Background Note for session 2b

HMIS Assessment Frameworks

Some HMIS Assessment Frameworks

Data Quality Assessment Frameworks would need to assess:

- The maturing of the training process.
- The maturity of the technical support process.
- The maturity of data quality.
- The health information system.

There are different approaches to do so. Given below are a few suggested approaches. These are macro-assessment approaches. These need to be confined with district level approaches within a given context.

1. Readiness Matrix on use of information for action

The Readiness Matrix aims at evaluating/measuring the level of readiness of each specific state/district with respect to use of information for action. This matrix has been developed by Professor Geoff Walsham of Cambridge University in collaboration with the NHSRC in India, and pilot tested for Indian states. The matrix is based on 6 dimensions of readiness each with 3 sub dimensions. Each sub dimension then has to be rated on a 4 level scale signifying different degree of readiness.

Dimension 1: Technology

Technology implies looking at all technological aspects of a health information system including the following sub dimensions:

***Software Customization**:* While the software application is customized with respect to all the national datasets and reporting formats, for it to become more relevant and useful for states, the application needs to be customized to state specific needs. Various types of customization are possible including adding new data elements, indicators (in addition to what already exists as per the national application), new reports and sometimes even new modules. The more customization undertaken by the state reflects in some senses a greater level of maturity and readiness of the state to take ownership of the application and tune it towards meeting their individual needs for information for action. The four levels signify different levels of readiness with respect to this dimension with level 0 showing no such additional customizations being requested, level 1 a minimum level, level 2 a significant level and level 3 reflecting the condition of a strong institutional process to be in place whereby states and district level users can raise requests, which are transmitted to the development team, and once the development is carried out, the revised application is fed back to the user from where the request originated.

Server Capacity: Server capacity reflects the dimension of the state's ability to manage independently server hosting of the application. At the lowest level (0), the state is not running a server based application, at level 1, they are using an external server, level 2 indicated that they are either renting their own server or using the state specific rented server. At level 3, the state is both having their own server and also managing it, indicating they have reached the level of "most ready".

***Internet Access**:* This sub-dimension reflects the importance of internet access in building readiness on the use of "information for action." Indeed, internet does not only give access to the

entire server based application, but also with it to the various tools required to generate reports and analysis. Internet then allows for speedy disseminaton of such analysis which can promote readiness in the use of information for action. In other words, the readiness in using "information for action" increases with the number of institutional levels having access to the internet.

Dimension 2: Information Systems Processes

The main goal of an information system is to make information circulate vertically both upwards to different levels of the hierarchy and also the feedback down the level. Further, the information system should also strengthen the circulation of information horizontally at the same administrative level from the unit dealing with the health information systems to the other health programme managers. This can then potentially support staff at each level to take ownership of their respective data, and establish processes to encourage its systematic and regular use for supporting everyday action.

Regularity of Upward Reports: Establishing effective information system processes is fundamental to a well functioning and operational information system. "Regularity of Upward Reports" is a good proxy to evaluate how effectively a routine system is functioning as it indicates the frequency and regularity of report submission to the next higher level. The greater the regularity of these upward reports indicates deeper processes of institutionalization and readiness for using the information for generating action. Regularity of reporting can be impeded by both technical and institutional reasons such as poor internet access or weak systems existing around data verification. To strengthen staff capacity for regular upward reporting requires the removal of the inhibiting conditions and building their awareness on the necessity of proper and valid information. Level 0: implies the absence of an established system to submit reports on a regular basis. Level 1: implies submission of reports taking place but not without support from external actors of some kind. Level 2: implies a significant rate (almost complete) of submitting reports independently. Level 3: The submission of the reports is complete, timely and carried out independently.

Practice of Feedback Reports: A well functioning practice of feedback reports is an essential element of using information for action and strengthening data quality. Feedback is possible when reports are generated, sent up regularly, and there is an institutional process in place to discuss and provide feedback on issues of both data quality and actions identified. Generation, transmission and feedback on reports are under continuous development, thereby stimulating processes of institutionalization and state ownership of information. At Level 0, no such feedback practice exists, meaning the state is the least ready for "information for action." At level 1,

however, some informal practices exists around feedback, while at level 2, this practice is more regular through written communication. At level 3, the state has developed well-established institutional mechanisms for feedback, including discussions both verbally and through written reports.

Procedure for Data Verification: To be able to use the data collected one must make sure the data is also valid, and this process of validation is taking place at all levels in a regular manner. Various forms of data validation can take place including "eyeballing of data" to identify abnormalities, using validation rules to generate queries, establishing min-max ranges for data and seeing if registered data falls within these ranges. Also important is to have processes in place to ensure that when validation queries are identified, there is a process of discussion, and some responsibilities in place to ensure the necessary corrections are made. Level 0: indicates that there is no procedure for data verification at all. Level 1: indicates that there are established procedures for data verification at district level. Level 2: indicates that some verification procedures are in place at the block level, while Level 3 implies a state of institutionalization where verification procedures are operating systematically at all levels, and there is a process of feedback in place when changes are made at any level.

Dimension 3: Data Quality

It goes without saying that data quality is the foundation for an effective and functional health information system. Action at various levels from the development of health policies to state and district management and the support to the field functionaries all rely on reliable data. Thus, within the context of readiness for the use of "information for action", the data quality dimension reflects the state's ability to circulate quality data which can be trusted, used and thus help in the overall strengthening of health service delivery.

Completeness: For local action to take place, information on which it is based on must be complete. Incomplete data, leads to actions that are not well grounded in reality, and may even lead to the taking of inappropriate actions. If data completeness is not existent (level 0, or "no reporting") or low (level 1), the state can be said to lack the basic tools needed to construct the basis on which action should be based. At level 3, data is significantly complete, reflecting the "most ready" level, and with it readiness of the data to be used for action.

Accuracy: How valid is the data gathered? The data process includes activities of collection, verification and a level of validation. A measure of accuracy used in health information system application is through validation rules that help to raise queries when data fails to pass through

the validation rules programmed in the system. How many validation queries raised provides an indicator of the level of accuracy of data, with least queries reflecting most accuracy. Level 0: indicates that no checking is being done, thus the practice of validation does not exist. Level 1 refers to a situation where a significant level (greater than 25%) of validation queries are raised, while Level 2 indicates minimal validation queries being raised, say less than 25 %. Level 3 refers to a situation where there is no obvious or serious validation queries being raised.

***Verification Procedures in Place*:** This sub-dimension contributes to readiness for the use of "information for action" by reflecting importance of established procedures for verifying data completeness and data accuracy. At the "least ready" Level (0), no such procedure is in place. Level 1 reflects the existence of some informal procedures, while at the following Level 2, these procedures have become detailed and written. At the "most ready" Level (3), the state in question has detailed written procedures that are signed, formalized, distributed and followed.

Dimension 4: Human Capacity

Technical tools are of little help if people are not able to use them. Human capacity, therefore, is a central element in institutionalizing the health information systems and indicates whether the state has the human resources in place in order to use "information for action". The dimension has the following sub-dimensions:

Adequacy of Team: An established team is necessary in order to manage the health information system and lead to future adaptations more or less independently of external support. If the state has no established team, it is categorized as least ready (Level 0). The state's readiness, however, increases with one level if a state team is in place (Level 1), if there are public health components in the state team (Level 2), and yet another level if a district team is also in place (Level 3).

Adequacy of Training: The sub-dimension reflects the level of training taking place within the state. The more advanced is the training, the more a state can be seen to be ready for the use "information for action." When training is limited at both the state and district levels, it can be said to be least ready. When training is focused primarily on technical aspects, readiness is at level 1 whereas at level 2, use of information training is carried out. Level 3 signifies that the state has their own master trainers who are capable of independently conducting training for their state users.

Advocacy on Information for Action: In order for data to be useful, users must understand why it is gathered. Indeed, the role of advocates is to encourage this understanding and to argue for its

importance. Advocates need to have at hand stories and examples which shows how data can be connected to specific health situation in the state and its use can bring about improvements. Advocates, therefore, play an important role in stimulating the view on data as having a practical purpose and preventing it from being seen in "isolation." At level 0, no such advocates exist, whereas on level 1 some can be found externally. At level 2, advocates are found internally while at the last level of "most ready", advocates are also present not only at the state but also district level.

Dimension 5: Institutional Collaboration

Various programs and missions must collaborate to gain a holistic and complete system of information, both to improve results, and also reduce the potential for conflict. In a deeply institutionalised system, institutions of cooperation need to be in place so to ensure effective integration and decentralization of systems.

Involvement of Program Management:

The greater is the involvement of program managers in the health information system, the stronger will be the readiness of the system to use information for action. This requires building collaboration across programs, building capacities and improving processes by which horizontal dissemination of information takes place. Ideally, we would like to see program managers to be active members of the health information system. Level 0: implies that there is no involvement of the program officers in the HMIS-team. Level 1: indicates that there is some, but limited involvement of the program officers. Level 2: Indicate that there is significant involvement of the programme managers. Level 3: indicates that the program officer an active member of the health information system team.

Health Information Systems Budgets in Place: If dedicated budgets are in place to support health information system activities it reflects an ongoing process of institutionalization. Budgets should be in place at different levels from the state, district to sub district. Level 0: Indicates that no individual or independent budget is established for the health information system at any level in the state. Level 1: indicates that there is an independent budget existing at the state level, but not for any other level. Level 2: indicates a budget also available at the district level, and at the highest level (0), the health facilities also have individual budgets in place.

Integration of Systems: Integration of systems requires a linking at both the technical and institutional levels. Integration of systems is a key component of most national health reform agendas, and is necessary to promote more effective information for action. The higher the degree

of effective integration, the more we would expect the system to be ready for information use. Level 0: represents a standalone health information system with no other systems being integrated. In Level 1, one or two systems are integrated with the health information system, while in level 2 it is more than 2 systems. At level 3, all systems are under one institutional structure.

Dimension 6: Use of Information for Action

This dimension relates to evidence of information being generated from the health information system being used for specific kinds of action. The various sub dimensions include.

Data Analysis: Analysis of data is a fundamental condition for the use of information, as it helps to convert the raw data into a usable form for the users. Analysed data helps to provide "planners," for example with information about the quality of their data and also the health situation in various districts and facilities. This can help them to make better plans for the future. This requires analysed data to reach as many as possible. And as users can independently conduct such analysis, richer will be the quality of information use. Level 0: indicates that no data analysis is being currently carried out. Level 1: indicates that some limited form of data analysis is done, but through external actors. Level 2: indicates regular data analysis taking place by internal actors. Level 3: represents the situation where data analysis is done systematically and internally.

Feedback Reports Being Generated: Feedback reports indicate that data analysis is being carried out and feedback to the levels below. This process will lead to improvements in data quality by strengthening accountability and ownership of data. At Level 0 no such process exists on the generation of feedback reports. At Level 1, it is done in a limited way and externally, Level 2 indicates limited feedback taking place but is done internally. While at Level 2, feedback reporting is frequent and done internally. At the "most ready" Level 3, feedback reporting on the use of "information for action" is being done systematically done internally.

Action Taken: This represents concrete examples of information being used for action taking, such as for planning, monitoring, or for developing certain interventions. At Level 0 there is no such evidence of action, while Level 1 indicates limited action, Level 2 some important action but as a one-off, and Level 3 represents systematic and regular action.

The Instrument

Guidelines: This readiness matrix is based on 6 dimensions of readiness; each dimension has 3 sub dimensions; each sub dimension has four levels moving from "least ready" to "most ready"

Please mark a X against your choice in each sub-dimension

Dimension:	Sub-dimension:	Level:				Comments
		0	**1**	**2**	**3** (institutionalized)	
Technology:						
	Software customization requested:	No additional customization requested	Minimum customization requested	Significant customization requested and carried out	Established institutional procedure in place for dealing with customization requests	
	Server capacity:	No server used	NHSRC shared server used	Own server used	Own server self managed	
	Internet access:	Only available at state level	Available in most cases at District level	Available in most cases at Block level	Available in most cases PHC-level	
Information system processes:						
	Regularity of upward reports:	Not being submitted without external intervention	Partial submission taking place, but not completely independently	Significantly completion rate being done independently	100% complete, timely and independently	
	Practice of feedback reports:	No practice existing	Some practice of feedback, mostly informal	Regular systematic feedback through written communication	Well established institutions for feedback including discussions	

	Procedure for data verification:	No procedure existing	Only taking place at district level	Some verification also taking place at Block level	All levels systematic procedure in place, including feedback on changes made	
Data Quality:						
	Completeness:	No reporting	Very low level of completeness (< 40%)	Significantly complete (> 40%)	Fully complete	
	Accuracy:	No checking being done	Significant validation queries raised (>25%) during checking	Minimal validation queries raised (<25%) during changes	No validation queries raised during changes	
	Verification procedures in place:	No procedure in place	Informal procedures existing	Detailed written procedures signed, distributed.	Detailed written procedures signed, distributed and followed	
Human Capacity:						
	Adequacy of team:	State team not established	State team in place	Public health components in state team	District team also in place	
	Adequacy of training:	Limited training at state and district levels	Primarily technical focus in training	Use of information training carried out	State trainers in place who are capable of conducting training	
	Advocacy on information for action:	No advocates at state level	Some external advocates at state level	Internal advocates	Advocates also present at district level	
Institutional collaboration:						
	Involvement of program management:	No involvement of programme officers	Limited involvement of programme officers	Significant involvement of programme managers	Program manager formally part of the HMIS-team	

	HIMS budgets in place:	No clear budget line for HMIS	Only state budget defined for HMIS	District offices also have HMIS budget in place	MO at PHC-level also have HMIS budget in place	
	Integration of systems:	Stand alone HMIS	One or two systems integrated with HMIS (RIMS, IDSP)	More than two systems integrated	All systems under one institutional structure	
Use of Information for action:						
	Data analysis:	Not carried out	Externally being done	Frequently done internally	Systematically done internally	
	Feedback reports being generated:	Not carried out	Externally being done	Frequently done internally	Systematically done internally	
	Action taken:	No action	Limited action	Some regular action	State PIPs being made based on HMIS	

The Readiness Matrix

Example of using the "Readiness Matrix" to evaluate use in India

The different states were ranked based on the different dimensions by 3 researchers and an average of the scores was computed. The state wise summary scores are presented out of a maximum possible total of 48.

State	Scores	Ranking
KERALA	42,99	1
Gujarat	41,66	2
Karnataka	34,34	3
MAHARASHTRA	33,66	4
PUNJAB	33,34	5
MADHYA PRADESH	31,01	6
UTTARANCHAL	28,66	7
MANIPUR	28,64	8
MIZORAM	28,34	9
BIHAR	28,33	10
ORISSA	28,01	11
ASSAM	27,99	12
Chandigarh State	24,68	13
ANDHRA PRADESH	24,66	14
MEGHALAYA	22,68	15
WEST BENGAL	22,33	16

JAMMU And KASHMIR	22,32	17
TRIPURA	22	18
Himachal Pradesh	21,34	19
Nagaland	20,33	20
Goa	14,33	21
UTTAR PRADESH	14,32	22
UTTAR PRADESH	14,32	23
DELHI	14,02	24
Haryana	13,65	25
CHHATTISGARH	11,65	26
Jharkhand	10,99	27
RAJASTHAN	10,99	28
Sikkim	10	29
ARUNACHAL PRADES	8,99	30
Pondicherry	7,67	31
Dadra Nagar and Havell	4,67	32
Lakshadweep	4,33	33
Andaman and Nicobar	3,99	34
Daman and Diu	2,66	35

Table -State wide summary scores on the Readiness Matrix

To unpack what these scores mean and why, for the top three states, a detailed dimension wise analysis is presented schematically. First, an overall schema is presented that defines the overall categorizations of the good, average and poor dimensions.

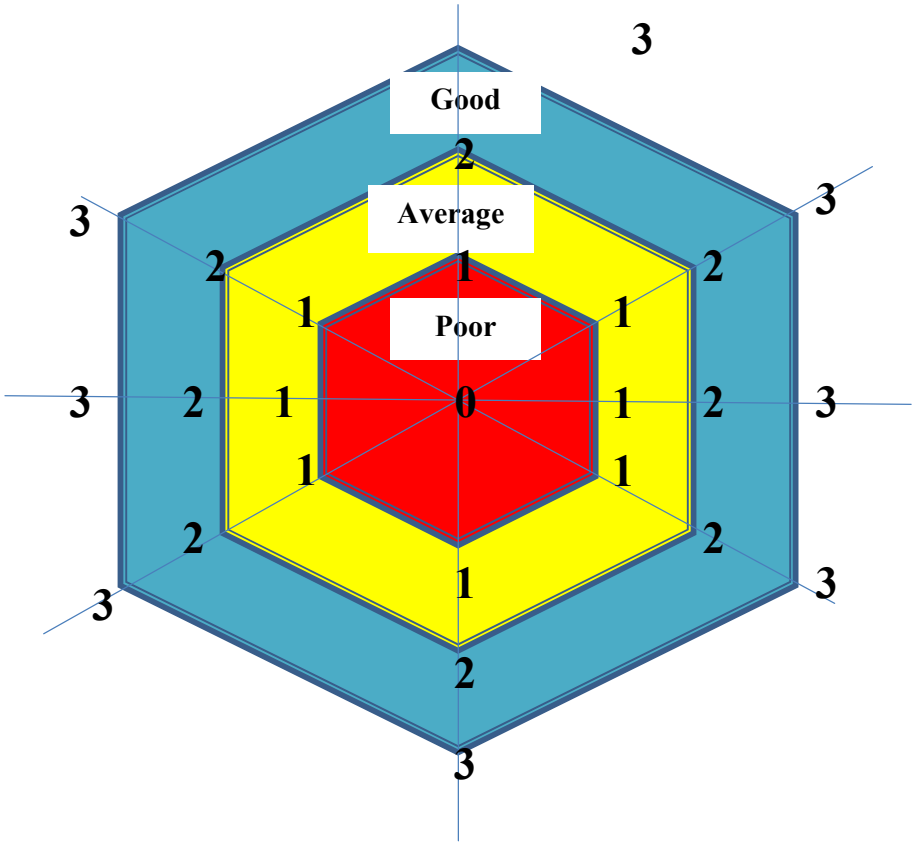

Figure 1: Rating of readiness matrix:

Following this, the top three states identified – Kerala, Gujarat and Karnataka – in that order are detailed along the different dimensions.

Kerala

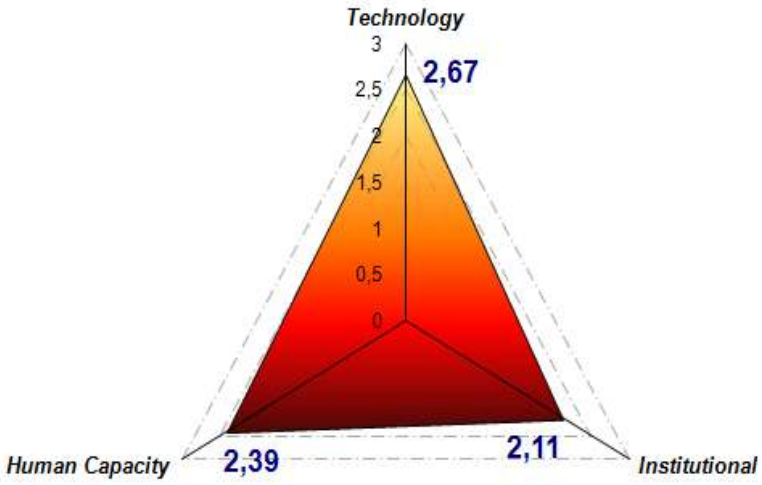

Figure 2: Kerala state readiness matrix

Gujarat state

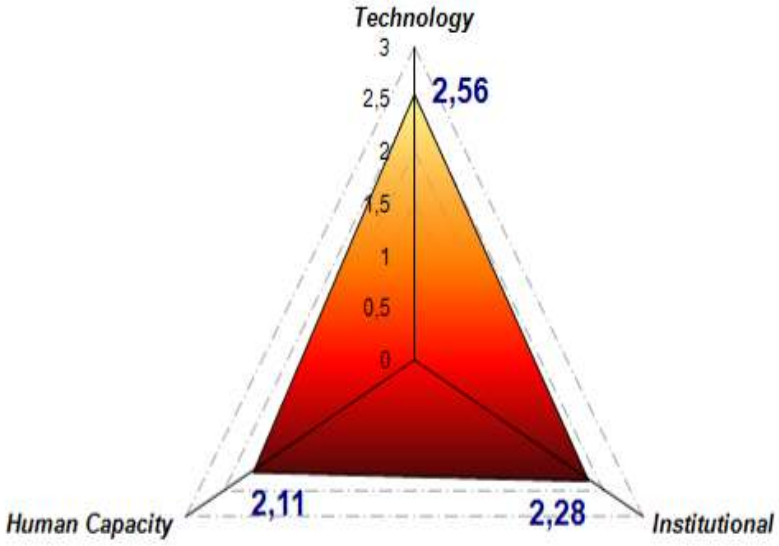

Figure 3: Gujarat state readiness matrix

Karnataka

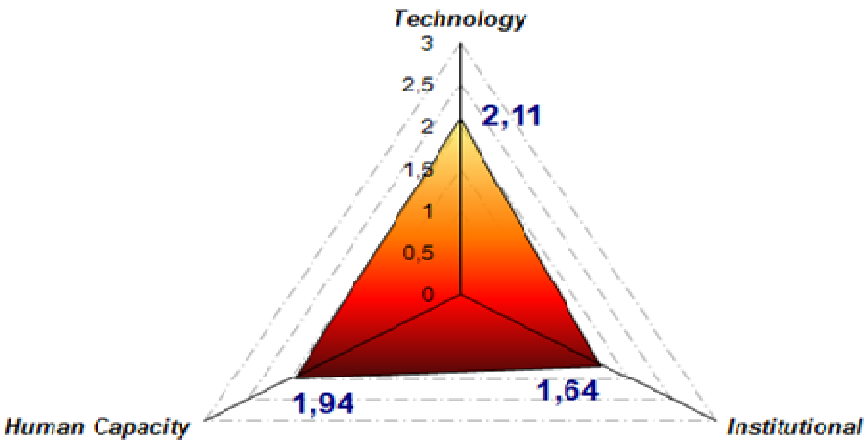

Figure 4: Karnataka state readiness matrix

After gaining an overall idea of the variations across the different dimensions for the top ranked states, a further drilling down is presented across the different dimensions. As an illustration, the analysis carried out for the technology dimension is presented for the three states to understand what the critical contributing factors were.

Technology dimension

Kerala

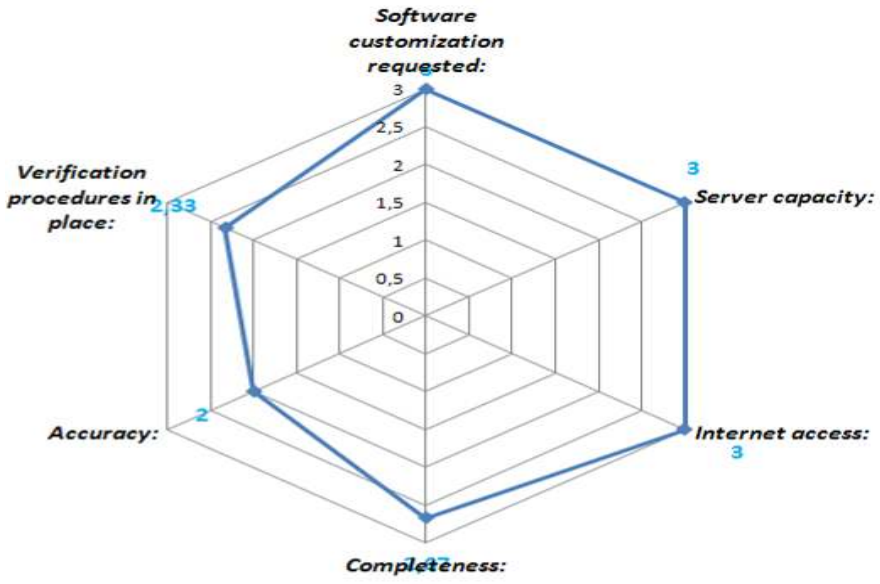

Figure 5: Kerala state technology dimension readiness

Gujarat

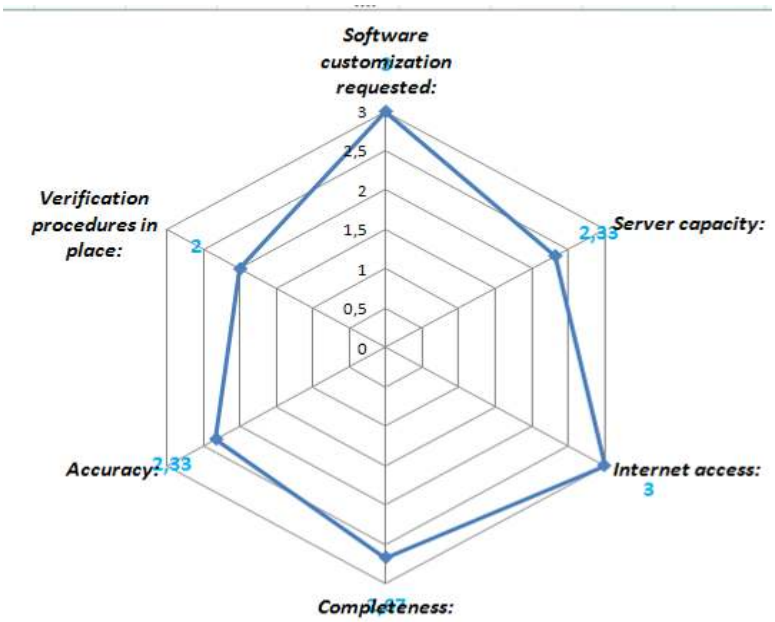

Figure 6: Gujarat state technology dimension readiness

Karnataka

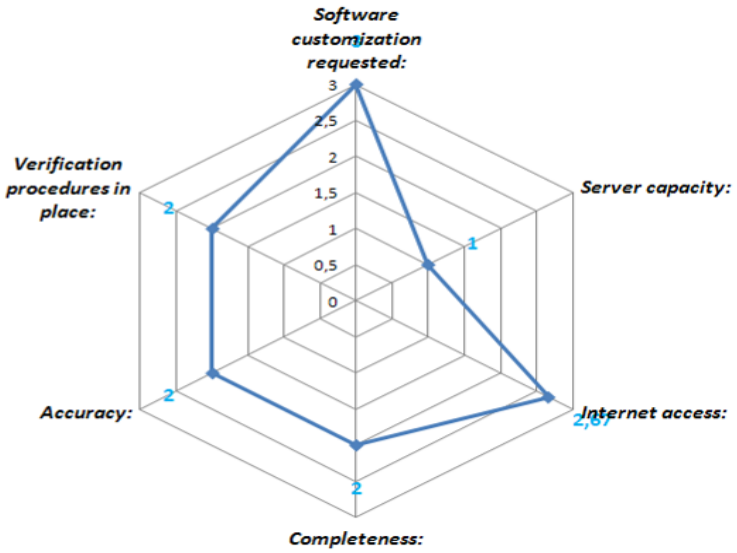

Figure 7: Karnataka state technology dimension readiness

An analysis of the above figures helps to understand for example how server capacity and internet access play an important role in determining the state of technology readiness. For example, while Kerala state scored highest points in both these sub dimensions Gujarat and Karnataka states were progressively lower on them. As a policy maker, then this points to the need for making improvements in these areas if the overall state readiness on information for action has to be strengthened. Strengthening server capacity for example, helps to get ownership of their own data as compared to having to access the same from a national database. Improved internet access can help to provide access to data, improve the availability of feedback reports disseminated through the web.

In this way, the readiness matrix described above can serve as a useful diagnostic tool to identify areas of strengthening for a state to improve its overall capacity to use information for action. Similar analysis can also be carried out at the district level to understand inter-district variations and identify areas of improvement to strengthen local information use.

2. Tali tool to assess levels of information usage

This tool was developed by HISP South Africa in early 2000 that helped to identify three levels of information usage, and the detailed criteria by which a facility or a district system could be assessed and placed into level 1, 2 or 3. Assessment was done using a qualitative assessment supported by a checklist containing the different criteria of each level.

Level	Broad description	Detailed description of criteria
Level 1	**The information system is working technically according to its specification:** timely and accurate data is submitted to the district; district manages data in database, reports to region and feedback to facility. Similar at regional and central levels.	Clearly defined Essential datasets for all compulsory reporting have been defined? Has an information manager been identified? Have all the expected routine reports been submitted? Have feedback reports been issued? User friendly guideline including information handling at that level is available?
Level 2	**Data is analysed, disseminated and used:** Summary reports of data produced and disseminated regularly Indicators are being assessed against performance / targets on a regular basis.	Are summary reports available Are indicators graphed? Are indicators discussed in management meetings?
Level 3	**Information from the system used for planning and evaluation of achievements:** Indicators and information are used by managers to inform their action plans. Indicators and information used to document performance in all written reports	Are indicators interpreted and understood? Are problems identified based on available information? Have any problems been addressed, and can these steps be documented, and an improvement shown using indicators and data?

Table : Criteria for Assessing Levels of Information Use

This tool has been extensively used for carrying out assessment of facilities in South Africa, and also in various other countries where HISP is operating

3. Assessment tool for National Health Information Systems

An assessment tool was developed by Arthur Heywood, Jorn Braa, Sundeep Sahay, and Calle Hedberg for the Health Metrics Network in collaboration with representatives from the health services and other stakeholders from the following countries: South Africa, Botswana, Malawi, Mozambique, Tanzania, Ethiopia, India, Vietnam and Thailand. This tool aimed at assessing the status of nations on their health information systems, by quantify achievements of countries according to a normative framework across 11 categories. These categories were identified based on HIS related **problems** found to be endemic at all levels of the health administration. This included:

1. Fragmentation: a lack of coordination and integration among numerous sub-systems where each health program runs their own system with little regard as to how this is integrated with the overall HIS.
2. Excessive data and reporting demands on health workers, with multiple uncoordinated forms overlapping each other and leaving gaps.
3. Lack of standardisation and alignment within and between data sets and reporting forms contributing to poor quality of data and the information that can be derived from it.
4. Management hardly uses existing information for planning and monitoring.
5. Staff responsible for the HIS is inadequately trained and under-skilled at all levels.
6. Insufficient financial and political commitment to the HIS at the national level.

To try and address these adverse conditions, a normative framework was first formulated representing conditions that should necessarily be in place. This is summarized in the Table below.

Context and resources	Legal and regulatory framework: Policy and priority Resources: Human, financial and equipment Data flow and information infrastructure Management: National and local HIS committees
Process	Integration: Institutional, data and technical. National indicators and data sets. Software at the District
Outputs	Quality of data and information Use of information: mechanisms promoting information use Information culture. Information for action Dissemination and advocacy

Table -Normative framework for HIS assessment

Drawing from this normative framework, an assessment tool was designed which is detailed below.

Assessment tool

The grading is from 0 representing No / None to 3 representing Yes/fully adequate. *As far as possible, each situation that the four values 0-1-2-3 should represent has been specified.* The arithmetic average of all applicable scores, usually expressed as a percentage, is to be used

1 CONTEXT AND RESOURCES

Legal and regulatory framework

Score (0= No to 3= Yes)		
1.	The country has recent legislation providing the framework for integrated collection, processing and use of health data, development planning, and HIS infrastructure development e.g. access to information, e-governance, electronic exchange of data, and electronic security measures (0: No, existing legislation is outdated or woefully inadequate; 1: Basic legislation exist, but not the regulatory framework; 2: Basic legislation and a regulatory framework exist, but not the resources and/or political/administrative will to implement them; 3: Yes)	0 1 2 3
2.	There is a written **HIS *strategic plan*** in active use that emphasises integration of different data sources a) at the national level b) in a modified form at most sub-national areas and districts (0: No; 1: The strategic plan exists, but it is not used or is not pro-integration; 2: The strategic plan exist, but the resources to implement it are not available; 3: Yes, it exists and are being implemented)	0 1 2 3 0 1 2 3
3.	There is a representative **national HIS committee** that actively encourages and supports research and development, innovation and an "entrepreneurial spirit" at all levels, thereby creating a balance between innovation and standardisation (0: No, all important decisions are centralised; 1: Local innovation and R&D are allowed, but must be authorised on beforehand; 2: Local innovation and R&D are generally sanctioned, but the national HIS committee are mostly following external advice ("stargazing"); 3: Yes)	0 1 2 3

Score (0= No to 3= Yes)		
4.	The national sets of goals, objectives, indicators and data elements are following **international standards** (0: No; 1: International standards and objectives are only considered in an ad-hoc manner; 2: Yes, but national innovations and views are generally not used as input to the same international standardisation processes; 3: Yes, work on standards are flowing both ways)	0 1 2 3

Human resources

5.	There are adequate numbers of dedicated **HIS staff** in approved posts at each level a) Full time Epidemiologist in HIS office in each subnational area b) District **Information Officers** (DIOs) functioning in every district (0: No; 1: Up to 40% have epidemiologist / permanent DIOs; 2: 40-80% of have adequate staff; 3: >80% have adequate HIS staff)	 0 1 2 3 0 1 2 3
6.	There are one or more **"hot-lines"** for HIS and IT support available at national, sub-national, and district levels (0: No hotlines available; 1: Hot-line(s) available only at national level; 2: Hot-line(s) available at all levels, but response time is slow; 3: Hot-line(s) available at all levels during HIS systems uptime hours (up to 24/7), providing on-the-fly support)	0 1 2 3
7.	HIS staff at subnational/district level are able to **modify and improve their HIS** when changed circumstances (e.g. new programmes, new information needs) make this relevant (0: No, such skills are sorely lacking; 1: Huge variations in such skills are typical; 2: The majority have good knowledge, but still needs significant external support and further training; 3: Yes)	0 1 2 3
8.	**Capacity building** activities has occurred over the past year at **district** level a) for HIS staff (statistics, software and database maintenance, and/or epidemiology) b) program managers (epidemiology, report writing, information management) c) health facility staff (data collection, self-assessment, analysis, presentation) (0: No; 1: Limited capacity building; 2: Significant capacity building, but largely depending on external (e.g. donor) support and input; 3: Significant capacity building occurred as part of a long-term government-driven HRD plan)	 0 1 2 3 0 1 2 3 0 1 2 3

9.	Capacity building activities has occurred over the past year at **national** level for program managers (epidemiology, report writing, information management) (0: No; 1: Limited capacity building; 2: Significant capacity building, but largely depending on external (e.g. donor) support and input; 3: Significant capacity building occurred as part of a long-term government-driven HRD plan)	0 1 2 3
10.	Written **guidelines** exist defining how facility supervisors and district managers should use information and integrate it into overall health service management (0: No guidelines exist; 1: Written guidelines exist but are not implemented/used; 2: Written guidelines exist and are used, but not integrated into overall service supervision; 3: Yes)	0 1 2 3

Finances

11.	There is a specific national **government budget** for core funding of HIS activities (0: No; 1: Yes, but mainly covering salaries and basic recurrent expenditure for existing staff; 2: Yes, but the budget allocations are not based on a long-term strategic HIS plan 3: Yes, with both recurrent and capital budgets based on a long-term strategic plan)	0 1 2 3
12.	**Donor funds** for HIS developments are "untied" and channelled through a consolidated fund within the national ministry (and/or sub-national ministries in federal systems) (0: No, donors pick projects with limited co-ordination and funds are often tied to goods and services from the donor country; 1: There is no consolidated fund(s) and often tied aid, but mechanisms for government co-ordination are in place; 2: There is a consolidated fund, but not all donors participate and/or significant funding are "tied"; 3: Yes)	0 1 2 3
13.	There is a specific **district budget** for HIS activities in at least 80% of all districts (0: No, HIS expenditure (if any) are centrally controlled; 1: Yes, but mainly covering salaries and basic recurrent expenditure for existing staff; 2: Yes, but the budget allocations are not based on a long-term strategic HIS plan 3: Yes, with both recurrent and capital budgets based on a long-term strategic plan)	0 1 2 3
14.	The district budget is able to cover the cost of providing facilities with locally customised primary **data collection tools** (registers, summary sheets, etc) (0: No, many facilities do not have primary data collection tools; 1: There is a budget line for it, but it is not sufficient to satisfy the needs; 2: Districts rely on higher levels to provide all data collection tools (i.e. no local customisation) 3: Yes)	0 1 2 3

Health Information Infrastructure / Computerisation

15	A complete and up to date national facility list exists for the public sector a) in regular use at national level b) data on infrastructure and human resources for each facility c) geographic coordinates available for each facility (0: none at all, 1: list very out of date or covers <50% 2: Up to date for 50-80% 3: yes)	 0 1 2 3 0 1 2 3 0 1 2 3
16	The basic computerised information communication infrastructure (PCs, email, Internet & Intranet access) are in place a) at the national level b) at the sub-national level c) at the district level d) at facility level (0: Only a minority of managers have access to a PC; 1: Most managers have access to a PC but no email; 2: Nearly all managers have access to a PC and the Internet; 3: Yes)	 0 1 2 3 0 1 2 3 0 1 2 3 0 1 2 3
17	Technical IT support (networks, installation, repairs, general hardware/software maintenance) is available and functional with acceptable response times (0: Technical IT support generally not available; 1: Technical IT support available, but response/repair/replacement times are often 2 weeks or more; 2: Technical IT support available, but response/repair/replacement times are usually from 3 days to 2 weeks; 3: Technical IT support available with response/repair/replacement times usually less than 3 days)	0 1 2 3
18	Routine, semi-permanent, and survey data are in generally captured at the district level and submitted electronically via email or other networks a) to higher levels b) to the national level (0: No, generally reports are on paper; 1: Data is captured and submitted on diskettes; 2: Data is captured and submitted by email or similar; 3: Data is captured locally but stored in or automatically submitted to national servers)	 0 1 2 3 0 1 2 3
19	Integrated HIS data and analysed information are readily accessible by managers through Internet / intranet (0: No; 1: Some published reports etc are available; 2: Both raw data and processed information are available, but only to users physically connected to the government Intranet; 3: Both raw data and processed information are available, either via the government Intranet or via the Internet with appropriate access control/firewalls)	0 1 2 3

20	The HIS unit at national level is running one integrated HIS database or "data warehouse" containing data and information from all key health programmes (0: No; 1: There is no integration, but key health data/information are presumably available from the HIS unit in whatever format available; 2: There is a "data warehouse", but its content are not functionally integrated/streamlined to support transparent, integrated analysis; 3: Yes, there is a "data warehouse" containing most relevant health data sets with common format and identifiers.	0 1 2 3
21	Integrated systems equivalent the national HIS database or "data warehouse" are running at sub-national and/or district levels (0: No system integration at sub-national and/or district levels; 1: Limited system integration at sub-national and/or district levels; 2: Equivalent system integration at sub-national and/or district levels; 3: Equivalent system integration at sub-national and/or district levels *and* sub-national/district managers have access to the national "data warehouse" via the Intranet/Internet enabling vertical collaboration via ICT)	0 1 2 3
22	The unit is formally, legally and practically able to modify by adding/changing data elements and indicators, reports etc. to the national and sub-national HIS database or "data warehouse" without external support (0: No, programs arenot flexible; 1: ; 2:; 3: Yes)	
23	A patient based Electronic Health Record system is running at facility level in the public health sector for key MDG programs (e.g. EPI, PMTCT, ARV, TB) (0: only by private company/international consultants; 1: minor modifications can be done within limits prescribed by software owner/consultant; 2: Significant modifications, but within limits; 3: Any modification can be done because software is open source or software owner has provided source code.	0 1 2 3

2 PROCESS

Data management

Score (0= No to 3= Yes)	
24 There are written guidelines for how information from HIS should be used at different levels a) in the annual planning processes b) in the annual budget process (0: No; 1: Yes, but they are outdated and/or not suitable; 2: Yes, but there are several often contradictory sets of guidelines and regulations from different ministries; 3: Yes, up-to-date streamlined guidelines are in use)	0 1 2 3 0 1 2 3

Score (0= No to 3= Yes)		
25	Up-to-date HIS Data from all subsystems and programs (including MDGs) is easily available at one point in the ministry of health (0:Data not available1: Data available, but with difficulty 2: Data available, but not systematically 3: Yes)	0 1 2 3
26	The ministry is actively promoting integration of data/information from different sources and programmes under the HIS unit at all levels (0: No; 1: Integration is only pursued at the (sub-)national level; 2: Integration is pursued from the district level and upwards; 3: Yes, integration is pursed at all levels including facility levels)	0 1 2 3
27	There are written procedures for dissemination of reports/information "horizontally" to all programme areas and management at the same level at least on a quarterly basis (0: No written procedures and negligible "horizontal" dissemination; 1: There are no *written* procedures, but dissemination are common practice; 2: There are written procedures, but they are not fully implemented; 3: Yes, written procedures exist and are largely followed)	0 1 2 3
28	Health managers are generally demanding complete and validated HIS information delivered on time (0: Negligible demand from managers; 1: Demand from managers are ad-hoc, usually as a result of external pressure (e.g. questions from politicians or the media); 2: General strong demand from managers, but they do not have the skills and experience to evaluation completeness and quality; 3: Yes)	0 1 2 3
29	Anonymous HIS data and indicators are in principle regarded as belonging in the public domain, i.e. it should be available to all interested citizens (0: Access is strictly controlled; 1: Public access accepted in principle, but not implemented in practice; 2: Public access accepted in principle and largely implemented; 3: Public access and availability are guaranteed by law/regulations and fully implemented)	0 1 2 3

Plans and indicators

30	A national Essential/**Minimum Indicator and/or data Set** has been implemented in the public health sector (0: None exist; 1: Exist but not implemented; 2: *Data* Set only implemented; 3: Yes)	0 1 2 3
31	All indicators in the national Essential/Minimum Indicator Set are linked to the relevant short (1 year), medium (3-5 years), and long-term (10-15 years) targets (0: No targets; 1: Under 40% of indicators have targets; 2: 40-80% of indicators have targets; 3: All indicators have relevant targets)	0 1 2 3

32	The national Essential/Minimum Indicator and/or data Set has also been implemented in the private for-profit and private not-for-profit health sectors (0: No; 1: Exist but not implemented; 2: Data Set only implemented; 3: Yes)	0 1 2 3
33	The national Essential/Minimum Indicator Set contains all the 15 health-related MDG-indicators (0: None; 1: Eight or less; 2: Eight or more but not all; 3: Yes)	0 1 2 3
34	Program Managers at all levels have to get broad acceptance for any extensions or additions to the accepted Essential/Minimum Indicator/Data Set via a consensus-building process (0: Each programme demands data as they see fit; 1: There is a policy or guidelines in place, but it is not enforced; 2: Most, but not all programme managers have accepted the consensus-building process as a pre-requisite for introducing new data/indicators; 3: New indicators/data elements cannot be introduced without such a process and formal acceptance by the responsible management team)	0 1 2 3
35	All key indicators, with numerators and denominators, are known and understood by programme staff a) at the national level b) at the sub-national and district levels (0: No; 1: Limited knowledge/understanding, need continuous support; 2: Good knowledge/understanding, but need backstopping; 3: Yes)	 0 1 2 3 0 1 2 3

Data sources

36	All managers at the national level have easy, regular **access** to the Health Information Systems data and analysed information (0: No or very limited access; 1: Access to data/information for their own programme area only; 2: Sector wide access, but only to processed data/indicators and not "raw" data; 3: All managers have access to all data and information)	0 1 2 3
37	There are user-friendly **guidelines** and formats for data analysis using indicators at each level, customised to support the paper-based or computer-based systems in use (0: No guidelines or formats; 1: Brief guidelines exist, but not user-friendly and/or outdated: 2: User-friendly guidelines exist for *technical* analysis only; 3: User-friendly guidelines and formats covering both *technical* analysis and *use* of indicators for planning and decision-making exist and are in regular use)	0 1 2 3

38	**Population mid-year estimates** for use as denominator data are available electronically for facility, district and sub-national level (0: No mid-year estimates available in electronic format; 1: Mid-year estimates available at sub-national level; 2: Mid-year estimates available at district level; 3: Mid-year estimates at facility level (facility catchment and/or target populations);	0 1 2 3
39	Data from non-ministry of health surveys is easily available in the ministry of health within the HIS framework a) Household surveys e.g. Demographic and Health Survey b) Vital registration (births and deaths) c) Socio-economic and poverty reduction data d) Literacy and Universal Basic Education (0: Not available 1: Limited availability or out of date 2: Available, but not directly in HIS framework 3: Yes – used for denominators)	 0 1 2 3 0 1 2 3 0 1 2 3 0 1 2 3

3 RESULTS

Analysis and Use of Information

Score (0= No to 3= Yes)	
40	Summary **reports** covering key indicators and programme areas are produced regularly (monthly/quarterly) at a) district/sub-national levels b) at national level (0: No reports produced during last year; 1: Few reports; 2: Regular reports, but usually too late for routine management; 3: Yes, always)	 0 1 2 3 0 1 2 3
41	Graphs are widely used to display information: a) Each health programme has at least two **up-to-date graphs** of relevant indicators displayed publicly in the national office b) The national health Information office has at least 6 up-to date graphs of relevant indicators from different MDG programme areas c) Subnational / District offices have up to date graphs displayed (0: No graphs; 1: Some graphs, but not up-to-date; 2: Up-to-date graphs displayed, but only for some programmes; 3: Yes)	0 1 2 3 0 1 2 3

	Score (0= No to 3= Yes)	
42	**Maps** (GIS or hand drawn) are widely used to display information: a) A GIS is used and maps of relevant indicators are displayed publicly in the national office b) Sub-national offices have up-to date maps of relevant indicators from different MDG programme areas c) Subnational / District offices have up to date maps displayed (0: No maps; 1: Some maps, but not up-to-date; 2: Up-to-date maps displayed, but only for some programmes; 3: Yes) GIS / Maps are used at every level	0 1 2 3 0 1 2 3 0 1 2 3
43	There are incentives for good information performance, such as awards for the best service delivery performance, for the best/most improved district, or for the best HIS products/utilisation (0: No; 1: Sporadic use of incentives only; 2: Institutionalised use of incentives in some areas; 3: Yes)	0 1 2 3
44	Managers are held accountable for performance, based on routine and/or survey-based health indicators at A) National level B) District level (0: Management positions not performance related; 1: Managers have performance agreements, but nobody are *actually* held accountable; 2: Managers have performance agreements, but *actual* accountability are determined by other factors; 3: Yes)	0 1 2 3 0 1 2 3
45	Available and relevant data from census, household surveys, ad-hoc surveys and research reports are used in an integrated way for indicator evaluation and cross-checking (0: No cross-verification done; 1: Occasionally; 2: Commonly done, but only as a "manual" process because data formats and identifiers do not match; 3: Commonly done using multiple data sources that have been aligned to a common framework and format for ease-of-use in integrated analysis)	0 1 2 3

Dissemination of Indicators and Interpreted Information

46	There is a written **data/information flow policy** in active use that includes integrated collection and dissemination of indicators and interpreted information from all key subsystems (0: No data/information flow policy; 1: Data/information flow policy exists, but is not adhered to; 2: Data/information flow policy in use, but it does not include dissemination of indicators and interpreted information ; 3: Yes)	0 1 2 3

47	Integrated HIS **summary reports** covering (at least) key MDG health indicators and programme areas are distributed regularly (at least every 3 months) to a) other ministries and elected bodies at national level b) to the media and the general public at national level (0: No integrated reports; 1: Occasional reports, but less frequently than quarterly; 2: Regular integrated reports at least quarterly, but mainly targeting the National Assembly and Cabinet; 3: Regular integrated reports at least quarterly to the National Assembly and all other relevant ministries)	 0 1 2 3 0 1 2 3
48	Management teams are producing regular written **feedback** from a) National to sub-national managers b) Sub-national to district c) District to facility (0: No feedback; 1: Under 40% of sub-national units receive regular written feedback; 2: 40-80% of sub-national units receive regular written feedback; 3: All sub-national units receive regular written feedback)	 0 1 2 3 0 1 2 3 0 1 2 3
49	Key data and indicators from across programme areas are readily available through an **integrated database** framework a) within the health sector b) within the government sector (a "National Statistics Framework") (0: No data warehouse; 1: Data warehouse exist, but not web-enabled; 2: Web-enabled data warehouse exist, but only internal ministry access; 3: Web-enabled data warehouse exist, with at least partial public access via the World Wide Web)	 0 1 2 3 0 1 2 3
50	Anonymous data and indicator sets from the health sector (public and private) are **generally available** (at a reasonable price) to any interested user (patient-identifiable data sets obviously excluded) (0: No data available 1: Annual report of ministry available in all districts 2: Data available on paper, but have to make major effort to get it 3: Most data easily available via web)	0 1 2 3

Information for action

51	Managers at all levels are able to, and actually use information from HIS for local programme **management**, planning and monitoring (0: All key decisions are centralised; 1: Information used for monitoring, but no real planning done; 2: Programme planning and monitoring done, but not resource allocation; 3: All resource allocation (budgets, staff allocations) are supposedly based on HIS data/indicators)	0 1 2 3

52	HIS data/information has during the last 5 years resulted in significant changes in annual **budgets** and/or general resource allocation (0: Budgets are not activity/result driven; 1: Some shifts, but links to information not clear; 2: Information driven resource allocation adopted in principle, but not yet fully implemented; 3: All resource allocation (budgets, staff allocations) are based on HIS information, resulting in major shifts)	0 1 2 3
53	At least five problems/challenges from different program areas have been addressed through a **written action plan** based on HIS data/indicators (0: No; 1: Addressed yes, but not via a written action plan; 2: Written action plan, but no clear use of HIS data/indicators; 3: Yes)	0 1 2 3
54	The effects of the written action plans have been demonstrably **monitored** using integrated HIS data and indicators from different subsystems (0: No; 1: Partially; 2: Yes, but not documented; 3: Yes, documented)	0 1 2 3

Advocacy

55	HIS information are widely used to advocate for targets and resource allocation in the annual budget processes a) by national management teams with **Cabinet and the National Assembly** b) by **district and sub-national** management teams (0: very few targets/budget proposals are backed up by HIS information; 1: Some (10-40%) of targets/budget proposals are backed up by HIS information; 2: Most (40-80%) of targets/budget proposals are backed up by HIS information; 3: Over 80% of targets/budget proposals are backed up by HIS information)	0 1 2 3 0 1 2 3
56	HIS information is readily available in a written annual (or biannual) report that pulls together and analyses critically health information from all subsystems (0: No report 1: Report out of date or poor quality 2: Report made but analysis weak 3: Yes)	
57	HIS information are being used to advocate for **equity** and increased resources to disadvantaged groups and communities by e.g. documenting their disease burden as linked to socio-economic indicators (e.g. poverty) and poor access to health services and other public services (0: Not used for equity purposes; 1: HIS information are used for equity purposes on an ad-hoc basis; 2: HIS information are regularly used to promote equity, but not explicitly linked to quantifiable socio-economic indicators; 3: HIS information are systematically used to pursue equity and linked to socio-economic and/or access indicators as part of a National Statistical Framework)	0 1 2 3

58	The key national performance indicators on MDGs are well known among politicians and regularly used by the media a) Under 5 mortality rate is well known b) National immunisation coverage is well known c) Maternal mortality rate is well known d) HIV prevalence rate is well known (0: No; 1: Known by a few "specialists" only; 2: Known among health-focused politicians, but generally not in the media; 3: Yes)	 0 1 2 3 0 1 2 3 0 1 2 3 0 1 2 3
59	Members of the **National Assembly** have regularly used HIS information to evaluate government performance on health during the last year (0: No; 1: HIS information used occasionally, but with clear reservations due to completeness or quality of data; 2: HIS information used frequently, but with reservations or disagreements due to completeness or quality of data; 3: Systematic use of HIS information, with most Assembly Members accepting the HIS information as largely reflecting the real situation)	0 1 2 3

This tool was used by a network of researchers to make an assessment of the National HIS of 11 countries including 3 States in India. While the detailed results of this assessment exercise are reported elsewhere, it will suffice to say here that except for Thailand and South Africa, a well functioning HIS was not identified in any of the surveyed countries. Various best practices, especially relating to addressing the problem of fragmentation were identified through the practices seen in Thailand and South Africa. While this tool was originally designed to make a national level assessment, it may be customized to do a similar exercise at the state or province and district levels.