Studies
in
Population and Development

No. 09-01
National Rural Health Mission
Improved Monitoring and Evaluation
for Programme Planning and Service Delivery

Alok Ranjan Chaurasia

Shyam Institute

National Rural Health Mission

Improved Monitoring and Evaluation for Programme Planning and Service Delivery

Alok Ranjan Chaurasia

'SHYAM' Institute
June 2009

Summary

The framework of implementation of the National Rural Health Mission provides for a monitoring and accountability framework based on stringent internal monitoring, external surveys and community monitoring. Information available from these three sources has been proposed to be integrated and synthesize through the process of triangulation. The present paper argues that, in the existing scenario, triangulation is possible only at the upper tiers of health and family welfare services delivery system and not at the grass roots level because there is only one source of health and family welfare information below the district level. It is also argued that triangulation at district and above district levels contributes little to improving the efficiency and effectiveness of health and family welfare services delivery. The paper also describes a conceptual framework for strengthening the monitoring and evaluation functions of the health and family welfare services delivery system. This alternative framework may also constitute the basis for monitoring and accountability mechanism outlined in the framework of implementation of National Rural Health Mission.

1. Background

Government of India has recently launched the National Rural Health Mission which aims at architectural corrections in the health care delivery system with a view to make it an accountable, accessible and affordable system of quality services. The Mission envisions, among others

- provision of effective health care to the rural population.
- raising public spending on health from 0.9 per cent of the GDP to 2-3 per cent of the GDP.
- architectural corrections in the health system to effectively handle increased allocations through strengthening of public health management.
- effective integration of health concerns through decentralized management with determinants of health.
- improvements in accessibility, equity, affordability, accountability and effectiveness of primary health care.

The framework for implementation of the Mission outlines the following five main approaches through which Mission activities are to be implemented:

A. Communitisation
B. Improved management through capacity building
C. Flexible financing
D. Innovations in human resources management
E. Monitoring progress against standards.

Although, the framework for implementation emphasizes progress monitoring against pre-set standards, yet it is silent about comprehensive performance assessment. The implementation framework proposes an intensive monitoring and accountability system through a three pronged process of community based monitoring, external surveys and stringent internal monitoring. However, the framework for implementation is silent about how can information available through internal monitoring, external surveys and community monitoring be combined to facilitate informed decision making to improve programme performance.

2. Triangulation

One approach that has been suggested to operationalise the monitoring and accountability system suggested in the framework of implementation is the triangulation. Triangulation is a shorthand term for synthesis and integrated analysis of data from multiple sources for program decision-making. It is a powerful tool that can be used to demonstrate program impact; identify areas for improvement; direct new programs and enhance existing programs; and help direct policy changes. Triangulation can strengthen the understanding of complex issues and provide support for making evidence based decisions. Triangulation methods have been used in different contexts to promote informed decision-making. These methods have been used to map HIV/AIDS surveillance data onto programmatic data in order to document the location of the epidemic in relation to distribution of programs and services. These methods have also been used to map interventions and resources within the context of various epidemics as a way of demonstrating needed shifts in resource allocations for interventions and to link evidence-based interventions to epidemic type and in mapping surveillance data

with prevention data to identify the match between the distribution of preventive services and trends in the epidemic. There has also been attempts to broaden the focus of triangulation to include a strong capacity-building focus and process. The purpose of triangulation is to answer key questions driven by country needs; and to build the capacity for use of data from multiple sources thereby providing the basis for program and policy decision-making. It is therefore argued that triangulation can be used to combine the information available from internal monitoring, external surveys and community monitoring to strengthen the monitoring and accountability system of the Mission.

It may be emphasised here that triangulation is essentially a process. Its primary purpose is to strengthen the routine management information system (MIS) both in terms of quality and use of the information at different tiers of the health and family welfare services delivery system for improved decision making. It is not an end in itself. The underlying assumption of the triangulation process is that the available information has some deficiencies that hamper its use for programme planning and programme decision making. Triangulation assumes that these deficiencies can be eliminated or minimised through integrated analysis of the information available from multiple sources and synthesising the results of the integrated analysis to support informed decision making. The basic requirement for triangulation, therefore, is that the information in need must be available from at least more than one source. If the information is available from only one source then there is no triangulation. Because of this limitation, triangulation has only a limited role in strengthening the management information system.

Triangulation can be carried out at different tiers of the health and family welfare services delivery system right from the grass roots level to the central level. However, the basic orientation of the triangulation of health and family welfare information varies by the basic orientation of the health and family welfare services delivery system by the administrative and managerial hierarchy. At the grass roots level, the health and family welfare services delivery system is essentially directed towards effective delivery of primary health care services in an efficient manner so as to achieve universal coverage of key health and family welfare interventions such as immunisation and oral rehydration therapy to prevent deaths from diarrhoes. By contrast, at national and state levels, the focus of the health and family welfare services delivery system is essentially on impact of health and family welfare programmes and activities and their policy implications. This means that, at the grass roots level, triangulation must be oriented towards analysing effectiveness and efficiency of the health and family welfare services delivery where as it should be able to answer impact and policy related questions at state and national levels. The very different orientation of triangulation at different tiers of the health and family delivery system introduces considerable complexity in the triangulation process. This complexity can be addressed through following an indicator-based approach to triangulation. This implies that the first step in the triangulation process is to identify a set of indicators for triangulation at different tiers of the health and family welfare services delivery system. The indicators may be classified into input, process, output, outcome and impact indicators. It is obvious that these indicators are different at different tiers of the services delivery system, although there exists well defined linkages between indicators at different tiers of the health and family welfare services delivery system.

Table 1: Template for selecting indicators for triangulation.

Tier	Input indicator	Process indicator	Output indicator	Outcome indicator	Impact indicator
Village	*Indicator 1*				
SHC		*Indicator 2*			
PHC			*Indicator 3*		
CHC				*Indicator 4*	
District					
State					*Indicator 5*
India					

The indicator-based triangulation process is congruent to results-based management approach that constitutes the core of the monitoring and accountable system of the National Rural Health Mission. For the success of the Mission, it is imperative that relationship is established between inputs under the Mission with the Mission outputs and Mission outcomes. It is also necessary that outputs and outcomes of the Mission actually lead to changes in the impact indicators at all levels of the health and family welfare services delivery system. This relationship can be established horizontally at one tier of the health and family welfare services delivery system as well as vertically across different tiers. Obviously, the triangulation needs to be modelled by taking into the above considerations.

Once the indicator set for triangulation is decided, the second requirement for triangulation is to describe the data required for estimating these indicators. The data required for the estimation of indicators may come from different sources. The monitoring and accountability mechanism described in the framework of implementation of the National Rural Health Mission emphasises three sources of data - internal monitoring, external surveys and community monitoring. A critical examination of the data available from different sources is necessary as data fro different sources may vary in terms of quality and scope. Moreover, there may be a situation that a given source may not provide the data necessary for the estimation of agreed indicators. A critical examination of different sources of data is therefore necessary before using the data from the source for the purpose of triangulation. It is also important to note that the complexity of triangulation increases parabolically with the increase in the number of sources of data. The simplest way of triangulation is to use data from two sources. Complexity in triangulation does not increase substantially when the number of sources increase to three. However, when there are more than three sources of data, the triangulation becomes too complex to handle.

Triangulation, therefore requires a comprehensive review of the existing data sources including the context and contents of each of the data source and the comparability, quality, reliability and timeliness of the information available from different sources.

Table 2: Template for identifying the information required for estimating indicators for triangulation.

Tier	Input indicator	Process indicator	Output indicator	Outcome indicator	Impact indicator
Village level					
Indicator 1	*Information required and sources*				
Indicator 2		*Information required and sources*			
Indicator 3			*Information required and sources*		
Indicator 4				*Information required and sources*	
Indicator 5					*Information required and sources*
SHC level					
Indicator 1 *Indicator 2* *Indicator 3* *Indicator 4* *Indicator 5*					
PHC level					
Indicator 1 *Indicator 2* *Indicator 3* *Indicator 4* *Indicator 5*					
CHC level					
Indicator 1 *Indicator 2* *Indicator 3* *Indicator 4* *Indicator 5*					
District/State/Central levels					

The above considerations suggest that the following steps are critical to the process of triangulation:

- A decision about the administrative tier at which the triangulation is to be carried out. Triangulation at different tiers of the services delivery system has different orientation. At the grass roots level, triangulation may help in improving efficiency and effectiveness of service delivery. At the upper tiers of the services delivery system, triangulation may help in addressing policy issues but may be of little help in tackling concerns related to efficiency and effectiveness of services delivery.
- It is to be decided whether triangulation is to be done horizontally or vertically. Horizontal triangulation is confined to one administrative tier only. Vertical triangulation involves more than one administrative tiers.
- At list of input, process, output, outcome and impact indicators at different tiers of the health and family welfare services delivery system needs to be decided to constitute the basis for triangulation. This is important as indicator-based triangulation is congruent to results-based management.
- Information requirement for each of the identified input, process, output and impact indicators needs to be assessed at different tiers of the health and family welfare services delivery system.

3. Sources of Information

Critical to the process of triangulation is the availability of information that permits estimation of the agreed indicator set from at least two sources. There are different sources of health and family welfare related information at different tiers of the health and family welfare services delivery system. Moreover, information available from different sources at different tiers of the services delivery system varies in terms of scope and coverage as well as in terms of information quality and its timeliness. It is in this context that an examination of different sources of health and family welfare services related information at different tiers of the health and family welfare services delivery system becomes important for any triangulation exercise.

A synthesis of health and family welfare related information available from different sources at different tiers of the health and family welfare services delivery system is summarised in table 3. The common information source that runs across all tiers of the health and family welfare services delivery system is the programme service statistics or the information related to the services provided by health and family welfare services providers. The programme service statistics, however, has a number of limitations. First, it is limited to the public health and family welfare services delivery system only. It provides no information about the services outside the public services delivery system. Second, these statistics are known to be associated with errors of duplication over time and place that have often been found to be quite substantial in the magnitude. Third, programme services statistics provide little information about the characteristics of the population - population size and distribution, population structure, etc. As such, estimation of a range of indicators, especially outcome and impact indicators is not possible on the basis of the programme service statistics alone.

Table 3: Availability of information at different tiers of the health and family welfare services delivery system

Tier	Information source			
	Programme service statistics	Census	NFHS	DLHS
Village level	No information is currently available. The health worker keeps a record of services provided in the village. This information is not reported separately. Information about population by age, sex and social class, etc. is not available. Estimation of agreed input, process, output, outcome and impact indicators is not possible at the village level.	The Primary census Abstract provides limited village wise information at 10-year interval only.	NFHS is not designed to provide village wise information	DLHS is not designed to provide village wise information

Tier	Information source			
	Programme service statistics	Census	NFHS	DLHS
SHC level	Information related to services delivered is available. Break up of information by sex, age and social class is generally not available. Information about population by age, sex and social class, etc. is not available. Estimation of agreed output, outcome and impact indicators is not possible.	No information is currently available but information available through the Primary Census Abstract can be aggregated. Census is carried out at an interval of 10 years only.	NFHS is not designed to provide village wise information	

Tier	Information source			
	Programme service statistics	Census	NFHS	DLHS
PHC level	Information related to services delivered is available. Break up of information by sex, age and social class is generally not available. Information about population by age, sex and social class, etc. is not available. Estimation of agreed output, outcome and impact indicators is not possible.	No information is currently available but information available through the Primary Census Abstract can be aggregated. Census is carried out at an interval of 10 years only.	NFHS is not designed to provide village wise information	

Tier	Information source			
	Programme service statistics	Census	NFHS	DLHS
CHC level	Information related to services delivered is available. Break up of information by sex, age and social class is generally not available. Information about population by age, sex and social class, etc. is not available. Estimation of agreed output, outcome and impact indicators is not possible.	No information is currently available but information available through the Primary Census Abstract can be aggregated. Census is carried out at an interval of 10 years only.		

Tier	Information source			
	Programme service statistics	Census	NFHS	DLHS
District level	Information related to services delivered is available. Break up of information by sex, age and social class is generally not available. Information about population by age, sex and social class, etc. is not available. Estimation of agreed output, outcome and impact indicators is not possible.	Information available can be used to estimate selected demographic indicators using indirect techniques of demographic estimation. Census is however carried out at an interval of ten years only.	NFHS is not designed to provide village wise information	Information about selected list of indicators is available. However, indicators by social class as well as by rural/urban cannot be estimated because of very small sample size. Some of the indicators cannot be estimated. DLHS is not carried out regularly. The frequency is irregular.

Tier	Information source			
	Programme service statistics	Census	NFHS	DLHS
State/National level	Information related to services delivered is available. Break up of information by sex, age and social class is generally not available.	Information available can be used to estimate selected demographic indicators using indirect techniques of demographic estimation. Census is however carried out at an interval of ten years only.	Information about selected list of indicators is available for the total population as well as by sex, residence, social class, wealth index, etc. NFHS is not carried out annually. The frequency is irregular.	Information about selected list of indicators is available. However, indicators by social class as well as by rural/urban cannot be estimated because of very small sample size. Some of the indicators cannot be estimated from the information available. DLHS is not carried out regularly. The frequency is irregular.

Besides the most common sources of information shown in table 3, there are many other sources which may provide information for estimating input, process, output and outcome indicators. These include:

- Coverage evaluation surveys initiated all over India at the launch of Universal Immunization Programmes. These surveys provide information about selected indicators (primarily child immunisation and indicators related to maternal health) at the district level only.
- Multi-indicator cluster survey pioneered by UNICEF. These surveys provide information related to indicators of children. Information available from this survey is available at the district level only.

It is evident from table 3 that below the district level, there is only one source of health and family welfare information - the programme service statistics. The limitations of the programme service statistics in meeting the information needs of monitoring and evaluation functions of the health and family welfare services delivery system are well known and need not be repeated here. In any case, the very fact that below the district level, there is only one source of health and family welfare information implies that the triangulation of health and family welfare information is not possible below the district level. Since the very purpose of triangulation is to strengthen the monitoring and evaluation functions of the National Rural Health Mission, it is obvious that triangulation, at best, has only a limited role in strengthening the monitoring and accountability mechanism outlined in the framework of implementation of the Mission in the context of improving the efficiency and effectiveness of public health and family welfare services in meeting the health and family welfare needs of the people. Meeting the felt health and family welfare needs of the people is critical to achieving the goals of National Rural Health Mission. In the prevailing situation, triangulation can be carried out only at national and state levels, and, to a very limited extent, at the district level. A triangulation exercise at national, state and district levels, however, contributes little towards strengthening the monitoring and evaluation functions of the public health care delivery system at the grass roots level - the level where services are actually delivered. Moreover, a triangulation exercise at national, state or even at district level may be an exercise in futility as it is already well known on the basis of the information available from different sources that the health and family welfare situation as well as the status of health and family welfare services vary widely across states and across districts within a state. It is also well known that these variations have persisted over time despite all developments and expansion of the health and family welfare services delivery system. It is very much doubtful that the triangulation exercise can reveal anything more than these well known observations. Moreover, triangulation of health and family welfare information at the national, state and district levels contributes little to decentralised, community needs based planning for health and family welfare services delivery. Community needs based planning for health and family welfare services delivery is essentially a bottom-up planning process. In order to make this approach of planning really effective in, it is necessary that triangulation of health and family welfare information available from different sources should be done at the grass roots level - the interface with the people - so that triangulation facilitates evidence-based decision making at the grass roots level.

The key question in improving the efficiency and effectiveness of health and family welfare services delivery system in Madhya Pradesh is to strengthen the monitoring and evaluation functions. In the decentralised community needs assessment approach of planning for health and family welfare delivery, it is imperative that these functions are strengthened at the level where the services are actually delivered. It is well known that health and family welfare needs of the people are very dynamic in the context and the contents. They keep of changing because of a host of social, economic and family factors as well as because of the improvements in health and family welfare services delivery. It is therefore necessary that the changing health and family welfare needs of the people are regularly monitored and fed into the decentralised planning process. It is in this context that the monitoring and evaluation function of the public health care delivery system needs to be strengthened. It is also in this context that, to be really meaningful, any triangulation exercise should be carried out only at the grass-roots level, the interface with the people and not at the upper tiers of the health and family welfare service delivery system just because information from at least two different sources.

The only way to strengthen the monitoring and evaluation functions of the National Rural Health Mission so as to achieve its goals and objectives is to improve the availability and quality of health and family welfare related information at the village level and organised at the sub-health centre, primary health centre and community health centre level for planning for health and family welfare services delivery as well as for efficient delivery of delivery of health an family welfare services. This requires a complete reinvigoration of the existing system of collection and reporting of health and family welfare information. In order to achieve the goals and objectives of the National Rural Health Mission, it is imperative that

a. There should be an effective system of assessing the health and family welfare needs of the community. Health and family welfare needs of the community cannot be assessed in an ad-hoc manner as the health and family needs of the community keep on changing with time.
b. There should be a system of monitoring up to what extent the identified health and family welfare needs of the people have been met. For this purpose, it is necessary that monitoring of health and family welfare services delivery must be beneficiary based rather than institution bases as is the case at present.
c. In view of the fact that the delivery of health and family welfare services in an efficient manner is contingent upon institutionalisation of agreed implementation processes and availability and quality of infrastructure and facilities of an acceptable standard, there should be a mechanism to monitor implementation processes and the availability and quality of health and family welfare services delivery infrastructure and facilities.

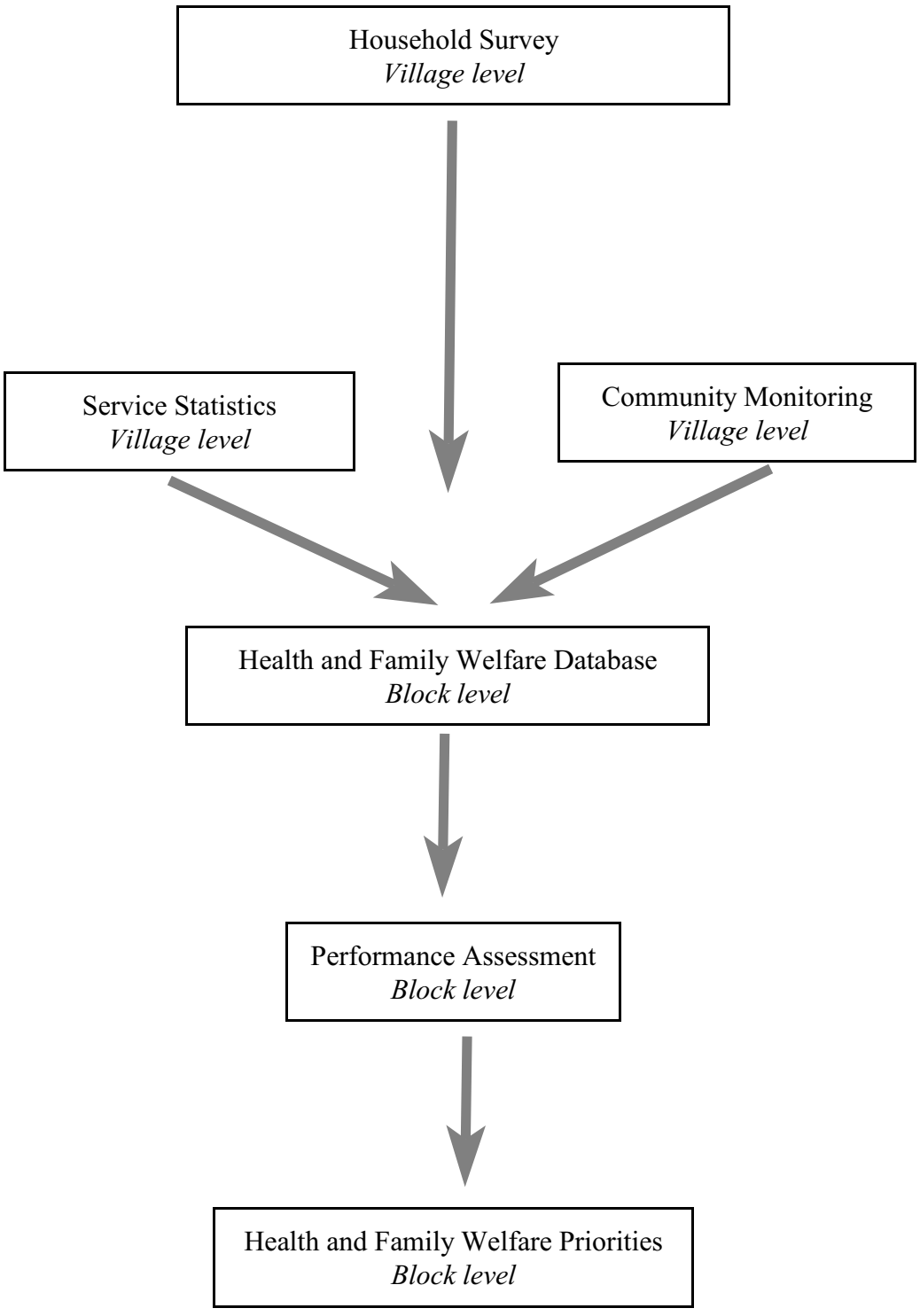
Information available from these three sources can than be combined to make an evidence based assessment of health and family welfare situation, identification of health and family welfare priorities and the capacity of the health and family welfare services delivery system to meet the identified health and family welfare priorities. It is in this context that an alternative conceptual framework has been outlined in the following pages that may help in meeting the information needs of monitoring and evaluation functions of National Rural health Mission.

4. A Conceptual Framework

The conceptual framework for improving the health and family welfare information system to support planning, monitoring and evaluation functions of the National Rural Health Mission is described schematically in figure 1. The framework combines the information available from the programme service statistics, community monitoring and household level survey to build a household and village level health and family welfare data base. The information available through this database can be used to assess the health and family welfare situation at the grass roots level, setting up health and family welfare priorities, health and family welfare services delivery planning to meet the identified priorities and monitoring the extent up to which the identified needs are actually met. The focus of this conceptual framework are the people and the community and not the public health and family welfare services delivery institutions as is largely the case at present. The effectiveness of this alternative framework depends upon a basic change in the orientation of the monitoring and evaluation functions of the health and family welfare services delivery system. In other words, the framework suggested in this section helps in comprehensive performance assessment of the programmes and activities under the National Rural Health Mission.

The pivot of the proposed alternative conceptual framework is the annual household survey in each village. This survey will not only provide the much needed denominator for estimating almost all the health and family welfare indicators that constitute the basis for planning for health and family welfare services delivery but will also help in assessing the health and family welfare needs of the people. Assessment of health and family welfare needs is essential for estimating the demand for health and family welfare services which is necessary for planning of Mission activities and programmes. Another rationale for conducting the village and household level health and family welfare survey is to assess the quality and coverage of services delivered through public as well as private health and family welfare services delivery system as the services provided can be matched with the demand for services as identified through the household survey.

The second component of the proposed conceptual framework is the information about the health and family welfare services provided at the village level through either public or private health and family welfare services delivery system. The point to emphasise is that information about the service provided should be beneficiary specific so that it can be matched with the demand for services available through the household survey. This will help in assessing the extent up to which the identified health and family welfare demands or needs of the community are actually met and what are the gaps. For successful implementation of the Mission, it is necessary that the felt health and family welfare demands of the community must be met by the health and family welfare services delivery system either public or private. This is possible only when the health and family welfare services provided through the system are marched with the demand for services available through the household survey. A reinvigoration of the existing internal monitoring system under the National Rural Health Mission is necessary to bring out this change in the monitoring process within the health and family welfare services delivery system.


Household Survey
Village level
Service Statistics
Village level
Community Monitoring
Village level
Health and Family Welfare Database
Block level
Performance Assessment
Block level
Health and Family Welfare Priorities
Block level

The above framework addresses all the information needs of planning, monitoring and evaluation functions of the health and family welfare services delivery system in the following manner:

Table 4: Data source and type of data available from different sources.

Indicators	Data source
Impact	Household survey
Outcome	Household survey Service statistics
Output	Household survey Service statistics
Process	Service statistics Community monitoring
Input	Community monitoring

There are two broad components of the conceptual framework suggested above. The first is the data collection component. This component is to be implemented at the village level. This component comprises of three activities:

- A household survey covering all households in the village. This survey is to be carried out once in a year. This survey is primarily meant to estimate the demand for health and family welfare services.
- A reporting system to provide information about the health and family welfare services delivered. The important point is that this information must be beneficiary specific so that it can be matched with the demand for services identified through the household survey.
- A community monitoring system that provides information about the processes institutionalised and inputs provide for the delivery of health and family welfare services.

The second component of the conceptual framework is related to the integrated analysis of the collected/reported data from household survey, reported services delivery and information through community monitoring. This task is to be carried out at the block level but separately for each village within the block. The village level analysis may then be combined to obtain sub-health centre level, primary health centre level and community health centre level health and family welfare situation assessment and identification of the health and family welfare needs of the people. This information will facilitate community needs based planning for health and welfare services delivery. It may be emphasised here that the task of analysing the village wise health and family welfare information is primarily repetitive in nature and can easily be done at the block level with the help of the information technology by developing appropriate software for the purpose. The only requirement is that the development block level capacity in integrated data analysis through the application of the information technology will have to be developed. This is however not a difficult proposition.

Finally some comments on the operationalisation of the above conceptual framework. It is obvious that collective efforts are needed for operationalisation of the framework suggested above. Some of the observations for operationalisation of the conceptual framework are summarised in table 5.

Table 5: Approaches for the operationalisation of the conceptual framework.

SN	Components	Suggested options
1	Household survey	Conducting annual household survey is the most important yet the most contentious part of operationalisation of the framework. There are two issues: 1) Designing the survey; and 2) Conducting the field work. As regards the design of the survey, it may be done jointly by TMSA and DTC. It is suggested that the survey may be carried out in a phased manner. In the first year, the survey may cover 40 randomly selected villages in each development block. In each subsequent year, the survey may be expanded to cover 40 additional village so that in a period of 5 years all villages in the development block will be covered. As regards the field work, there are two options. First is to entrust the job to the Female Health Worker. This is however not a viable proposition as the primary task of the Female Health Worker is to deliver services to the people and to conduct a survey. The second approach is to involve non-government organizations and other philanthropic organization such as volunteers of National Service Scheme, etc. This is an area which can be explored further and its feasibility may be assessed.
2	Reporting of services provided	This is least contentious as the Female Health Worker has traditionally been reporting services delivered at the village level. The only issue is that the reporting should be beneficiary oriented rather tan institution specific. Appropriate changes in the reporting format are required.
3	Community monitoring	Community monitoring has been introduced as pilot project under the National Rural health Mission. There is a need to rationalise the concept and link it with the management information system as suggested in the conceptual framework. This may require development of an information sheet that may be used for the purpose of community monitoring.
4	Integrated analysis	This is to be done at the development block level for which, the capacity of the development block will have to be strengthened. Appropriate software may be developed for the purpose. This purpose should be capable of generating reports,

5. Conclusions

The health and family welfare services delivery system in India has been known for its target-based approach of programme implementation. In 1996, in a major policy shift, the target-based approach was replaced by the community needs based approach of programme implementation. However, there has been little invigoration of the monitoring and evaluation system. The old target-based monitoring and evaluation system was retained with the word 'target' replaced by the phrase 'expected level of achievement' nicknamed ELA. As the result, the entire process of monitoring and evaluation remained limited to calculating simple proportion of target or ELA achieved. In the absence of any well-defined process of assessing the health and family welfare needs of the community, the entire community needs assessment process remained very much ad-hoc in nature and *laissez-faire* in approach. Although, the framework of implementation of the National Rural Health Mission outlined a monitoring and accountability framework to measure the progress, yet even this framework ignored the need of evolving a new monitoring and evaluation system that is suited to the community needs assessment approach of planning and implementing health and family welfare services.

In an attempt to strengthen the monitoring and evaluation functions of the health and family welfare services delivery system and monitoring and accountability mechanism of the National Rural Health Mission, triangulation of the health and family welfare information has been advocated. Triangulation implies integrated analysis and synthesis of health and family welfare information available from different sources. Unfortunately, in the existing situation, triangulation is possible only at the upper tiers of the health and family welfare services delivery system. Triangulation is not possible below the district level as health and family welfare related information below the district level is available from only one source - the programme service statistics. Triangulation at district and above district levels, however, hardly contributes to improving the efficiency and effectiveness of health and family welfare services, especially at the grass roots level - the interface with the people.

There is a need of a more pragmatic approach to generate information necessary for monitoring and evaluating the progress of National Rural Health Mission. This approach must be able to integrate information available from internal monitoring, household survey and community monitoring, the three focus areas of the monitoring and accountability mechanism of the National Rural Health Mission. There is a need to combine the beneficiary-based information with the provider-based information at the level where all planning to meet the health and family welfare needs of the people is carried out. This will require substantive capacity building at the grass roots level. The monitoring and evaluation system of health and family welfare service should be able to measure the needs effectiveness, capacity efficiency and goal effectiveness and the realised efficiency. The conceptual framework presented in this paper outlines such a system.

Although, the current availability of health and family welfare related information at different tiers of the health and family welfare services delivery system seriously restricts the usefulness and scope of triangulation, yet, it is still possible to make a beginning by carrying out triangulation exercise at state and district levels. At the same time, there is a need to initiate efforts to improve the availability of health and

family welfare information necessary for monitoring and evaluation at the lower levels of the health and family welfare services delivery system in conjunction with the conceptual framework discussed above.

A two stage plan of action is therefore suggested for strengthening the monitoring and evaluation functions of the health and family welfare services delivery system. These stages are described below.

Stage 1. In the first stage, the Data Triangulation cell may take up the task of triangulation of the available information at the state and district levels. The process outlined in table 6 may constitute the basis and may provide guidance for taking up the triangulation exercise at the state and district level. Some of the indicators that can be estimated by triangulating the existing information include:

1. Proportion of pregnant women registered for ANC check-up to total estimated pregnant women.
2. Proportion of pregnant women registered in the first trimester of the pregnancy to total estimated pregnant women.
3. Proportion of pregnant women who have undergone three ANC.
4. Proportion of pregnant women received TT2 or booster.
5. Proportion of pregnant women anaemic.
6. Proportion of pregnant women severely anaemic.
7. Proportion of institutional deliveries.
8. Proportion of safe deliveries.
9. Sex ratio at birth.
10. Ratio of institutional deliveries to total safe deliveries.
11. Proportion of low birth weight babies.
12. Pregnancy wastage rate.
13. Proportion of new born breast fed within one hour of birth.
14. Drop out rate between I and III dose of DPT vaccine.
15. Drop out rate between I and III dose of OPV vaccine.
16. Ratio of the number of Measles vaccination to the number of BCG vaccination.
17. Proportion of new born babies actually weighed.
18. Ratio of the number of children given BCG to the estimated number of live births.

In order to estimate the above indicators at the state and district levels on the basis of the programme service statistics, estimates of population and its basic characteristic will have to be estimated on the basis of the information available from different sources at different times of point. As such interpolation/extrapolation of the information available from different sources will have to be carried out first. At the state level, most of the data required may be obtained from such sources as National Family Health Survey, population census, etc. These data can directly be used for the triangulation purpose. At the district level, however, the required information is not readily available. They will have to be interpolated or extrapolated from the information available from different sources. The two most common sources of district level information are population census and district level households survey in addition to the programme service statistics.

Table 6: Template for triangulation of health and family welfare information at state and district level.

Task	State level	District level
Estimate population	Projections of state population on the basis of 2001 population census have been prepared by the National Commission on Population.	Estimates of population of the district may be obtained by fitting a logistic curve to the district population obtained through different population census.
Estimate birth rate	State level estimates of birth rate are available through NFHS and SRS.	Birth rate estimates are available from 1981, 1991 and 2001 population census. Assuming a linear trend, estimates of birth rate can be projected beyond 2001.
Estimate total number of live births	Population of the state and the birth rate provide estimates of annual number of births	Population of the district and the birth rate provide estimates of annual number of births
Reported number of safe deliveries	Available from HMIS	Available from HMIS
Estimate proportion of safe deliveries	Can be calculated on the basis of estimated number of live births and reported number of safe deliveries. *The proportion of safe deliveries so estimated may be compared with the estimates available through NFHS, SRS and DLHS.*	Can be calculated on the basis of estimated number of live births and reported number of safe deliveries. *The proportion of safe deliveries so estimated may be compared with the estimates available through DLHS.*
Estimate IMR	Estimates of IMR are available through SRS, NFHS, DLHS, etc.	District level estimates of IMR are available from 1981 and 1991 census. They can be calculated from 2001 census also and then projected to the year 2008.
Estimate total number of infant deaths	Can be estimated from estimated number of live births and IMR estimate. Estimated infant deaths can be compared with reported infant deaths.	Can be estimated from estimated number of live births and IMR estimate. Estimated infant deaths can be compared with reported infant deaths.

Task	State level	District level
	A similar exercise can be carried out for under-5 mortality rate and maternal mortality ratio.	A similar exercise can be carried out for under-5 mortality rate and maternal mortality ratio.
Estimate number of pregnant women	Can be estimated from the estimated number of live births	Can be estimated from the estimated number of live births
Reported number of pregnant women registered for ANC	Available from HMIS.	Available from HMIS.
Proportion of pregnant women registered for ANC	Can be calculated on the basis of estimated number of pregnant women and reported number of pregnant women registered for ANC. The estimate so obtained may be compared with estimates available through NFHS.	Can be calculated on the basis of estimated number of pregnant women and reported number of pregnant women registered for ANC. The estimate so obtained may be compared with estimates available through DLHS.
Reported number of pregnant women registered in the first trimester	Available from HMIS.	Available from HMIS.
Proportion of pregnant women registered in the first trimester.	Can be calculated on the basis of estimated number of pregnant women and reported number of pregnant women registered in the first trimester. Estimates so obtained may be compared with estimates available through NFHS.	Can be calculated on the basis of estimated number of pregnant women and reported number of pregnant women registered in the first trimester. Estimates so obtained may be compared with estimates available through DLHS.

The triangulation exercise can be carried out in three phases. In the first phase, attention may be restricted to the state level only. Most of the state level data are available from different sources and therefore simple interpolation or extrapolation is required for the purpose of triangulation. This exercise may be carried out for all the 18 states covered under the National Rural health Mission so as to provide a first hand comparison.

Triangulation of the information at the district level may be carried out at the second stage as district level triangulation is more rigorous as it requires district level projections.

Stage 2. The second stage of strengthening the monitoring and evaluation functions of the health and family welfare services delivery system may focus on improving health and family welfare information at the lower tiers of the health and family welfare services delivery system. This activity may be based on the conceptual framework describes above. This will however require a comprehensive reinvigoration of the existing management information system which, at present, is essentially a reporting system.

Based on the above discussion, a work plan has been prepared for the Data Triangulation Centre which is appended. This work plan may be the basis for carrying the activities of the Data Triangulation cell further.

Work Plan for Data Triangulation Cell
(June 2009 - May 2010)

Period	Activity		
	Stage 1 *State level*	Stage 1 *District level*	Stage 2
JUN-AUG 2009	Triangulation of state level information on selected indicators for all the 18 states covered under NRHM.	Preparation of the estimates of the population districts for different years of the period 2001-2011.	Discussion on the conceptual plan for strengthening the health and family welfare information system. Finalisation of operationalisation plan.
SEP-NOV 2009		Preparation of the estimates of birth rate, infant mortality rate, under-five mortality rate, etc. for the districts for different years of the period 2001-2011.	Development of household survey formats and community monitoring information sheet. Development of data entry, tabulation and analysis software. Selection of field agencies.
DEC 2009-FEB 2010		Estimation of district level indicators on the basis of HMIS and their comparison with estimates available from SRS, NFHS, DLHS, etc.	Training and orientation. Household survey. Creation of block level health and family welfare database.
MAR-MAY 2010		First district level triangulation report.	Launch of reinvigorated health and family welfare information system.