

Lilongwe, Malawi 7th September, 2007

Addressing the needs in terms of geographic information and GIS capacities to support HIV/AIDS monitoring, evaluation and response in Malawi.

**Report of the meeting which took place in Lilongwe
Malawi, 7th September 2007**

Meeting organized by the Ministry of Health (MOH) Malawi with support of Reach Trust and the World Health Organisation (WHO)



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1. Executive Summary

The meeting organised by the Ministry of Health (MOH) Malawi with support from Reach Trust and the World Health Organisation (WHO) took place at the REACH Trust office in Lilongwe, Malawi on 7 September 2007.

The purpose of the meeting was to address the needs in terms of geographic information and GIS capacities to support HIV/AIDS monitoring, evaluation and response in Malawi.

Eleven representatives from seven different governmental and non-governmental organizations participated in the meeting (See Annex I).

The principal outcomes of this meeting have been the identification of specific tasks aiming at

- preparing the data necessary for measuring HIV/AIDS population coverage
- supporting the preparation of the 2008 population census
- creating an health facility registry for the country

2. Introduction

The result of the Geographic Information System (GIS) capacity and data analysis conducted in Malawi in July 2006 [1] in the context of the joint project: "Promoting equity and a health systems approach towards treatment access and responses to HIV and AIDS in Southern Africa" (World Health Organization (WHO), REACH Trust Malawi / Southern African network on Equity in Health (EQUINET)) clearly demonstrated that some important data gaps would need to be covered before being able to measure the availability and accessibility coverage offered in the country in terms of HIV/AIDS care.

This report also highlighted the presence, in the country, of GIS capacities, data and skills that could be leveraged if the different institutions involved in the collection, management and maintenance of this type of information would be working more closely.

Rather than wait to have the opportunity to organize a large meeting involving all the key GIS stakeholders in the country it has been decided to initiate a more focused collaborative process among certain institutions to demonstrate, the need and benefit of working together to tackle health related issues.

The present meeting has therefore been organized by the Ministry of Health (MOH) with support from REACH Trust and the WHO on 7 September 2007 with the objective to:

- Establish or strengthen the connection between the main institutions using Geographical Information System (GIS) which could perform the technical work;
- Improve the quality and level of completeness of the already existing GIS data and associated information in order to answer the needs from the different partners involved in HIV/AIDS monitoring, evaluation and response in Malawi;
- Possibly establish a link between this work, the GIS component of the Malawi Health Facility Registry and the Health Management Information System (HMIS).

Nine representatives (Annex I) coming from the following governmental and non-governmental institutions attend this meeting:

- Ministry of Health (MOH)
- Ministry of Land, Physical Planning and Surveys
- National Roads Authority (NRA)
- National Statistical Office (NSO)
- National TB Control Programme
- Reach Trust
- World Health Organisation (WHO)

The agenda reported in Annex II has been followed for the meeting.

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3. Welcoming note and introduction of the participants

The meeting was opened by Mr Kelvin Saukila, Chief Statistician, on behalf of Mr Chris Moyo, Deputy Director, HMIS.

In his welcome address Mr Saukila stressed the importance of this meeting not only to support HIV/AIDS monitoring, evaluation and response in Malawi but also for any other health interventions. He thanked the participants for coming, WHO for instigating the discussions and REACH Trust for providing the venue for the meeting. He concluded by hoping that the days deliberations will contribute to the established objectives and will be of value to all the participants.

This welcoming note was then followed by self introduction of the participants.

4. What is needed

The first session of the meeting had for objective to devise a clear picture of the needs in terms of geographic information and GIS capacities to support HIV/AIDS monitoring, evaluation and response in Malawi.

The MOH started the session by presenting its own needs in terms of data, human resources, networking and equipment at both the central and the district level.

All these resources are for example needed in order to report the percentage of the population residing within 5 km of a health facility in the context of the Health Sector Wide Approach (SWAp) Monitoring and Evaluation framework. This key indicator, which require the use of GIS, is supposed to be reported by every districts annually which therefore calls for the necessary capacity to be in place at that level.

The HMIU unit being in charge of monitoring equity, Geography and GIS could also support the collection and analysis of disaggregated data on equity. The results could then be used to allocate care to the most vulnerable and the most in need groups in the population.

GIS could also be used for the planning of new facilities, allocation of resources (both human and infrastructural) as well as making the relevant information available for decision makers.

At the Headquarter level, the MOH needs:

- one officer totally dedicated to GIS based application with one assistant;
- advanced GIS training for the officer and basic training for the assistant;
- to extend their GIS network both within and outside the country;
- some specific hardware, including spares and printers, as well as software;
- access to additional GIS databases.

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At the district level, the MOH needs:

- training of the district assistant statistician;
- hardware and software;
- supervision and on-the-job mentoring.

This was followed by a presentation from WHO which outlined the needs in terms of data and skills for the Equity Project. Here, the overarching aim was to relate information on the spatial distribution of population suffering from HIV/AIDS and the location of ART sites and thereby match the demand for care and its availability (offer) so as to have an idea of the coverage which is offered by the care delivery system in place.

The equity project is proposing to address this issue through:

- the creation of graph showing the spatial distribution of the prevalence population and the ART patient compare to the location of the ART sites;
- the measure of the percentage of the population in need located within 1 hour of travel of the nearest ART site taking into account the patient coverage capacity of each site.

The following information and data are necessary in order to obtain these results:

- Population - number and spatial distribution;
- Health facilities - location and patient coverage capacity;
- Environment - landcover and terrain including slope and drainage network;
- Transportation - type, condition and network;
- HIV/AIDS - Prevalence down to the lowest level of desegregation possible.

Some specific skills (data collection, extraction, cleaning, analysis and modeling), hardware (GPS devices and computers capable of running GIS applications) and software (ArcView 3.x with the Spatial Analyst extension) are also needed in order to run the tool which has been selected for this work [2].

For information, the needs listed by the participants to the GIS stakeholder meeting that took place in Lusaka in April 2007 regarding the similar process in Zambia [3] has also been presented during this meeting.

5. What do we have at disposal ?

The second session of the meeting looked at the GIS capacities and data available in the country.

The session started with a presentation of the results of the GIS capacity and data availability analysis conducted by WHO in July 2006 in the context of the Equity project [1] and the visit that followed in April 2007.

This exercise had proved the existence of considerable capacity in terms of GIS skills, hardware and software available in the country.

When it comes to data, several layers of good quality exist but they are either unknown, underused or might need to be updated or integrated with other sources of data to increase their usefulness. The situation with regard to health facilities is different because of the important discrepancies that exist between the sources of data that are available (see section 7).

The fact that a larger number of GIS stakeholder with very limited communication or even working relationship were observed in the country unfortunately leads to duplication and efforts and lost opportunities, difficulties to make data compatible (coding scheme, time component, lack of data collection protocols and standards,...) and a large part of specific hardware (e.g. large size printer) which is not frequently used.

The conclusion of this presentation was that leveraging the existing capacity and data as well as improving the working connection between the stakeholders would benefit all and improve decision making.

This presentation was followed by a discussion aimed at completing or updating the information obtained through this analysis.

The following information were reported by the participants:

- the National Roads Authority (NRA) indicated that they were about to release a new version of their data set, subject to parliamentary sanction;
- the National Statistical Office (NSO) gave an update of the preparation of the 2008 population census;
- the Ministry of Health (MOH) mentioned the existence of the extension of the catchment areas for individual health facilities as well as the availability of data for health facilities managed by NGOs that would also need to be cleaned and updated. They also mentioned about the Human Resources survey that is being planned for November and December 2007.

It has also been proposed to add the location of schools and water points to the list of layers to be look after.

6. How could we fill the gaps ?

The previous session allowed to identify several gaps, principally in terms of data and collaboration between the institution attending the meeting.

It has therefore been proposed to start filling these gaps through the implementation of a collaborative process aiming at measuring population coverage in Malawi in the context of the project "Promoting an equity and health systems approach towards treatment access and responses to HIV and AIDS in Southern Africa" (Annex III).

In addition to answer the needs of the above mentioned project, this process will also benefit the different stakeholder involved in the process, for example:

- Public Health Institutions (MOH, NAC,...) will have access to improved data set for decision making and research
- value will be added to the data produced by the NSO, NRA and the Survey Department and demonstrate their importance for public health

The fact that this process requires the use of data coming from different sources (NSO, NRA, MOH, Survey Department,...) will directly help improving data compatibility and collaboration between the different GIS stakeholder in the country.

This process will also demonstrate how working together through an integrated approach can help solving problems, health related in this case, and lead to reduction of duplication of efforts which will resonate at the policy level and should facilitate the mobilization of funds from donors.

Last but not least, it is expected that this process could serve as the basis for revitalizing the development of a National Spatial Data Infrastructure (NSDI) for Malawi, demonstrate that the health sector should be part of this development and insure a regular update of the core layers (health facilities, roads, rivers,...) taking the time component into account.

In this regards, the process currently taking place in Zambia [3] has been presented as possible example of what could be applied in Malawi on the longer term.

In the meantime, some other areas of collaboration have also been identified during this discussion as follow:

- the National Road Authority to discuss with the Survey Department regarding the possibility to integrate their respective road network data into one unique dataset;
- the Survey Department to help the National Statistical Office redesigning their enumeration areas for the coming census based on more recent data sets;
- the National Statistical Office proposed its help for collecting data in the field (*e.g.*; health facility location) at the same time that they do collect their own data.

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The possibility to pool together resources such as GPS devices, digitizing table or large size printers in order to answer everybody needs using the already available capacities instead of buying new material has also been discussed.

On a more technical perspective the Survey Department has accepted to:

- look at the possibility for all the institutions involved to use the spot 10 and/or Landsat ETM+ satellite images as ground reference;
- compare the Digital Elevation Model (DEM) they have created with the global SRTM data;
- initiate a discussion regarding the use of a different projection system that would be compatible with the above mentioned satellite image and facilitate the integration of GPS data.

This should serve as the basis for the proposition of agreed upon standards to be used in the country.

Finally, in order to facilitate connections between GIS professionals it has been suggested that the contact information of each institution GIS focal points in the country could be posted on the Malawi Geographic Information Council (MAGIC) web site. The possibility of hosting a metadata portal, as a common service to the different institutions, is also to be evaluated by MAGIC and its secretariat, the National Spatial Data Centre (NSDC).

7. Creating a Health Facility Registry (HFR) for Malawi

For the health sector, the location of the health facilities in the country is an important layer needed for decision making and planning.

The importance of this layer and the existence of several inconsistent sources of health facility location in the country calls for the establishment of a process aiming at creating an Health Facility Registry (HFR) and ensure its regular update.

It has been proposed to use the document developed by MEASURE Evaluation and WHO [4], which details the standardized approach for uniquely identifying a health facility, as the basis for defining the fields that would be part of the registry. The first set of proposed fields are as follow:

- health facility country registry code
- health facility name
- health facility contact information
 - postal address (street number, city, postal code, other; in some circumstances, a facility may have some but not all of the postal address elements and in these cases the elements that are present should be recorded; if the facility has no postal address at all, this element would be omitted)
 - main telephone number
 - main fax number
 - main e-mail address

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- name of the director
- director's telephone phone number
- facility's geographic administrative unit (at least first and second level)
- GPS coordinates (latitude, longitude waypoint ID)

In a first phase, the different sources of health facility location will be integrated into one unique database in order to differentiate the facilities for which there is a need to collect or update this information from those where the information at disposal is up-to-date and of quality.

In a second phase, this database will be completed through the Human Resource survey planned by the MOH for the end of 2007.

Once cleaned and validated the update dataset will constitute the Health Facility Registry which will form a component of the HMIS.

From there a regular data updating mechanisms which takes advantage of any field data collection opportunity (for example through the quarterly report that each health facility have to pass to the HMIS district level officer) will have to be established in order to maintain the registry as up-to-date as possible.

Once its dissemination is ensured, this registry will form a unique centralized up-to-date data set of quality used by all the institutions.

In addition to avoiding duplication of efforts, the establishment of such registry would:

- reduce the duplication of efforts,
- facilitate the integration of data coming from disparate sources,
- strengthen the HMIS,
- facilitate and support data collection at the health facility level.

8. Conclusion and next steps

The discussion which took place during the meeting have been very productive and have demonstrated the willingness of the different institutions present to improve collaboration between themselves to reduce duplication of efforts and improve the quality and compatibility of the data they are producing.

In this regards, the collaborative process proposed by WHO in the context of the equity project has been seen as a good way to show a concrete example of the benefits that each institutions could gain out of it.

The participants also expressed their willingness to see this process going beyond HIV/AIDS and even health end up in a process similar to the one that has been initiated in Zambia for the generation of a joint proposal that would not only serve to find fund in a more coordinated way but would also leverage the capacities and skills existing in

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the country, set the standards to be used by all institutions in order to improve: data quality, compatibility (interoperability), documentation (metadata), access and use and establish the process(es) that would insure the update of each layer.

This process would nevertheless require the buy of a more larger group of stakeholder and would therefore not be possible before spring next year.

In the meantime it has been agreed to work on:

- the tasks that are listed in section 6 of this report
- the creation of the health facility registry for the country (section 7)
- supporting the preparation of a good quality Enumeration Area layer for the 2008 population census
- the use of all this data to measure population coverage in the context of the equity project

In this regards it is important that other key stakeholders such as the national HIV/AIDS Council, the Central Statistical Office and the local government are informed and invited to participate in this process.

The Ministry of Health has therefore agreed to act as the leading agency for this process not only because the main driver is health but also in order to facilitate the link with these other institutions.

The meeting came to a close at 17:00 with a closing note made by Mr Kelvin Saukila from the MOH summarizing the days deliberations and thanking the participants for their time and valuable inputs to the process.

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References

- [1] WHO (2006): Measuring availability and accessibility coverage. Result of the GIS capacity and data availability analysis: Malawi; WHO internal document, September 2006
(http://www.gsdi.org/SDIA/docs2007/apr07links/GIS_Malawi_final.pdf)

- [2] AccessMod: <http://www.who.int/kms/initiatives/accessmod/en/index.html>

- [3] Ministry of Health Zambia (2007): Addressing the needs in terms of geographic information and GIS capacities to support HIV/AIDS monitoring, evaluation and response in Zambia. Report of the meeting which took place in Lusaka Zambia, 19th April 2007 (<http://www.moh.gov.zm/gishiv.htm>)

- [4] MEASURE Evaluation and World Health Organization (2007). The Signature Domain and Geographic Coordinates: A Standardized Approach for Uniquely Identifying a Health Facility, Health Facility Assessment Technical Working Group, January 2007, WP-07-91.
(<https://www.cpc.unc.edu/measure/publications/pdf/wp-07-91.pdf>)

Annexe I. List of Participants (*in alphabetical order*)

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Annex II. Agenda of the meeting

Addressing the needs in terms of geographic information and GIS capacities to support HIV/AIDS monitoring, evaluation and response in Malawi

Meeting organized by the Ministry of Health with the support of WHO and REACH Trust

Lilongwe, Malawi, 07.09.2007 (REACH Trust)

Agenda (04/09/07)

13.00 Introduction		
	<i>- Welcoming and introduction of the participants. - Presentation of the context, objectives and expected outcomes for the meeting</i>	<i>MOH, WHO</i>
13.30 What is needed ?		
	<i>- by the MOH, including the HIV/Mal/TB assessment plan - for the Equity project - potential additional needs in terms of geographic information and GIS capacities to support HIV/AIDS monitoring, evaluation and response</i>	<i>MOH, WHO and participants</i>
14.00 What do we have at disposal ?		
	<i>- Outcome of the GIS capacity and data availability report - Update and complement of information by the participants</i>	<i>WHO and participants</i>
14.30 Coffee		
14.45 How could we fill the gaps ?		
	<i>- proposition of collaborative process - Discussion</i>	<i>WHO and participants</i>
15.30 Creating an health facility registry for Malawi		
	<i>- presentation of the situation - the Signature Domain - discussion</i>	<i>WHO, MOH and all the participants</i>
16.30 Next steps and conclusion		
17.00 Closure		

Annexe III. Collaborative process document

Measuring population coverage using GIS Proposition of collaboration for the application accessmod in Malawi

Promoting an equity and health systems approach towards treatment access and responses to HIV and AIDS in Southern Africa: a joint project between the World Health Organization (WHO), REACH Trust Malawi and the Southern African network on Equity in Health (EQUINET)

July 2007

1. Introduction

This document describes a proposition of collaboration between different institutions in order to measure population coverage in Malawi in the context of the project "Promoting an equity and health systems approach towards treatment access and responses to HIV and AIDS in Southern Africa".

2. Objective

The main objective of the collaboration is to pull together the necessary information, data, resources and skills in order to measure the population coverage offered by HIV/AIDS care in Malawi.

Indirectly, this process should also insure that the method could be applied again in the future using the data and resources at disposal in the country.

3. Partners

The data, information and skills necessary for the application of the selected method being under the responsibility of different stakeholders in the country it is proposed that the collaborative process take place among between the following institutions:

- the Ministry of Health (MOH),
- the National AIDS Council (NAC),
- the Survey Department,
- the National Statistic Office (NSO),
- the local government,
- the Road Department,
- the US Centers for Disease Control and Prevention (CDC),
- REACH Trust,
- The World Health Organization (WHO).

4. Method, data, hardware and software

The method which is proposed to be used is based on the use of AccessMod [1]. This tool, developed by WHO, allows to estimate the this coverage on the basis of:

- the location of each facility and the capacity of care they have at disposal
- the spatial distribution of the population or patients that needs to be covered
- the characteristics of the environment that the patients have to cross in order to reach the nearest facility (slope, landcover,...)
- a specific traveling scenario which has been decided by the user

In order to be able applying this method it is necessary to have access to the following information/data for the all country:

- the geographic location (Latitude and longitude) and an estimation of the maximum number of patients that each HIV/AIDS health care provider (public and private) can cover
- the spatial distribution of the population coming from the most recent census
- a Digital Elevation Model (DEM) from which we can derive slope
- the spatial distribution of the road and river network with an indication of the maximum traveling speed for each road type
- the spatial distribution of the landcover
- the distribution of the HIV/AIDS prevalence down to the lowest level of desegregation possible

Table 1 present the source proposed for this information/data.

	MOH	NAC	Survey Department	NSO	Local government	Road Department	CDC	REACH Trust	WHO
Geographic location of the HIV/AIDS health care provider (public and private)	X	X		X	X		X		X
Spatial distribution of the population coming from the most recent census				X					
Spatial distribution of the landcover			X						
Digital Elevation Model (DEM) from which we can derive slope			X						
Spatial distribution of the road and river network			X			X			
Maximum traveling speed for each road type			X			X			
Maximum number of patients that each HIV/AIDS health care provider (public and private) can cover	X	X					X	X	X
Distribution of the HIV/AIDS prevalence down to the lowest level of desegregation possible	X	X		X			X	X	X

Table 1 - Source of the information/data proposed for the application of the method

Regarding the location of health facilities, the situation observed in Malawi might call for the establishment of a separated group, formed by the institutions reported in Table 1, that will look at creating and sustaining the existence of an health facility registry. WHO will take contact with the institutions in question to discuss this issue.

It will also be necessary to estimate the maximum traveling time that is acceptable for a patient to travel in order to reach the nearest facility and to define the traveling scenario to be considered when applying the method.

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The compilation, homogenization, integration of the information/data and the application of AccessMod will also require the following GIS software:

- ArcView 3.x (AccessMod does not run on ArcGIS for the moment)
- the spatial analyst extension

Finally, Some additional capacities could also be necessary depending on the availability and/or interoperability of the georeferenced data, including access to:

- GPS devices,
- software for the treatment of satellite images.

5. Workplan

The workplan presented in Table 2 has been established on the basis of the GIS capacity and data availability analysis performed in Malawi in July 2006 as well as the meetings which took place with several institutions in April 2007. It therefore

	Institutions involved	July	August	September	October	November	December
Establishment of the collaborative group	WHO						
Compilation, homogenisation and integration of the different data sets and information	Survey Department, WHO						
Estimation of the maximum traveling time that is acceptable for a patient to travel in order to reach the nearest facility	MOH, NAC, CDC, REACH Trust, WHO						
Definition of the traveling scenario to be considered	MOH, NAC, Survey and Road Department, CDC, REACH Trust, WHO						
Application of AccessMod	Survey Department, WHO						
Calculation of the population coverage indicators	CDC, REACH Trust, WHO						

Table 2 - Proposed workplan

6. Budget

Apart from the health facility location, all the GIS data necessary for the application of AccessMod are already available in the country and the Survey Department, owner of the other data layers, have already accepted to put them at disposal for the project as long as they can be the one performing the application of AccessMod.

For the health facility location, an analysis of the current data at disposal will have to be performed before being able to know if some funding are necessary in order to update this data set in order to have access to the location of all the HIV/AIDS health care provider. In a second phase, funds will certainly have to be secured in order to allow the establishment and sustainability of an health facility registry for the country.

The other activities reported in the workplan (Table 2) only requiring a limited amount of time from the concerned institutions, REACH Trust being already mandated by the equity project to work on those issues and a part time GIS technician being available for this

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project at WHO headquarter, it is expected that no additional resources will be needed in order to perform the above described work.

This situation will have to be reevaluated if this would actually not be the case

Web sites

[1] AccessMod web site: <http://www.who.int/kms/initiatives/accessmod/en/index.html>