sous-comité Système d'Information en y intégrant le plan d'action de la géo-activation du SIS	PV de réunion	Membres du Sous-Comité Système d'Information	DEPS	Janvier 2024	Juin 2024	
19	Évaluer le niveau actuel de la maturation de la géo-activation du SIS en identifiant les lacunes actuelles au travers de ses 9 éléments	Rapport d'évaluation	Programmes nationaux Partenaires technique-financiers	DEPS	Février 2024	Mars 2024	
20	Développer le plan d'action pour soutenir la géo-activation du SIS et ainsi, couvrir les lacunes identifiées lors du niveau actuel de géo-activation du SIS	Plan d'action de la géo-activation développé et budgétisé	Membres du Sous-Comité Système d'Information Partenaires technique-financiers	DEPS	Mars 2024	Avril 2024	

Pre-workshop survey to assess the current level of geo-enablement across Malaria, TB and HIV programs as well as the unit in charge of the Health Information System (HIS)

Workshop (Saly – Senegal, 6-10 November 2023) attended by 55 participants from 11 countries to take them through the HIS geo-enabling concept and process, finalize the assessment and strengthen their technical capacity

Post-workshop technical support provided to 10 countries to help them develop an action plan aiming at filling the gaps identified during the assessment

Training workshop material

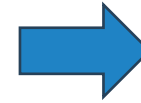


<https://bit.ly/4d2nfTS>



REFERENCE_MATERIAL

PRESENTATIONS



BIBLIOGRAPHY

GIS_SOFTWARES

HGL_GUIDANCE

NATIONAL_GUIDES



Geo-enabling the Health Information System, programs or interventions training workshop for Asia Pacific

Session 1: The geographic dimension and the potential of geospatial data and technologies in public health



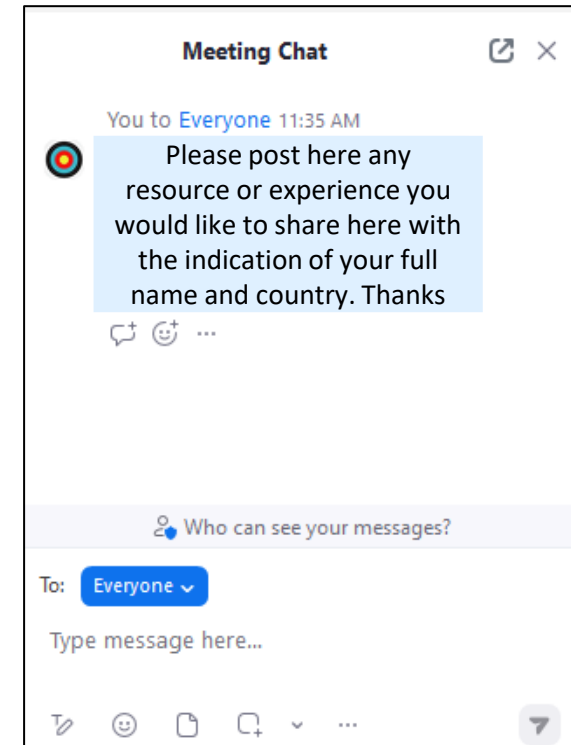
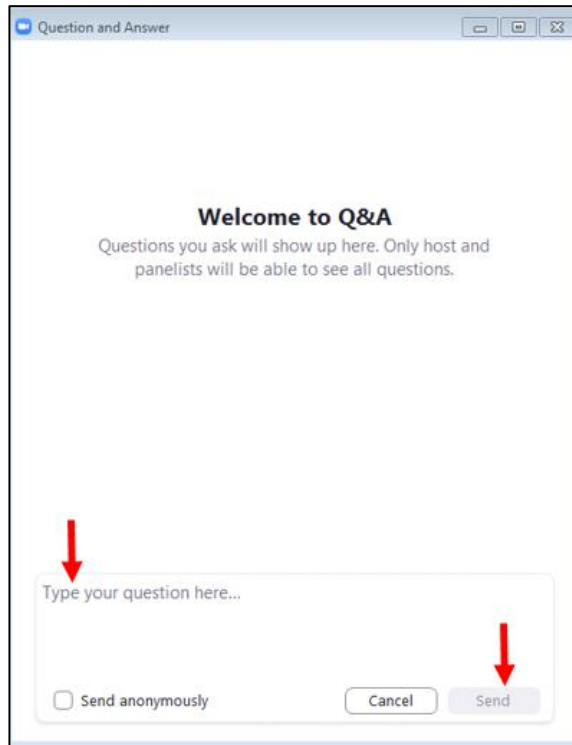
Glossary of terms: <https://bit.ly/37Wje0v>

Recording of each module will be made available



Questions and knowledge sharing during the modules?

<https://tinyurl.com/3999y744>



Please post your questions in the Zoom Q&A (not the chat)

You can also ask questions using this short Google form (between modules for example)

You can share any resource or experience you see relevant to the participants in the chat



We will answer them as much as possible during the modules

We will also be using the chat to share information

Agenda – Module 1

20 min - Welcome & opening, objectives of the workshop, introduction of the facilitator and agenda

40 min - **Session 1:** The geographic dimension and the potential of geospatial data and technologies in public health

30 min - **Session 2:** Examples of application of geospatial data and technologies in public health

30 min - **Session 3:** Introduction to the HIS geo-enabling framework

➔ Introduction to the potential of geospatial data and technologies and of the framework we developed and are implementing in countries to geo-enable the HIS, programs or interventions

Geo-enabling the Health Information System, programs or interventions training workshop for Asia Pacific

...and beyond

Session 1: The geographic dimension and the potential of geospatial data and technologies in public health

Public Health

“All organized measures (whether public or private) to prevent disease, promote health, and prolong life among the population as a whole.”¹

“The art and science of preventing disease, prolonging life and promoting health through the organized efforts of society”²



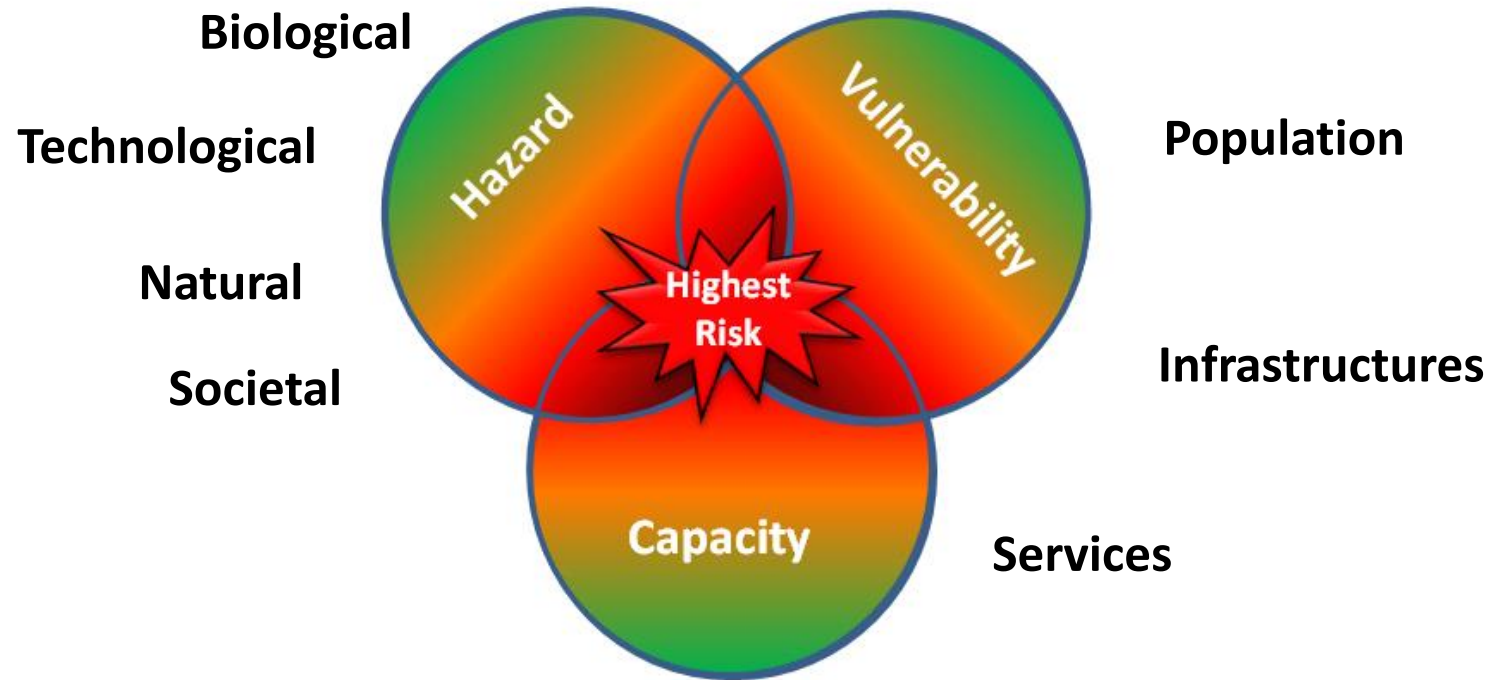
The three main functions of public health are:

- **Risk assessment** - The assessment and monitoring of the health of communities and populations at risk to identify health problems and priorities
- **Policy development** - The formulation of public health policies designed to solve identified health problems and priorities
- **Assurance of services** – To ensure that all populations have access to quality, timely, and cost-effective care

¹ http://www.euro.who.int/_data/assets/pdf_file/0007/152683/e95877.pdf

² Acheson, 1988; WHO: <http://www.euro.who.int/en/health-topics/Health-systems/public-health-services>

Risk Assessment

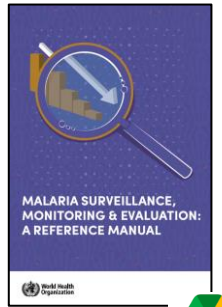


➔ The populations, infrastructures and services most at risk to experience losses or damages are located in geographic areas where the hazard and vulnerability are the highest and capacity the lowest.

➔ **There is a strong geographic dimension to risk and its assessment**

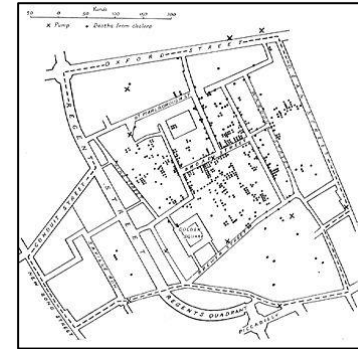
Risk Assessment

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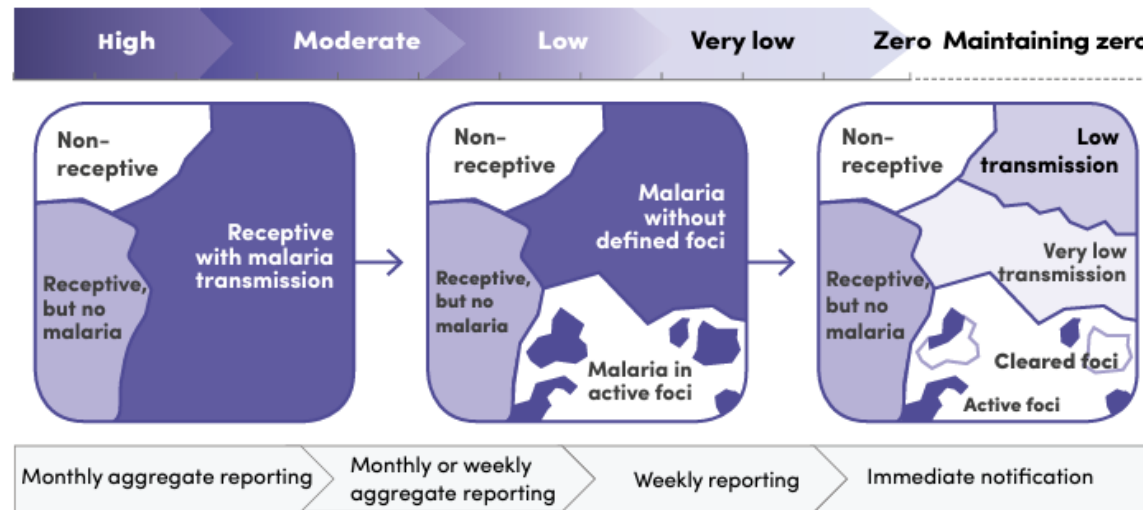
➔ At the origin of modern epidemiology

“Study of the relationship between diseases and the factors likely to influence their frequency, **distribution** and evolution.” ¹



John Snow's original map showing clusters of cholera cases during the London epidemic of 1854.

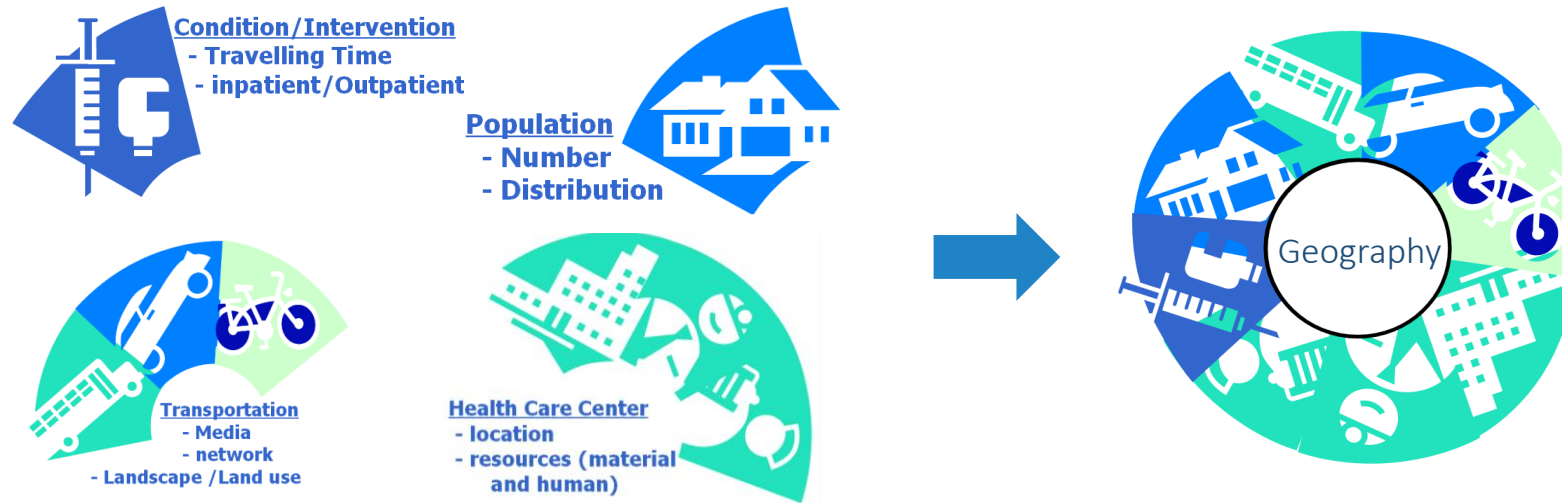
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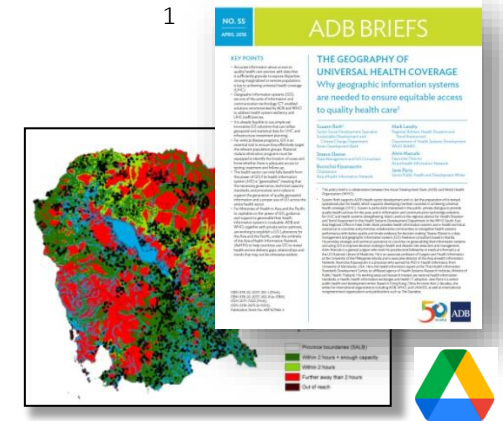
The evolution of the geographical granularity of interventions aiming at eliminating communicable diseases like malaria demonstrates the importance of this dimension in epidemiology

1. <https://dictionnaire.lerobert.com/google-dictionnaire-fr?param=%C3%A9pid%C3%A9miologie>
2. <https://iris.who.int/bitstream/handle/10665/272284/9789241565578-eng.pdf?sequence=1>

Assurance of services



- ➔ Physical (geographical) access to health care is influenced by the location of the health services, the spatial distribution of the population and the environment between the two
- ➔ A strong geographic aspect to the assurance of services
- ➔ Allows a more comprehensive and systemic approach to Universal Health Coverage (UHC)

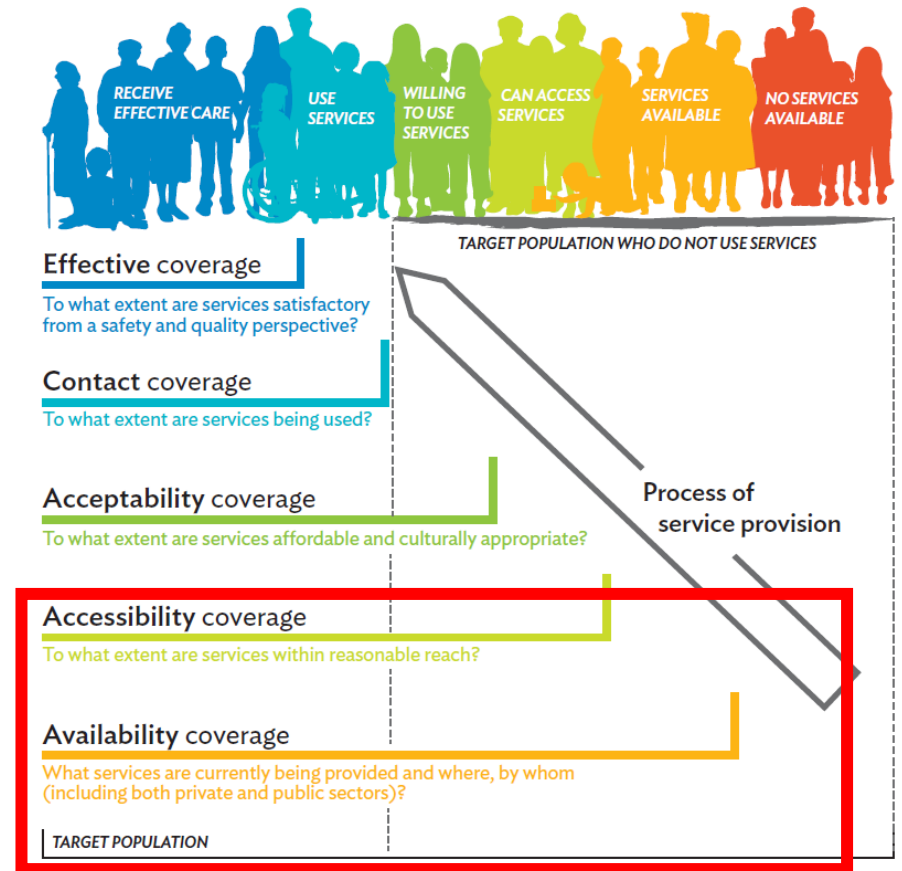


1. <https://www.adb.org/publications/geography-universal-health-coverage>
 2. APMEN tech talk <https://www.youtube.com/watch?v=pTsJKCKfJQ>

Assurance of services

“Universal Health Coverage means that all individuals and communities receive the health services they need without suffering financial hardship.”¹

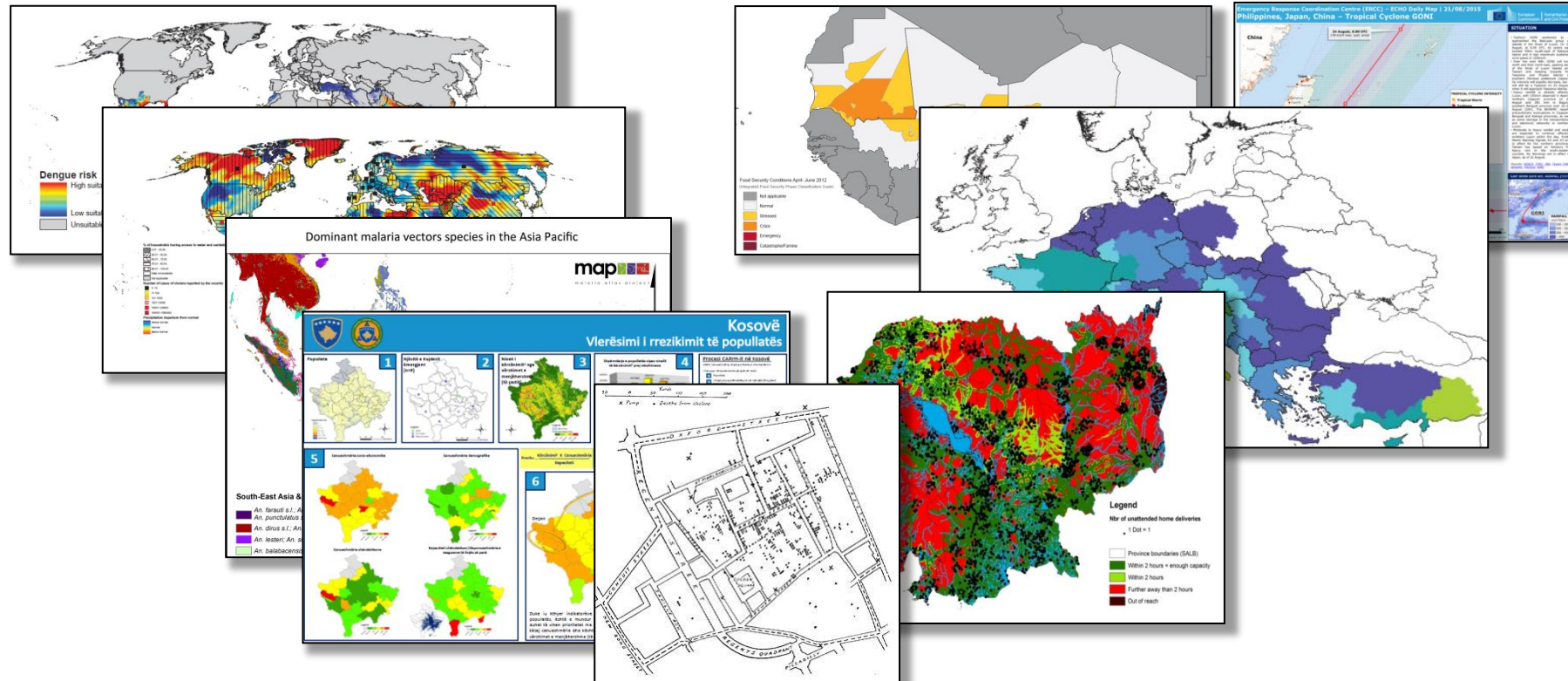
- ➔ Equitable access to quality health care is mediated by a number of factors that stand between the availability of services and actual effective service usage or coverage
- ➔ The Tanahashi framework can be used to analyze health service coverage
- ➔ The first three levels of this framework have a strong geographic dimension.



Tanahashi framework (1978)²

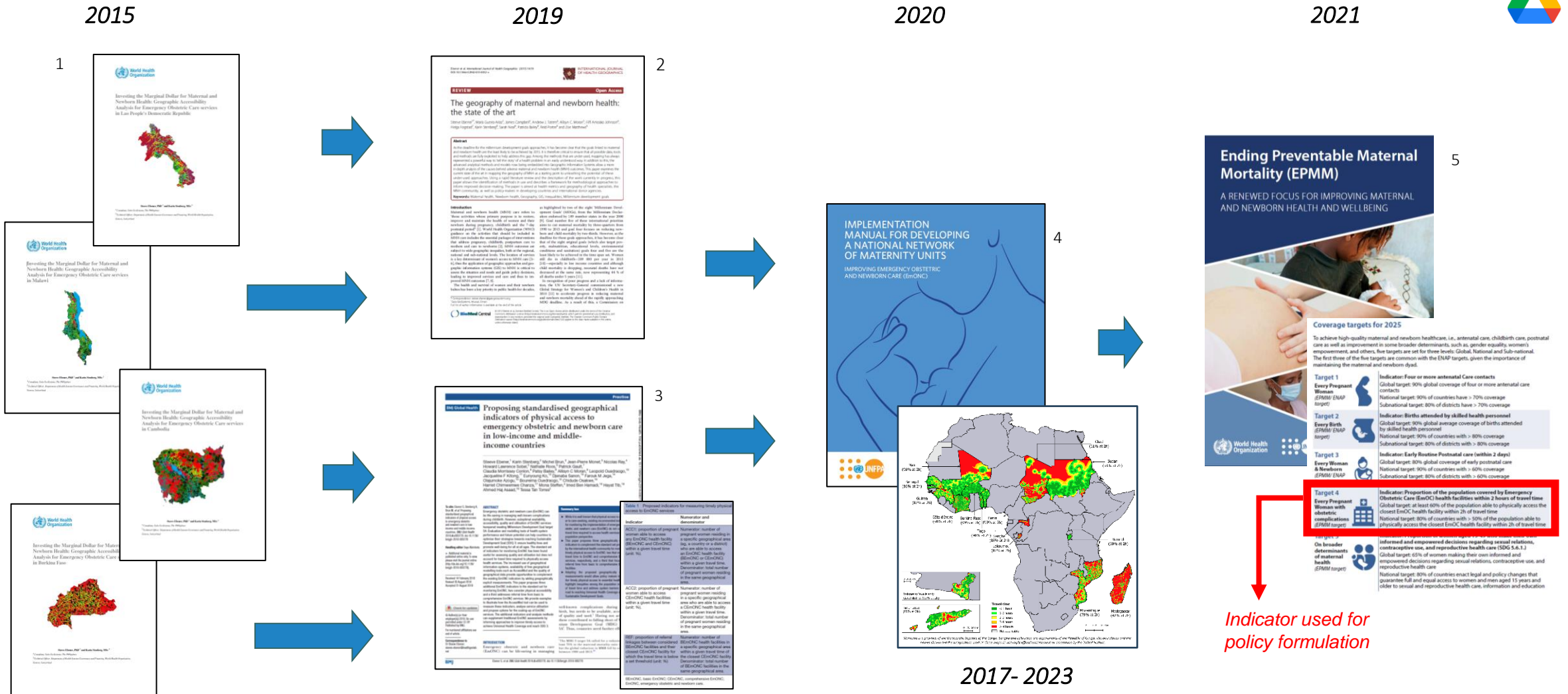
1. [https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-\(uhc\)](https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-(uhc))
2. <https://www.adb.org/publications/geography-universal-health-coverage>

Policy development



- ➔ A map is a powerful media to visualize and analyze the spatial distribution of public health related issues at this at all levels.
- ➔ Support informed decision making and policy development

Policy development – Reference indicators



- <https://www.accessmod.org/>
- <https://iis-healthgeographics.biomedcentral.com/articles/10.1186/s12942-015-0012-x>
- https://gh.bmj.com/content/4/Suppl_5/e000778.info

- <https://www.unfpa.org/featured-publication/implementation-manual-developing-national-network-maternity-units>
- <https://www.who.int/publications/i/item/9789240040519>

To summarize

- ➔ Geography plays a key role in public health by offering :
- A neutral “platform” for the integration, visualization, and analysis of data coming from different sources
 - A “tool” to support geographically-based decision making and therefore a more systemic and systematic approach to solving public health challenges
- ➔ Geography is an important dimension that should be captured in any health-related information system

Geospatial data and technologies

Geospatial data

Also referred to as spatial data, information about the locations and shapes of geographic features and the relationships between them, usually stored as coordinates and topology.

➔ Digital representation of geography (content)

Geospatial technologies

Refers to equipment used in visualization, measurement, and analysis of earth's features, typically involving such systems as Global Navigation Satellite System (GNSS), Geographical Information Systems (GIS), remote sensing (RS) and new emerging technologies like Common Geo-Registries (CGR)

➔ Tools used to visualize, analyse and/or model geography and geographic phenomena in a digital form

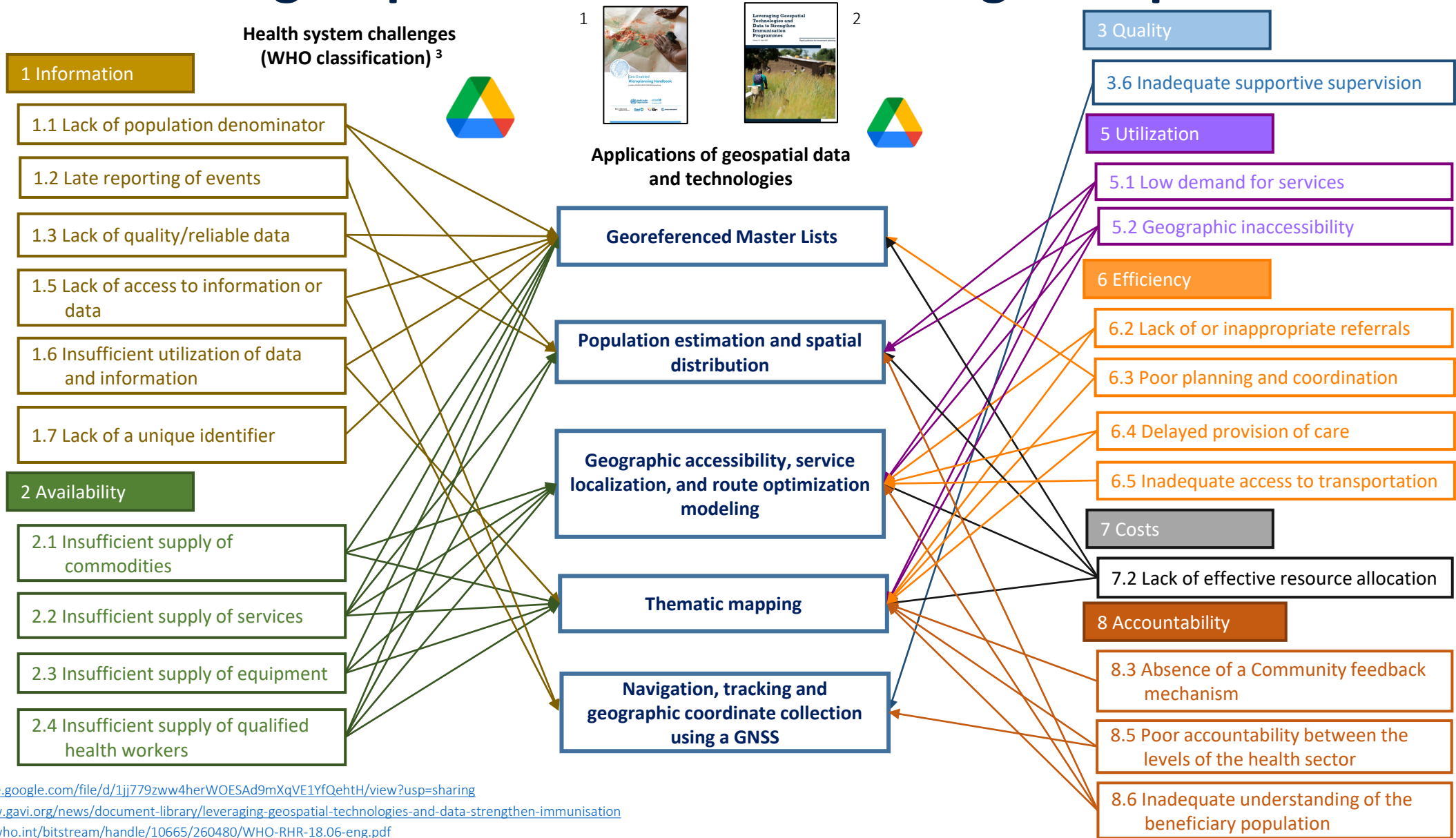
➔ Contributes to the digitalization of the health system

The most important use cases of geospatial data and technologies in public health

1. **Planning:** Estimating population coverage, expanding the network of health facilities, optimizing routes
2. **Communicable/vector-borne diseases:** Risk mapping, microplanning, estimating population movements, identifying potential areas of reinfection, surveillance, monitoring, investigation and management of outbreaks,...
3. **Immunization :** Microplanning, campaign monitoring, disease surveillance, immunization coverage modelling,...
4. **Emergency Management:** Hazard and risk assessment/reduction, early warning, rapid initial assessment, response management, reconstruction planning,...

5 main applications supporting these use cases: Georeferenced master lists, thematic mapping, population estimation and spatial distribution, geographic accessibility modelling, GNSS navigation and tracking

Potential of geospatial data and technologies in public health



1. <https://drive.google.com/file/d/1jj779zww4herWOESAd9mXqVE1YfQehtH/view?usp=sharing>
 2. <https://www.gavi.org/news/document-library/leveraging-geospatial-technologies-and-data-strengthen-immunisation>
 3. <https://iris.who.int/bitstream/handle/10665/260480/WHO-RHR-18.06-eng.pdf>

Georeferenced master lists

Unique, authoritative, officially curated by the mandated agency, complete, up-to-date and uniquely coded list of all the active (and past active) records for a given type of geographic feature/object (e.g. health facilities, administrative units, villages)

➔ The information that allows to do the following for each of the records in the master list:

- Uniquely identify (unique identifier, name)
- Classify (type, ownership,...)
- Locate (address, administrative division, geographic coordinates)
- When it applies, contact (head name, phone number, email address,...)

Example for health facilities

Unique ID	Health facility name
HF0013	San Juan Referral Hospital

Health facility type	Owernship
Referral Hospital	Government

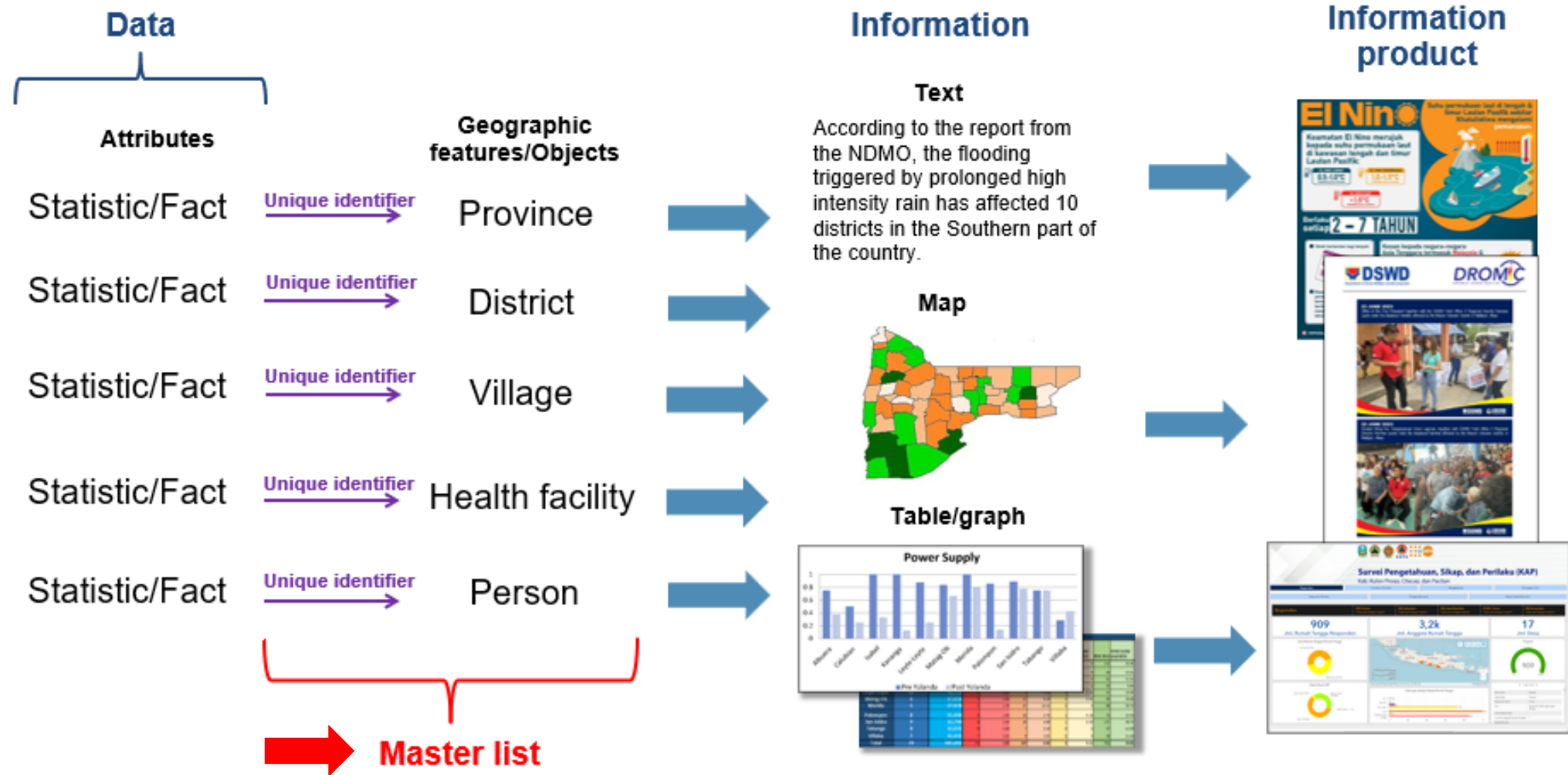
Address	Province code	Province Name	Latitude	Longitude
20, St Andreas Street	TLK01	Andustar	14.412830	121.033090

Head name	Head position	Phone number
Horm Mada	Director	+99 97 11477917

➔ Any other data element is to be considered programmatic attributes and managed outside the master list

Georeferenced master lists – Role

Their place in the data to information products continuum



Georeferenced master lists – Role

They play a key role to ensure data quality across the 6 dimensions of data quality and this for both statistical and spatial data

Data quality dimension	The role of the master list is to ensure that:
Completeness	there are no data gaps
Uniqueness	there are no duplicates
Timeliness	the data represent the reality for each considered point in time
Validity	the syntax of the data element is respected across sources (format, name,...)
Accuracy	The data correctly describe the “real world” feature or event being described
Consistency	data is interoperable between sources

- ➔ Reduce duplication of efforts and therefore cost by maintaining only one list instead of several ones
- ➔ Support data interoperability and collaboration across partners as well as promote innovation and data use
- ➔ Provide the denominator for the implementation of any programs or intervention

Georeferenced master lists – Examples (Philippines)



Philippine Standard Geographic Code (PSGC)
<https://psa.gov.ph/classification/psgc>

Master list of administrative units of the Philippines maintained by the Philippine Statistics Authority (PSA)

Released quarterly down to the 4th subnational level (42,001 Barangays as of 31 December 2023)

A	B	C	D
10-digit PSGC	Name	Correspondence Code	Geographic Level
010000000	Region I (Ilocos Region)	01000000	Reg
010280000	Ilocos Norte	01280000	Prov
010280100	Adams	01280100	Mun
0102801001	Adams	012801001	Bgy
010280200	Bacarra		
0102802001	Bani		
0102802002	Buyon		
0102802003	Cabaruan		
0102802004	Cabulalaan		
0102802005	Cabusigan		
0102802006	Cadaratan		
0102802007	Calioet-Libong		
0102802008	Casilian		
0102802009	Corocor		

A	B	C	D	E	F
Region/Province/Municipal/Bgy. Name	Unit Type	New Code	Mother Unit/Old Name	Old Code	Description/Legal basis
Province of Zamboanga Sibugay, Region IX	Newly created province	09830000			RA 8973
Municipality of Alicia, Zamboanga Sibugay	Transferred Municipality	09830100	Zamboanga del Sur	09730100	RA 8973
Municipality of Buug, Zamboanga Sibugay	Transferred Municipality	09830200	Zamboanga del Sur	09730400	RA 8973
Municipality of Diplahan, Zamboanga Sibugay	Transferred Municipality	09830300	Zamboanga del Sur	09733900	RA 8973
Municipality of Imelda, Zamboanga Sibugay	Transferred Municipality	09830400	Zamboanga del Sur	09733600	RA 8973
Municipality of Ipi, Zamboanga Sibugay	Transferred Municipality	09830500	Zamboanga del Sur	09730900	RA 8973
Municipality of Kabasalan, Zamboanga Sibugay	Transferred Municipality	09830600	Zamboanga del Sur	09731000	RA 8973
Municipality of Mahuhay, Zamboanga Sibugay	Transferred Municipality	09830700	Zamboanga del Sur	09731400	RA 8973
Municipality of Malangas, Zamboanga Sibugay	Transferred Municipality	09830800	Zamboanga del Sur	09731600	RA 8973
Municipality of Naga, Zamboanga Sibugay	Transferred Municipality	09830900	Zamboanga del Sur	09732000	RA 8973
Municipality of Olotanga, Zamboanga Sibugay	Transferred Municipality	09831000	Zamboanga del Sur	09732100	RA 8973
Municipality of Payao, Zamboanga Sibugay	Transferred Municipality	09831100	Zamboanga del Sur	09733500	RA 8973
Municipality of Roseller Lim, Zamboanga Sibugay	Transferred Municipality	09831200	Zamboanga del Sur	09734200	RA 8973
Municipality of Say, Zamboanga Sibugay	Transferred Municipality	09831300	Zamboanga del Sur	09732600	RA 8973
Municipality of Tuluan, Zamboanga Sibugay	Transferred Municipality	09831400	Zamboanga del Sur	09733400	RA 8973
Municipality of Titay, Zamboanga Sibugay	Transferred Municipality	09831500	Zamboanga del Sur	09732900	RA 8973
Municipality of Tungawan, Zamboanga Sibugay	Transferred Municipality	09831600	Zamboanga del Sur	09733100	RA 8973

Summary of changes



National Health Facility Registry v3.0
<https://nhfr.doh.gov.ph/Home>

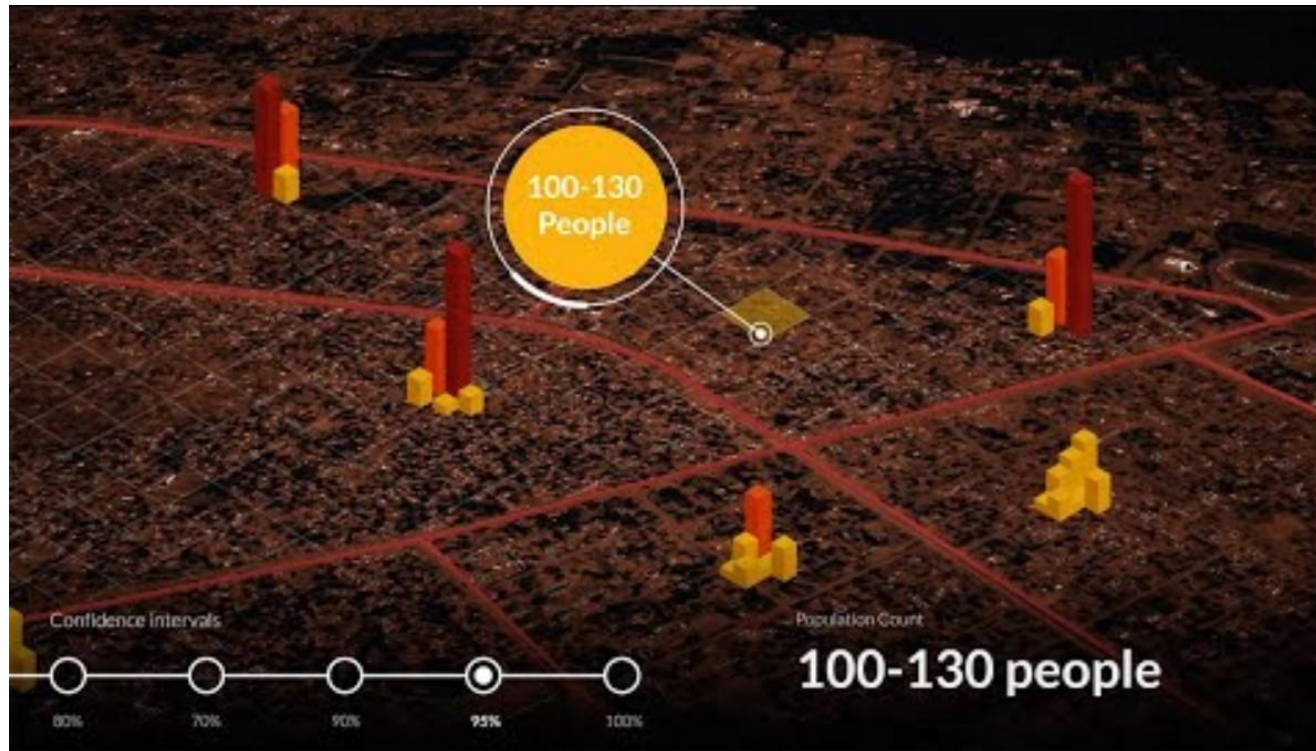
Master list of health facilities in the Philippines maintained by the Department of Health (DOH)

Updated on a regular basis (40,328 health facilities as of 01 April 2024)

A	B	C	D	E	F	G
Health Facility Code	Health Facility Code Short	Facility Name	Facility Major Type	Health Facility Type	Ownership Major Classification	Ownership Sub-Classification for Government facilities
DOH000000000047902	47902	A.E. PACIO QUALIHEALTH MEDICAL CLINIC AND LABORATORY	Health Facility	General Clinical Laboratory	Private	
DOH000000000047962	47962	A.G.S. DIAGNOSTIC & DRUG TESTING LABORATORY	Health Facility	General Clinical Laboratory	Private	
DOH000000000005343	5343	AB-ABUT BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit
DOH000000000002371	2371	ABACCAN BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit
DOH0000000000034007	34007	ABANON BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit
DOH000000000002667	2667	ABLAN SARAT BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit
DOH0000000000036878	36878	ABONANGAN BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit
DOH0000000000034093	34093	ABOT-MOLINA BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit
DOH0000000000046041	46041	ABUOR BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit
DOH0000000000012711	12711	ABUT BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit
DOH0000000000013909	13909	ACAO BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit
DOH0000000000048879	48879	ACCU HEALTH DIAGNOSTICS	Health Facility	General Clinical Laboratory	Private	
DOH0000000000047903	47903	ACCULFE MEDICAL LABORATORY	Health Facility	General Clinical Laboratory	Private	
DOH0000000000047985	47985	ACCURA-TECH DIAGNOSTIC LABORATORY	Health Facility	Drug Testing Laboratory	Private	
DOH0000000000025981	25981	ACNAM BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit
DOH0000000000011713	11713	ACOP BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit
DOH0000000000047984	47984	ACULAB DRUG TESTING CENTER	Health Facility	Drug Testing Laboratory	Private	
DOH0000000000004172	4172	ADAMS MUNICIPAL HEALTH OFFICE	Health Facility	Rural Health Unit	Government	Local Government Unit
DOH0000000000032212	32212	ADAMS RURAL HEALTH UNIT BIRTHING FACILITY	Health Facility	Birthing Home	Government	
DOH0000000000030319	30319	AG-AGRAO BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit
DOH0000000000029922	29922	AG-AGUMAN BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit
DOH0000000000017784	17784	AGAGA BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit
DOH0000000000036465	36465	AGAT BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit
DOH0000000000036890	36890	AGDAO BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit
DOH0000000000036606	36606	AGGAY BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit
DOH0000000000036829	36829	AGNO BARANGAY HEALTH STATION	Health Facility	Barangay Health Station	Government	Local Government Unit

Population estimation and spatial distribution

Use of statistical models, remote sensing datasets, and sampled census or household survey information to create spatially accurate estimates of population density and distribution, often including age and sex disaggregation

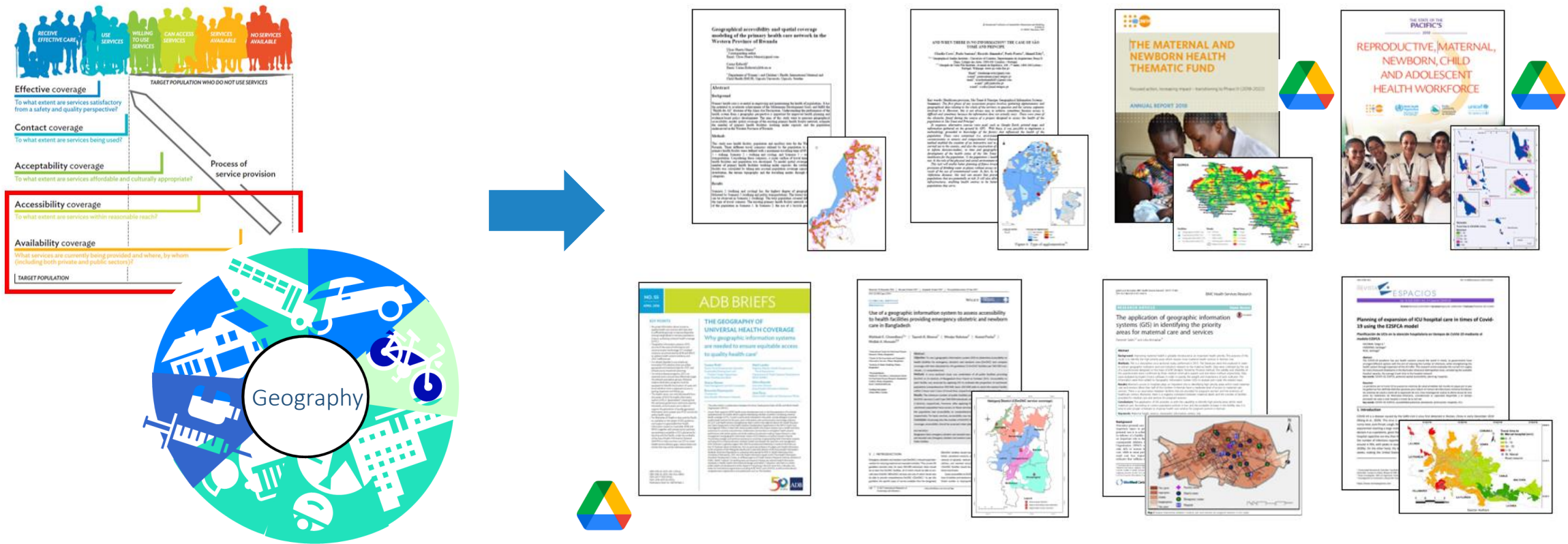


<https://www.youtube.com/watch?v=Z1XrHOt8w2A&t=8s>

Geographic accessibility, service localization, and route optimization modeling

Advanced modelling approaches that help programs, and microplanning teams, assess and improve the planning, allocation and delivery of resources

Geographic accessibility, service localization

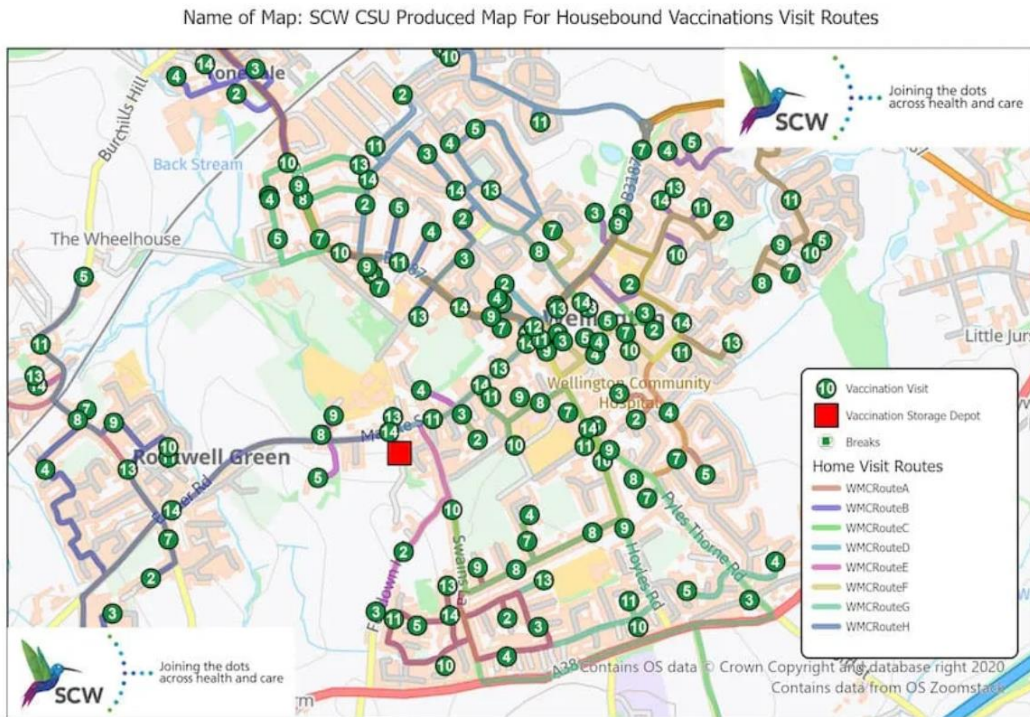


Increasing bibliography on this topic, including in relation to COVID-19

Geographic accessibility, service localization, and route optimization modeling

Route optimization modeling

Use of algorithms to calculate optimal routes based on various factors such as traffic flow, distance, travel time, vehicle types and other use-defined parameters to generate the most efficient route for a given scenario

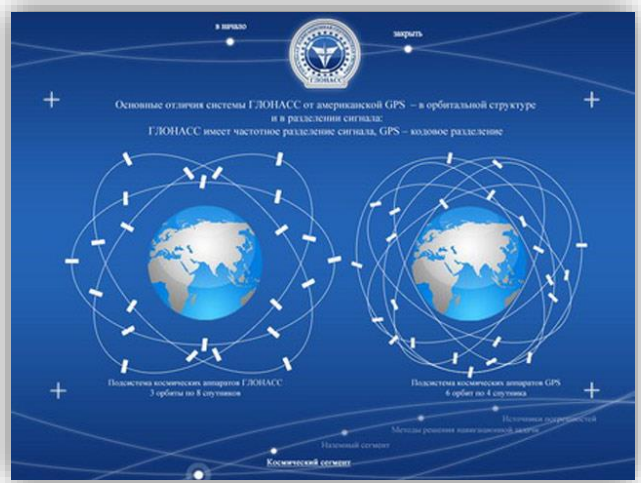


Benefits:

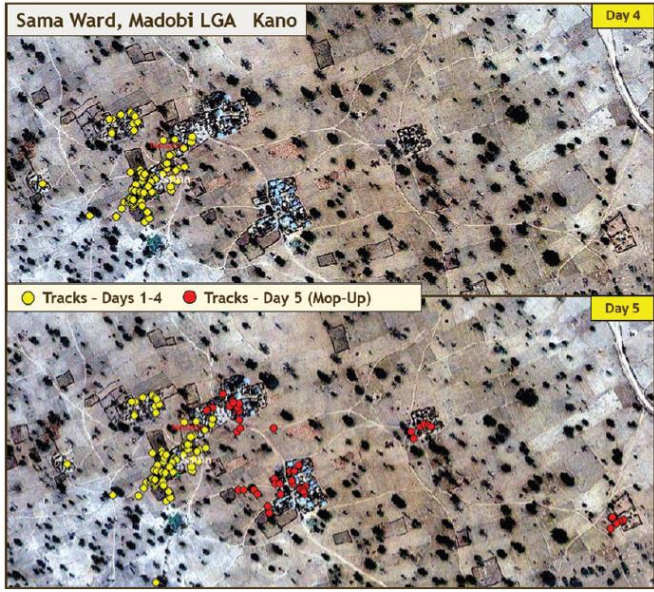
1. Cost efficiency (reduce fuel consumption, maintenance costs, operational expenses)
2. Time saving (on-time delivery)
3. Improved resource allocation (vehicles, personnel and time)
4. Environmental sustainability (reduce carbon emissions)

Navigation, tracking and geographic coordinate collection using a GNSS

Use of a Global Navigation Satellite System (GNSS) enabled device to get to a particular location (navigate), track movements or collect geographic coordinates (latitude, longitudes) in the field



Navigation



Tracking to support Polio eradication in Nigeria ¹

Collection of geographic coordinates in the field

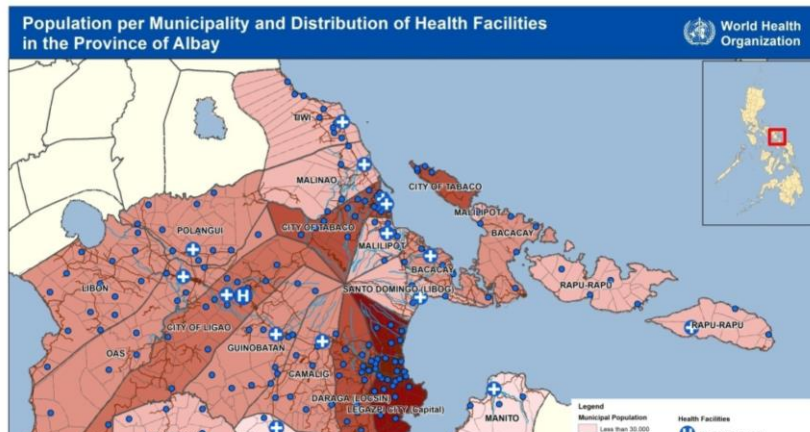


Global Navigation Satellite System (GNSS)

1. <https://www.researchgate.net/publication/266945980> Improving Polio Vaccination Coverage in Nigeria Through the Use of Geographic Information System Technology/figures?lo=1

Thematic mapping

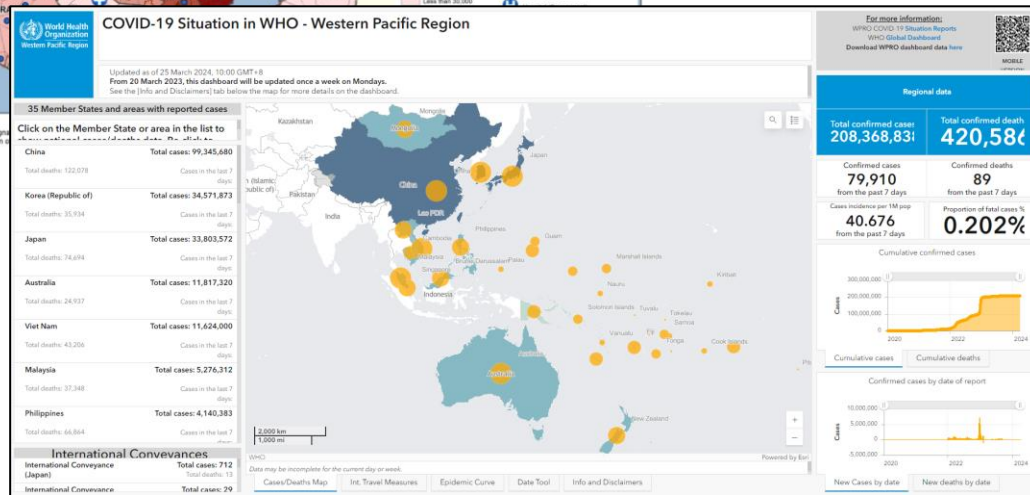
Creation of thematic maps designed to convey information about a single topic or theme, such as population density or health



Static map

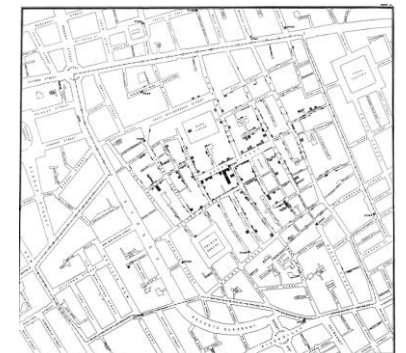
Most used capability of a GIS software to portray the geographic distribution of one or more phenomena.

Involves the use of colors and/or symbols to visualize selected properties of geographic features.



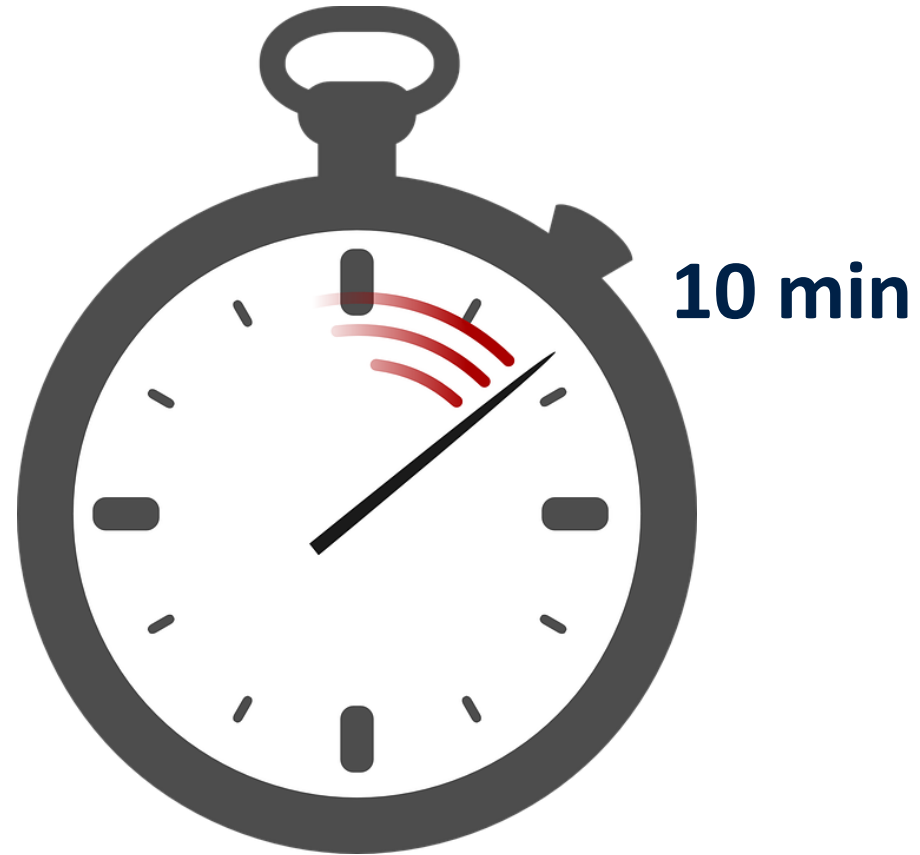
Dynamic map as part of a dashboard

Used in public health for a very long time for visualizing and analyzing health-related Phenomena.



John Snow's cholera map in London (published in 1854)

Short break



Geo-enabling the Health Information System, programs or interventions training workshop for Asia Pacific

...and beyond

Session 2: Examples of application of geospatial data and technologies in public health

Planning - Accessibility analysis (Vanuatu)

Objective

Ensure that the population has equitable geographic access to primary health care services

Method

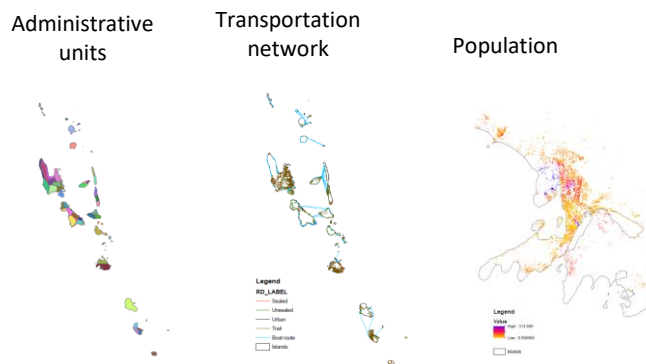
- Data compilation, quality assessment and improvement
- Use of AccessMod to conduct different analysis aiming at evaluating the current level of accessibility of primary health care services, service referral and propose solutions for scaling up
- Technical capacity strengthening

Reference:

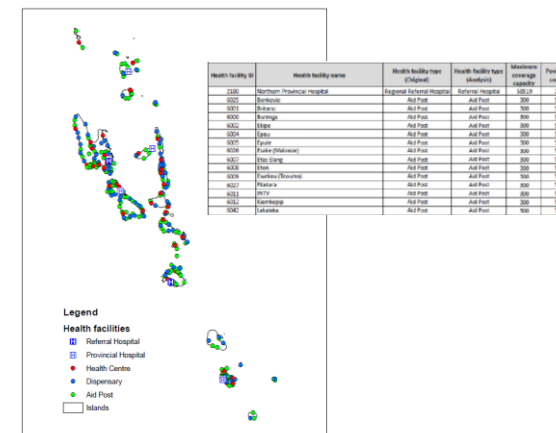
https://healthgeolab.net/KNOW_REP/Acc_Analysis_VUT_050224_FINAL.pdf



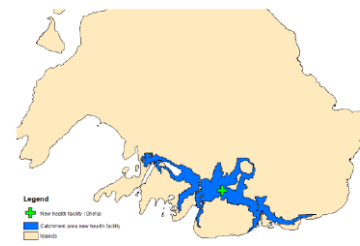
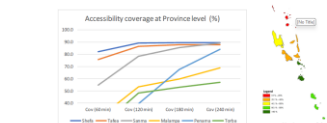
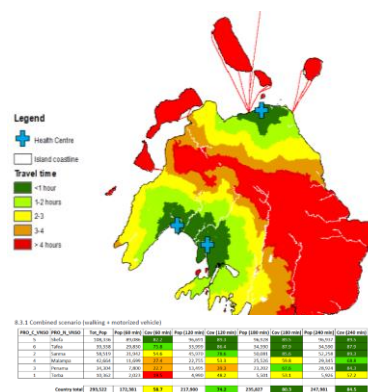
Result



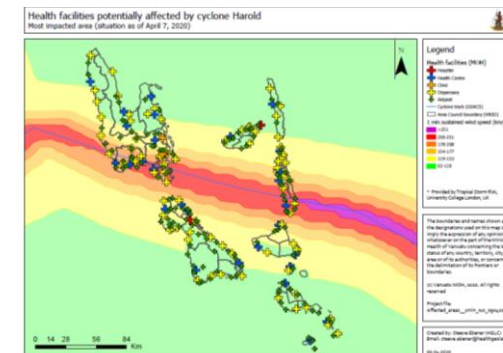
Improved geospatial data that can be used to support other programs



Updated georeferenced master list of health facilities



Accessibility analysis including scaling up scenarios

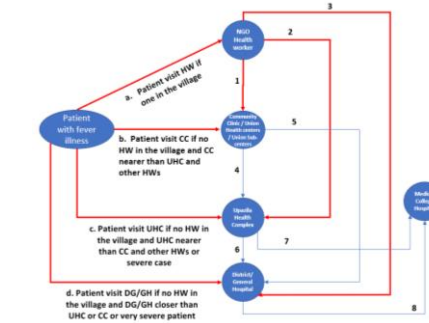


Rapid impact assessment maps to support the response to cyclone Harold 2020

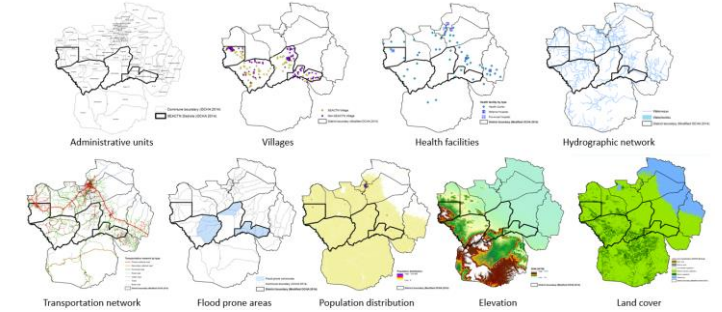
Planning - South and Southeast Asia Community-based Trials Network (SEACTN) (Bangladesh, Cambodia, Lao PDR)

Project implemented by MORU. Objectives of the accessibility analysis component is to guide the implementation of the SEACTN programme by:

- Estimating the proportion of the total population that can physically access the different level of the existing health service delivery network within a given travel time (1, 2, 3 hours);
- Identify areas which are hard to reach and where there is currently no SEACTN village health workers;
- Estimating travel time between each SEACTN village (existing and proposed) and the nearest health facility; and
- Defining the location of potential sites for new health facilities to increase population coverage and reduce the referral time between SEACTN villages and the nearest health facility.



Understand the referral pathways



Prepare the data for the accessibility analysis

Questionnaire for Accessibility Analysis
Where to get information: Office, to be collected in the field, Local authority, Health worker/professionals, LHM

This questionnaire will be used to collect the relevant information for creating the village profile. There are 4 different sections in the questionnaire for accessibility analysis. Each of the section has multiple questions to answer.

Section 1: SEACTN Site Location

1.1. SEACTN study site number _____ 1.2. Village Name _____ 1.3. Village Code _____
1.4. District Name _____ 1.5. District Code _____
1.6. Province Name _____ 1.7. Province Code _____

Section 2: Village context

What is the average elevation of the village? _____ (meters) (to be collected from the desk research)
What is the area of the village? _____ (to be collected from the desk research)

Village structure - Which area of these types best describes the layout of the village (choose the one that applies best) (to be collected from the desk research)

Clustered (settlement mostly discernible in patchy grouping areas - in this type of village, homes of farmers and artisans are clustered together)

Linear (houses built on parallel rows with each house surrounded by small gardens - the paddy fields are usually at a distance from the house)

Dispersed (houses scattered with no definite pattern or shape)

Mixed (mix between the clustered and dispersed village structure - usually a larger compact settlement of houses which is surrounded by a few small hamlets at a distance)

2.1. What type of communication routes exist between households in the village (multiple options can be selected)? (None)

Paved road
 Unpaved road
 Paved path/trail
 Unpaved path/trail
 Waterway
 Other (specify) _____

Section 3: Physical context

On which main landforms does research/locate area?

In a plain
What is the main type of terrain?

Class	Label	Speed (km/h)	Mode of travel
1	Bare area	3.6	WALKING
2	Built-up area	3.6	WALKING
3	Low density vegetation	2.9	WALKING
4	Medium density vegetation	2.2	WALKING
5	Dense vegetation	1.5	WALKING
1001	Primary national road	3.6	WALKING
1002	Secondary national road	3.6	WALKING
1003	Provincial road	3.6	WALKING
1004	Rural road	3.6	WALKING
1005	Urban road	3.6	WALKING
1006	Track	3.6	WALKING

Validate travel scenario through village profiling survey

Accessibility to the nearest village with a VMW as of July 2023 – Dry season (walking scenario)

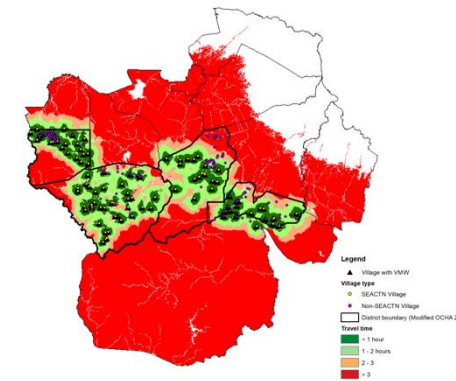


Percentage of population within 1, 2, or 3 hours of travel time:

District	Population coverage per travel time		
	1 hour	2 hours	3 hours
Pailin	98.2	100.0	100.0
Samlout	67.5	95.9	99.4
Rukh Kiri	44.1	84.1	99.3
Koas Krala	20.3	61.4	67.7

Number of SEACTN and non-SEACTN villages by travel time to VMW:

Travel time	SEACTN village	Non-SEACTN village
Less than 1 hour	80	80
Between 1 and 2 hours	1	30
Between 2 and 3 hours	0	13
More than 3 hours	0	11
Total	81	134



Conduct the different analysis using AccessMod

Reference: <https://seactn.org/>

Planning - Prioritization of EmONC services (Indonesia)

Objective

UNFPA has been using GIS-based approach to help countries establish or prioritize their national network of Maternity Units, especially EmONC services

Method

- Data compilation, quality assessment and improvement
- Technical capacity strengthening
- Consultation to define local parameters
- Use of AccessMod to conduct different analysis aiming at evaluating the current level of accessibility of EmONC services and test different scenarios to prioritize health facilities for a cost-effective delivery of services

Reference: <https://www.unfpa.org/featured-publication/implementation-manual-developing-national-network-maternity-units>

Result

Garut district

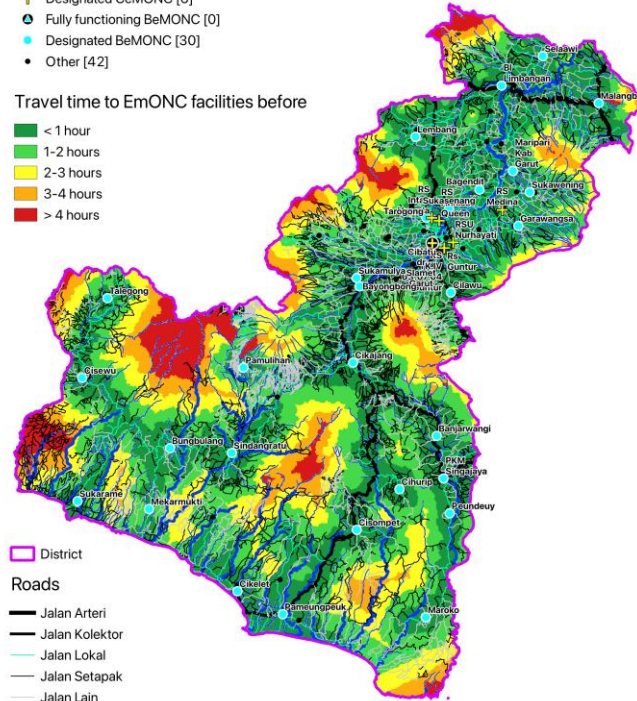
Health facilities [79]

- Fully functioning CeMONC [1]
- Designated CeMONC [6]
- Fully functioning BeMONC [0]
- Designated BeMONC [30]
- Other [42]

Travel time to EmONC facilities before

- < 1 hour
- 1-2 hours
- 2-3 hours
- 3-4 hours
- > 4 hours

- District
- Roads
 - Jalan Arteri
 - Jalan Kolektor
 - Jalan Lokal
 - Jalan Setapak
 - Jalan Lain
- Hydrography
 - Main River
 - River
 - Lake



Before prioritization (37 EmONC)
 82.5% pop coverage in 1 hour
 95% pop coverage in 2 hours

Garut district

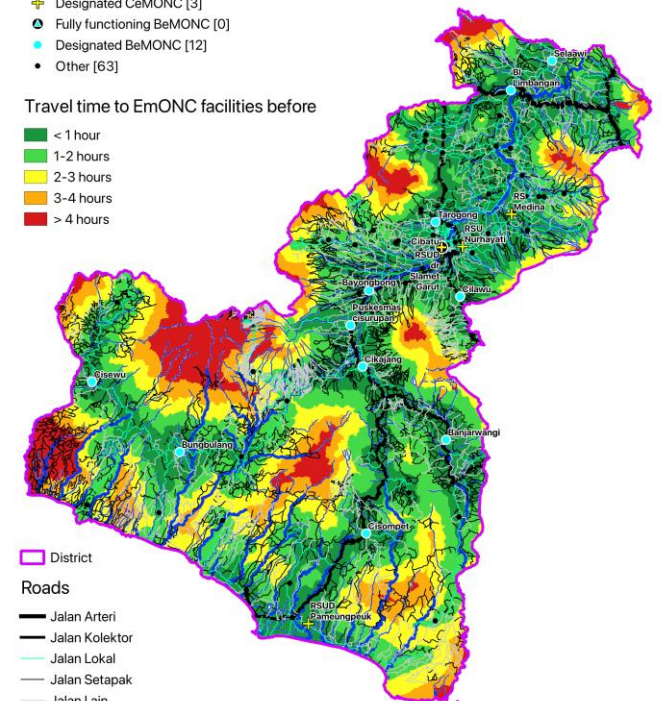
Health facilities [79]

- Fully functioning CeMONC [1]
- Designated CeMONC [3]
- Fully functioning BeMONC [0]
- Designated BeMONC [12]
- Other [63]

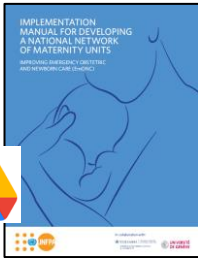
Travel time to EmONC facilities before

- < 1 hour
- 1-2 hours
- 2-3 hours
- 3-4 hours
- > 4 hours

- District
- Roads
 - Jalan Arteri
 - Jalan Kolektor
 - Jalan Lokal
 - Jalan Setapak
 - Jalan Lain
- Hydrography
 - Main River
 - River
 - Lake



After prioritization (16 EmONC)
 77% pop coverage in 1 hour
 93% pop coverage in 2 hours

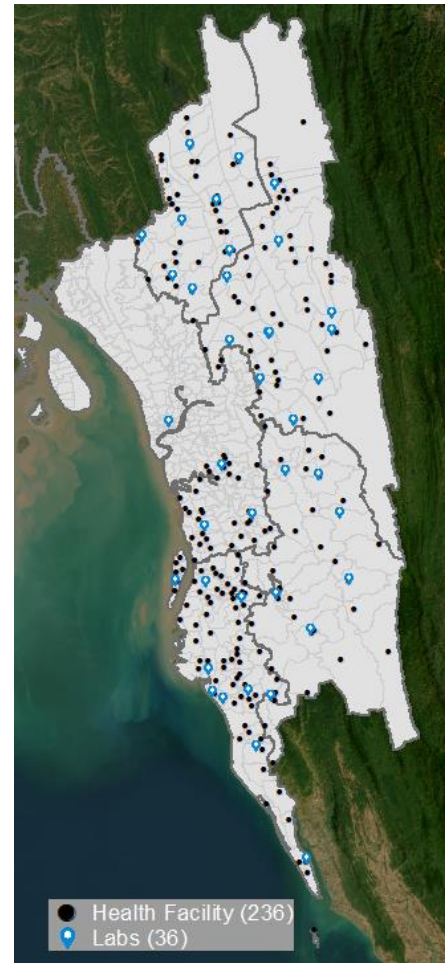


Planning - Diagnostic Network Optimization (DNO) (Bangladesh)

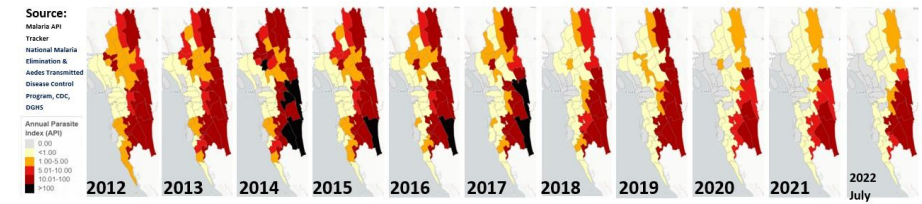
MORU and GroupMappers have been supporting the National Malaria Elimination Programme (NMEP) with the use of the OptiDx tool to model an evidence-based strategy for introducing G6PD diagnosis that best uses available resources to optimise access to testing by *P. vivax* patients

Objectives:

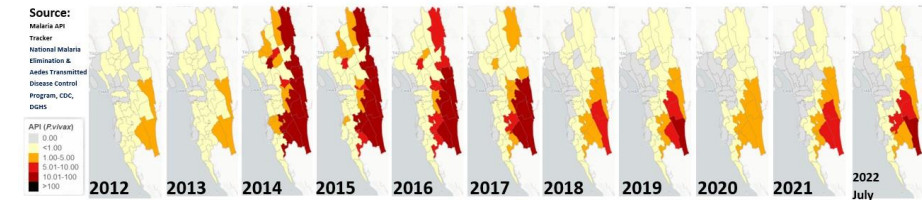
- Assemble a comprehensive geospatial database of:
 - Health system infrastructure
 - *P. vivax* case loads
 - Economic cost associated with *P. vivax* disease and case-management in Bangladesh
- Model the coverage and cost of potential scenarios for introducing G6PD testing
- Prepare DNO outputs that can be included into strategic and operational plans and funding proposals by NMEP



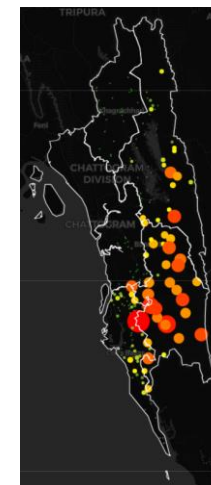
Malaria Annual Parasite Index (API) in Bandarban, Chattogram, Cox's Bazar, Khagrachari & Rangamati from 2012 to 2022



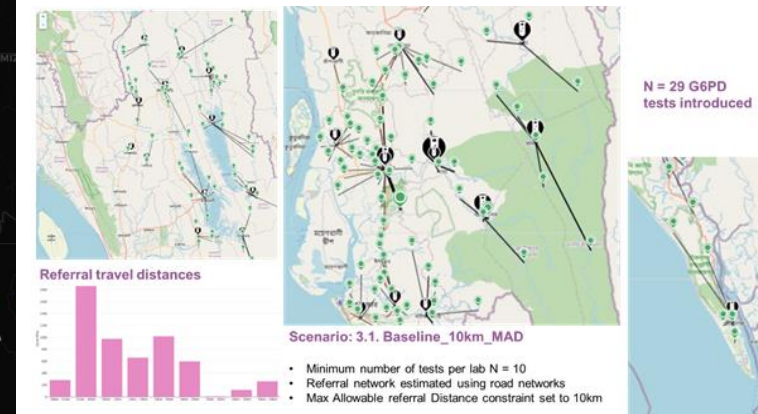
Malaria API (*P.vivax*) in Bandarban, Chattogram, Cox's Bazar, Khagrachari & Rangamati from 2012 to 2022



Demand



Results



Communicable/Vector-borne diseases - Thematic mapping (Philippines, Lao PDR)

Thematic maps are being used to help visualizing the spread of diseases by different programs in countries

The Philippines has been using thematic maps to look at the distribution of dengue incidence at the subnational level, allowing to identify areas at risk and enables faster mobilization of resources.

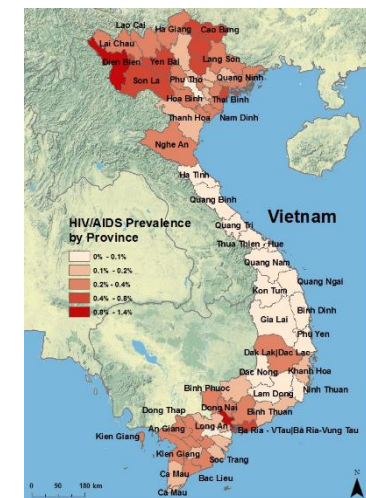
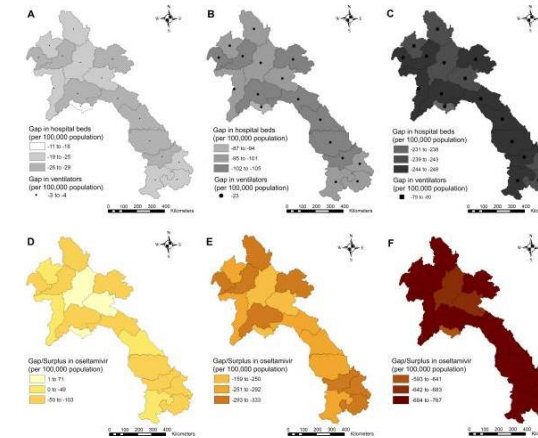
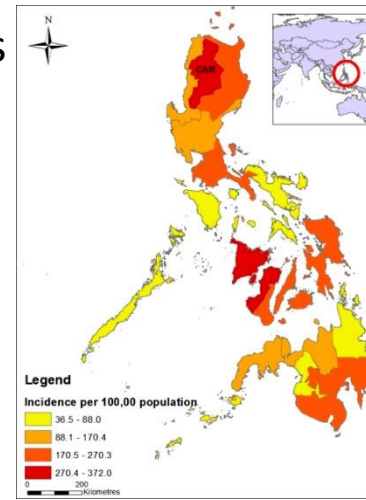
Reference: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3335676/pdf/tropmed-86-753.pdf>

Thematic maps have also been used to support health care planning for pandemic influenza in Lao PDR. By exporting simulation results into GIS software, maps geographical analysis of the distribution of resources.

Reference: Stein *et al.* *BMC Public Health* 12: 870 (2012) doi:10.1186/1471-2458-12-870

Vietnam has been using thematic maps to show prevalence of HIV/AIDS cases per province, show the correlation of HIV cases with Tuberculosis cases (as TB is one of causes of death among HIV infected people), and the relationship between the increase of infection and number of clinics in certain areas.

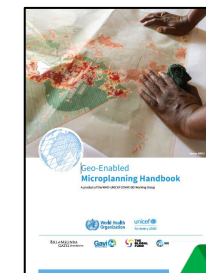
Reference: http://sites.tufts.edu/gis/files/2013/11/Wanlund_Anne.pdf



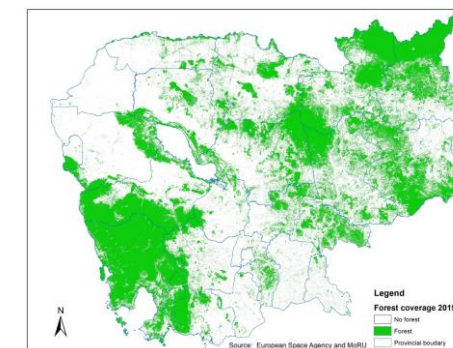
Vector borne diseases - Malaria stratification (Cambodia)

The National Center for Parasitology, Entomology and Malaria Control (CNM) with MORU's support has been working on geo-enabling the microplanning of its malaria programme

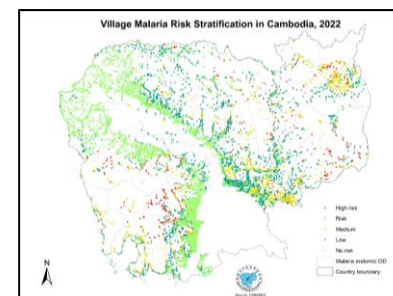
Checking, correcting and updating the list and location of villages and health facilities as well as the boundaries of the Operational Districts for the Malaria endemic areas



ESA analysed imagery using ground truthing data collected by MORU and CNM to generate a new forest cover map



Stratifying malaria risk at the village level based on average reported API, percentage of forest coverage and distance to the nearest health facility using a tool built in the Malaria Information System




https://www.ajtmh.org/view/journals/tpmd/95/6_Suppl/article-p97.xml


Communicable diseases - Malaria surveillance and risk mapping (Bangladesh)


The National Malaria Elimination Programme (NMEP) with the support of MORU and GroupMappers has been working on increasing the granularity of malaria surveillance and risk mapping

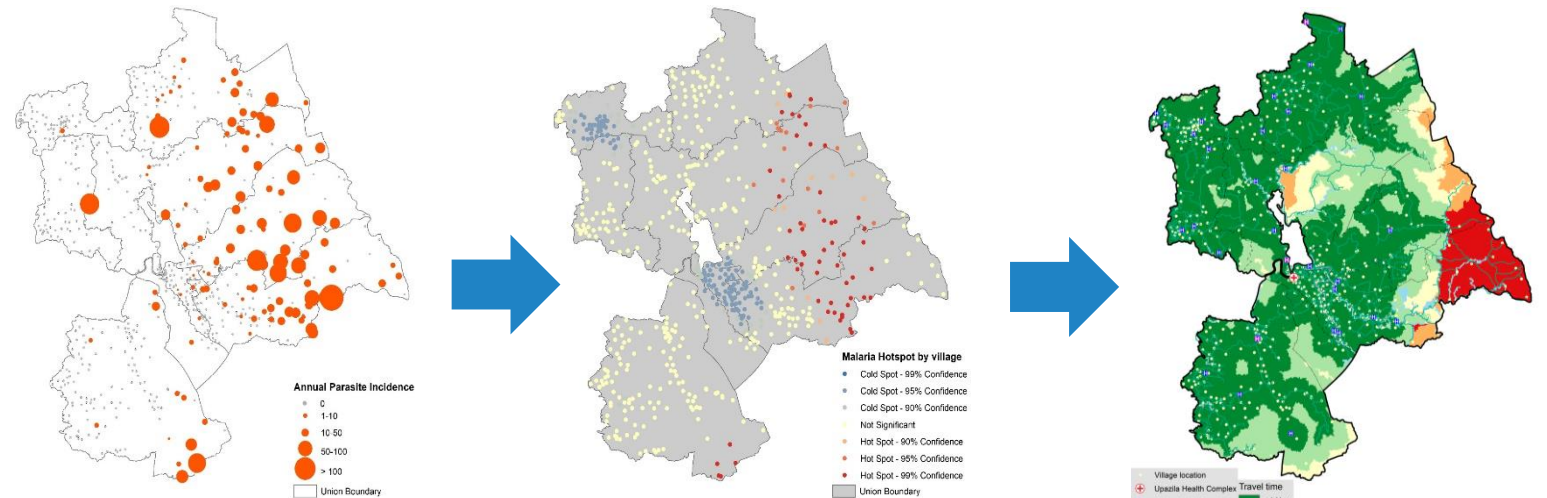
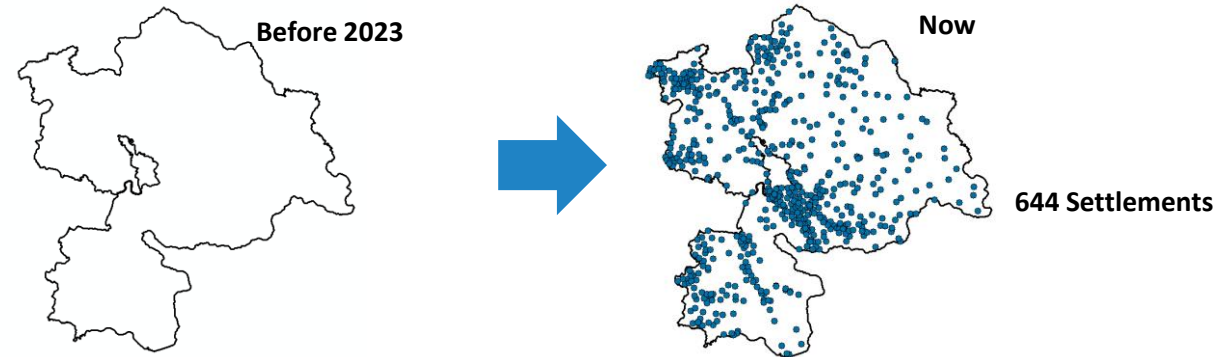
Enhance malaria data by transitioning from the Upazila (sub-district) to the settlement level

 Settlements Mapping

 Health Facilities Mapping

 Digitalized Malaria Data Collection in Bandarban, BD

 Baseline geospatial data for Accessibility Analysis



Settlement level API mapping (fine scale malaria risk)

Malaria hotspot map

Physical accessibility modeling



Immunization - Geo-enabled microplanning (Myanmar)

Objective

Use of geospatial data and technologies to support routine immunization microplanning as well as monitoring and evaluation in 49 townships

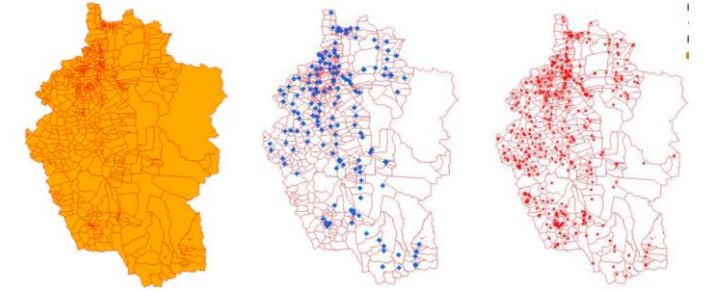
Method

- Documentation of the routine immunization data ecosystem
- Development of the master list of EPI communities, vaccination points and health facilities
- Technical capacity strengthening
- Collaborative mapping exercise with MOHS staff
- Creation of electronic microplanning maps

Reference: <https://bit.ly/3vyUuNL>



Result

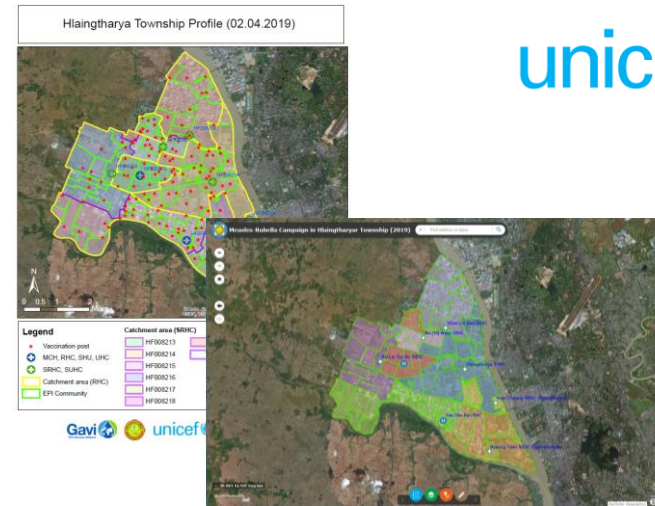


Establish/updated/complete the master list of EPI communities, vaccination posts and health facilities with geographic extent or location

Type	Definition	Population's presence status options
Ward	4th level administrative divisions encountered in urban areas and officially recognized by the GAD	long term
Village	long term settlement officially recognized by the GAD	long term
Army	Settlement managed by the Ministry of Defense	short term, long term, seasonal
Camp	Settlement typically settled for displaced population (refugees or internally displaced population, for example)	
Workers settlement	Settlement setup by workers to live to their place of work (plantation, factory, building site, mining site...)	
Other settlement	Any other inhabited place not cover by the other definitions	

Population presence classification	
PS_T_EN	Definition (English)
Short term	Settlement setup for a period shorter than 1 year
Long term	Settlement setup for a period longer than 1 year
Seasonal	Settlement setup temporarily over the same period every year

New classification of EPI communities



Digital microplanning maps (pdf and online)

Modified routine immunization forms

Immunization - Geo-enabled microplanning (Mozambique)

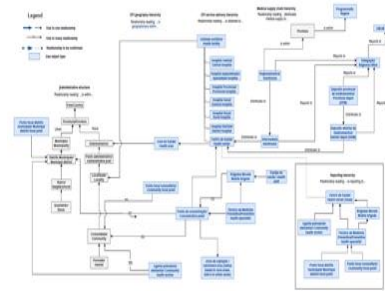
Objective

Geo-enable routine immunization microplanning (implemented in 2 districts and about to be scaled up to another 36 districts)

Method

- Documentation of the routine immunization data ecosystem
- Establishment and validation of the master list of health facilities and concentration points
- Technical capacity strengthening and field data collection
- Use of AccessMod to delimitate proximity basins and estimate population coverage
- Creation of electronic microplanning maps
- Deployment of a Common Geo-Registry

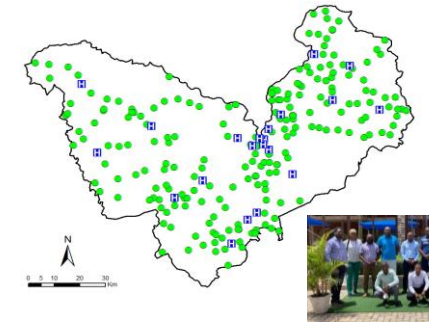
Result



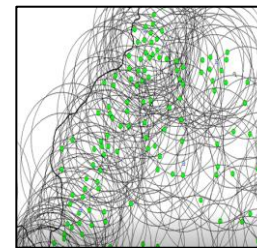
Immunization ecosystem data model

HF_ID	HF_NAME	HF_TYPE_P	HF_TYPE_E
1040106	HOSPITAL CENTRAL	020101 Hospital	
1040106	CS Mocimboa Saude	020102 Centro de Saude Urbano	Urban Health Center
1040107	CS Mocimboa Saude	020102 Centro de Saude Rural	Rural Health Center
1040108	CS Mocimboa Saude	020102 Centro de Saude Rural	Rural Health Center
1040109	CS Mocimboa Saude	020102 Centro de Saude Rural	Rural Health Center
1040110	CS Mocimboa Saude	020102 Centro de Saude Rural	Rural Health Center
1040111	CS P. Antonio (Povoado)	020102 Centro de Saude Urbano	Urban Health Center
1040112	CS Mocimboa Saude	020102 Centro de Saude Rural	Rural Health Center
1040113	CS Mocimboa Saude	020102 Centro de Saude Rural	Rural Health Center
1040114	CS Mocimboa Saude	020102 Centro de Saude Rural	Rural Health Center
1040119			
1040127			
1040138			
1040139			
1040140			
1040141			
1040142			
1040143			
1040144			
1040145			
1040146			
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1040200			

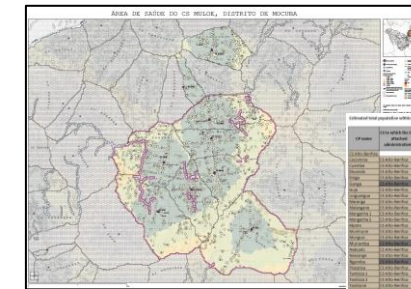
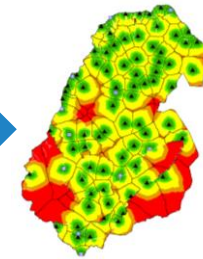
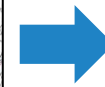
Georeferenced master list of health facilities and concentration points



Field data collection to collect geographic coordinates of health facilities and concentration points



Improved method to estimate population coverage



Microplanning maps and population estimates for the optimization of the concentration point network

Comunidade	População	População Estimada	População Estimada (com pontos de concentração)	População Estimada (sem pontos de concentração)
1	1000	1000	1000	1000
2	2000	2000	2000	2000
3	3000	3000	3000	3000
4	4000	4000	4000	4000
5	5000	5000	5000	5000
6	6000	6000	6000	6000
7	7000	7000	7000	7000
8	8000	8000	8000	8000
9	9000	9000	9000	9000
10	10000	10000	10000	10000

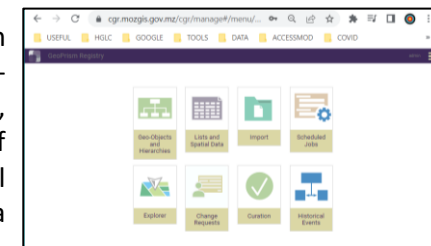
Passo 1.1a. Mapeamento das comunidades e análise de acessibilidade para alcançar todas as comunidades

Comunidade	População	População Estimada	População Estimada (com pontos de concentração)	População Estimada (sem pontos de concentração)
1	1000	1000	1000	1000
2	2000	2000	2000	2000
3	3000	3000	3000	3000
4	4000	4000	4000	4000
5	5000	5000	5000	5000
6	6000	6000	6000	6000
7	7000	7000	7000	7000
8	8000	8000	8000	8000
9	9000	9000	9000	9000
10	10000	10000	10000	10000

Adjustment of the microplanning form



Deployment of the GeoPrism Registry platform (Common Geo-Registry) for the maintenance, regular update and sharing of master list and associated spatial data



Emergency management - Vulnerability and risk analysis (Kosovo, North Macedonia)

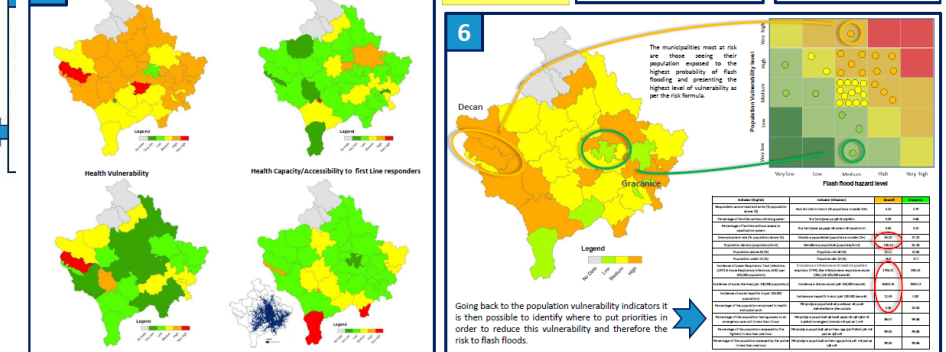
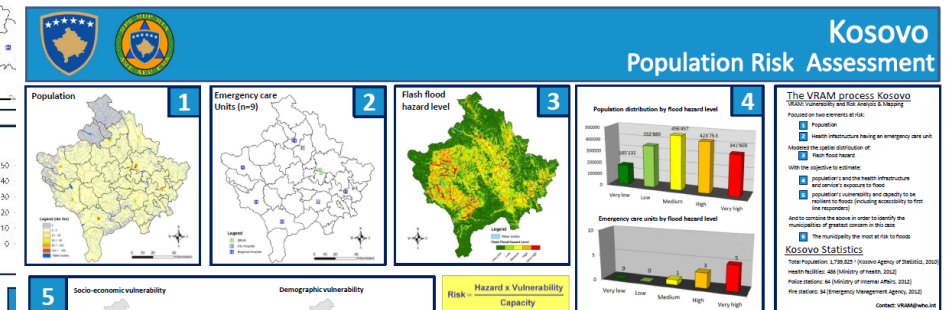
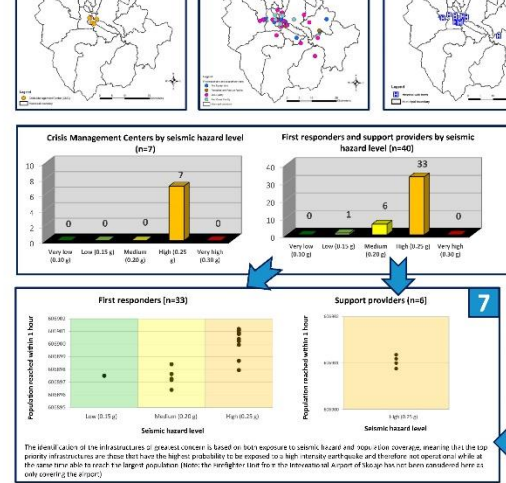
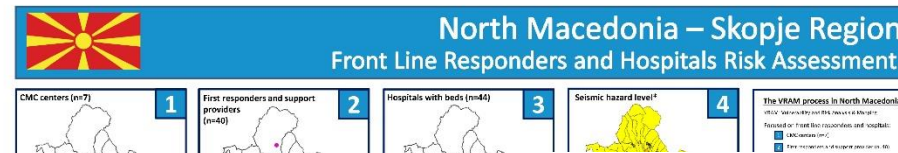
GIS-based methods can be used to conduct geographically-based vulnerability and risk analysis.

The Vulnerability and Risk Analysis & Mapping (VRAM) approach has for example been implemented in different countries (e.g. Kosovo, North Macedonia) to support emergency preparedness of the health sector

Objectives :

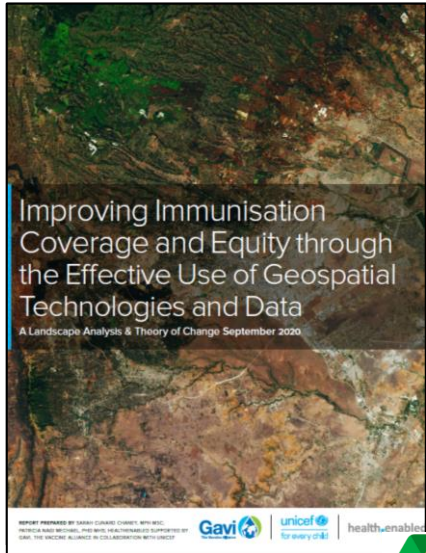
- Identify the health facilities and other infrastructures that will most likely not be operational during a disaster
- Identify the geographic area(s) in which the population is most at risk to experience significant losses

The infrastructures and populations most at risk to experience damages and losses are located in areas where the hazard intensity and vulnerability are the highest and the coping capacity the lowest



Reference: <http://tinyurl.com/ydab3jpd>; <http://tinyurl.com/2s3z2wnn>

Other immunization related use case



Population estimation and spatial distribution with geospatial technologies

The use of statistical models, remote sensing datasets and sampled census information to create spatially accurate and precise estimates of population density and distribution.

How can it improve immunisation outcomes?

Improved population denominator estimation at sub-district levels supports the measurement of programme targets and coverage in a geospatially enabled immunisation programme; improves programme planning for more accurate allocation of resources and reduced waste.

What do you need? Many existing gridded population datasets are freely available for download along with guidance on intrinsic uncertainties and recommendations for use. Effective use of existing datasets or the creation of new model estimates requires technical capacity in geospatial statistics, database systems and computer application technology.

Main challenges: Inherent uncertainties in modelling must be carefully considered. Confidence, awareness and understanding of methods used for estimation are still developing in many national statistical offices and ministries. There is a need for more capacity building and opportunities for national health workforce.

Evidence/resource base: Practical guidance on how to use existing spatially distributed population estimates for immunisation programme planning is needed. Evidence is also needed on how denominators from modelled population estimates and spatial distribution can impact immunisation programme delivery and coverage outcomes.

Microplanning with geospatial technologies

The process of identifying communities, immunisation resources, and geographic features to create operational workplans for immunisation service delivery based on spatially accurate maps.

How can it improve immunisation outcomes?

Spatially accurate maps for local-level service delivery planning can improve coverage and reach of services by identifying all settlements in a given catchment area and ensuring that vaccinator work assignments are realistic and efficient.

What do you need? The validated geospatial data from health systems mapping and spatially distributed population estimates must be combined with local-level settlement names and landmarks to create maps for improved microplanning. Data collection must include stakeholders and leaders at the local level to inform the process.

Main challenges: Initial time and cost to build the capacity and systems for creating digitally enhanced maps for microplanning requires commitment and sustainable resources. Data must be updated regularly to maintain the validity and usefulness of the maps.

Evidence/resource base: Practical guidance is needed for implementing a digitally-enhanced microplanning process. Evidence is needed of the impact on routine immunisation coverage.

Disease surveillance with geospatial technologies

The collection and analysis of geolocated data on disease incidence to identify and respond to outbreaks of vaccine-preventable disease or adverse events following immunisation.

How can it improve immunisation outcomes?

Disease surveillance systems with standardised data collection can improve information sharing and coordination for targeted action in response to outbreaks and contribute to optimised distribution of immunisation program re-sources and services.

What do you need? Beside the technical capacity to develop, maintain and report into a digital platform, the digital data collection must operate within an established system of investigation and response that empowers managers to effectively utilise real-time geospatial data on disease incidence.

Main challenges: Establishing roles and responsibilities for effective data use, outbreak investigation and response; digital data collection should fit into the data reporting workflow and not create parallel reporting systems.

Evidence/resource base: Evidence is needed to understand how integrated geospatial technologies can improve outbreak detection and response.

Vaccinator tracking

The use of global positioning devices to monitor the movement of vaccination outreach teams during campaign or outreach vaccination activities.

How can it improve immunisation outcomes? In combination with validated digital health resource maps and operational microplans, it can help programme managers identify missed settlements and provide rapid corrective action to improve coverage.

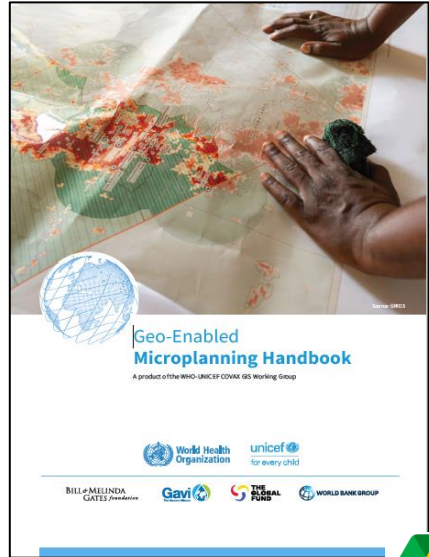
What do you need? A vaccinator tracking system must feed into an established database and user interface containing the health system map and micro-plans with complete settlement lists. Vaccinator tracking builds on top of an established and sustainable system of geospatially enabled immunisation programming.

Main challenges: Mobility tracking can not guarantee that vaccines are delivered. Supportive supervision is required to maintain quality and accountability during campaign and outreach activities. Vaccinator resistance and privacy concerns must be addressed within a system of trust and transparency.

Evidence/resource base: Evidence shows that vaccinator tracking combined with operational microplans can reduce missed settlements.

<https://www.gavi.org/news/document-library/leveraging-geospatial-technologies-and-data-strengthen-immunisation>

Other microplanning related use case



<https://knowledge.unicef.org/resource/geo-enabled-microplanning-handbook>

Annex B

Annex B Use case examples of geo-enabled microplans

Programme Designer	GIS Technical Staff

B1: COVAX use case example

Figure AC: Evolution of a map
(Source: GRID3)

Annex B2

B2: Malaria stratification use case example

Background
As part of Cambodia's aim to eliminate malaria by 2025, the country had found success in using village malaria workers (VMAWs) to diagnose and treat patients in rural areas, along with increasing access to long-lasting insecticide-treated bednets (LLINs). More recently, these interventions have been supplemented by strategies to target high-risk groups, such as forest goers, with mobile malaria workers (MMWs). However, the spread of parasites resistant to artemisinin and later artemisinin combination therapy anti-malarial drugs has threatened to roll back progress made against the disease. Much of the transmission occurs in and around forests where the main mosquito vectors breed, and migrant populations, despite...

Annex B3

B3: Routine immunization/expanded programme on immunization use case example

Background
Rapid urbanisation often outpaces the ability of public health services to provide sufficient routine immunization services in growing cities and emerging urban areas. This was the case in the city of Patna in India's Bihar state, which had a population of 2 million and an annual cohort of 50,000 newborn children. Unfortunately, these infants were grossly underserved by routine immunization services, especially among poor and marginalised populations. According to 2005-2006 surveys, only 32.8% of children in Bihar state had received all basic vaccinations by their first birthday.

Primary reasons for poor vaccination rates in Patna included:

- Limited number of vaccination sites (31), with an average site serving a population of 6,700 and expected to vaccinate 1,600 new infants each year.
- Lack of clearly defined coverage areas, vaccine storage depots and vaccination sites, leading to many unserved areas.
- Insufficient human resources for vaccination, including trained vaccinators and local mobilizers.
- Poorly-organized system for vaccine distribution from storage depots to vaccination sites.

To address these challenges, Patna set out to create a more effective vaccination system to reach more unvaccinated children by using geo-enabled microplanning.

Objective
Public health experts set out to leverage GPS data, satellite imagery, and GIS software, in conjunction with population and human resources data, to identify optimal vaccine storage depots and vaccination sites and to plan more efficient vaccine distribution systems.

Officials aimed to accomplish the following through the geo-enabled microplanning approach:

- Update city maps, as existing maps lacked sufficient detail in recently developed areas.
- Determine a large number of additional vaccination sites that would be easily accessible to the general public. Selected sites had to allow for timely access to vaccines and provide the ability to reach underserved populations.
- Delineate well-defined catchment areas for each vaccine storage depot to ensure efficient planning, reduce overlap of service areas and avoid service gaps.
- Determine efficient vaccine delivery routes, as one vehicle was often deployed to deliver vaccines to multiple sites.
- Address human resource challenges, as there was a lack of vaccinator nurses, community mobilizers and supervisors to cover these growing urban areas.

Stakeholders and Personnel
The Patna Department of Health collaborated with the local Remote Sensing Application Centre at the Department of Science and Technology, to develop a hub-and-spoke model of vaccination for urban areas. Key stakeholders included the District Immunization Officer and the Urban Nodal Immunization Officer, supported by UNICEF and WHO officials. The US Centers for Disease Control (CDC) provided funds to UNICEF's Bihar field office for activity planning and supported data analysis and layering of ground information on GIS maps.

Process and Methods
The intervention was tested in the catchment area of a public hospital, which also served as a vaccine storage depot. This helped fine-tune the process for determining new sites, which was later expanded to other areas. The Patna Public Health Department's geo-enabled microplanning process is outlined below.

- Officials identified nine hospitals of the Patna urban areas as outreach and vaccination hubs based on their location and vaccine storage facilities. Using satellite images, team members collaborated to demarcate the boundaries of each hospital's catchment area. Hospital superintendents were given responsibility for all microplanning vaccination activities in their respective areas.

Annex B4

B4: Polio supplemental immunization activities use case example

Scenario Background
By the end of 2010, Nigeria seemed poised to eliminate polio from the country, with only 21 recorded cases in the year. However, spikes in case numbers over the next two years signalled that the disease was rebounding rather than receding. Health officials were puzzled by the rise in wild poliovirus cases, as vaccination coverage was above 90% for children under the age of five, the threshold required to eliminate the disease.

Nigeria's National Primary Health Care Development Agency (NPHCDA) identified a possible reason for the polio resurgence when officials noticed that the number and location of settlements on the hand-drawn maps at a ward headquarters did not match the a...
Because microplanning for polio vaccin...
any inaccurate or incomplete informati...
many vaccines to areas that did not nee...
opportunity for the wild poliovirus to re...

Following several mapping assessment for vaccination planning proved to be f...
incorrectly located or named, and some...
inefficient and unbalanced work plans f...
campaign coverage, since officials relie...
maps and data to guide its polio campai...

Objective
In December 2011, the NPHCDA began m...
maps for 11 northern states, which acco...
was to create accurate, coordinate-bas...
vaccination teams and efficient vaccine...
accountability and avoiding vaccine wa...

Stakeholders and Personnel
In planning and executing the geo-enab...
Eradication Initiative (GPEI) partners...
Nigeria, to collect and validate data on...
Solutions, Novel T and eHealth Africa p...
Centers for Disease Control and Prevent...
supported the process by providing acci...
data science methods.

Process and Methods
The NPHCDA worked with technical exp...
implement a comprehensive methodol...

- The team used high-resolution sat...
in target states that did not appear...
were targeted to include both new a...
increasing size of hamlets, small se...
buildings present. This population...
area, helping to more accurately p...
technology was not available for th...
officials were able to generate spat...
machine learning algorithms, and...
detailed example of bottom-up pop...
- Data collectors were trained on us...
local guides to record the coordina...
the smallest administrative divisio...
names with village leaders. Unann...

Annex B5

B5: Emergency outbreaks: measles vaccination use case example

Background
Nigeria's measles vaccination coverage has been persistently poor, and the country ranks as one of the lowest for measles vaccination coverage in the world. This resulting low population immunity has allowed for increased transmission of the virus and led to measles outbreaks across the country, particularly in northern states. These outbreak emergencies were preceded by underperforming measles vaccination campaigns that had repeatedly missed households and entire settlements. Health officials at Nigeria's National Public Health Community Development Agency (NPHCDA) recognized that to prevent future outbreaks they would need to improve vaccination coverage and make it easier for target populations to get vaccinated.

In order to be effective, the data for target populations...
successful polio vaccinatio...
Case).

Although the polio microplanning complete further data colle...
vaccination campaigns utili...
vaccine, while the measles...
from health care workers, i...
age for a measles vaccine is...
information for settlement...

Having accurate populatio...
workers and resources. The...
reporting was often infla...
data had shown total popu...
government areas (LGAs). I...

Objective
Health officials set out to...
The maps would need to:

- have clear boundaries
- show population estim...
- ensure that all settlem...

Because the measles vacci...
northern states, the NPHC...
states. At the time, simil...
microplanning for souther...

Identifying vaccination site...
who were not vaccinated b...
measles vaccination camp...
estimates would be impo...
time spent at each site b...
have to ensure that enoug...
overlapping catchment are...

Stakeholders and Personnel
The NPHCDA took the lead...
from the WHO Nigeria office

Local-level stakeholders in...
and Team Supervisors, wh...
validation of data was con...
enabled tablets and GIS to...

Annex B6

B6: Co-deployment of Malaria interventions (IRS and ITN) in Zambia

Microplanning and delivery through geo-enabled co-deployment of malaria interventions (indoor residual spraying (IRS) and insecticide treated nets (ITN) in Zambia.

Background
In Zambia, Akros supports the National Malaria Control Programme alongside USAID President's Malaria Initiative (PMI) VectorLink project and PATH to implement digital solutions to strengthen malaria vector control microplanning and coverage. Digital tools were used to assist the national malaria programme to address three challenges related to malaria campaigns:

- poor estimates of population and structures for microplanning;
- limitations in planning and monitoring campaign coverage at village level; and
- limited resources for digitally monitoring programmes.

For vector control campaigns, having ready access to accurate, geographically distributed population and structure counts is essential for high-quality planning, deployment and monitoring. The accuracy of these estimates has a significant impact on resource allocation and intervention coverage estimation. Having access to granular data by health facility catchment area (HFCA) or lower levels can improve the specificity of planning. In Zambia, these estimates have, historically, been derived from district level headcounts for campaign planning.

Attaining 80-85% coverage of vector control interventions at the community level is crucial for effective malaria control. Often, vector control programmes struggle to attain maximum impact because hamlets or houses or scattered houses are missed during intervention deployment. The individuals living in these unprotected houses or communities continue to act as reservoirs for malaria infection. To ensure high coverage levels, teams need to understand where populations are located, and managers need to be able to hold field teams accountable for reaching even the furthest houses. In Zambia, the need to plan and monitor vector control coverage was particularly acute during the 2021-2022 season, as the government implemented a "mosaic" approach where 50% of communities were to receive indoor residual spraying (IRS) and 60% were to be covered by insecticide treated nets (ITNs), with a 10% overlap. This mosaic approach proved difficult to implement, as it required precise planning to ensure each community is allocated one of the two types of vector control.

As described below, both low-tech and high-tech approaches were used to support microplanning and campaign delivery at national and sub-national levels. These approaches, which included the use of the digital platform Reveal, supported development of microplanning maps to guide commodity and human resource decision-making, and contributed to field teams achieving significantly greater coverage rates of the interventions.

Objective:
To apply a combination of low-tech and high-tech approaches to assist the Zambia National Malaria Elimination Programme (NMEP) to address three challenges:

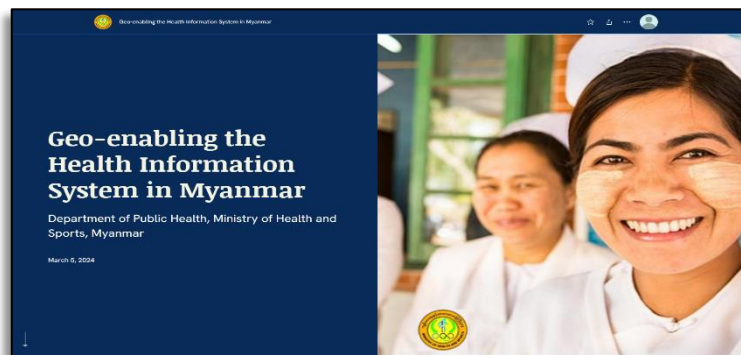
- poor estimates of population and structures for microplanning
- limitations in planning and monitoring campaign coverage at village level
- limited resources for digitally monitoring programmes.

Stakeholders:
Zambia's Ministry of Health, National Malaria Elimination Programme, Akros; USAID President's Malaria Initiative VectorLink Project (AB Associates).

Process and Methods:
Microplans created for all of Zambia.
In 2021, Akros supported the Zambia National Malaria Elimination Programme (NMEP) to microplan for its indoor residual spraying (IRS) and insecticide treated net (ITN) campaigns, using detailed maps with operational boundaries and population and structure count estimates down to the operational area level. To start, Akros staff engaged the Ministry of Health (MOH) and local health facility staff to discuss, map and verify the Health Facility Catchment Area (HFCA) boundaries for all 116 districts in Zambia over a period of 4 months. Using these boundaries, the Geo-Referenced Infrastructure and Demographic Data for development (GRID3) project used their gridded, satellite images to derive settlement level and health facility level population estimates. Akros further refined these population and structure count estimates in select districts using field-verified data captured

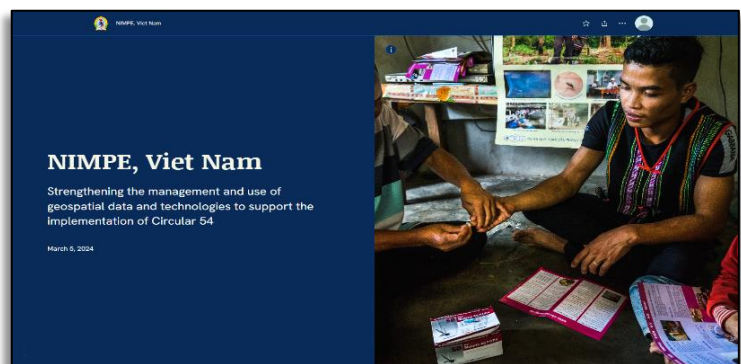
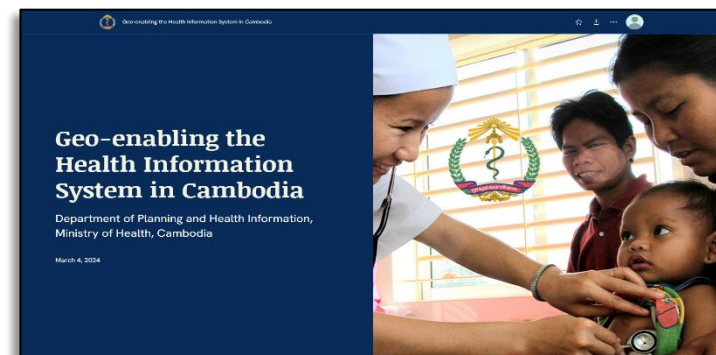


Other country specific use cases



Myanmar
(<https://arcg.is/OCHOz>)

Cambodia
(<https://arcg.is/0uviGj>)



Viet Nam
(<https://arcg.is/1XmLij>)

Mongolia
(<https://arcg.is/100u4r>)



Geo-enabling the Health Information System, programs or interventions training workshop for Asia Pacific

...and beyond

Session 3: Introduction to the HIS geo-enabling framework

A geo-enabled health information system

An Information System that fully benefits from the power of **geography**, **geospatial data** and **geospatial technologies** through the proper integration of the geographic and time dimensions across its business processes

➔ Can you think about one piece of data or information within an HIS that has neither a geographic nor a time dimension?

*" Everything happens somewhere
at a given time"*

➔ Properly integrating geography and time in the HIS improves geographically-based decision making and provides a more systemic and systematic approach to solving public health problems.

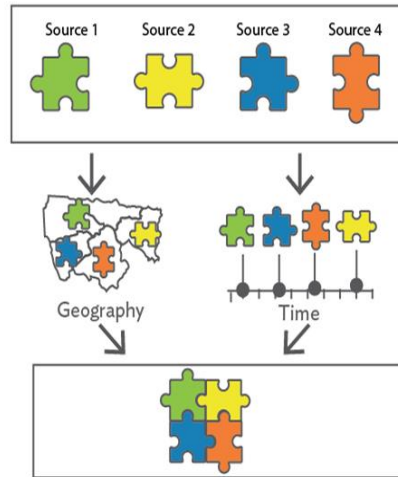
➔ Directly applicable to any program or intervention

Benefits of a proper integration of the geographical and temporal dimensions in the HIS, a program or an intervention

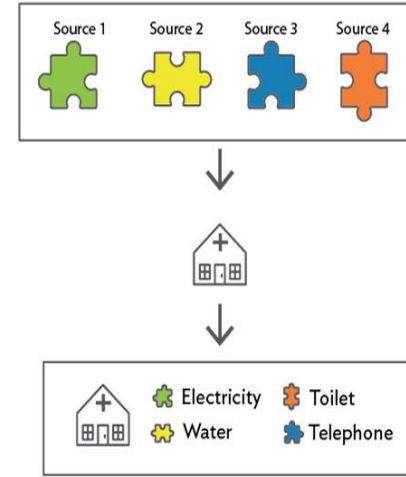
1



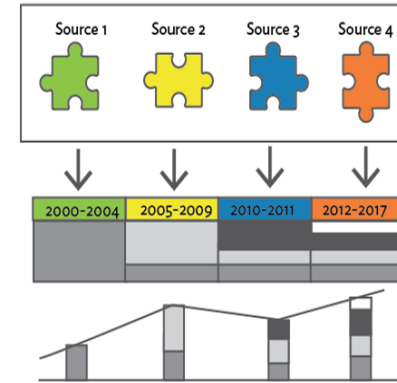
1 Contextualize data from different sources in both space and time



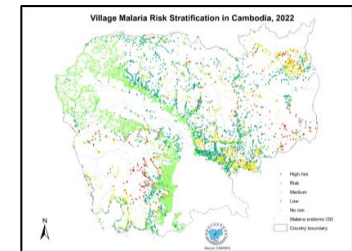
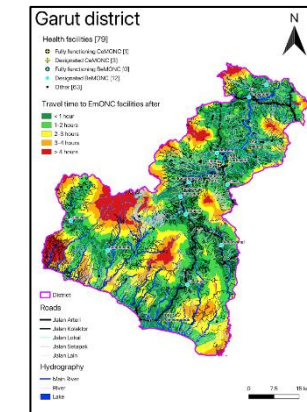
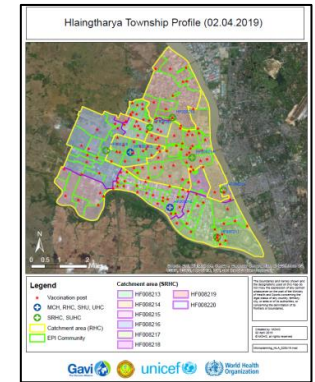
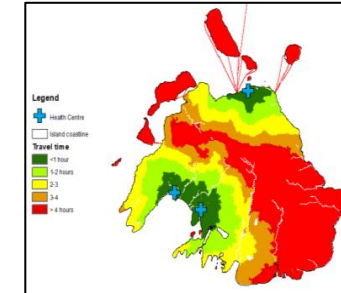
2 Use geographic features (i.e. health facilities) as the common link between data collected by different sources



3 Facilitate trend analysis by taking into account how geography is evolving through time



4 Use a geographic information system (GIS) to create thematic maps, conduct spatial analyses, or apply spatially distributed models



➔ How do you benefit from this in a sustainable way?

➔ By geo-enabling the health information system, programs or interventions

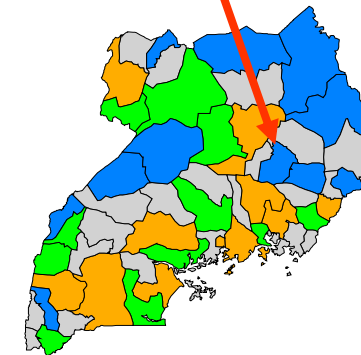
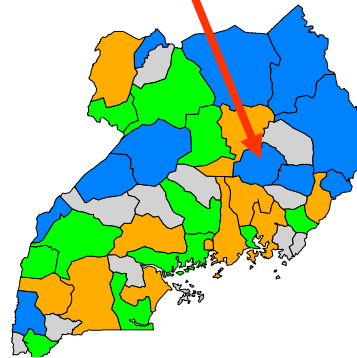
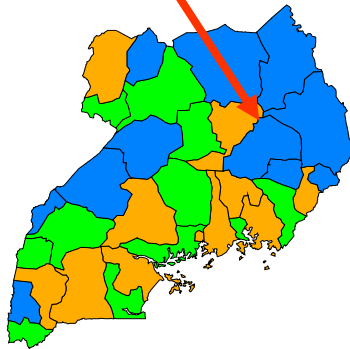
¹ <https://www.adb.org/publications/building-capacity-geo-enabling-health-information-systems>

A geo-enabled health information system

Importance of simultaneously managing the geographic and temporal dimensions

Uganda

	01.01.1990-14.03.1991	15.03.1991-20.03.1997	21.03.1997-27.11.2000	28.11.2000-30.06.2001	01.07.2001-30.06.2005
Kampala	Kampala	Kampala	Kampala	Kampala	Kampala
Kamuli	Kamuli	Kamuli	Kamuli	Kamuli	Kamuli
Kapchorwa	Kapchorwa	Kapchorwa	Kapchorwa	Kapchorwa	Kapchorwa
Kasese	Kasese	Kasese	Kasese	Kasese	Kasese
Soroti	Soroti	Katakwi	Katakwi	Katakwi	Katakwi
		Soroti	Soroti	Soroti	Soroti Kaberamaido
Mubende	Kiboga	Kiboga	Kiboga	Kiboga	Kiboga
	Mubende	Mubende	Mubende	Mubende	Mubende
Kitgum	Kitgum	Kitgum	Kitgum	Kitgum	Kitgum
			Pader	Pader	Pader

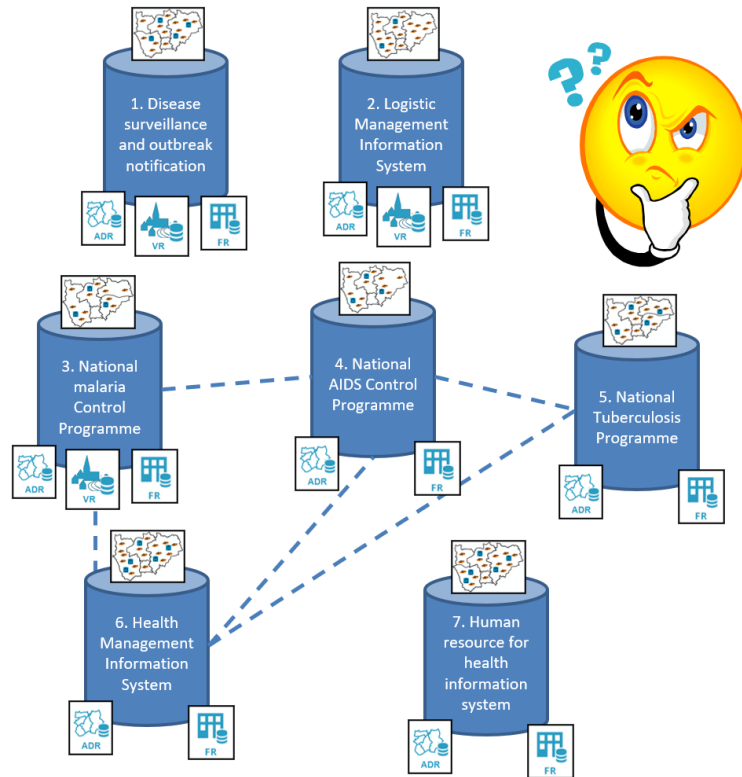


➔ Geography changes continuously over time and at a different “speed” depending on the geographic feature being considered

<https://salb.un.org/en>

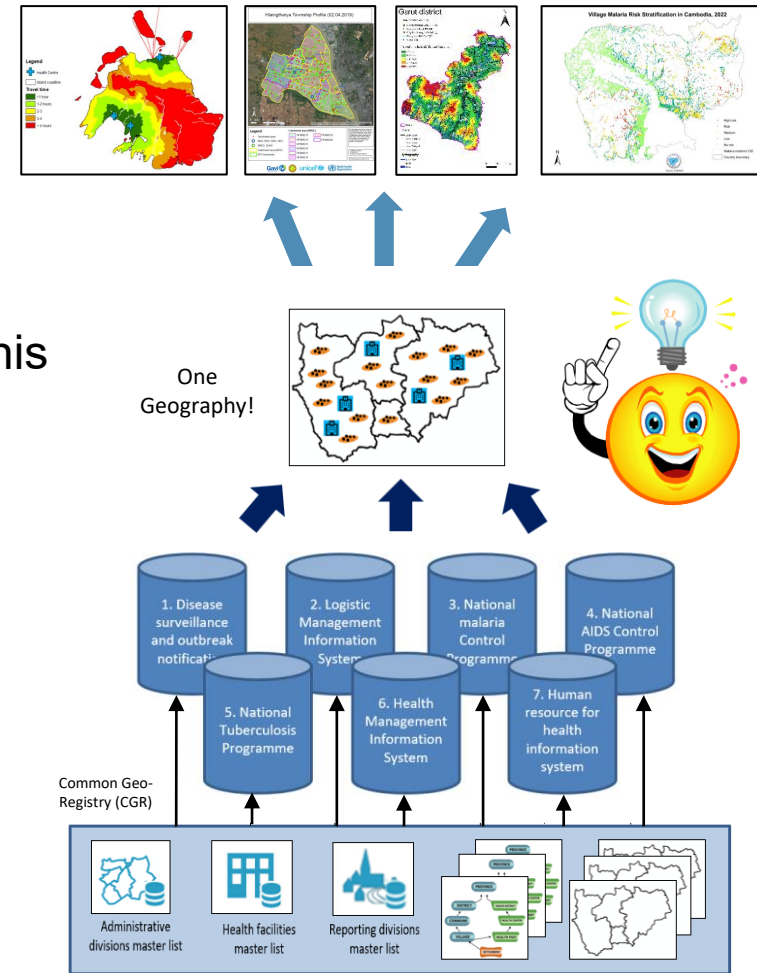
The vision behind the geo-enablement of the HIS

Passing from this ...



Each information system maintains and uses a different geography which is not cost-effective and does not allow benefiting from the power of geography, geospatial data and technologies

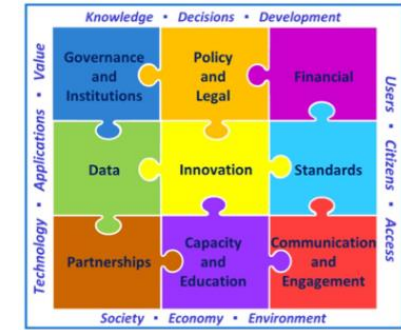
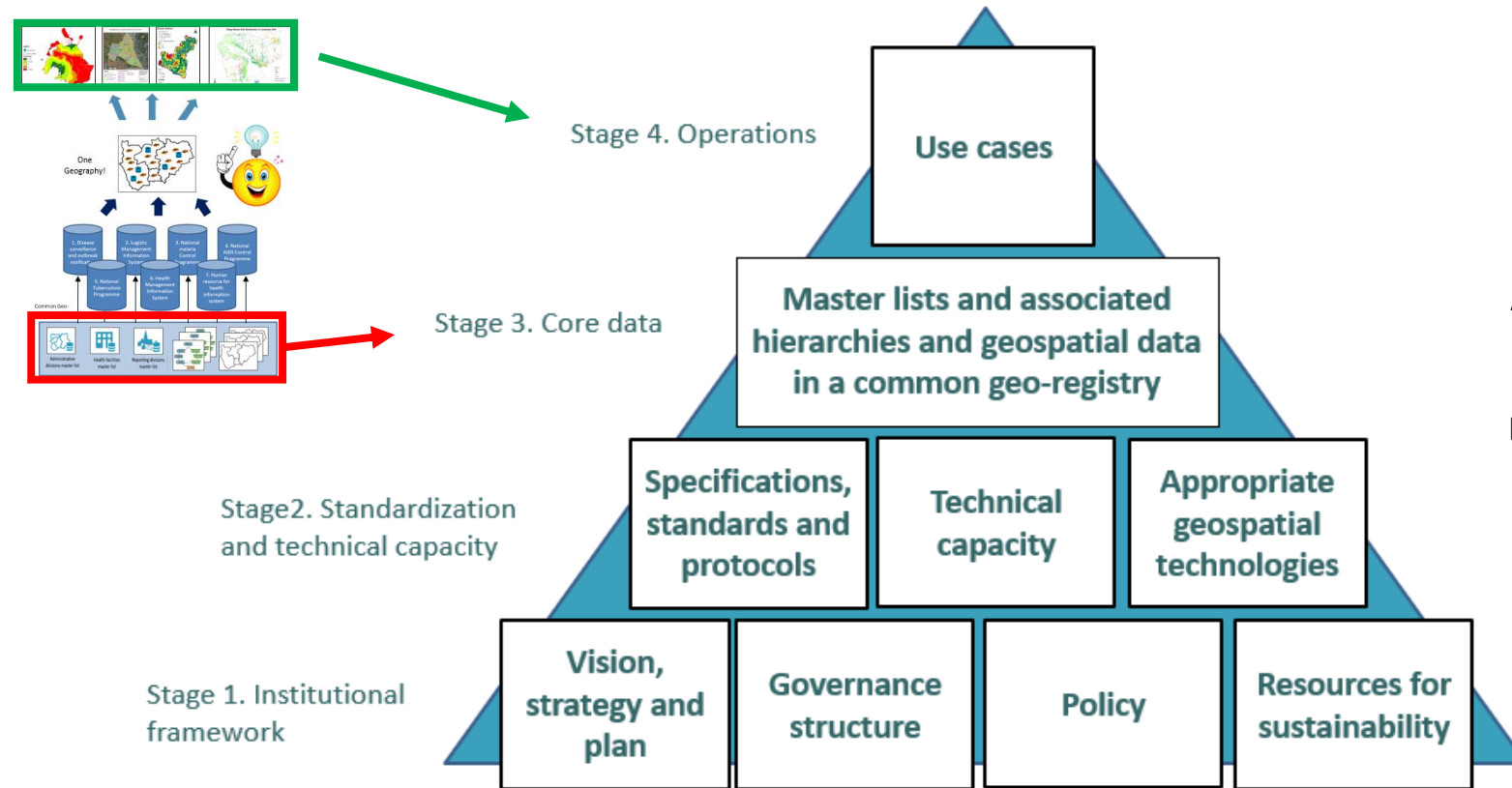
... to this



All information systems use the same geography over time, which not only reduces duplication of effort and costs, but also takes full advantage of the power of geography, geospatial data and technologies

The HIS geo-enabling framework

9 elements that must be in place and sustained over the long term for a HIS, a program or an intervention to be considered geo-enabled

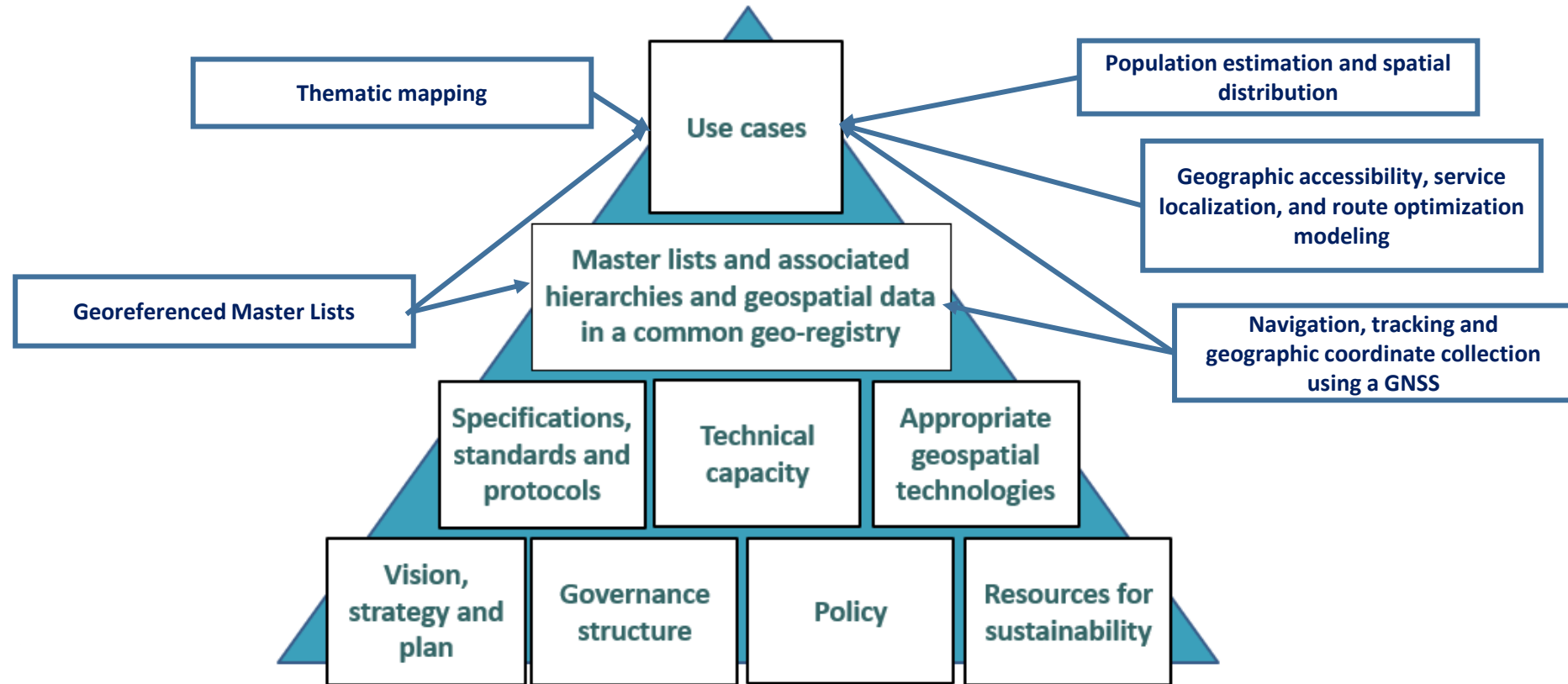


Aligned with the United Nations Integrated Geospatial Information Framework (UN-IGIF) – Cross sectoral framework

➔ Each stage supports the next one towards an operational use of geography, geospatial data and technologies to support the implementation of health programs

The HIS geo-enabling framework

The place of the 5 main applications of geospatial data and technologies



➔ Apart from the georeferenced master list and the collection of geographic coordinates which are also key to the core data stage of the framework, all these application are enabling the use cases

The HIS geo-enabling framework

1. A Clear **vision, strategy, and action plan** for the management and use of geospatial data and technologies have been defined.
2. A **governance structure** supporting the vision, strategy, and action plan has been established.
3. Sufficient **technical capacity** has been developed to support the proper management and use of geospatial data and technologies.
4. Geospatial data **specifications, standards, and protocols** have been defined and are being implemented to ensure the availability and quality (completeness, uniqueness, timeliness, validity, accuracy, and consistency) of geographic information across the whole data lifecycle.
5. The **master lists** for the core geographic objects (health facilities, administrative divisions and villages, and reporting divisions) and their associated hierarchies and geospatial data have been developed, made accessible, and an updating mechanism put in place for each of them using a **common geo-registry**.
6. The appropriate **geospatial technologies** have been identified and are being used in accordance with good geospatial **data management practices**.
7. **Use cases** (applications) supporting health programs (communicable diseases surveillance, malaria elimination, health service coverage, disaster management, etc.) towards reaching SDG 3 are being implemented and documented.
8. **Policies** supporting and enforcing all the above as well as geospatial data accessibility have been released.
9. The necessary **resources** to ensure long term sustainability have been identified and secured.

The HIS geo-enabling framework – Objectives and benchmarks

Element of the framework	Objective	Benchmarks
1. Vision, strategy, and action plan	A vision, a strategy and an action plan have been defined and are implemented to support the geo-enablement of the HIS	<p>1.1 The MOH has a vision, strategy, and plans regarding the management and use of geospatial data and technologies.</p> <p>1.2 Each key program has a vision, strategy and action plan regarding the management and use of geospatial data and technologies</p>
2. Governance structure	A governance structure supporting the vision, strategy and action plan has been established and is operational	<p>2.1. The MOH has established a governance structure to handle issues pertaining to the management and use of geospatial data and technologies.</p> <p>2.2. All the health program and the stakeholders involved in the management and use of geospatial data and technologies in health are part of the governance structure.</p> <p>2.3 The MOH is on board of the National Spatial Data Infrastructure (NSDI).</p>
3. Technical capacity	The central units of the Ministry of Health as well as the main health programs have sufficient technical capacity to manage and use geospatial data and technologies	<p>3.1. The MOH has a central level geospatial data and technologies management unit (GDTMU) with enough technical capacity to: a) ensure guardianship over the defined guidelines, standards and protocols; b) support the development, maintenance, regular update and sharing of the master lists for the geographic objects core to public health; c) support the implementation of the guidelines, standards, protocols, and master lists across all health programs and information systems; and d) providing services to the HIS unit and beyond if needed.</p> <p>3.2 The key health programs have enough technical capacity to support the implementation of their activities with the support of the central level unit</p>
4. Data specifications, standards and protocols	All programs use the same data specifications, standards and protocols to ensure geospatial data quality	<p>4.1. The NSDI has defined the geospatial data and technologies related specifications, standards and protocols that should be used by all governmental agencies.</p> <p>4.2. The MOH is using the geospatial data and technologies related specifications, standards and protocols across all key health programs.</p>



Used to assess the current level of geo-enablement in each country and as the basis for developing the action plan to fill existing gaps

The HIS geo-enabling framework – Objectives and benchmarks

Element of the framework	Objective	Benchmarks
5. Master lists and common geo-registry	The Ministry of Health has quality master lists and associated GIS layers for the geographic objects key to public health	<p>5.1. The MOH has a complete, up-to-date, uniquely coded, and geo-referenced (for point type objects) master list for each geographic object key to public health (health facilities, administrative divisions and villages, reporting divisions).</p> <p>5.2. The government maintains, regularly updates, and share shapefiles containing the boundaries of the administrative and health reporting divisions.</p> <p>5.3 These master lists and associated spatial data are simultaneously hosted, maintained, regularly updated, and shared using a Common Geo-Registry.</p> <p>5.4. All the master lists, and especially their officially recognized codes, are being integrated in all the information systems and used for data collection, reporting, and monitoring across all health programs.</p>
6. Appropriate geospatial technologies	The central unit of the Ministry of Health as well as the main health programs have access to the necessary and appropriate geospatial technologies	<p>6.1. The central level geospatial data management and technologies unit has access to the necessary and appropriate geospatial technologies (GNSS, GIS) to support its mandate.</p> <p>6.2 The key health programs have access to the necessary and appropriate geospatial technologies (GNSS, GIS) to support the implementation of their activities</p>
7. Documented use cases	The benefits of managing and using geospatial data and technologies are recognized by all programs and use cases demonstrating this are documented	<p>7.1. Geospatial data and technologies are recognized as important and their full potential is being used to support the implementation of key health programs towards reaching SDG 3.</p> <p>7.2 Use cases supporting decision making and/or planning are documented and available.</p>
8. Policies supporting the geo-enabling process	The necessary policies to support the geo-enablement of the Health Information System have been defined and are being applied	<p>8.1. A policy/Policies enforcing the following has/have been released:</p> <ul style="list-style-type: none"> a) The mandate over the guardianship on geospatial data specifications, standards, and protocols as well as over the development, maintenance, update, and sharing of master lists for the geographic objects core to public health using a common geo-registry. b) The use of the developed specifications, standards, protocols, and master lists by all the stakeholders in the health sector.
9. Resource for sustainability	The financial resources necessary to ensure the sustainability of geo-enablement exist in the long term	<p>9.1. The central level geospatial data management and technologies unit has the necessary financial resources to ensure the long-term sustainability of its activities linked to the geo-enablement of the HIS.</p> <p>9.2 The key health programs have the necessary financial resources to ensure the long-term sustainability of their activities</p>



Used to assess the current level of geo-enablement in each country and as the basis for developing the action plan to fill existing gaps

The HIS geo-enabling framework - Origin

1



Situation in countries of the Asia-Pacific region (2017)

Géo-enabling components	BGD	BTN	KHM	FJI	IND	IDN	LAO	MMR	MYS	NPL	PHL	LKA	VNM
1. Vision, needs, strategy and plan	Yellow	Green	Yellow	Yellow	Green	Red	Yellow	Yellow	Green	Yellow	Red	Yellow	Red
2a. Governance structure	Yellow	Yellow	Red	Yellow	Green	Red	Yellow	Red	Green	Yellow	Green	Yellow	Yellow
2b. GIS technical capacity	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
3. Data specifications, standards and protocols	Red	Green	Red	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Red	Green	Red	Red
4. Master list	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
5. GIS technology	Yellow	Yellow	Green	Green	Yellow	Green	Green	Green	Green	Green	Green	Green	Green
6. Map production (use)	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
7. Policy	Red	Yellow	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Yellow
8. Resources for sustainability	Yellow	Yellow	Red	Red	Red	Red	Yellow	Red	Red	Red	Red	Red	Red

← Has received a GIS training (mainly in data collection and thematic mapping)

← Has access to a GIS software

← Generates thematic maps, but spatial analysis and modelling are very limited

Existing
 In process
 Not existing

BGD = Bangladesh, BTN = Bhutan, KHM = Cambodia, FJI = Fiji, IND = Inde, IDN = Indonésia, LAO = République Démocratique Populaire du Lao, MMR = Myanmar, MYS = Malaisie, NPL = Népal, PHL = Philippines, LKA = Sri Lanka, VNM = Viet Nam.

➔ Important gaps for the elements guaranteeing the quality, effectiveness and long-term sustainability of data and information products

¹ Source: <https://www.adb.org/publications/building-capacity-geo-enabling-health-information-systems>

The HIS geo-enabling framework - Origin

Situation in French speaking African countries (2023)

Element of the HIS geo-enabling framework		BFA	BDI	COG	CIV	GIN	MDG	MLI	CAF	COD	SEN	TGO	
Stage 4. Operations	Use cases	HIS	Completed/sufficient	Completed/sufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	Completed/sufficient	In progress/insufficient	In progress/insufficient	
		Malaria	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	Completed/sufficient	In progress/insufficient	In progress/insufficient
		TB	Completed/sufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient
		HIV	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	Completed/sufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	Completed/sufficient	In progress/insufficient
Stage 3. Core data	Master lists and geospatial data and Common Geo-Registry (CGR)		Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	
	Data specifications, standards and protocols		Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	
	Stage 2. Standardization and technical capacity	Technical capacity	HIS	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient	In progress/insufficient
Malaria			Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	
TB			Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	
HIV			Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	
Stage 1. Institutional framework	Geospatial technologies	HIS	In progress/insufficient	In progress/insufficient	Completed/sufficient	Missing / not started	In progress/insufficient	In progress/insufficient	In progress/insufficient	Completed/sufficient	Missing / not started	Missing / not started	
		Malaria	In progress/insufficient	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	
		TB	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	
		HIV	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	
Vision, strategy and plan		Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	
Governance mechanism		Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	
Policies		Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	
Stage 1. Institutional framework	Financial resources	HIS	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	
		Malaria	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	
		TB	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	
		HIV	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	Missing / not started	

← Series of use cases that have not been institutionalized

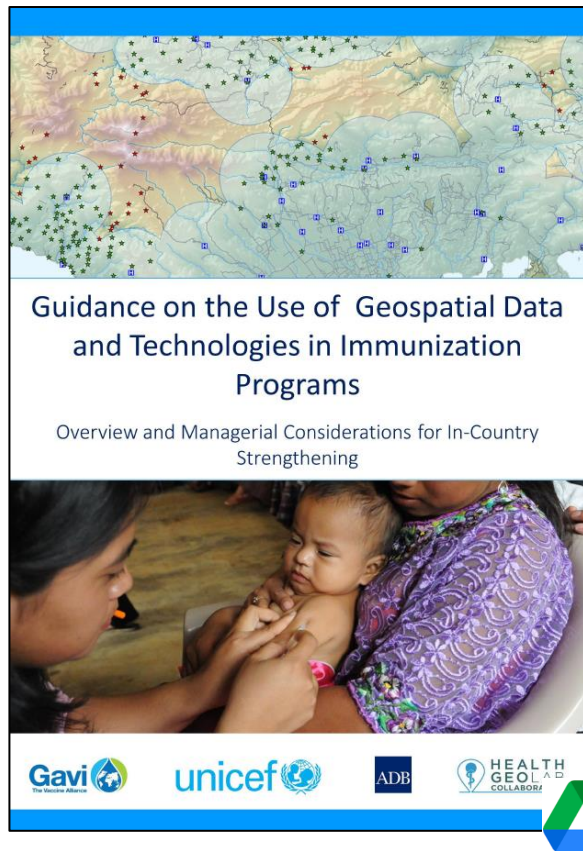
BFA = Burkina Faso, BDO = Burundi, COG = Republic of Congo, CIV = Ivory Coast, GIN = Guinea, MDG = Madagascar, MLI = Mali, CAF = Central African Republic, COD = Democratic Republic of the Congo, SEN = Senegal, TGO = Togo

■ Missing / not started
 ■ In progress/insufficient
 ■ Completed/sufficient

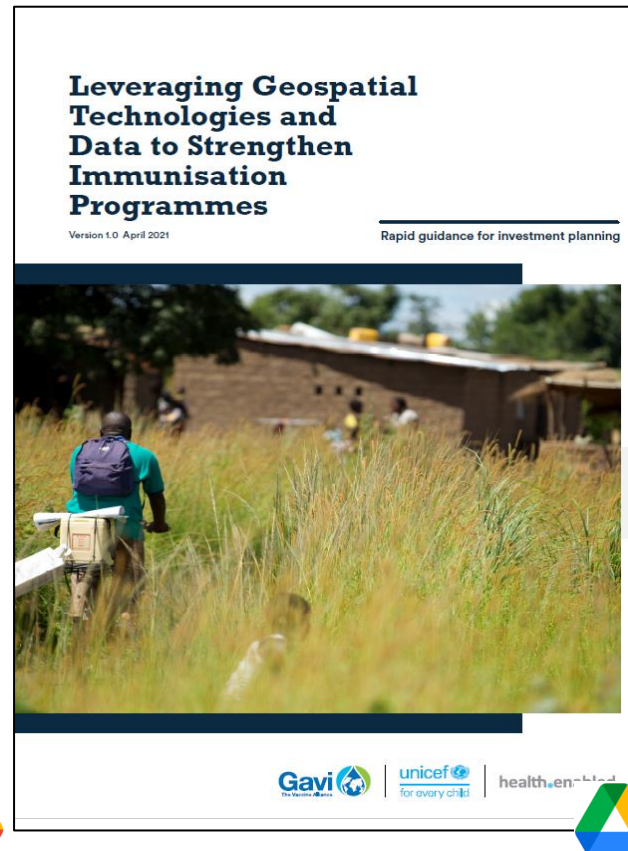
➔ Important gaps for the elements guaranteeing the quality, effectiveness and long-term sustainability of data and information products and this across programs

Guidelines including/based on the HIS geo-enabling framework

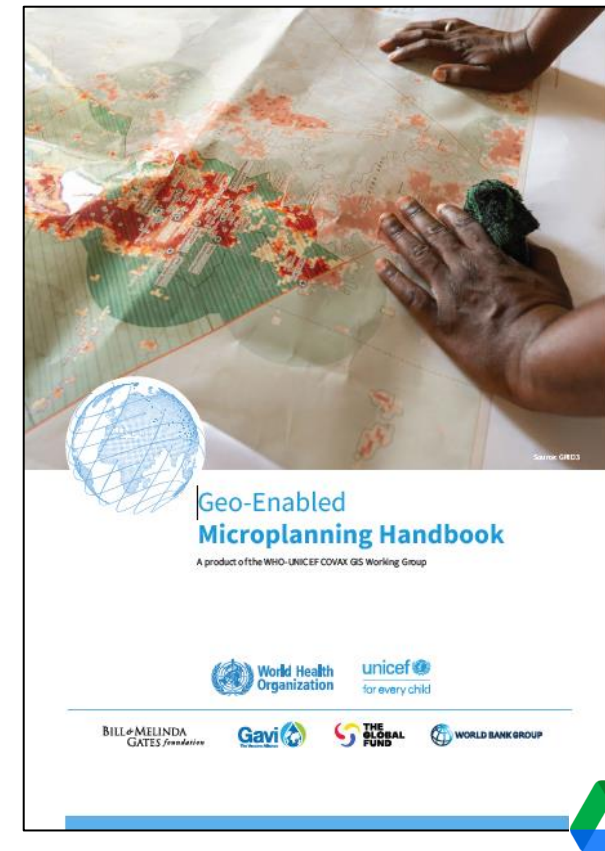
2018



2021



2023



➔ Framework used by UNICEF, GAVI, WHO and the Global Fund to support the management and use of geospatial data and technologies in countries.

1 <https://www.unicef.org/media/58181/file>

2 <https://www.gavi.org/news/document-library/leveraging-geospatial-technologies-and-data-strengthen-immunisation>

3 <https://drive.google.com/file/d/1jj779zww4herWOESAd9mXqVE1YfQeHtH/view?usp=sharing>

The HIS geo-enabling framework in the 3 guidelines

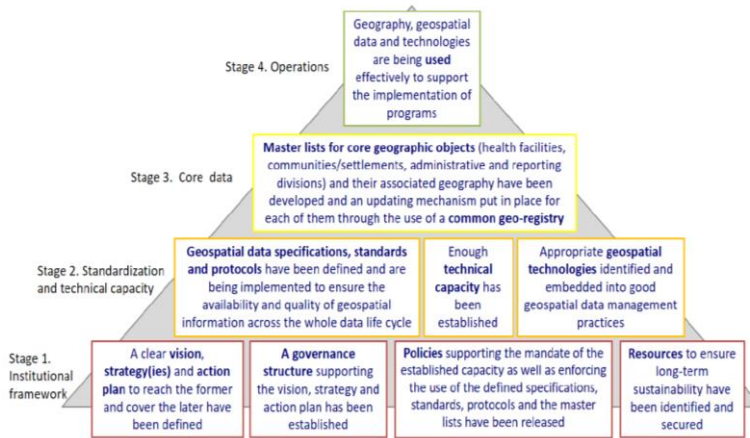
	Guidance on the Use of Geospatial Data and Technologies in Immunization Programs	Rapid guidance for investment planning	Geo-Enabled Microplanning Handbook
Objective/purpose	Provide a non-technical introduction to the role of geospatial data and technologies in immunization programs and propose a process-based framework to guide decision-makers and planners in strengthening the management and use of geospatial data and geospatial technologies in immunization program in countries.	Provides information, steps and important considerations for the process of selecting, planning and budgeting geospatial data and technology applications for immunization.	Provide health officials with guidance on how to integrate geospatial data and technologies – in particular, geographic information systems (GIS) – into the microplanning process. The handbook also provides evidence on the benefits of geo-enabled microplanning
Target audience	All stakeholders interested in advocating for or investing in the management and use of geospatial data and technologies in immunization programs.	In country immunization programs willing to invest in the use of geospatial data and technology applications	Public health program managers/ designers (country relevant staff, health officials at national and subnational level) and technical experts (GIS and other technical staff supporting microplanning efforts)
	↓ Promotion	↓ Resource mobilization	↓ Technical implementation

➔ Complementary while presenting some overlap

➔ Applicable to other health programs and interventions

The HIS geo-enabling framework in the 3 guidelines

Guidance on the Use of Geospatial Data and Technologies in Immunization Programs

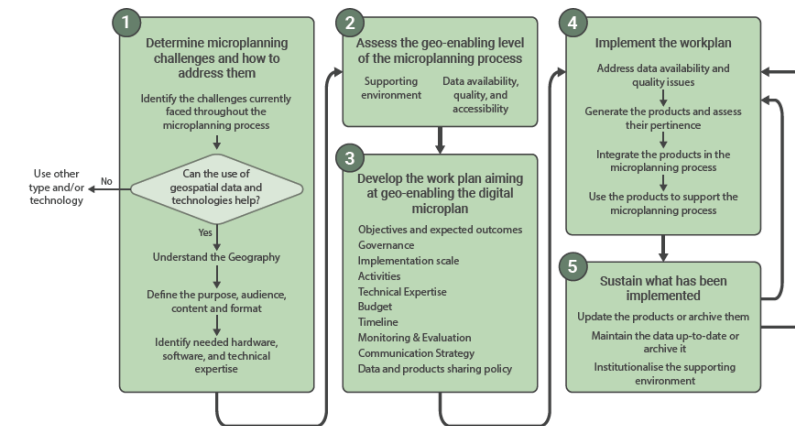
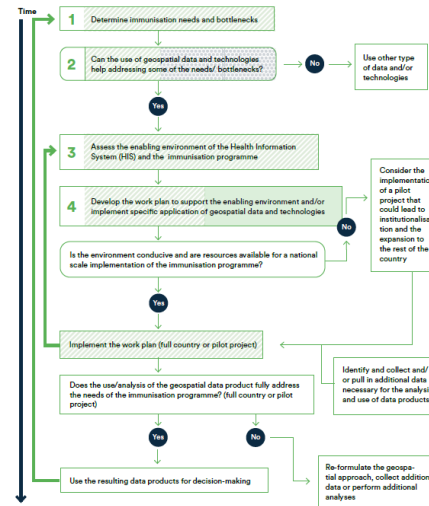
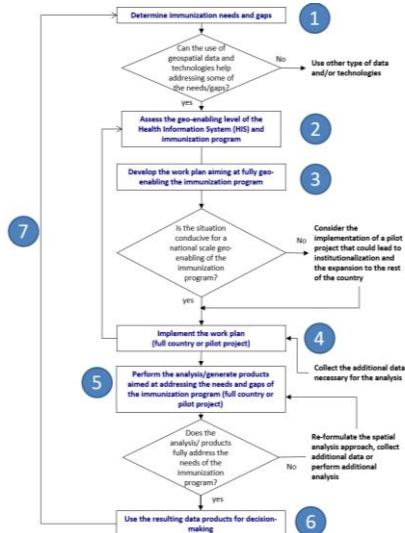
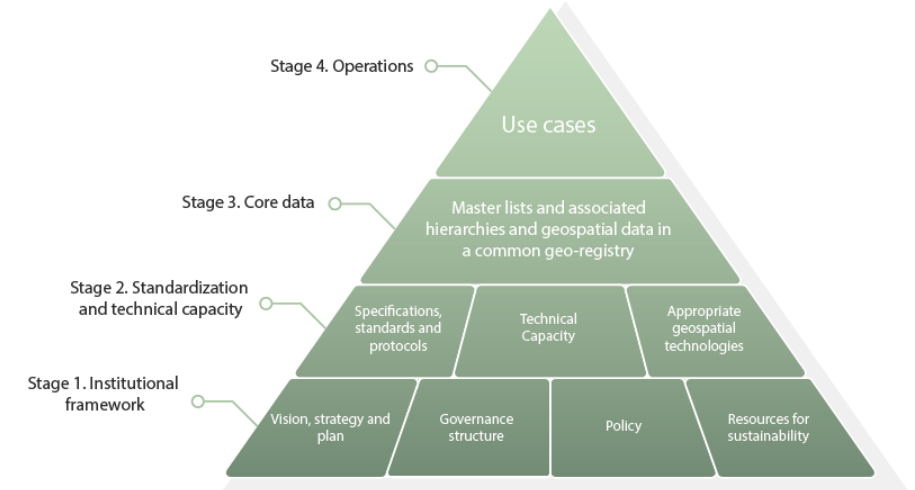


Rapid guidance for investment planning

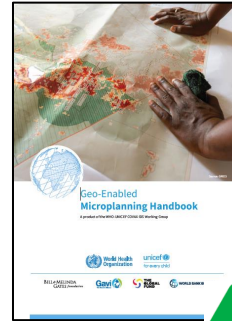
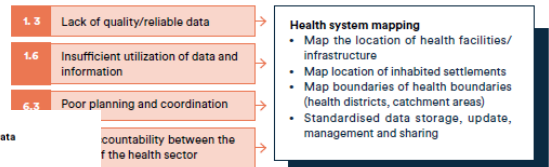
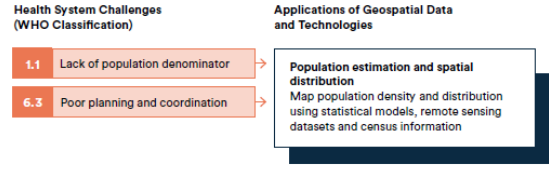
Considerations for the geo-enabling environment

The long-term sustainability of these applications will depend on the availability of the necessary enabling environment. The elements that compose the enabling environment have been captured in the HIS geo-enabling framework developed by the Health GeoLab Collaborative [7] and used as reference by UNICEF when developing the geo-enabling framework for the immunisation programme as part of the 2018 UNICEF Guidance [2].

Geo-Enabled Microplanning Handbook



Additional useful tools – Challenges addressed by applications of geospatial data and technologies



Health System Challenges (WHO Classification)

- 3.6 Inadequate supportive supervision
- 6.3 Poor planning and coordination
- 8.5 Poor accountability between the levels of the health sector

Applications of Geospatial Data and Technologies

- Vaccination session tracking**
 - Map the progress of vaccination activities during house-to-house campaigns or routine immunisation outreach activities
 - Map the geographic coverage of vaccination activities

Health System Challenges (WHO Classification)

- Accountability between the levels of the health sector
- Inadequate supply of services
- Geographic inaccessibility
- Poor planning and coordination

- Geographic accessibility modelling**
 - Compute the traveling time to reach health services
 - Estimate the part of the target population without physical and timely access to health resources

- 1.5 Lack of access to information or data
- 1.6 Insufficient utilisation of data and information
- 3.6 Inadequate supportive supervision
- 6.3 Poor planning and coordination

- Campaign monitoring**
 - Collect near real-time geolocated data of daily vaccination coverage, vaccine supply & stockouts
 - Map campaign data to support real-time monitoring

- Inadequate supply of services
- Geographic inaccessibility
- Poor planning and coordination
- Inadequate supply of services

- Microplanning**
 - Create operational workplans for local-level immunisation service delivery using accurate maps of health facilities/ infrastructure, inhabited settlements, boundaries of health areas and natural geographic features

- 1.6 Insufficient utilisation of data and information
- 6.3 Poor planning and coordination
- 7.2 Lack of effective resource allocation

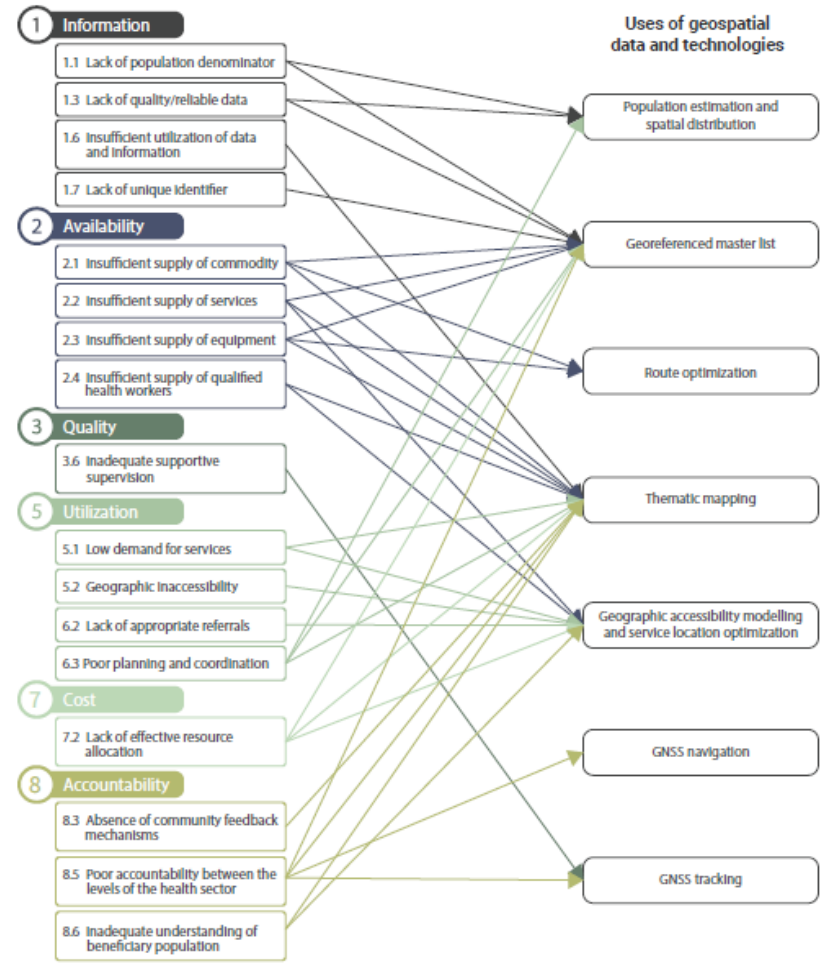
- Vaccination Coverage modelling**
 - Compute vaccine coverage for sub-national units using surveys and routine administrative information
 - Map differences in immunisation coverage between population subgroups for sub-national units
 - Map number of unimmunised or under-immunised children for sub-national units

- Inadequate supply of services
- Geographic inaccessibility
- Poor planning and coordination
- Inadequate supply of services

- 1.2 Delayed reporting of events
- 1.3 Lack of quality/reliable data
- 1.5 Lack of access to information or data
- 6.3 Poor planning and coordination

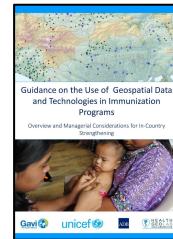
- Disease surveillance**
 - Map location of suspected or confirmed disease cases
 - Visualise and analyze disease incidence to identify and respond to outbreaks

Microplanning challenges (WHO HSC classification)



Additional useful tools – Program specific supporting material

Guidance on the Use of Geospatial Data and Technologies in Immunization Programs



Appendix H. Potential gaps and corresponding activities to be implemented in order to reach the geo-enabling of the HIS in general and immunization program in particular

Element of geo-enabling framework	Benchmarks	Potential identified gap	Activities to fill the gap	MOH entities to be involved in the activity		
				HIS unit	Immunization program	National pilot project
1. Vision, strategy(ies) and plans	1.1 The MOH has a vision, strategy(ies), and plans regarding the management and use of geospatial data and technologies	The MOH has defined its vision, needs, strategy(ies) and plan but they have not yet been captured in official documents	Support the MOH with the development of such documents	X		X
	1.2 The vision, strategy and plan of the immunization program is aligned to the MOH one	The MOH has not yet defined/ finalized its vision, strategy(ies) and/or action plan regarding the management and use of geospatial data and technologies in health The immunization program has defined its vision, strategy(ies) and plan regarding the use of geospatial data and technologies but they are not aligned to MOH's	Use the support of the immunization program to help the MOH with the definition and documentation of the vision, strategy(ies) and plan in concordance with the NDSI if in place Support the alignment with the MOH vision, strategy(ies) and plan	X	X	X
		The immunization program has not yet defined its vision regarding the use of geospatial data and technologies	Support the immunization program with the development of such documents and ensure their alignment with MOH's		X	X
2. Governance structure	2.1 The MOH has established a governance structure to handle issues pertaining to geography, geospatial data management and geospatial technologies	The MOH has established a governance structure but not all the immunization stakeholders are not on board	Advocate for the immunization stakeholders to be on board of the established governance structure	X	X	X
	2.2 All the program, including immunization, as well as the development partners using geospatial data and technologies, are involved in this structure	The MOH has not yet established a governance structure to handle issues pertaining to the management of geospatial data and technologies	Use the support to the immunization program to support the establishment of such governance structure at the MOH level	X	X	X
	2.3 The MOH is on board of the National Spatial Data Infrastructure (NSDI)	The country does not yet have a NSDI A NSDI is in place but the MOH is not yet involved	Use immunization as an example that could support the establishment of a NSDI in the country Advocate for the MOH to be on board of the NSDI	X	X	X

Strategies, stakeholders' involvement and implementation level to fill existing gaps

Appendix J. Generic Terms of Reference (TOR) for the position of geospatial data manager/GIS technician

1. Background
The Ministry of Health (MOH) has embarked in a process aiming at geo-enabling its Health Information System (HIS) in order for the all Ministry to share the same geography and therefore benefit from the visualization and analytical power that GIS technology offers. In this context, the MOH is looking for a data manager/GIS technician in order to be in the position to provide technical support in the areas of geospatial data management and GIS services during the geo-enabling process.

2. Main responsibilities
The main responsibilities of the incumbent will be to provide technical support in the areas of geospatial data management and GIS services in line with the guidelines, standards, and protocols identified/defined as part of the activities of the TWG on geospatial data management and GIS services.

3. Description of duties
Working under the supervision of head of the MOH HIS unit and in close collaboration with the TWG Members, the incumbent will be in charge of:

- Providing geospatial data management and GIS technical support to the Department of Public Health in a first phase and then to the entire MOH
- Developing, maintaining, updating and sharing the master lists for the geographic objects core to public health (health facilities, communities/settlements and administrative divisions);
- Supporting the definition of guidelines, standards and protocols aiming at improving the availability, quality (completeness, uniqueness, timeliness, validity, accuracy and consistency) and accessibility of geospatial data.
- Supporting the implementation of the guidelines, standards, protocols and master lists in all the information systems across the MOH;
- Generating GIS based data products to support decision making.

4. Expected deliverables

- Authoritative, standardized, complete, up-to-date and uniquely coded master lists of health facilities, communities/settlements and administrative divisions in the country;
- Guidelines, standards and protocols endorsed by the TWG on geospatial data management and GIS;
- Geo-enable Health Information System (HIS);
- Data products (table, graphs and maps) as per the established SOPs

5. Required qualifications

a. Education:

- University degree with a background in data management and/or GIS or enough professional experience in data management and/or the use of GIS to be considered as equivalent;

b. Skills:

- Good knowledge in the use of ArcView, ArcGIS or other GIS software as well as MS Office suite;
- Demonstrable skills in relation to data standardization and data management;
- Ability to work harmoniously as part of a team.

c. Experience:

- At least one experience working in a GIS related project;
- Experience in the area of Public Health would be seen as an advantage;

d. Languages:

- National language: Proficient
- English would be seen as an advantage

Terms of reference

Appendix I. Item to be consider when estimating the cost for the geospatial related activities listed in the work plan

Activity	Item to be included in the costing
Geospatial data management	<ul style="list-style-type: none"> Data manager/GIS technician salary as well as continuous education and participation to conference and training Regular update of the master lists for the geographic objects core to public health and immunization and their associated geography Availability of a common geo-registry for the simultaneous hosting, management, updating and sharing of the master lists
Equipment/software	<ul style="list-style-type: none"> GIS software and MS Excel GNSS enabled devices Laptop matching the minimum requirements of the GIS software being used and having enough hard disk capacity to store geospatial data (1 TB recommended) Separated large screen and external keyboard to facilitate the work of the technician and extend the life of the laptop Shared drive or enterprise geospatial server solution for data and product storage when having several GIS technicians Internet connection with a good bandwidth
Training on geospatial data management and/or technologies	<ul style="list-style-type: none"> Equipment used during the training (GNSS enabled devices, laptop with the GIS software) Good Internet access in case some web based tools and/or data are being used Facilitator
Field data collection	<ul style="list-style-type: none"> Pilot study for testing data collection Field work planning and monitoring (visits and surveys) Field data acquisition software Salary for data collectors GIS expert (training and supervision) Workshops and materials for training in field data collection Purchase of satellite images or topographic maps Working time to digitize features from base maps (satellite images, topographic maps...)
Data extraction	<ul style="list-style-type: none"> Purchase of satellite images or topographic maps Working time to digitize features from base maps (satellite images, topographic maps...)

Items for consideration when estimating costing

Appendix G. Immunization program geo-enabling quick assessment form

Quick immunization program geo-enabling assessment survey

Full name of the respondent _____
 Full name of the institution and Department _____
 Address: _____
 City/Town: _____
 State/Province: _____
 Country: _____
 Email address: _____
 Phone number: _____

Question 1: Has the immunization program defined its vision, strategy(ies) and action plan regarding the management and use of geospatial technologies to support its programs? Please check what applies

The vision, needs, strategy and plan have been defined and are being captured in official documents (policy, strategy, plan...)

The vision, needs, strategy and plan have been defined but have not yet been captured in official documents

The program is in the process of defining its vision, needs, strategy and plan

No vision, needs, strategy or plan have been defined yet

Other (please specify) _____

Question 2: Has a governance structure been established in the immunization program to handle issues pertaining to geography, geospatial data management and geospatial technologies?

Yes Partially No We are part of the MOH level structure

Can you please indicate which type of structure when applicable (board, committee, working group...)? _____

Question 3: Does the immunization program have a GIS capacity (staff that have received a training on geospatial data management and GIS)?

Yes No

Please briefly describe the number of skilled staff and the range of _____

Quick assessment tool



Can be contextualized to be applicable to any health program

Additional useful tools - Cost and timeline drivers for activities aimed at strengthening the geo-enabling environment

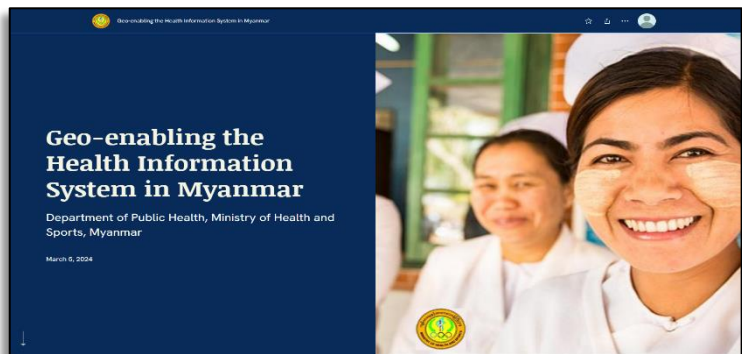
Rapid guidance for investment planning



<p>CONSIDERATIONS FOR THE GEO-ENABLING ENVIRONMENT</p> <p>Master lists and common geo-registry</p> <p>Main triggers that will be conducive of the activities in this area:</p> <p>5.1-5.2 The immunisation programme plans to use geospatial data and technologies as part of the intervention.</p> <p>5.3-5.4 There is a need to maintain and regularly update the Master Lists of specific geographic objects to sustain specific applications of geospatial data and technologies.</p> <p>5.5 There is a willingness to ensure consistency across all the information systems used by the health sector.</p> <p>Benchmarks (i.e. the situation to be ultimately achieved for a sustainable use of geospatial data and technologies in the immunisation programme):</p> <p>5.1 The types of geographic objects (e.g. health facilities, administrative divisions, health areas, villages) needed by the immunisation programme for the implementation of its interventions have been identified.</p> <p>5.2 The immunisation programme has access to a Master List for each geographic object they need to cover.</p> <p>5.3 These Master Lists are accessible to all the programmes and their partners through a common geo-registry.</p> <p>5.4 An updating mechanism is in place and the Master Lists are regularly updated.</p> <p>5.5 All the above Master Lists, and especially their officially recognised codes, are being integrated into all the information systems and used during data collection, reporting and monitoring across all programmes including immunisation (in the immunisation registry, for example).</p> <p>Anticipated potential activities to achieve benchmarks (Single cost/ Recurrent cost):</p> <ul style="list-style-type: none"> • Identification of the type of geographic objects needed by the immunisation programme and for which Master Lists would be required to support the application of geospatial data and technologies (single cost) • Development and agreement on standards for Master List content and structure (single cost) • Assessment of the currently available data for the required Master Lists and according to the identified standards, and identification of gaps, including gathering of existing datasets and stakeholder consultation (Single cost) • Data collection, including digitisation for completion of Master Lists (Single cost) • Establishment of the updating mechanism and regular update of Master Lists (recurrent) • Deployment of a Master List management platform compliant with recognised standards for hosting, management and sharing of Master Lists (recurrent) <p>Main timeline drivers</p> <ul style="list-style-type: none"> • Expedited identification of gaps in data quality and availability for the Master Lists that need to be filled • Availability of an operational platform to host, maintain and regularly update the Master Lists • Level of collaboration and coordination between the MOH and organisations in charge of maintenance of the datasets of geographic objects that might not be under the mandate of the MOH (e.g. administrative divisions, villages) • Delays in field data collection due to weather, social or political instability <p>Main budget considerations</p> <ul style="list-style-type: none"> • Scale of implementation (staff, equipment, training) • Data quality of existing datasets • Amount of travel and meetings required • Consultancy (field work training, supervision, technical oversight of data collection, management and analysis) for data collection for completion of Master Lists. Consider costs such as visits for field work, planning and monitoring. • Purchase of field data collection equipment • Salary/par-diems for field data collectors • Workshops and materials for training in field data collection <p>For establishment of the updating mechanism, platform and regular update of Master Lists consider costs:</p> <ul style="list-style-type: none"> • field visits for data collection • maintenance of field data collection equipment • situational assessment for feasibility of implementing a Master List management platform • consultancy to guide implementation activities of Master List management platform • standards followed by the MOH as aligned National Spatial Data Infrastructure (NSDI) <p>For identification and agreements on data and protocols (workshops) (Single cost)</p> <p>For programmes to implement the defined standards and protocols (recurrent)</p> <p>For support of the managerial level strategy/plan formulation cycle partly context specific</p> <p>For support in the health sector meetings required for buy-in, coordination</p> <p>CONSIDERATIONS FOR THE GEO-ENABLING ENVIRONMENT</p> <p>COST AND TIMELINE DRIVERS FOR ACTIVITIES AIMED AT STRENGTHENING THE GEO-ENABLING ENVIRONMENT</p> <p>Vision, strategy and plans</p> <p>Main triggers that will be conducive of the activities in this area:</p> <p>1. The importance of geospatial data and technologies is recognised and discussed within the health sector.</p> <p>Main budget considerations</p> <ul style="list-style-type: none"> • Amount required and set • Training shops. • Fee of expert groups in health • Existing policies <p>CONSIDERATIONS FOR THE GEO-ENABLING ENVIRONMENT</p> <p>COST AND TIMELINE DRIVERS FOR ACTIVITIES AIMED AT STRENGTHENING THE GEO-ENABLING ENVIRONMENT</p> <p>Governance structure</p> <p>Main triggers that will be conducive of the activities in this area:</p> <p>2.1 There is a need to discuss and agree the quality of geospatial data and technologies within the health sector.</p> <p>2.2 The issues that need to be addressed from the public health sector.</p> <p>2.3 A National Spatial Data Infrastructure or is in the process of being established.</p> <p>Benchmarks (i.e. the situation to be ultimately achieved for the sustainable use of geospatial data and technologies in the immunisation programme):</p> <p>2.1 The MOH has established a governance structure for geospatial data and technologies.</p> <p>2.2 All of the health programmes, including the MOH development partners using geospatial data are involved in this structure.</p> <p>2.3 The MOH is on the board of the NSDI.</p> <p>Anticipated potential activities to achieve benchmarks (Single cost/ Recurrent cost):</p> <ul style="list-style-type: none"> • Organisation of trainings on geospatial data collection, extraction, management, analysis, or visualisation for health staff involved in the application of geospatial data and technologies (as required by specific application) (Recurrent) • Organisation of initial and refresher trainings for data manager/GIS technicians at central level geospatial data management units (if one is established, or else the personnel with a mandate over geospatial data management belongs to a relevant data management unit) (Recurrent) • Participation of data manager/GIS technician to conference/events for continued training (Recurrent) • Establishment of partnerships to source technical capacity or training support for the MOH (e.g. technical institutes, Universities, NGOs, Centres of Excellence or other national agencies) (recurrent) <p>Main timeline drivers</p> <ul style="list-style-type: none"> • Existing technical capacity and skills within the MOH • Conducive MOH organisational structure (natural host for the central level geospatial data management unit) • Specific timeline of the application of geospatial data and technologies to be supported • Current presence of capacity building institutions (e.g. Universities) • Availability of the staff to be trained <p>Main budget considerations</p> <ul style="list-style-type: none"> • Existing technical capacity gaps • Amount training • Gaps in and curricula • Scale needed • Number of GIS technicians • Cost of technical capacity gaps • Training stations • Equipment (Global GNSS) with the • Good in tools or • Venues • Facilities • Training • Transport <p>Anticipated potential activities to achieve benchmarks (Single cost/ Recurrent cost):</p> <ul style="list-style-type: none"> • Purchase and maintenance of GNSS and purchase of laptops for staff involved in geospatial data management (recurrent) • Purchase of separate large screen and integrate the work of technician purchase of geospatial server solution for data and print several GIS technicians (recurrent) • When it applies, purchase of GIS software (base) for data management, analysis and visualisation (recurrent) • Establishment of internet connection or staff involved in geospatial data gathering and visualisation (recurrent) • purchase and maintenance of printers for <p>Main timeline drivers</p> <ul style="list-style-type: none"> • Current level of technical capacities and technologies that are needed • Efficiency of procurement and distributor to large numbers of equipment 	<p>CONSIDERATIONS FOR THE GEO-ENABLING ENVIRONMENT</p> <p>COST AND TIMELINE DRIVERS FOR ACTIVITIES AIMED AT STRENGTHENING THE GEO-ENABLING ENVIRONMENT</p> <p>Vision, strategy and plans</p> <p>Main triggers that will be conducive of the activities in this area:</p> <p>1. 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b) the use of the developed guidelines, standards, protocols and Master Lists by all the stakeholders in the health sector.</p> <p>8.2 The immunisation programme is complying with this policy.</p> <p>Anticipated potential activities to achieve benchmarks (Single cost/ Recurrent cost):</p> <ul style="list-style-type: none"> • Advocacy with the MOH for the development of the policy (single cost) • Development and regular review of the policy (recurrent) • Implementation of the policy including the alignment of the immunisation programmes strategic and planning documents to the defined policy (single cost) • Implementation of the policy • Evaluation of the level of implementation of the policy (recurrent) <p>Main timeline drivers</p> <ul style="list-style-type: none"> • Level of commitment and support of the managerial level • Presence of a local champion in the health sector • Level of collaboration and coordination in the health sector • Existence of cross-sector policies
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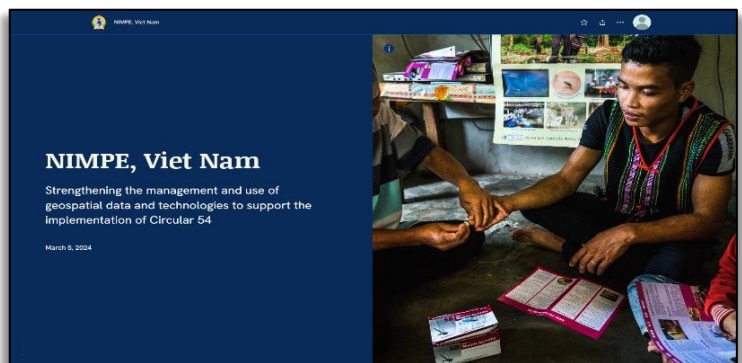
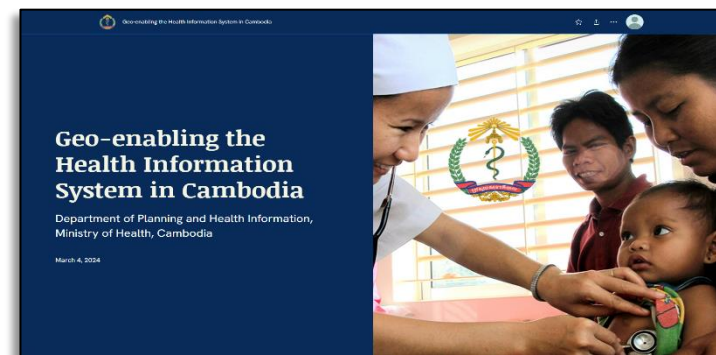
Provided for 7 of the 9 elements of the HIS geo-enabling framework

Example of in-country implementation



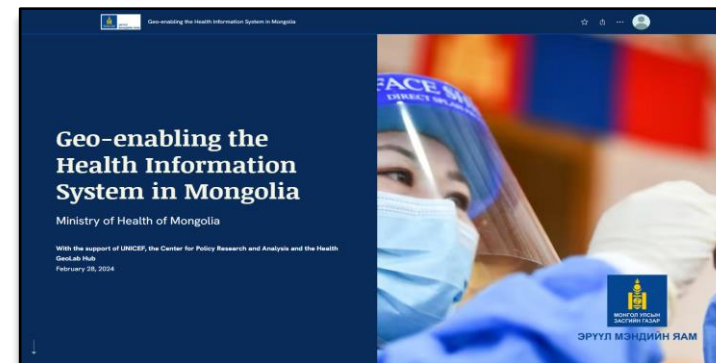
Myanmar
(<https://arcg.is/OCHOz>)

Cambodia
(<https://arcg.is/0uviGj>)



Viet Nam
(<https://arcg.is/1XmLij>)

Mongolia
(<https://arcg.is/100u4r>)



Example of in-country implementation - Myanmar



➔ Supports the convergence of efforts and resources

The HIS Geo-enabling toolkit

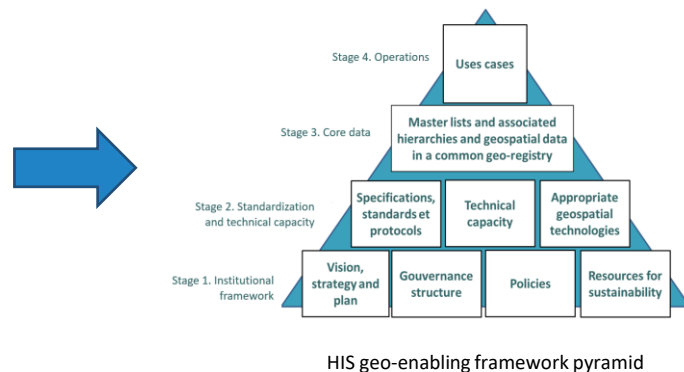
Designed to help countries assess their level of HIS geo-enabling and develop the action plan aimed at filling the identified gaps

MORU Tropical Health Network **HEALTH GEOLAB Hub**

HIS Geo-Enabling Toolkit

Version 1.5 (last update: 08.04.2024)

In collaboration with and with the support of:



Element of the framework	Benchmarks
1. Vision, strategies, and action plan	1.1 The MOH has a vision, strategy, and action plan regarding the management and use of geospatial data and technologies
2. Governance structure	2.1 The MOH has established a governance structure to handle issues pertaining to the management and use of geospatial data and technologies 2.2 All the health programs and the stakeholders involved in the management and use of geospatial data and technologies in health are part of the
3. Technical capacity	3.1 The MOH has a complete, up-to-date, uniquely coded, and geo-referenced for point base objects master list for each of the geographic objects key to public health: health facilities, administrative divisions and villages, reporting divisions. 3.2 These master lists are simultaneously hosted, maintained, regularly updated, and shared through a common geo-registry. 3.3 The government maintains, regularly updates, and share shapesheets containing the boundaries of the administrative and health reporting divisions. 3.4 All the above master lists, and especially their officially recognized codes, are being integrated in all the information systems and used for data collection, reporting, and monitoring across all health programs.
4. Data specifications, standards and protocols	4.1 The central level geospatial data management and technologies unit has access to the necessary geospatial technologies (GNSS, GIS) to support its mandate. 4.2 The key health programs have access to the appropriate geospatial technologies (GNSS, GIS) to support the implementation of their activities.
5. Use of geospatial technologies	5.1 Geospatial data and technologies are recognized as being important and their full potential is being used to support the implementation of key health programs towards reaching SDG 3.
6. Policies supporting that geo-enabling process	6.1 A policy/joint action plan enforcing the following has been released: (a) The standards over the geospatial data specifications, standards, and protocols as well as over the development, maintenance, update, and sharing of master lists for geographic objects core to public health through the use of a common geo-registry; (b) The use of the developed specifications, standards, protocols, and master lists by all the stakeholders in the health sector.
7. Resources for long-term sustainability of these geospatial data and technologies related activities	7.1 The MOH has the resources (human and financial) allocated to ensure the long-term sustainability of these geospatial data and technologies related activities

Benchmarks

Annex 2 - HIS geo-enabling quick assessment questionnaire

Introduction
The aim of this questionnaire is to obtain a picture of the situation in your departmental regarding its geo-enabling level.
This information can be used as baseline for the development of the action plan. Please take the time to browse the glossary before completing the questionnaire. [Help/Report/Contact Us](#)

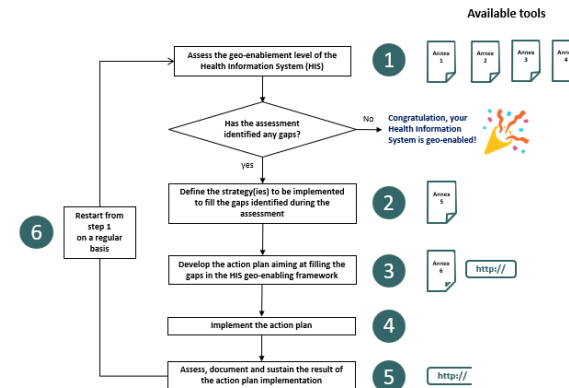
Respondent contact information
Full name of the respondent: _____
Function/position of the respondent: _____
Full name of the institution: _____
Full name of the department/unit: _____
Address: _____
City/Town: _____
State/Province: _____
Country: _____
Email address: _____
Phone number: _____

Priorities and challenges
This section aims at capturing the current priorities and challenges of your departmental response.
Priority 1: _____
Priority 2: _____
Priority 3: _____

HIS Geo-enabling quick assessment questionnaire

Indicator	Definition	Measurement approach	Baseline	Target	Start Date	End Date	Responsible	Deliverable	MSD Indicator	Status
1.1	Has the MOH established a governance structure to handle issues pertaining to the management and use of geospatial data and technologies?	Yes/No								
1.2	All the health programs and the stakeholders involved in the management and use of geospatial data and technologies in health are part of the MOH?	Yes/No								
1.3	The MOH has a complete, up-to-date, uniquely coded, and geo-referenced for point base objects master list for each of the geographic objects key to public health: health facilities, administrative divisions and villages, reporting divisions?	Yes/No								
1.4	These master lists are simultaneously hosted, maintained, regularly updated, and shared through a common geo-registry?	Yes/No								
1.5	The government maintains, regularly updates, and share shapesheets containing the boundaries of the administrative and health reporting divisions?	Yes/No								
1.6	All the above master lists, and especially their officially recognized codes, are being integrated in all the information systems and used for data collection, reporting, and monitoring across all health programs?	Yes/No								
1.7	The central level geospatial data management and technologies unit has access to the necessary geospatial technologies (GNSS, GIS) to support its mandate?	Yes/No								
1.8	The key health programs have access to the appropriate geospatial technologies (GNSS, GIS) to support the implementation of their activities?	Yes/No								
1.9	Geospatial data and technologies are recognized as being important and their full potential is being used to support the implementation of key health programs towards reaching SDG 3?	Yes/No								
1.10	A policy/joint action plan enforcing the following has been released: (a) The standards over the geospatial data specifications, standards, and protocols as well as over the development, maintenance, update, and sharing of master lists for geographic objects core to public health through the use of a common geo-registry; (b) The use of the developed specifications, standards, protocols, and master lists by all the stakeholders in the health sector?	Yes/No								
1.11	The MOH has the resources (human and financial) allocated to ensure the long-term sustainability of these geospatial data and technologies related activities?	Yes/No								

Strategies, stakeholder engagement and level of implementation to address existing gaps



Implementation process and associated materials

Annex 6 - Fictive HIS geo-enabling action plan

Introduction
The aim of this action plan is to outline a plan of action to address the gaps identified during the assessment of the HIS geo-enabling level. This information can be used as baseline for the development of the action plan. Please take the time to browse the glossary before completing the questionnaire. [Help/Report/Contact Us](#)

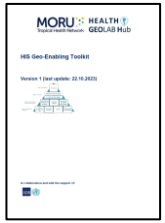
Implementation period January 2023 - August 2023 **Project Manager** John Doe

Activity	Activity description	Target group	Resources	Start Date	End Date	Responsible	Deliverable	MSD Indicator	Status
1.1	Review the MOH's current geo-enabling level and identify the gaps to be addressed.	MOH staff	1 person, 1 week	2023-01-01	2023-01-07	John Doe	Assessment report	1.1	Completed
1.2	Define the strategy(ies) to be implemented to fill the gaps identified during the assessment.	MOH staff	1 person, 1 week	2023-01-08	2023-01-14	John Doe	Strategy document	1.2	In progress
1.3	Develop the action plan aiming at filling the gaps in the HIS geo-enabling framework.	MOH staff	1 person, 1 week	2023-01-15	2023-01-21	John Doe	Action plan	1.3	Completed
1.4	Implement the action plan.	MOH staff	1 person, 1 week	2023-01-22	2023-01-28	John Doe	Implementation report	1.4	In progress
1.5	Assess, document and sustain the result of the action plan implementation.	MOH staff	1 person, 1 week	2023-01-29	2023-02-05	John Doe	Assessment report	1.5	Completed
1.6	Restart from step 1 on a regular basis.	MOH staff	1 person, 1 week	2023-02-06	2023-02-12	John Doe	Assessment report	1.6	In progress

Action plan template

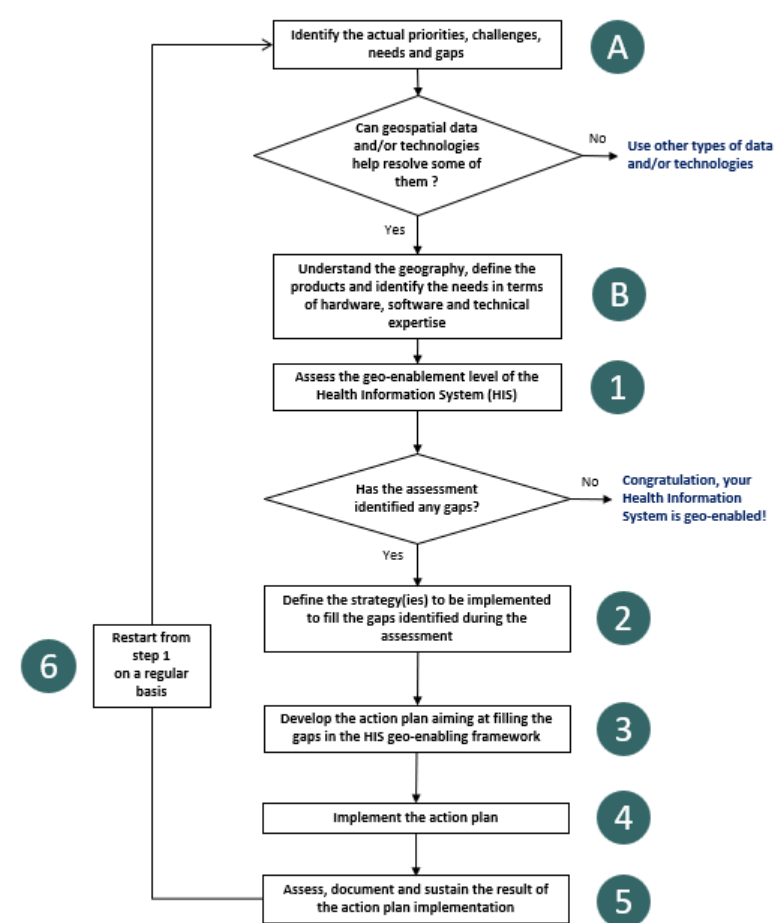
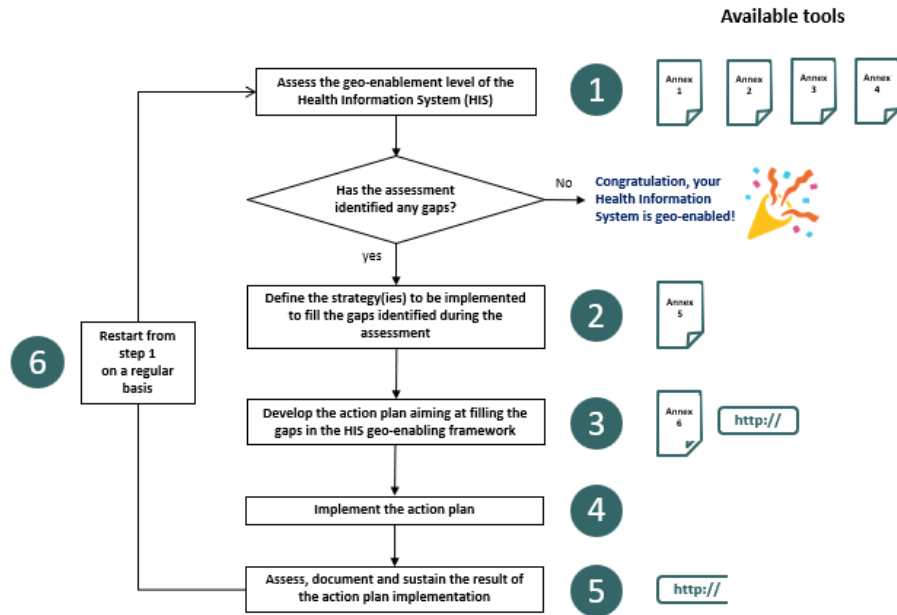
¹ https://www.healthgeolab.net/DOCUMENTS/HIS_geo-enabling_toolkit.pdf

The HIS Geo-enabling toolkit – Implementation process



Geo-enabling the HIS

Geo-enabling a program or intervention



Two additional steps at the beginning of the process

➡ Loop in both cases

Module 2 – «Homework »

- For participants from Ministry of Health programs/units of Asia Pacific: Complete the rapid HIS geo-enablement level assessment questionnaire if not already done (maximum 15 min)
- For other participants from Asia Pacific: Encourage your counterparts in the Ministry of Health to complete the questionnaire



<https://tinyurl.com/4veevrkr>

- ➔ The more programs we have, the more concrete and useful the rest of the training will be and the higher the possibility for each country to develop an action plan
- ➔ Thanks to APMEN's support will be provided to up to 3 countries of **Asia Pacific** after the training workshop to develop an action plan aiming at filling the gaps identified during the assessment

Programs/units having completed the questionnaire as of today

Country	HIS unit	Immunization	Malaria	Tuberculosis	HIV/AIDS	Other
Timor-Leste						
Afghanistan						
Bhutan						
Pakistan						
Papua New Guinea						Population and family health
Thailand						
Bangladesh						
Cambodia						
China						
Fiji						
Indonesia						
Malaysia						
Philippines						
Solomon Island						
Sri Lanka						

➔ The number of programs/units having completed the questionnaire will be one of the criteria used for the selection of countries that will receive support to develop an action plan

Module 2 – Schedule and agenda

Schedule Module 2

3 July 2024 (Bangkok 12pm / Geneva 6am / Fiji 6pm)

15 min - Recap of Module 1 and agenda of Module 2

30 min - **Session 4:** In-country implementation of the HIS geo-enabling framework

30 min - **Session 5:** Result of the HIS geo-enablement level assessment for Asia and Pacific (priorities and challenges)

30 min - **Session 6:** Understand the geography of the program or intervention

➔ Implementation of the HIS geo-enabling framework

**Thank you for your attention and
see you all again soon!**