AWARDS SCHEME FOR EXEMPLARY IMPLEMENTATION OF e-GOVERNANCE INITIATIVES

GIS Application to Induce Parity in Healthcare Services

(Decision Support System)

NAME OF CATEGORY- 'EXCELLENCE IN GOVERNMENT PROCESS

RE-ENGINEERING'

1. Coverage – Geographical and Demographic ()

(i) Comprehensiveness of reach of delivery centers: in GIS based decision support portal http://117.218.18.109:9090, policy and decision makers of 26 districts, 8 Corporations 225 Taluka health offices, 6 RDD and State level officers across the state of Gujarat are registered. For enrolment, username and password is provided through the department.

(ii) Number of delivery centers: 26 districts, 8 Corporations 225 Taluka health offices, 6 RDD and Commissionerate of Health.

(iii) Geographical: State/UT level- No of District covered: 26 Districts

Please give specific details:-

(iv) Demographic spread (percentage of population covered)
Population of whole Gujarat is 6.03 crores and this solution helps to ensure that parity in health services can be induced with the help of this decisions support system

2. Situation Before the Initiative (Bottlenecks, Challenges, constraints etc with specific details as to what triggered the Organization to conceptualize this project):

The core problem was with planning for better distribution and maintenance of healthcare services by getting a comprehensive overview of current distribution of various health care parameters. Some of the key challenges in the existing system

1. Earlier the process of establishing the health facilities were manual and with recommendations of local leaders
2. There was no rational planning of new health facilities setup and no connection with ground level realities
3. Limited Health service delivery centers, uneven distributed, no rational allocation of health centers
4. Uneven ratio of Population and health care workers and resources
5. No Single tool to evaluate the health programs with respect to their geographic coverage

6. The evaluation of health facilities performance and programmes were not well established

3. **Extent of Process re-engineered** (Processes that have been re-engineered, services which depend on these processes, analysis/re-design of Process workflows – before (As-Is) and after (To-Be) re-engineering; changes in activities and their sequencing; level of automation (Extent of computerization in terms of number of services computerized, Extent to which steps in each service have been ICT- enabled) #):

The solution analyses existing areas with inadequate health facilities and Human resource to deliver better and uniform healthcare services. A population centric gap analysis is done and new facilities and HR requirements are sanctioned to ensure that there is parity in healthcare services through the states and each area gets its sanctioned service. At the same time, the capacity of existing HR and infrastructure is being strengthened by recruiting medical and paramedical staff, extensive training for skill improvement and enhanced program performance. This is achieved by developing framework of gap analysis and identifying weakness in all components with support structure (As monitoring tool) at SC, PHC, and Taluka and district level. DSS has potential to find the gaps in infrastructure, HR, programs and performance which are being used in full in planning and monitoring of all said components on the basis of population and state government/GOI norms and policies. Due to DSS, policy makers are more informed about ground level realities and geographical distribution of infrastructure which helps them make more sound and prompt decisions thereby enabling better delivery.

Computer and internet facilities are available in all the health department offices and at all the districts and Talukas. This portal operates on SQL server by using ARC GIS software. It has the following features:

- Technology based facility mapping
- Technology based gap analysis and GIS support to induce parity in health care
- GIS Based GAP analysis provides opportunity to allocate health facilities which are more convenient to provide access to the vulnerable groups
- It provides opportunity to rational deployment of health staff and need base distribution of resources
- It provides the opportunity to evaluate health programs up to Sub-Center level as per the indicators
- It provides an opportunity to evaluate the performance of health facilities and programs by using GIS based DSS tools.

4. **Strategy Adopted**
   (i) Details of base line study done,
   - Mapping of actual 7210 SC, 1168 PHC, 300 CHC, 30SDH, 24Dh and other health facilities locations, SC, PHC, Taluka, and District Boundary in GIS environment.

- Gap analysis by using population of Census 2001 & 2011 & Current available health facilities (No. of CHC, PHC, SC etc.) districts wise.

- Gaps in current health facilities as per IPHS 2012 & RHS 2012 norms are as below:

Sr. No.	Facility	Existing	Required	Gap
1.	CHC	300	358	58
2.	PHC	1168	1433	265
3.	SC	7274	9156	1035

- Norms of IPHS 2012 & RHS 2012 were adhered.

(ii) Problems identified,

- Low orientation of IT in existing staff
- Exhaustive process for training of staff as it was tedious job
- Establishing inter-sectoral coordination between various departments like Urban and Rural Development, gram panchayats and district authorities.
- Gaps of CHC, PHC & SC .i.e. deficit in CHC, PHC & SC as per norms of IPHS 2012 & RHS 2012
- HR and other infra-structure gaps as per standard norms

(iii) Roll out/implementation model,
Initiatives taken for development:

Gap Analysis & M.O.U with BISAG for Portal Development. Training to Staff & Creation of database.

- Actual location of each Health facility, SC, PHC, CHC, SDH, DH(Latitude and Longitude) taken using Google Earth application
- Health facility location place mark in Google earth software by each DQMO. & Taluka M&E at Taluka and District level
- Health facility location place mark done as BISAG and census code.
- Found Lat. / Long. integrated in the actual GIS application of BISAG
- Mapping of SC, PHC, CHC, SDH, DH location and Boundary in GIS environment
- Integration of Geo-Spatial Database with departmental Health data
- Population and standard norms based criteria for GIS analysis of Infrastructure, HR, Programs and Performance.
- Identification of habitation not served by present criteria
- Identification of most suitable habitation location for proposed Health facility based on the Demography and available infrastructure facility
- Finally developed GIS based Decision Support Information system(Web GIS)

As a result Sanctions of New 40 PHC's &470 SC's. Further, Pharmacist, Staff nurse, Lab technicians, X-ray technicians were hired based on deficiency observed in some areas.

(iv) Communication and dissemination strategy and approach used.):

GIS Based DSS Project has established a huge working team over the past few years. Project Staff is involved at all the levels for comprehensive implementation of the System.

INVOLVEMENT

Mostly, following staff members have actively participated for successful implementation of the System:

- State MIS Team
- District MIS Team & District Project Coordinators(DQMO)
- Taluka MIS Team
- CPC as Coordinators in corporations

TRAINING

District and Taluka MIS Coordinators were trained on whole mapping process periodically at State Project Office with technical support from BISAG.

Training imparted mainly on following points:

- How to locate the school using Google Earth Software
- Use of KML file with Google Earth application
- Mapping the health facility village code with Census village code.

Important Aspect of DSS:

- On Mapping of actual 7680 SC,1208 PHC,300 CHC,30 SDH ,24 DH locations and Boundary in GIS environment.
- Integration of Geo-Spatial Database with Departmental of Health and family welfare i.e. Hospital Information System, Health Information System etc. which provides information on vital parameters relating to health and quality of services.HR and infrastructure at elementary stage. DSS has been made operational in all the districts of the state through which data from all the Health imparting facilities entry are being constantly collected and disseminated.
- Criteria based GIS Analysis
  - Category wise(Infrastructure, HR, Program and performance base and indicators)
  - Facility Wise(rural and urban area)

- Identification of villages and area not served by present criteria.
- Identification of most suitable village location for proposed Health facility based on the Demography and available infrastructure facility.
- Policy maker and departmental User search facility of nearby health facility through maps.
- Creation of buffer of the user's position and list of health facility under that buffer.
- Get Distance between any two health facilities and location and any two points.
- Data can be updated through form available in MIS system of portal.

The Process and activities of GIS based Health facilities mapping have its own reliability in its work profile. That makes whole project a unique combination of acceptability, Affordability – Adaptability- Availability for its users.

5. **Technology Platform used-**

i. **Description :**
- Hardware : Server with Windows OS Server 2008 R2 Enterprise 16GB RAM, 300GB HDD
- Software : ASP .net frame work 4.0, SQL Server 2005, ArcGIS 9.1

ii. **Interoperability**
System can be integrated with any DBMS which supports geodatabase and can also be integrated with other existing health applications as it uses census codes for district, taluka and village level data.

iii. **Security concerns**
Security audit has been done and user name and passwords provided for authentication and authorization.

iv. **Any issue with the technology used**
None

v. **Service level Agreements(SLAs)** (Give details about presence of SLA, whether documented, whether referred etc. #)

Service Level Agreements (SLAs) exist at all levels, These SLAs are available in the form of Government Orders and are available. For overall maintenance of portal we have a Govt. order with BISAG. And any other issues with portal will be resolved within 24 hrs after the Launch of complain.

6. **Citizen Centricity** (Give specific details on the following#)

(i) Impact on effort, time and cost incurred by user,
Total 7680 SC, 1208 PHC, 300 CHC, 30SDH, 24DH are located with actual location, Taluka boundaries are defined in GIS environment. So, Health facility Mapping System is convenient for user to know exact location of specific unit and also they can also identify surrounding health facility available within defined customized buffer boundary. There is an integration of Geo-Spatial Database with Departmental of Health. So,

mapping of distance is possible with existing facilities available. Any user performs criteria based analysis.

(ii) Feedback/grievance redressal mechanism,

All suggestions and feedback from stakeholders are archived in the database for further processing and decision-making as the portal is for the use of internal purpose only.

(iii) Audit Trails, Audit trail is implemented in database and web security audit is performed by cert-in empanelled agencies.

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(iv) Interactive platform for service delivery: Whole concept is about identifying the un-served areas in terms of Health services (curative and preventive) through scientific mapping of SC, PHC and CHC using a Geo-Informatics System. Commissionerate of Health has made smart use of the state's nodal agency BISAG. Through BISAG the whole health facility mapping project has become transformed to bring about standardization, transparency, cost effectiveness and interoperability.

(i) Stakeholder consultation:

Suggestions from stake holders are regularly received through email and in writing, they are considered for improvement in system.

7. **User convenience** (Give specific details about the followings #)

Policy Makers of Health Department .i.e. ACS (FW), PS (PH), Addl. Dir., Dy. Dir., Jt. Dir., RDD, CDHO, RCHO, and Taluka Health Officers are main users of this portal. And this portal is used to make decisions regarding employees of Health department, Infrastructure of health facilities across state, and various Programs of health department and Performance.

(i) Service delivery channels (Web, email, SMS etc.)

Web Portal for Central Data base & Reports

(ii) Completeness of information provided to the users,

GIS Mapping is conceptualized by MIS team of State Project Office under guidance of State Project Director through technical support of Bhaskaracharya Institute of Space Applications and Geo-Informatics (BISAG). GIS based facility mapping works to fulfil this need for community. Following aspects of the initiative proves that it is in a true way helps to provides better governance to stakeholders. GIS based facility mapping works under below areas of the education need of state. And provides information to reach and fulfil the need with effective result oriented mechanism

(iii) Accessibility (Time Window),

As the portal is live and is available for access 24*7 & 365 days

(iv) Distance required to travel to Access Points
Nil

(v) Facility for online/offline download and online submission of forms,
Yes there is a facility for online submission of data regarding HR, Infrastructure and Health Programmes

(vi) Status tracking: Status of Current HR & Infrastructure available with CoH along with the current performance of various Health Programmes

8. **Efficiency Enhancement** (Give specific details about the following #)

(i) Volume of transactions processed:
With highly user friendly approach.

▪ On Mapping of actual 7680 SC, 1208 PHC, 300 CHC,30, SDH ,24DH Boundary in GIS environment.

▪ We found the deficit in health facilities as per the norms and the details are s below:

Sr. No.	Facility	Existing	Required	Gap	Sanctioned
1.	CHC	300	358	58	26
2.	PHC	1168	1433	265	135
3.	SC	7274	9156	1035	847

(ii) Coping with transaction volume growth
A dedicated data centre and server is present with a storage capacity to deal with the voluminous data being generated. The IT Support Agency, BISAG, is responsible for the development of software and make available for service delivery.

(iii) Time taken to process transactions,
Web based and Immediate

(iv) Accuracy of output,
The accuracy of output 100 % as the data's and the mapping of health facilities is being authenticated & Verified by the department and BISAG regularly.

(v) Number of delays in service delivery
Nil

9. **Cost effectiveness** (Give details about impact on cost incurred w.r.t. overhead cost, direct and indirect cost, man days/man hour required to do a job etc.#) .

- Using technology of Google maps (Open source)
- Without G.P.S. devices (No tender process, Capacity building of existing man power by dept. itself.)
- Saves lots of time, cost (Funds) and effort for survey work, integration of database etc.
- As G.I.S. layers of roads, rails, habitations, river and administrative units like district, Taluka, Villages are available at BISAG.

10.   Capacity Building and Organizational Sustainability (Give details about hiring skilled staff, imparting training etc.#)

The Current Available staff of CoH is utilized so there was no specific recruitment was done. Phase wise Training was imparted to all State & District level staffs for this project We imparted a training for 8 Municipal Corporations, 26 District Officials. 258 Officials have been covered till now.

11.   Accountability (Give details about, impact on transparency of process, fixing responsibilities etc. #)

As the login's are provided to all concern Health Officials (State & District Level) so they can monitor the progress and performance of the health facilities and health programmes. This provides an input for appropriate decisions. State GIS Cell and District GIS Cell have been established for monitoring and are accountable for data entry and quality of data.

12.   Innovation (Give details on the extent to which re-engineered process is unique, compared to other common process re-engineering efforts, impact on number of steps required, identification and removal of bottlenecks/Irrelevant steps etc. #)

Current Health Facilities with their actual Lat. & Long. Are mapped & clubbed with population census 2011.

This provides an insight of current status of available health facilities with their respective population and provides an opportunity to plan for new health facilities to underserved areas according to IPHS 2012, RHS 2012 standards

13.   Appropriate Delegation (Give details on whether a team involving employees from all levels has been deployed for the project implementation and maintenance, can employees be held accountable for their actions, etc. #)

  1. State GIS Cell (Commissioner Health - Chairman, State Nodal Officer, Project Manager GIS)

  2. District GIS Cell (ADHO – District Nodal Officer, DQAMO – GIS Co-ordinator)

  3. Taluka (THO, M&E)

14.   Result Achieved/ Value Delivered to the beneficiary of the project-(share the results, matrices, key learning's, feedback and stakeholders statements that show a positive difference is being made etc):

- ▪ **To organization**
  - ● Specialized services of BISAG & Stakeholder's participation of CoH
  - ● In house developed software
  - ● Integration of more parameters & better criteria
  - ● Scaling up availability of more places for health facilities in underserved areas
  - ● Convergence with Various Health Programs
  - ● Supporting implementation of IPHS 2012 & RHS 2012 Base Decision Support System and other program specific guidelines
- ▪ **To citizen**
      Community will access to health services with quality nearby. The new sanctions of health facilities like **New CHC's – 26, PHC – 135 & SC – 847** will improve the delivery of health services to the local community.
- ▪ **Other stakeholders**

Accurate planning and information for coordination with other departments will be available.

15.   Extent to which the Objective of the Project is fulfilled-(benefit to the target audience i.e.G2G, G2C, G2B, G2E or any other, size and category of population/stakeholder benefited etc):

Community pertaining to un-served habitations under primary health care has been ensured access to health services. This has ensure that every child of the age of 6-14 years, mother and other common public shall have an availabilities of health services within minimum distance .

This project also provide opportunity to Health and Family Welfare Department, Local health authorities i.e. Municipal Corporation, Jilla Panchayat, Nagar Panchayat or Panchayat who are now able to identify requirements universalization of Health facilities.

In GIS based decision support system, Planning officials, Researchers, Social Workers, NGOs and any Health person are able to check existing facilities available under Health Department for specific demographic and specific area and analyze by disaggregation and customized inputs.

16.   Adaptability Analysis
(i) Measures to ensure adaptability and scalability
Adaptability GIS based Health facilities mapping has its unique team for research and successful software for communication and dissemination of

information. The objective to achieve providing health services nearby with quality makes the initiative adjustable to every need for the department of Health. Team work and participation makes it sustainable and long lasting.

GIS Health facility Mapping has its teams of

- **State MIS Team**
- **District MIS Team & District GIS Coordinators(DQMO)**
- **Taluka MIS Team**.
  - Web GIS allows access to various Geo-spatial applications, solutions through net and allows one to perform all GIS functionality through the web. BISAG has achieved standard of ISO 9001:2008 and ISO27001:2005 for its services.

(ii) Measures to ensure replicability
This concept is replicable with modification in citizen service centric departments.

(iii) Restrictions, if any, in replication and or scalability
NIL

(iv)　　　Risk Analysis
After comparing other ongoing health monitoring tools we found that web based application is more accurate and meaning full as a paperless review tool. To facilitate flow of correct and complete information to the beneficiaries, data validation system must be in place.

17. Comparative Analysis of earlier Vs new system with respect to the BPR, Change Management, Outcome/benefit, change in legal system, rules and regulations

	Pre deployment of "GIS Based DSS"	Post deployment of "GIS Based DSS
1	Manual preparation of facility maps	Technology based facility mapping
2	Political and other recommendations with poor policy support to sanction Health facility	Technology based gap analysis and GIS support induced parity in health care
3	Limited Healthcare care delivery centers uneven distributed, no rational allocation of health centers	GIS Based GAP analysis provides opportunity to allocate health facilities which are more convenient to access to the vulnerable groups
4	Uneven ratio of Population and health care workers and resources	It provides opportunity to rational deployment of health staff and need base distribution of resources
5	No Single tool to evaluate the health programs a with geographic area	It provides the opportunity to evaluate health programs up to Sub-Center level as per the indicators
6	The evaluation of health facilities performance and programmes were not well established	It provides an opportunity to evaluate the performance of health facilities and programs by using GIS based DSS tools.

18. Other distinctive features/ accomplishments of the project:

(State, District, Taluka level GIS Cell)

Simple in use of software with security & other distinctive features/ accomplishments of the project:

- Integration of Geo-Spatial Database with Departmental of Health and family welfare i.e. Hospital Information System, Health Information System etc. which provides information on vital parameters relating to health and quality of services.HR and infrastructure at elementary stage. DSS has been made operational in all the districts of the state through which data from all the Health imparting facilities entry are being constantly collected and disseminated.
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