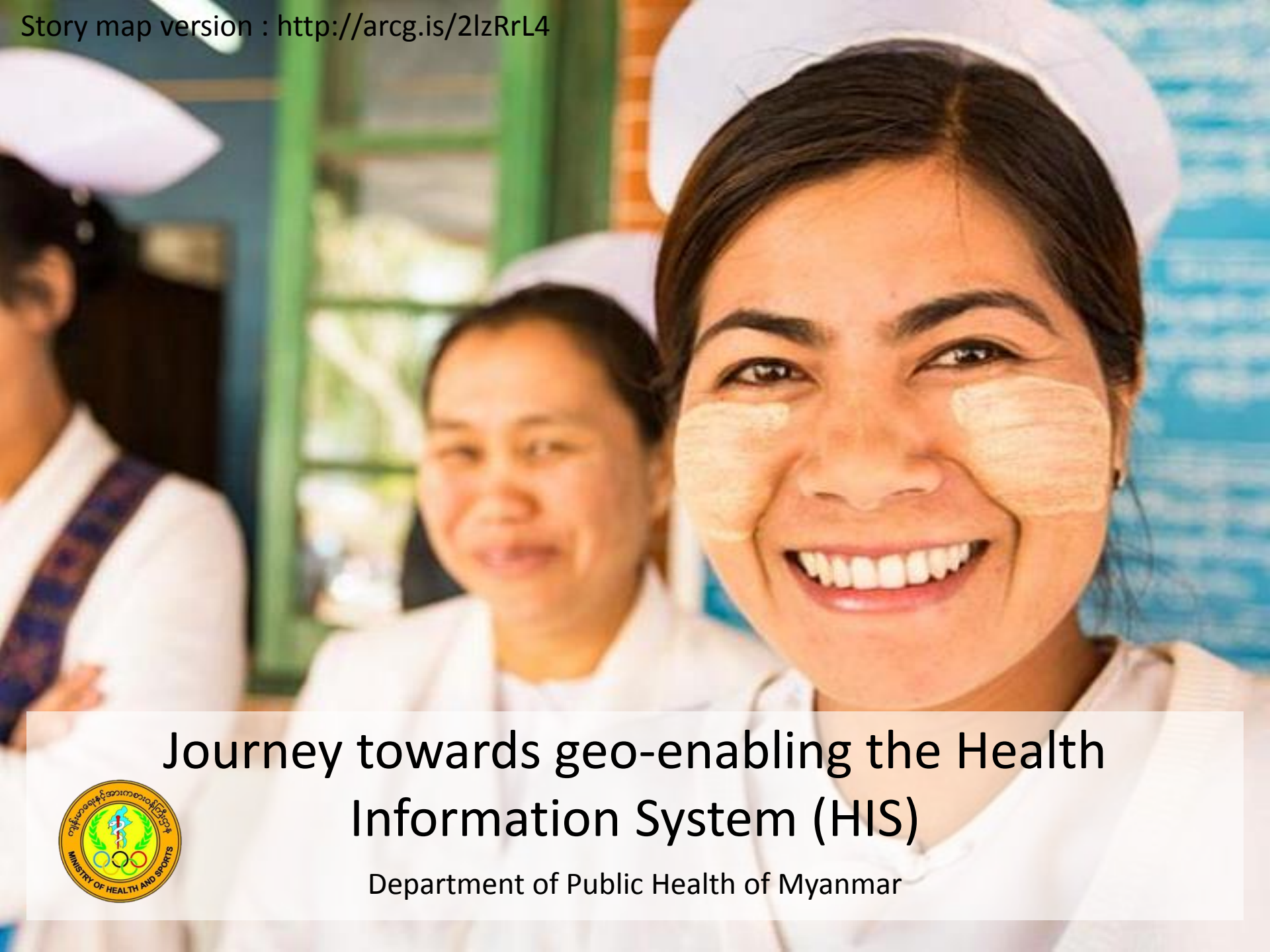
Story map version : http://arcg.is/2lzRrL4



Journey towards geo-enabling the Health Information System (HIS)

Department of Public Health of Myanmar

Public Health Priorities

Myanmar is facing wide geographic, ethnic and socio-economic disparities and several public health priority issues, including but not limited to:

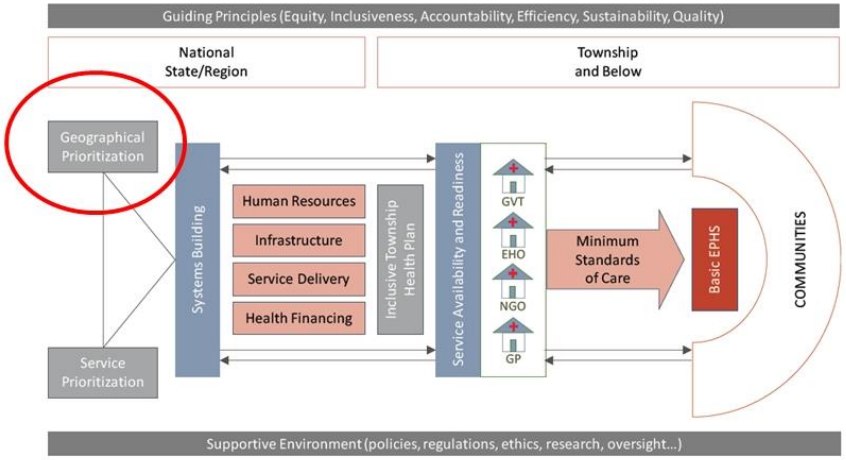
- Maternal and newborn death
- Diseases of national concerns including Malaria
- Natural disasters

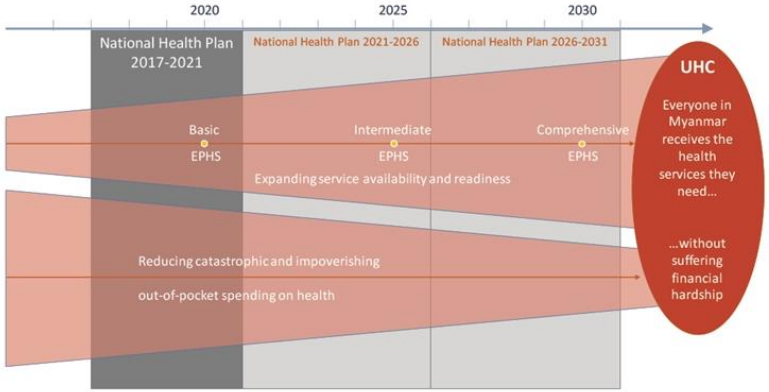
National Health Plan 2017-2021

The National Health Plan (NHP) aims to strengthen the country's health system and pave the way towards Universal Health Coverage (UHC.

The main goal of NHP 2017-2021 is to extend access to a Basic Essential Package of Health Services (EPHS) to the entire population by 2020 while increasing financial protection.

Integrating geography into the Health Information System (geo-enabling) contributes to the implementation of the National Health Plan 2017-2021 by supporting geographical and service prioritization, planning at Township level and system building.



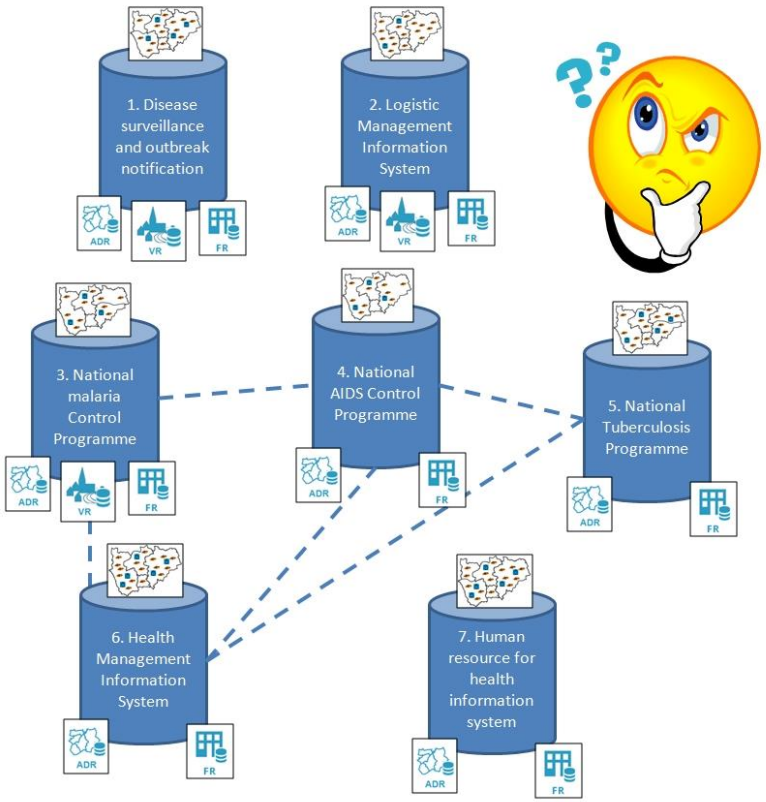


Source: NHP 2017-2021

Initial situation

At the time of starting the process for geo-enabling its Health Information System (HIS), the DOPH was facing the following situation:

- Lack of vision and governance structure
- Limited technical capacity
- Lack of agreed upon standards and protocols
- Lack of common master lists and use of different coding schemes
- No guidelines nor policy supporting the geo-enabling of the HIS

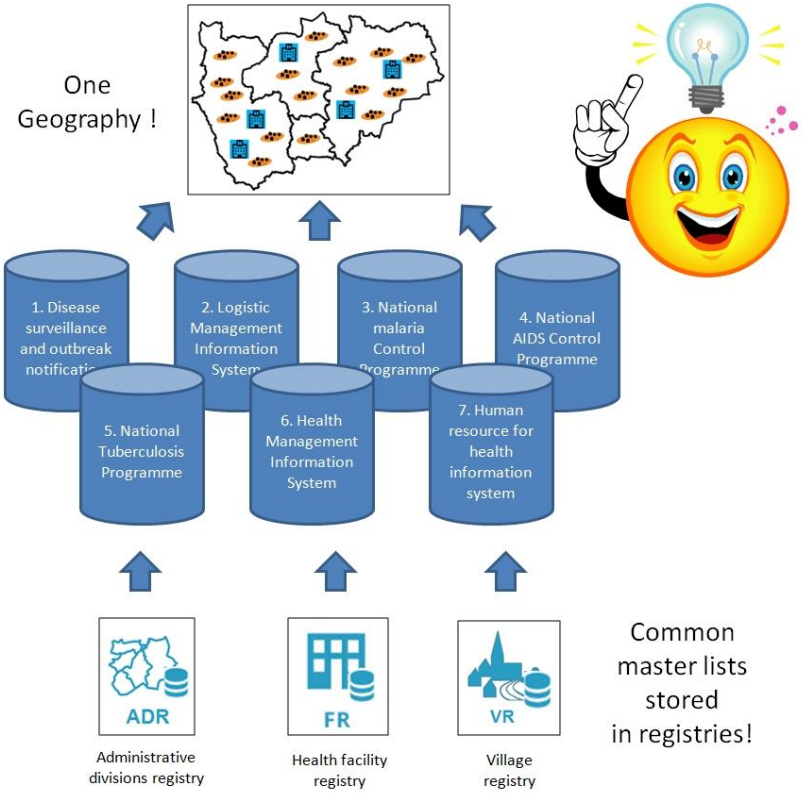


The above was resulting in information systems using different master lists and therefore not sharing the same geography.

Pilot project (August 2016 – March 2017)

A pilot project conducted over the Region of Magway has been used to demonstrate the benefits of geo-enabling the HIS by using common core geo-registries (platform hosting the master lists), and therefore the same geography across the following three programs:

- Planning: Proposition for a fully functional Emergency Obstetric and Newborn Care (EmONC) delivery network (Basic and Comprehensive)
- Disease monitoring and surveillance: Temporal follow up on health facility level number of positive malaria cases over 2015
- Emergency management: Rapid impact assessment after Chauk earthquake (August 24, 2016)

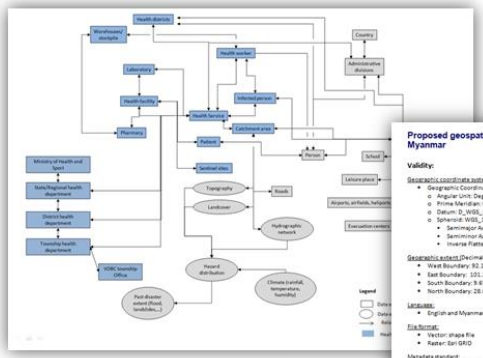


Geo-enabling

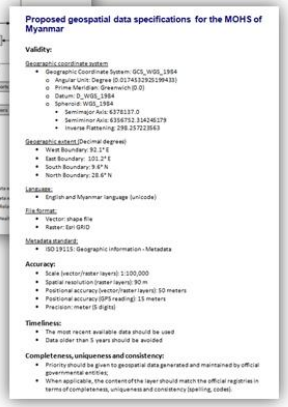
A geo-enabled HIS is an information system that fully benefits from the power of geography, geospatial data and technologies.

Geo-enabling the HIS requires not only for a clear vision to be captured in a strategy and a plan but also for a governance structure; technical capacities; data specifications, standards and protocols; and master lists to be in place to ensure a proper use of geospatial data and technologies.

In addition to that, a policy enforcing all of the above as well as the necessary resources to ensure sustainability on the long term have to be available.



Data model



Proposed geospatial data specifications for the MOHS of Myanmar

Validity:

Geographic coordinate system

- Geographic Coordinate System: GCS_WGS_1984
  - Angular Units: Degree (0.0174532925199432)
  - Prime Meridian: Greenwich (0.0)
  - Datum: D_WGS_1984
  - Spheroid: WGS_1984
    - Semimajor Axis: 6378137.0
    - Semiminor Axis: 6356752.314245179
    - Inverse Flattening: 298.257223563

Geographic extent (Decimal degree)

- West Boundary: 92.1° E
- East Boundary: 101.1° E
- South Boundary: 9.6° N
- North Boundary: 28.6° N

Language:

- English and Myanmar language (unicode)

File format:

- Vector: shape file
- Raster: Esri GRID

Metadata standard:

- ISO 19115: Geographic information - Metadata

Accuracy:

- Scale (vector/raster layers): 1:100,000
- Spatial resolution (raster layers): 90 m
- Positional accuracy (vector/raster layers): 50 meters
- Positional accuracy (GPS reading): 15 meters
- Precision: meter (5 digits)

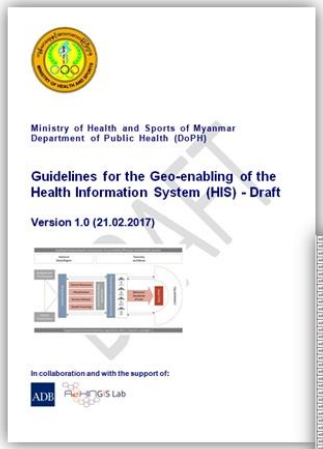
Timeliness:

- The most recent available data should be used
- Data older than 5 years should be avoided

Completeness, uniqueness and consistency:

- Priority should be given to geospatial data generated and maintained by official governmental entities;
- When applicable, the content of the layer should match the official registries in terms of completeness, uniqueness and consistency (spelling, codes).

Data specifications



Ministry of Health and Sports of Myanmar
Department of Public Health (DoPH)

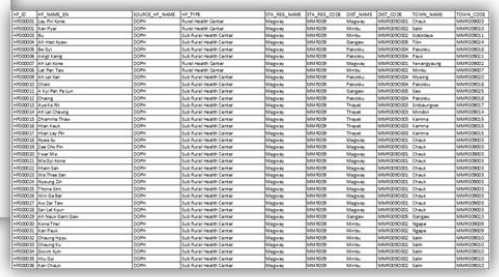
Guidelines for the Geo-enabling of the Health Information System (HIS) - Draft

Version 1.0 (21.02.2017)

In collaboration and with the support of:

ADB

Guidelines

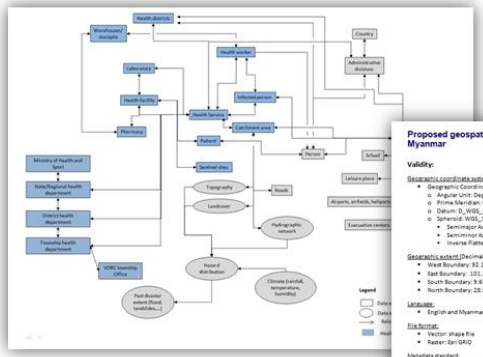


Master lists

Geo-enabling

In the context of the pilot project, such geo-enabling has been simulated through the:

- Identification of the data needs (data model)
- Definition and implementation of dataset specifications guidelines, standards and protocols
- Establishment of master lists for health facilities and administrative divisions for Magway and its surrounding based on the data specifications
- Integration of the unique codes from the master lists in the different datasets used for the pilot project
- Improvement of some geospatial data (roads, rivers)
- Use of the same data (master lists, geospatial and statistical data) across the 3 case studies



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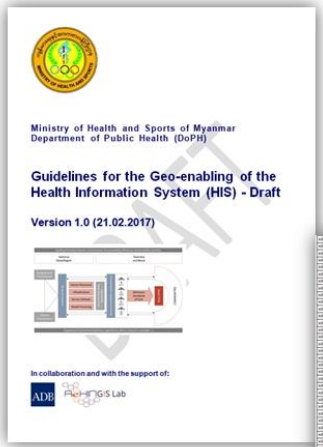

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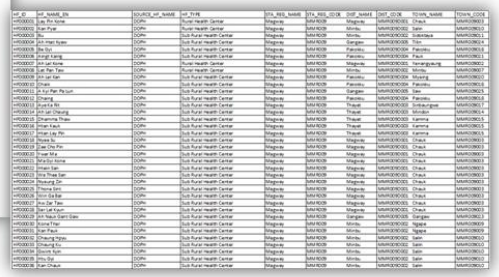


Dataset (2014-2015)

Geospatial data

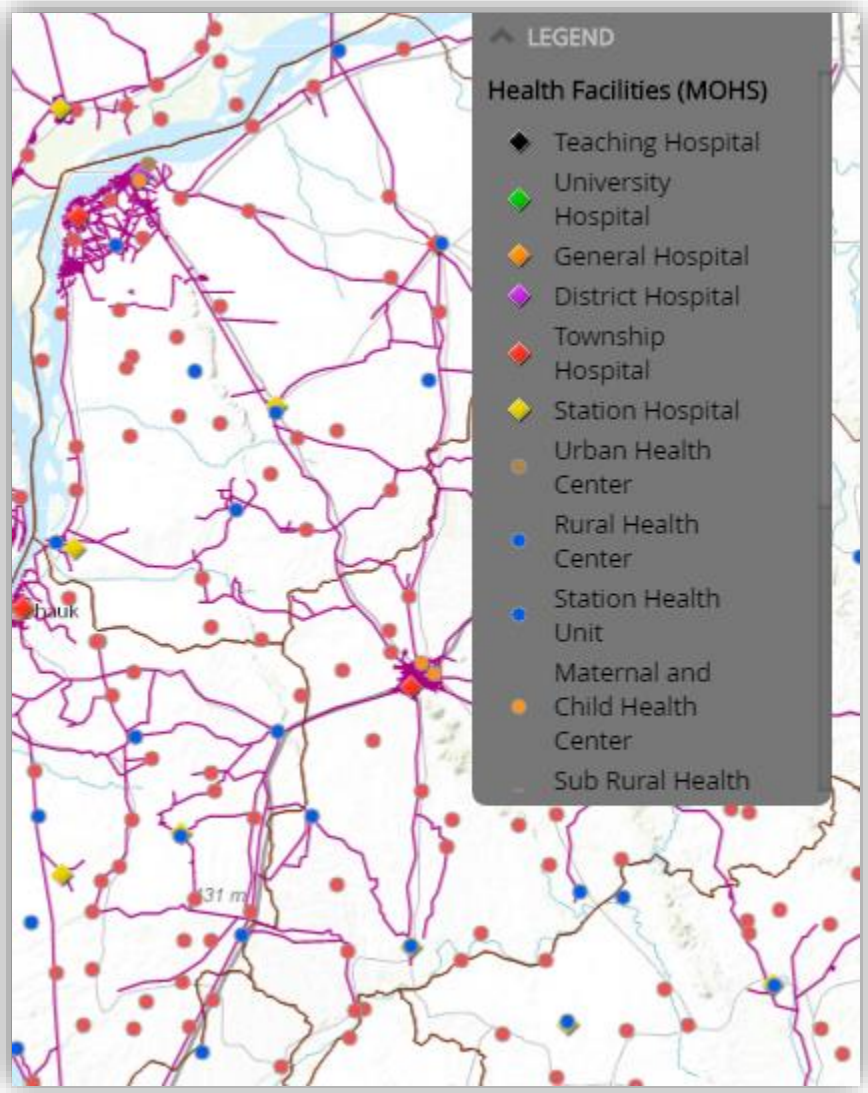
- Health facilities (MOHS)
- Townships (MIMU)
- Roads network (OSM)
- Hydrographic network (OSM)
- Population distribution (WorldPop)
- Landcover (GLOBELAND30)
- DEM (SRTM)
- Earthquake epicenter (USGS)
- PGA zones (USGS)

Statistics, information

- Number of positive Malaria cases (NMCP)
- Number of births in the hospitals (HMIS)
- Township level number of pregnant women (HMIS)

Norms

- Maximum travel speed on different road types (DLCA)

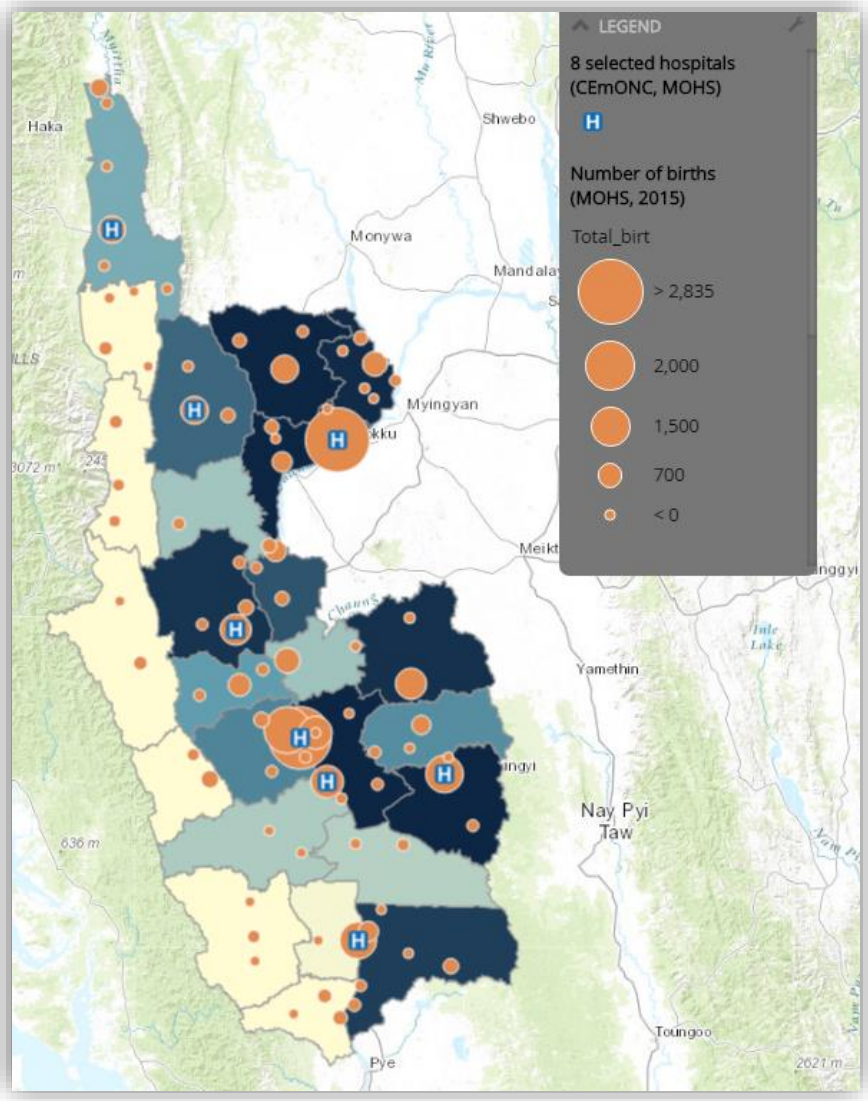


Results (EmONC Planning)

Following the 2009 WHO, UNFPA, UNICEF and AMDD Handbook on monitoring emergency obstetric care, the Region of Magway should count at least 40 fully functional EmONC facilities, including at least 8 fully functional CEmONC facilities.

8 hospitals from the health facility master list (in blue on the map) have been selected based on 2014-2015 data including the total number of births (proportional symbols on the map) and the distribution of registered pregnant women (background values on the map).

AccessMod has been used to identify the Rural Health Centers (RHC) located within 2 hours of reach of a Comprehensive Emergency Obstetric and Newborn Care (CEmONC) facility and outside potentially flooded areas, 122 of them in total.

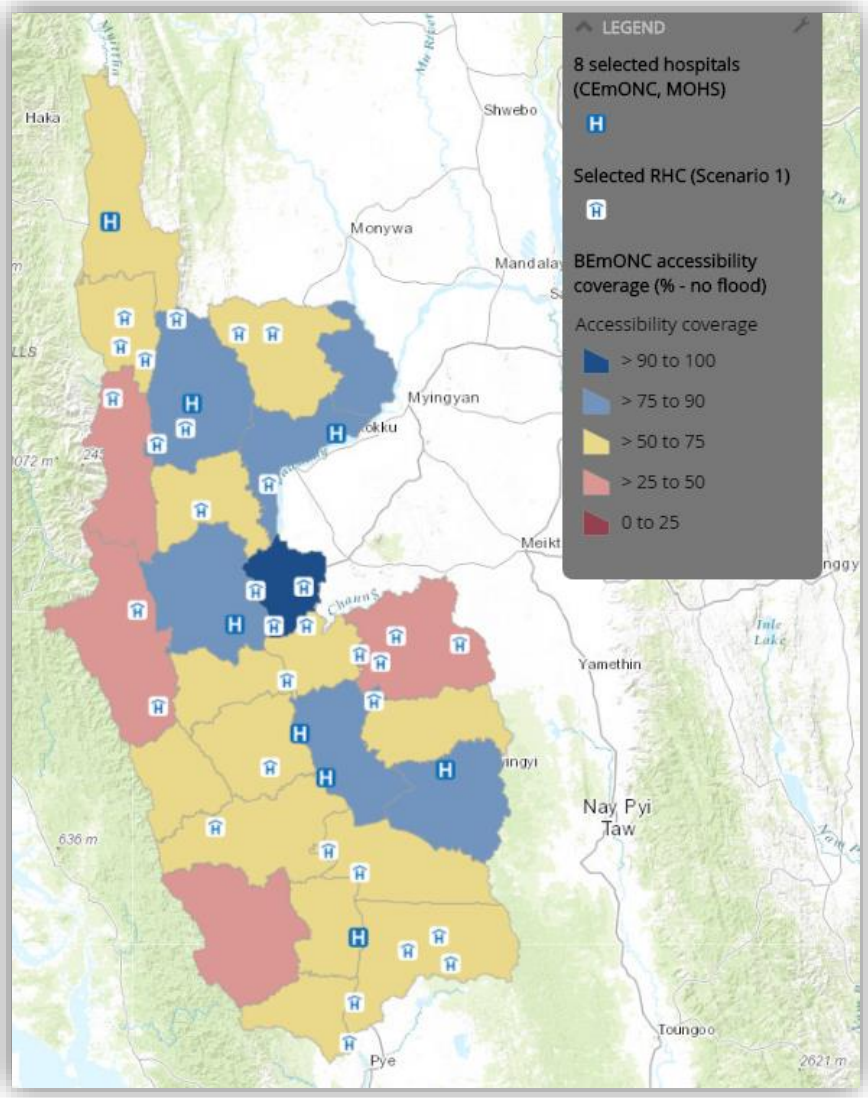


Results (EmONC Planning)

Different scenarios have been tested to select 32 additional Basic Emergency Obstetric and Newborn Care (BEmONC) facilities (in white on the map) to not only provide the best accessibility coverage possible at the regional level (71%) but also increase equity in access at the Township level (accessibility coverage values on the map).

Finally, the impact of the 2015 floods on accessibility coverage has been simulated, resulting in a reduction in access of 3% at the regional level and up to 10% in some Townships.

The above is an example of the type of advanced geospatial analysis that can be conducted to support geographic and services prioritization as well as planning once the HIS has been geo-enabled.

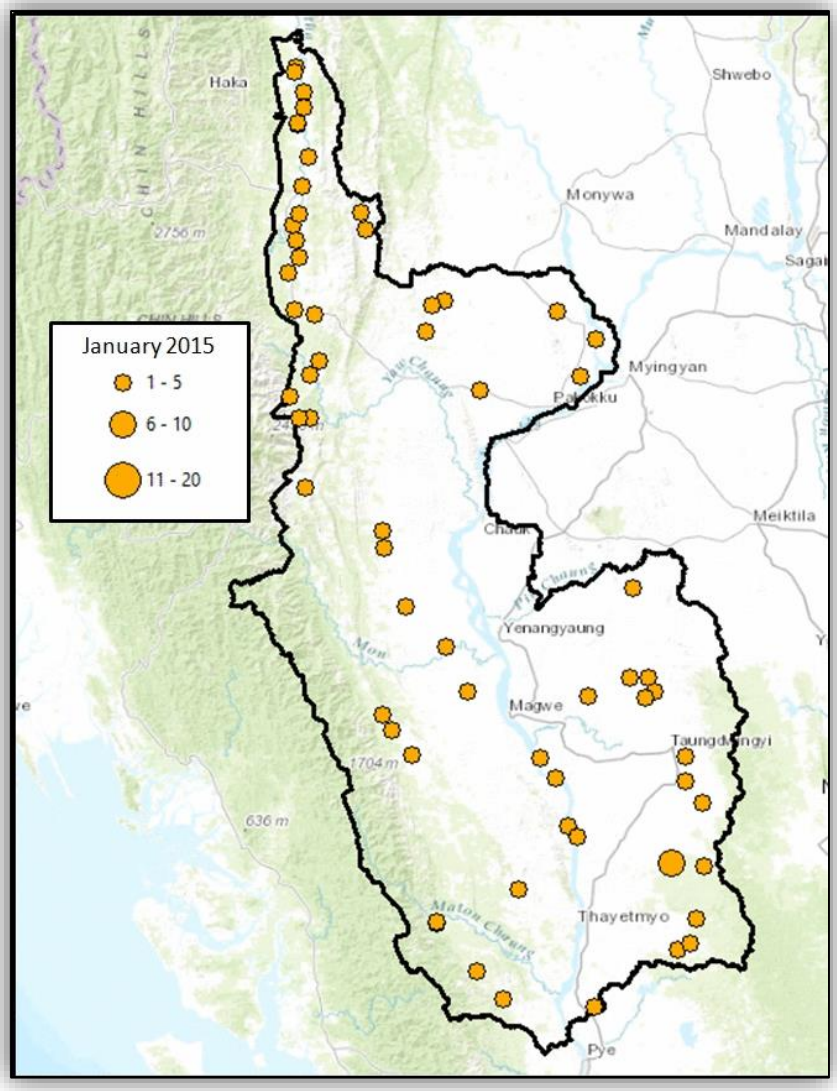


Results (Disease monitoring and surveillance)

Manually integrating the unique identifier from the health facility master list into the malaria case reporting database from the National Malaria Control Program (NMCP) allowed the mapping of the monthly number of positive cases reported in 722 health facilities over 2015.

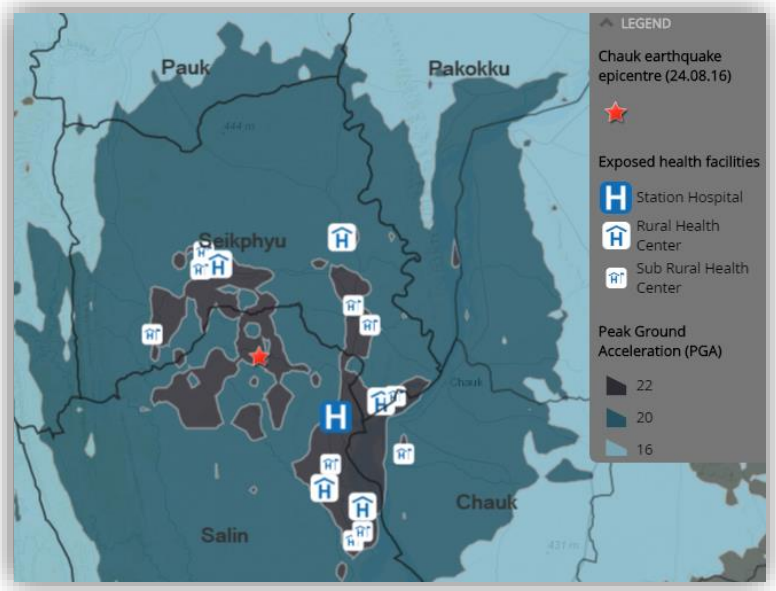
These values have been used to generate a time series animation (on the right) showing the evolution of these number of cases over that particular year.

Ensuring for a systematic integration of the master lists for the core geographic objects into the information systems used for Malaria and other diseases supports real time disease monitoring and surveillance and the use of spatial analysis and modeling capacities provided by advanced GIS software.



Results (Emergency Management)

The Peak Ground Acceleration (PGA) distribution map for the 24th August 2016 earthquake in Chauk (Background colors on the map) and the geographic coordinates from the health facility master list have been used to identify the 17 health facilities (hospital in blue and primary health care centers in white on the map) presenting the highest probability to experience damages at the time of the event.



The spatial distribution of pregnant women for the same year also allows the identification of how many of them are located in the same PGA zone and this by Township as per the table on the side.

Township code	Township name	Number of pregnant women (2015)
MMR009022	Seikphyu	585
MMR009010	Salin	1411
MMR009018	Pakokku	6
MMR009003	Chauk	231

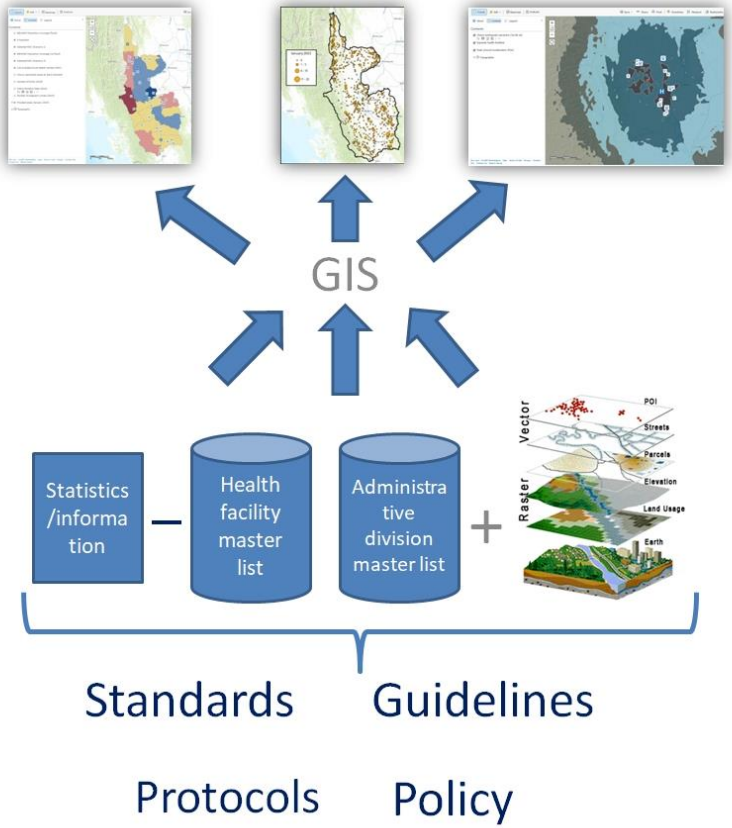
Township level number of pregnant women (2015) exposed to the highest PGA during Chauk earthquake

The above and the map illustrate the potential of geospatial data, including the master lists, and GIS for Rapid Impact Assessment (RIA) and response planning during a disaster.

Conclusion

Geo-enabling the HIS benefits the health sector by:

- Using geography and GIS as a common and neutral integrating and analytical platform that goes beyond thematic mapping
- Supporting data consistency across sources
- Reducing duplication of efforts and therefore data management cost
- Allowing to address multiple public health issues at the same time from a more systemic perspective
- Using the power of maps for planning and decision making



All of the above supports the implementation of the National Health Plan 2017-2021 to reach the Sustainable Development Goals (SDGs) but there is a need to institutionalize what has been initiated through the pilot project.

Institutionalization

The institutionalization of the process implemented over the past months will require to:

- Implement the vision behind the geo-enabling of the HIS
- Enforce the use of the developed standards, protocols, practices and master lists across the health sector
- Establish a governance mechanism for geospatial data management and GIS under the umbrella of the DOPH
- Strengthen, sustain and potentially expand the current technical capacity and establish it as a common resource for the all MOHS
- Include the geo-enabling into the HIS policy to support and enforce all the above as well as access to geospatial data
- Secure the necessary resources to ensure sustainability on the long term

"The necessary geospatial data, technologies and services are available, of quality and accessible in a coordinated way to support the implementation of the National Health Plan 2017-2021 towards achieving Universal Health Coverage (UHC)"

➡ Second phase of the project (May-December 2017)

Way forward

- Get the necessary commitment and support from the Ministry of Health and Sports to institutionalize what has been developed during the pilot project, include the geo-enabling in the HIS policy and establish a Technical Working Group on geospatial data management and GIS
- Engage all the key stakeholders in the process to also get their commitment and support and reach a more collaborative and coordinated approach to geospatial data management and GIS in the health sector in Myanmar

Acknowledgements

The journey continues…

For more information

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- AeHIN GIS Lab: steeve.ebener@aehingislab.net