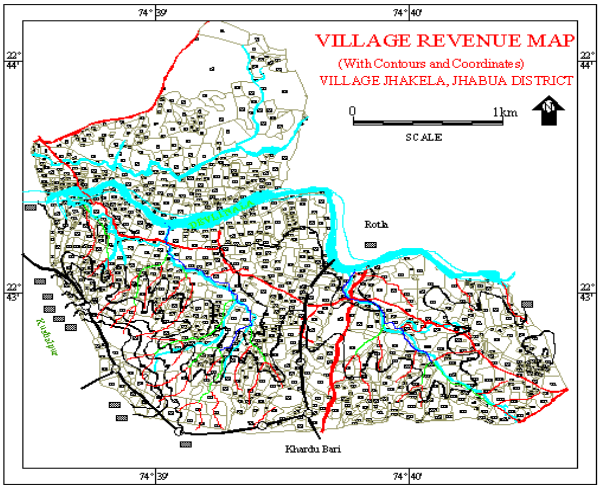
NATIONAL CENTRE FOR HUMAN SETTLEMENTS AND ENVIRONMENT

GIS

Applications centre



E-5/A, Girish Kunj, Arera Colony, Bhopal-016
Ph. 0755-2463731, 4277074 Fax: 0755-2465651
E-mail: nchsebpl@gmail.com, **Web site :** www.nchse.org, **mpgis.co.nr.**

National Centre for Human Settlements and Environment

GIS APPLICATIONS CENTRE

The resources:

Hardware Resources:

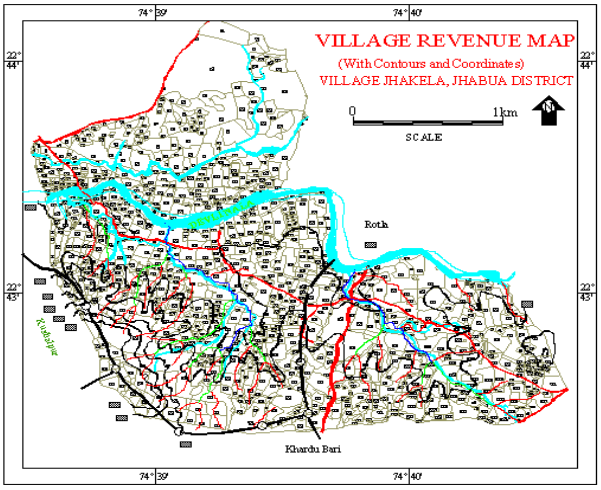
- Computers : A series of high performance Pentiums with special configurations for large data and images handling capacity.
- Digitiser : The cell has capacity to Digitise maps of size as large as A0.
- Optical Scanner : To enable on screen vectorisation the cell has in-house scanning facility. The cell also has graphic treatment facility on computer for quality improvement of map images.
- Plotter : High quality multi-colour large size plotter is available for printing of maps. Plotting of large maps can be produced with extreme precision and superior quality. Even the original maps can be printed with enlargement or reduction to any desired dimensions.

Software Resources:

- GIS : Standard GIS software packages are put to use for generation of maps. All kinds of maps with any complex level of information and details can be produced with high quality. The capabilities are very strong at processing and integration of maps, spatial analyses and map merging, meeting high cartographic standards etc.
- Remote Sensing Interpretation Software: Advanced facility of Digital Remote Sensed Data Interpretation and Analysis is available, which accommodates national and international Remote Sensed data.

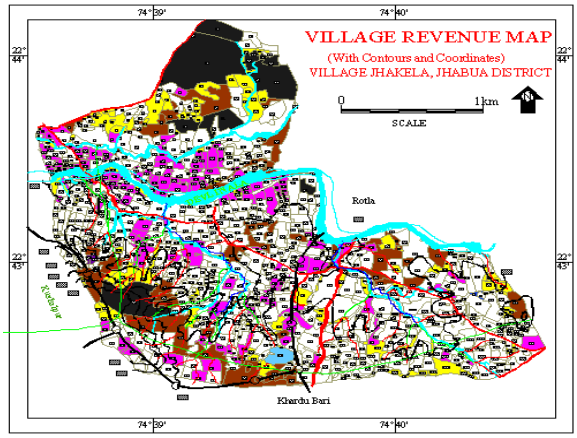
The GIS works capability:

Digitisation: Facility exists for in-house vectorisation of maps. Both the equipment and the manpower are attuned to the task of digitisation of maps with utmost precision and quality. The maps of any size and variety can be vectorised.



Software development: User oriented application software development on GIS and CAD platform is performed for specified disciplines for mechanising the large processes. Watershed and Natural Resource Planning related solutions are available.

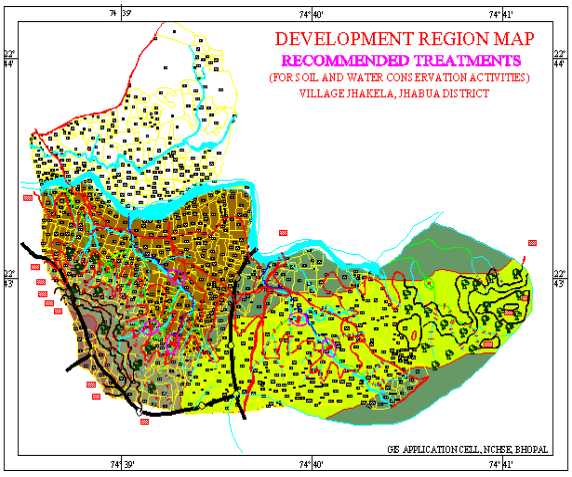
Remote sensing interpretation: Visual and digital interpretation of remote sensing products is also carried out by the Cell. Thematic maps are prepared, based upon the imageries, and are converted into the digital form for analyses and other GIS related works.



Map preparation: The task of thematic map generation is performed by the Cell. By linking the area information and details to the location map, presentable maps containing these features are prepared. Quality maps are generated for various natural resources and socio-economic details.

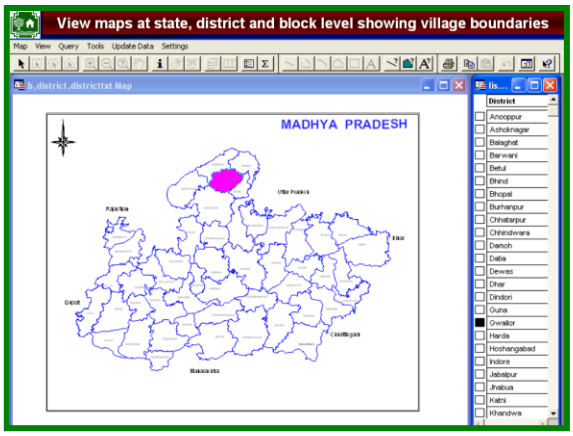
Training: Routine and special courses on GIS fundamentals, operations and concepts of Applications are regularly organised for sponsored candidates and individuals.

Watershed development planning: GIS is being applied to Watershed Development Planning in an unique manner. The work includes map preparation on multiple themes to do with Natural Resources Socio- economic details, etc. These themes are superimposed and merged for further analysis. The task of identifying treatment of area and locating the suitable sites is undertaken along with peoples' participation.



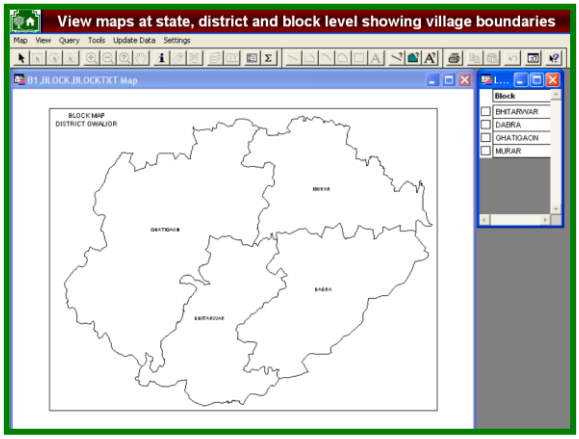
Details of Projects completed:

Health Information Management System for MP



Madhya Pradesh is a populous State with a large number of villages. Access to health facilities is very poor and the government's infrastructure is also limited and does not match the requirement any way. The health services also are not effective because of large geographic dimensions, poor connectivity and improportionate deployment of manpower and resources.

The Department of Family Welfare and Public Health, Government of M. P, manages these services through a large infrastructure spread over across the State. It runs several family welfare programmes involving heavy funds and resources. But, it is unable to exercise effective control over the activities as it lacks the exact information about its own infrastructure and activities. Unfortunately, neither such information was readily available nor there was any defined mechanism to maintain such vast information about the entire machinery.

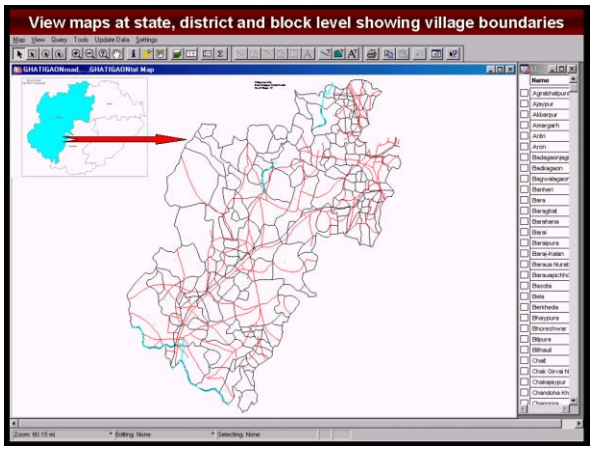


DANIDA, the Danish International Development Agency has been supporting Department of Health on resource development, training, family welfare (especially women and child) activities etc. It completed its tenure of stay in Madhya Pradesh in December 2004.

DANIDA and Health Department's higher authorities felt the strong need of compilation of up-to-date information from the field and realized this as the basic necessity to manage the huge infrastructure and the services associated. It was decided to develop a multifaceted database for the entire State covering information on health infrastructure, services, family programmes and the indicators of its impact. The information items to include were chosen as detailed information of all types of health service providers (individuals like qualified, nonqualified and traditional practitioners and government and private institutions) information on women such as pregnancy registration, ANCs, delivery, etc., information on children like births, birth rates, immunization etc.

The challenge was to cover the entire state, all its villages and towns and it called for a very large primary survey for getting the information from the very source in the field. NCHSE was invited to do the job which included carrying out the entire survey, computerization of the

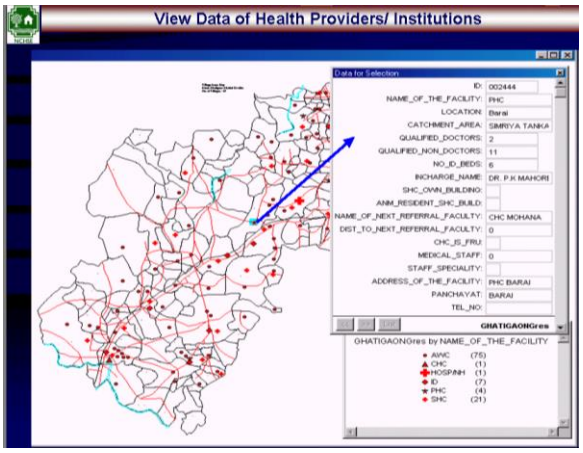
information, linking it to village maps and finally formulate a Geographic Information System on Health.



Since the DANIDA had a schedule of closing its operations in December 2004 and whereas the work was assigned only in the month of April 2004, there was extreme time pressure to accomplish the whole task without any time delays. The mandate was to cover 48 districts - nearly 54000 villages and 329 towns big or small, accessible or inaccessible.

NCHSE started the work with activities pertaining to data collection from the field which involved pin pointed planning about the field coverage, deployment of field staff along with their orientation training, conducting survey, supervision of field work, compilation of data and scrutiny and quality checks. In subsequent phase, the data entry and validation activities were managed, and a narrative database of all the information was created which was linked to maps of villages, yielding a GIS. To make it easy to use the information for the Health Department's field functionaries, a special software was created for accessing and working with database. The package works on MapInfo.

All the components of the project the survey, the data entry and the mapping, were simultaneously carried out by separate teams in full consonance amongst themselves to produce the desired outputs in time. The final product was delivered to the department along with installations of the package done at every Block Medical Office.



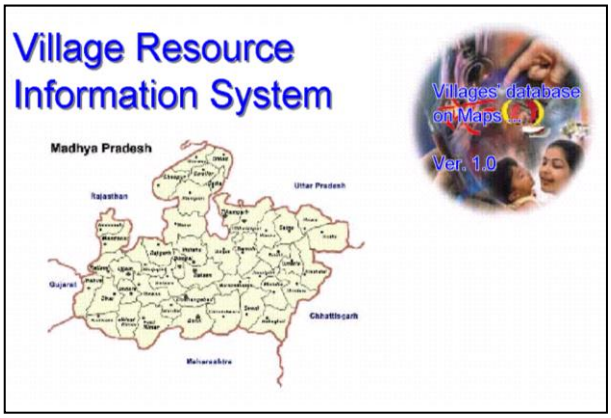
Special training was also imparted to each and every concerned staff of the department such as B.M.O., District Resource Person, CMO, etc. with a view to give them essential knowledge about features and capabilities of the package.

The Department of Health might be the only Government Department in M.P. which now possesses all relevant information, in the form of package commissioned at all the field offices and with the fully trained manpower to use it.

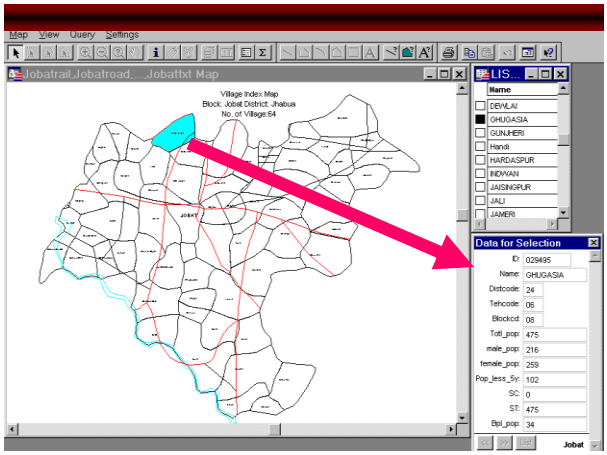
DANIDA has awarded to NCHSE a special certificate of accomplishment of having completed this nearly impossible task satisfactorily, punctually and with high quality.

The village level Mapped database the MP GIS

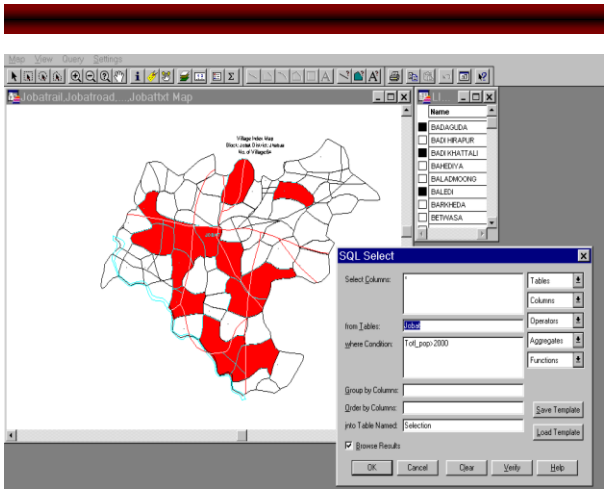
The village level information is always desired for any detailed planning, monitoring or reporting. Many databases are available but all are restricted to narrative lists, tables etc. The databases are also not easily perceptible to all – and often become the experts' property. For commoners, for those needing the information in ready served format so that the same is put to effective use, quickly, the maps are the simplest medium.



The MP GIS is the MAPPED DATABASE on MADHYA PRADESH which comes in handy, easy to use package which is affordable also. MP GIS has the following features:



- All the districts of the state are mapped showing the development blocks
- All the blocks are further mapped showing the village boundaries
- The demographic data is also attached with the village-units



- The database can be queried and results be seen on the map itself highlighting the villages qualifying the condition of the query.
- Graphs are also simultaneously created for any field item from database

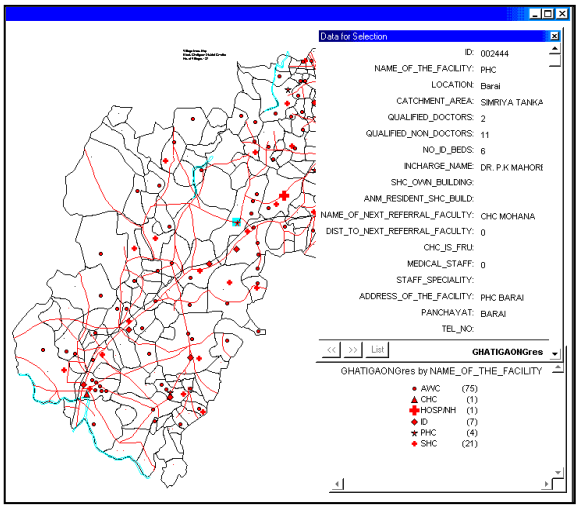
EASE OF OPERATIONS

- The maps are opened simply from selection of the menu/submenu items
- Alpha-indexed lists of the blocks and of villages appear for picking the name if one cannot recall its location on the map
- Short cut menus appear with right click on the map screen

WHERE IT CAN BE USED

The package is most useful for the following

- Simply viewing the whole maps with village names
- General retrieval of information on district, block and village level
- Modification of database and adding other information which makes it possible to orient the package for the needs of any specific department
- The database can be used for identification of villages matching any criteria and thus villages can be selected for any project/programme quickly and easily
- Planning for projects/programmes can also be performed using the same GIS based on socio-economic and other parameters
- GIS also offers another useful feature of adding multiple layers of information – thus other information can be mapped (in symbols/lines/text) for making the GIS more meaningful for the villages. For example village resources, forests, agriculture, water resources related information can be superimposed.



WATMAN

The Complete package for Watershed Micro-Planning

"The Watershed Development needs accurate planning. It needs planning for variety of themes and features of the concerned area. The planning is for development and it is most concerned with the facts and features, at the current time and their interrelationship and futuristic equation between the actions and impacts of these many items." - Anonymous

The need:

The PIAs (Project Implementing Agencies) take the task of implementing the Watershed programmes. The PIAs after collection of data have to draw conclusions about the present features of the area, the requirements and needs of the area and the people thereof, about the activities as solutions for the problems, etc.
It requires a definite technique to use the data, to draw conclusions and then take decisions about actions as remedy. No pre-defined, pre-tested and easy to follow procedures exist (or are not accessible to all), which could act as guidelines for the PIAs to methodically exercise micro-planning for Watershed Development.

- **WHY THE PROCEDURE?**

Not every one of us would know:

- The process of arriving at a fool proof action plan for Watershed development.
- As to what information at what step helps the process of planning?
- From which source, for what period/frequency, data is to be resourced?
- Which maps can be combined/used for mutual updating?
- How maps at different scales are combined/superimposed?
- How information is transferred upto khasra level?
- When to interact with villagers and how to use their inputs alongwith technical information?

The Procedure:

The guidance procedure is prepared in written document form. The users can take its advantage by adhering to the instructions in the sequence, which are already most logically arranged. The users, have to simply follow the activities mentioned, rather mechanically and they are driven through till arriving at suitable action plan. The process calls for a lot of mapped data illustrations and the cartographic work needs a assisting tool that is computer with CAD facilities. Hence it is customary to use software here. A combination of the documentation and the software is thus worked out for enabling an effective watershed planning. The software developed is meant for assistance in the planning process at several levels, and it basically acts as a tool for accessing the CAD functions related to the cartographic works. The software helps the total process of data recording into the computer, the illustration on maps, integration of maps, analyses, and eventually arriving at the to be proposed action plan for treatment activities for the watershed development. The unique feature is that the planning process sees a balanced use of scientific approach and villagers involvement to ensure that all the planned activities are technically viable and socially acceptable. A proper use will not only help and guide the user through the process, but it may lead to help achieve even that, which is beyond the scope of the here described planning technique.

Important features

- Complete stepwise procedure.
- Detailed documentation supported.
- Built in automation at several steps.
- First of its kind bringing technical information to khasra (village) map.
- Necessitates field and villagers' inputs.

Other Built-in Modules

· A full fledged glossary module on Watershed related terms.
· Papers/documents from Watershed experts.
· Multimedia based educational modules.
· Support material for conducting PRA in villages.

Details of Features of the Procedure:

1. Complete stepwise Procedure to Plan Watershed Development.
2. Designed under guidance of experts of Watershed, and experienced PIA (Project Implementing Agency) representatives.
3. Information from maps of various scales all brought to common scales.
4. Information finally transferred and made available at Khasra (micro) level.
5. Does include scientific information from Remote Sensing, thematic maps, secondary sources, etc.
6. Automatic scale alteration and map merging at various stages.
7. A full fledged CAD package works in background; may be accessed any time for any CAD utility.
8. Appendices included to detail any sub-procedure or to discuss methodology of important technical steps and field level works.
9. Includes a sophisticated Glossary package for ready references.
10. Includes standard Multimedia based, self explanatory, small, subject based educational documentaries for field staff and villagers.
11. Includes standard PRA support material to enable easy field working.
12. Requires simple PC and occasional peripheral support as hardware, that too for short duration.

LAYOUT OF THE PROCEDURE DOCUMENTATION

MODULE I: Basic Maps Preparation The first module deals with basic map preparation. These maps are all at small scales of 1:250,000 or 1:50,000 and are made from Survey of India toposheets and from remote sensing products. This module achieves the 'map base' preparation showing themes at village level and are prepared for miliwatershed unit.
MODULE II: Updating Maps, Scale Alteration & Analysis This module deals with mutual updation of the maps prepared in previous module and also performs few integration and analyses, exercises. This module also alters the scales of all maps to 1:12,500.
MODULE III: Microwatershed Level Works The module, uses the maps produced in previous module and allows them to be transferred to Khasra maps. Micro watershed level works. It helps arriving at several decisions regarding identification of treatment measures and suitable sites for these. The participation of the villagers is also ensured here. Action plan is prepared and finalised here, as per the actual ground level requirements and the consent of the villagers.

HOW TO USE THE PROCEDURE:
The procedure is provided under a package of written documentation and software. The document describes all steps for the entire process from beginning to end. All steps are arranged in logical order and therefore, these have to be followed in the same sequence. The document mentions steps to be performed manually and on computers and thus, it states clearly where and how the computer software has to be used. The users would keep on switching between the manual process and computerised processes alternately.

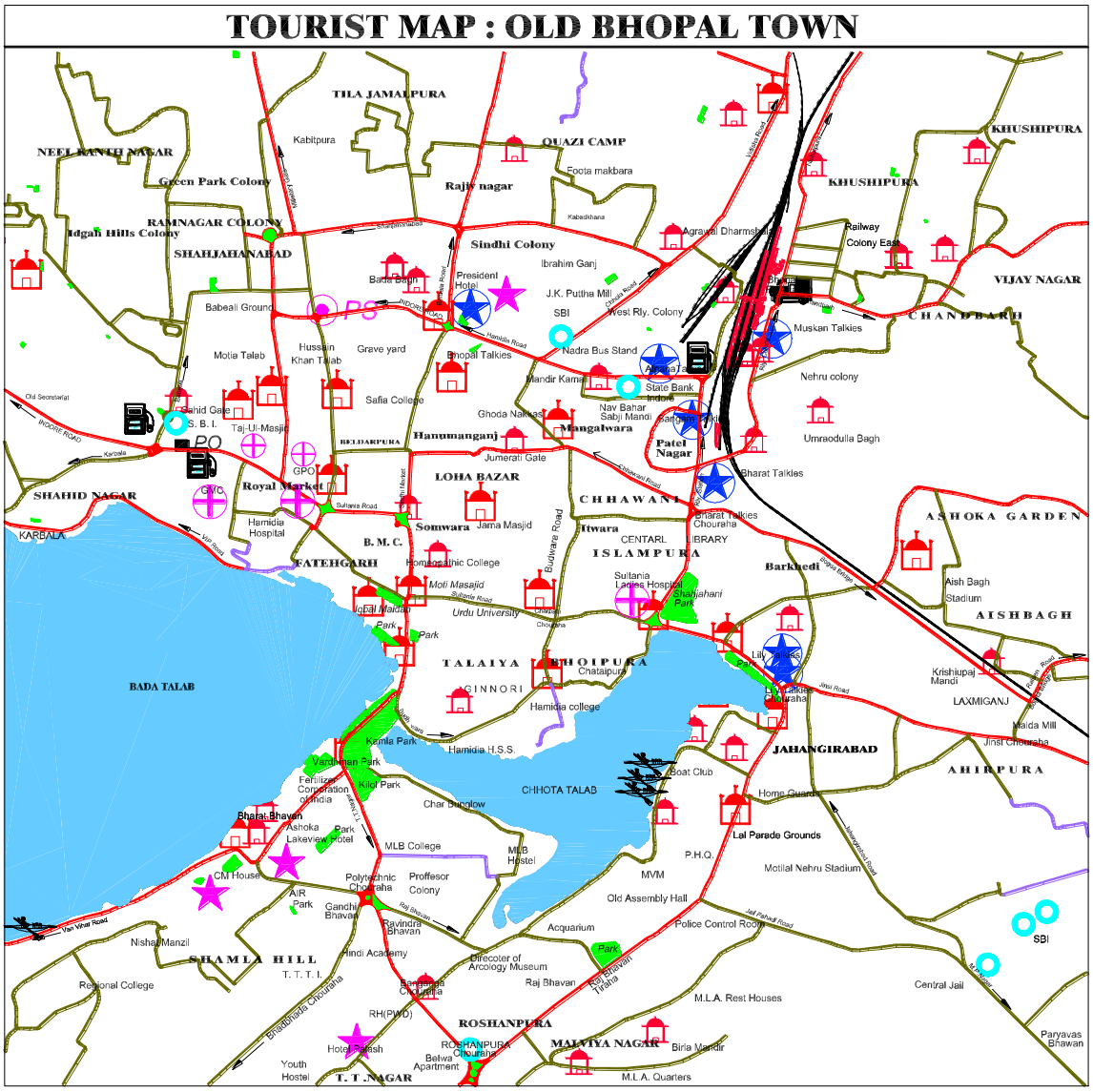
WHO CAN USE THIS PROCEDURE:
Users of the procedure are the Watershed implementing agencies. As such, there is no minimum specified qualification, or skill required to use this procedure, but it is expected that the user should be a team of individuals from various subject matters. The team should comprise of:
· Person(s) should be thoroughly familiar with watershed programme and all its components. · Person(s) should have knowledge of computers and cartography. Regarding computers, the knowledge of Auto CAD software is essential. There is definite need of manual mapping also. · Person(s) familiar with remote sensing data interpretation are required at certain points. · Field investigators to carryout field surveys and to collect data. · At certain times, access to experts (visiting) will be desired, from disciplines such as hydrology, agriculture, forestry, civil engineering etc

The DIGITISED Bhopal city map

The entire city map of Bhopal has been digitized. It shows all the features of the town such as – gardens, lakes, important landmarks, buildings, markets, school, colleges, temples, masjids, etc. All roads, sewers, water supply lines etc. have also been depicted. Wards have been demarcated. On the whole this is good tourist and administrative map of the town.

The computerised map can be used any planning and reporting purpose.

The map may also be made available in print form.



Preparation of GIS for Health services in Ujjain city

The assignment of "Preparation of Geographical Information System based Health Management Information System for Ujjain city of India" was awarded to National Centre for Human Settlements and Environment - NCHSE, by the Karolinska Institutet, Stockholm, Sweden for execution in partnership with R.D. Gardi Medical College, Ujjain.

The Ujjain GIS HMIS assignment had about four major subtasks listed as follows:-

1. Field survey for collection of data from the Ujjain city and its peri-urban areas on health infrastructure and services
2. Data entry to computerize whole of such information that would be compiled during the survey.
3. Digital mapping of the Ujjain city area and attachment of the database to formulate a full fledged GIS.
4. Packaging the above said GIS into custom friendly application software for the access, use and management of data base.

1. The Field Survey activity and Data entry

The assignment included collection of detailed information on Health Infrastructure and Services in Ujjain city through a primary survey. The survey was performed of providers covered as:

- ✓ For Individual Health Providers
- ✓ For Facilities (Nursing Homes, Diagnostic centres, etc.)
- ✓ For Anganawadis, Dai, ASHA programme workers.
- ✓ For Pharmacy (Chemist) shops.

The data collected was as follows:

- To include all basic identity related data of a provider.
- To include all manpower related data including number and type of persons according to qualifications & their nature of service
- Details of all facilities available, etc.

The Data Entry of the entire survey data was also performed through special softwares to ensure data quality and entry speed.

2. The GIS woks:

The details are as follows:
Step 1: Map procurement:
Step 2: Digitisation and superimposition to formulate base map:
Step 3: Geo-referencing of Maps:
Step 4. Updation of the base map:
Eventually, a perfect up-to-date map of the Ujjain city was produced by the Project.

3: Map linking with database was then performed.

The data from the database, was now attached using this common link of IDs.

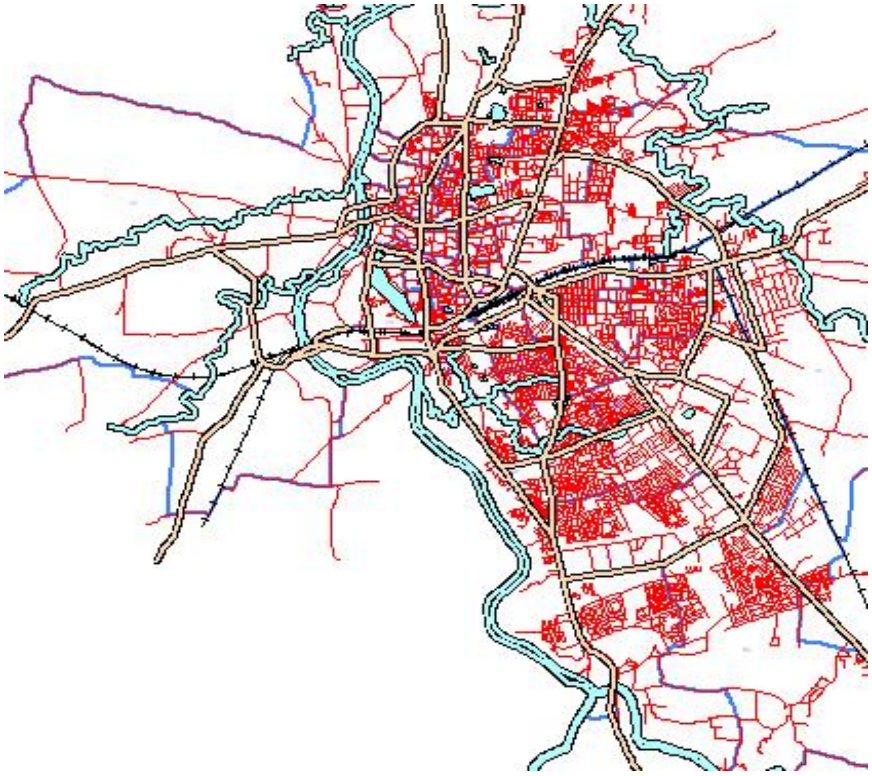
This work was followed by Packaging the GIS in a customised application software. The details of these activities are given in the following paragraphs.

4. The GIS application software:

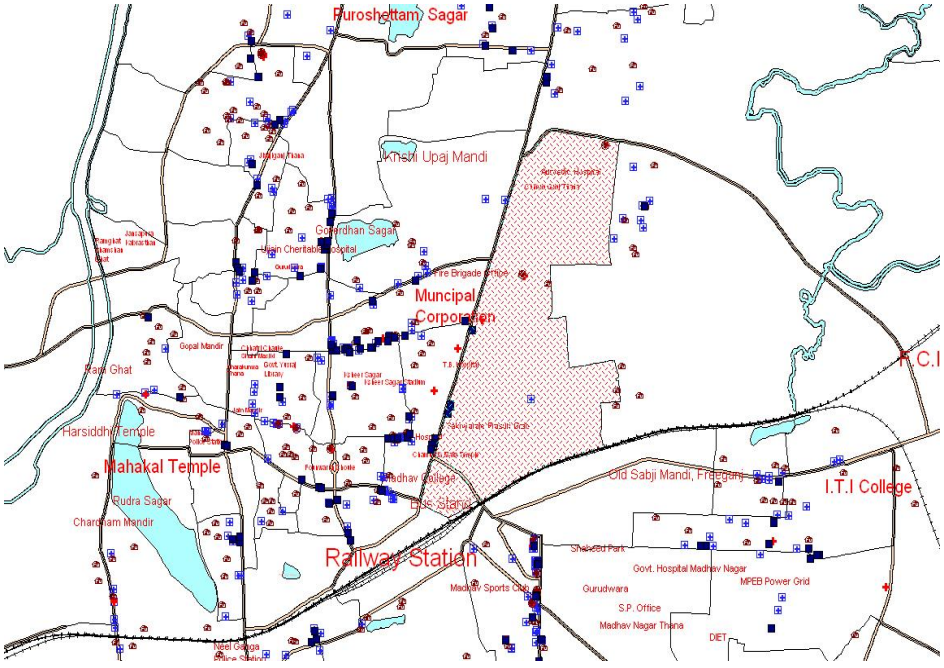
The entire Data base and Maps, were packaged into GIS application software developed in MapInfo.

Samples of Data and Maps:

The satellite data CartoSAT1 from NRSA at 2.5m.



Extracted Major features, minor roads, river/streams.

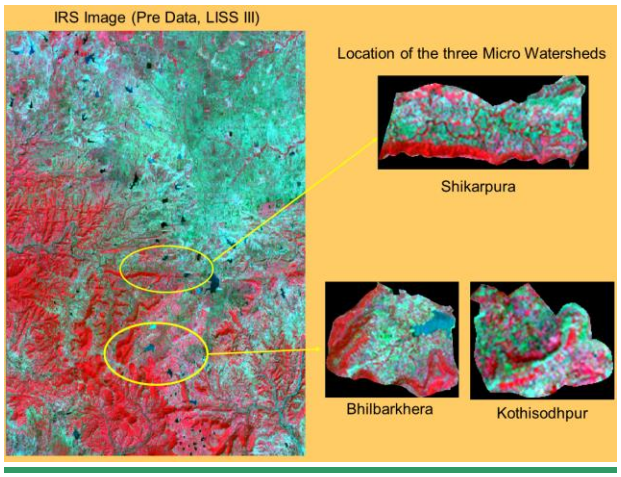


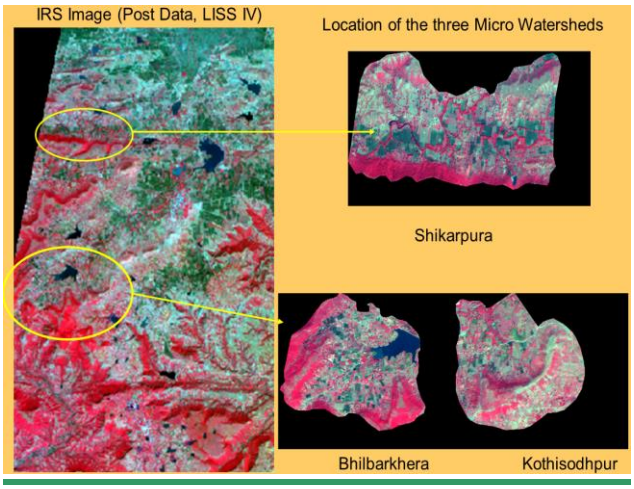
Final GIS showing locations of providers.

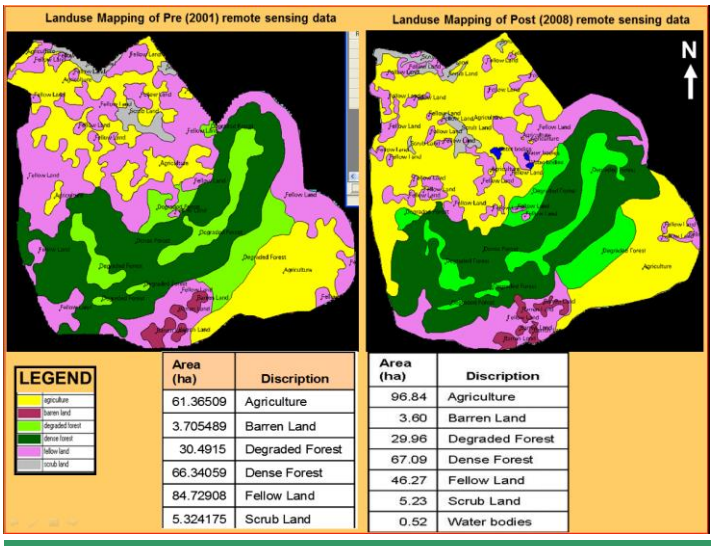
GIS and Remote Sensing based watershed programme impact assessment

The assignment of "The GIS and RS based impact assessment study of two districts in MP" was awarded to NCHSE by Watershed Mission through Water and Land Management Institute (WALMI), Bhopal for the areas of Nalccha Block of Dhar District and Lakhnadon Block of Seoni District Miliwatersheds.

Objectives of the project was, to assess the impact of watershed activities in the study area. Use Remote sensing data for the pre and post developed condition.Compare the pre and post developed condition and analysis the impact.







Area (ha)	Discription
61.36509	Agriculture
3.705489	Barren Land
30.4915	Degraded Forest
66.34059	Dense Forest
84.72908	Fellow Land
5.324175	Scrub Land

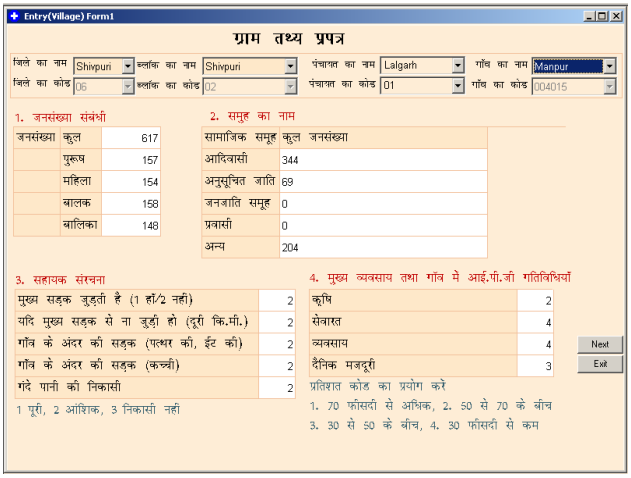
Area (ha)	Discription
96.84	Agriculture
3.60	Barren Land
29.96	Degraded Forest
67.09	Dense Forest
46.27	Fellow Land
5.23	Scrub Land
0.52	Water bodies

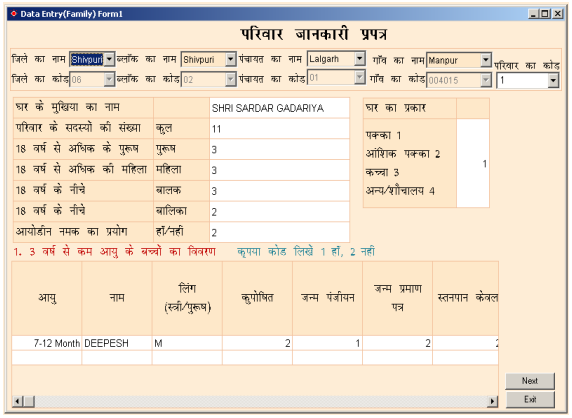
MIS for Village Planning (developed for UNICEF)

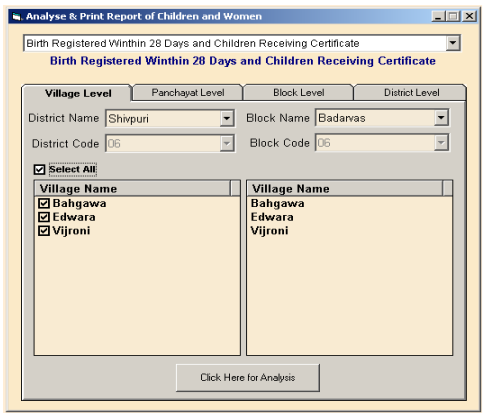
A package for the household level information on Health Indicators of family welfare activities shall be created for **Shivpuri and Guna districts**. The information on general village level statistics would also be included. This information is being collected through primary survey in villages, which will be entered in the computer to formulate the package.

The database will be encapsuled in software, which is a user-friendly interactive set of programmes, specially designed for retrieval and use of the information. Broadly, the system shall offer the following features.

- Village level data on General Information, Demographic Profile, Ethnographic details, Support infrastructure, Key Occupation & IGP activities in village, Market/Haat details, Public Offices/ Services in village, Basic Services & Service infrastructure, Available human resource in village will be available. Similarly another set of data Household wise, based on Information/ Data Sheet of family, Details of children below 3 years of age, 3-6 Years, 6-14 years, 14-19 years, Household information Sheet, Family death information will be available.



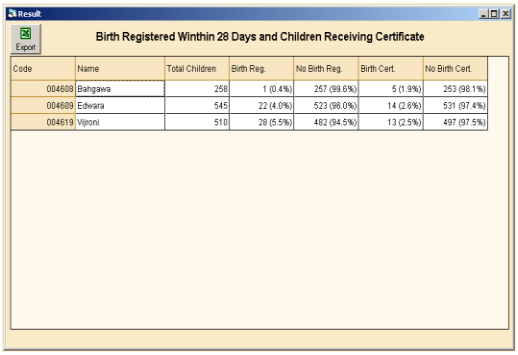


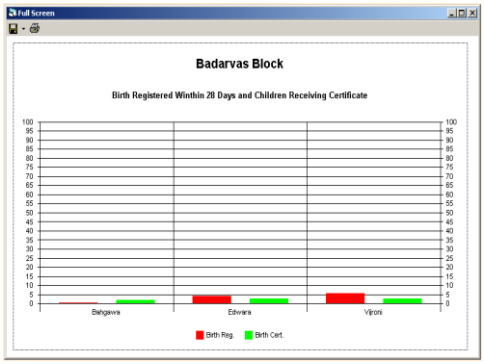


- Block level and district level summary would be generated. The package will have simple selection facility to choose village, blocks and district as unit.

- There shall also be facility to analyse data on different parameters. There is a set list of query analysis items to choose form. Simple to clubbed queries can be performed.

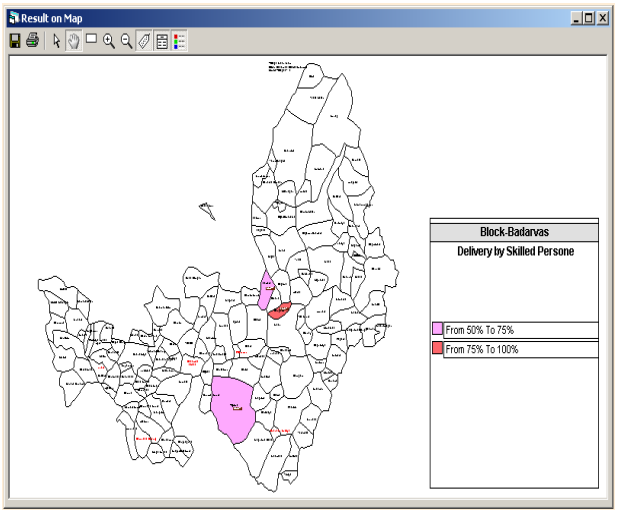
- There is also a report format built to view the data. There would also be a facility available to see the results in form of graphs such as line, bar or pie depending upon best suiting presentation.





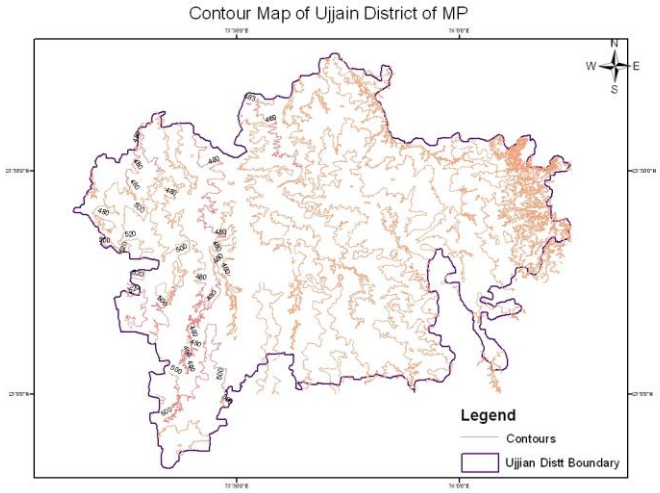
- Finally there shall also be a feature to view data on maps at village level. Even the query analysis outputs can be seen on this.

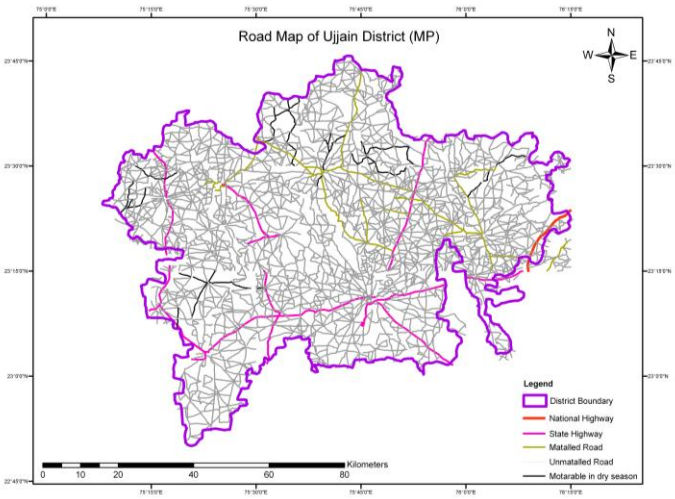
- The software is so prepared as to export data to other formats such as excel, Access or other database packages as well as SPSS. Thus, onward analysis can also be done in other statistical packages.



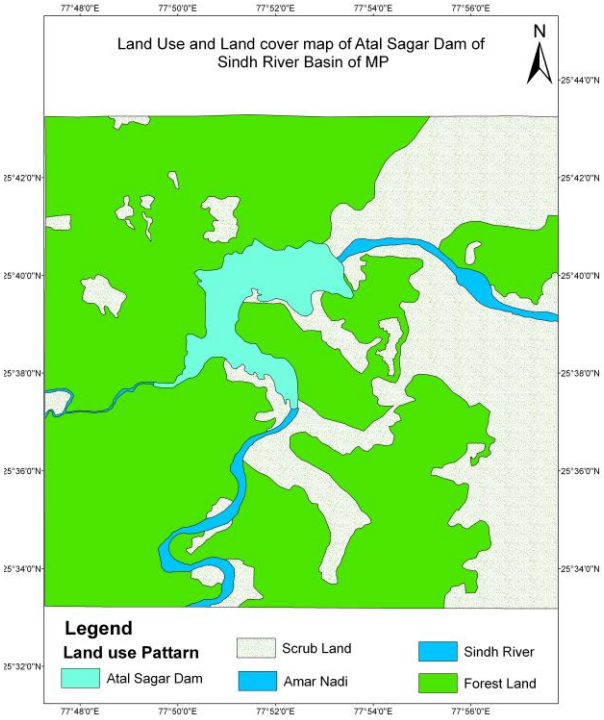
- The package offers another useful feature of updating the data format and minor other software items from time to time and thus the whole system is quite flexible. This feature can be best utilized to include other sectors' data in to the package that the some village level data can be expanded for additional fields.

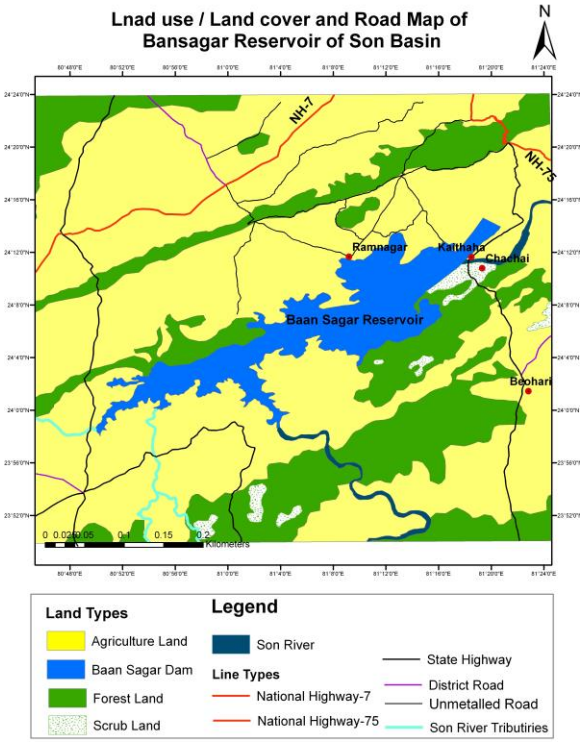
Preparation of GIS Map for integrated group water supply scheme for village and town of Dewas, Shajapur and Ujjain Districts of MP
for **Aarvee Associates Architects Engineer & Consultants Pvt. Ltd, Hyderabad**



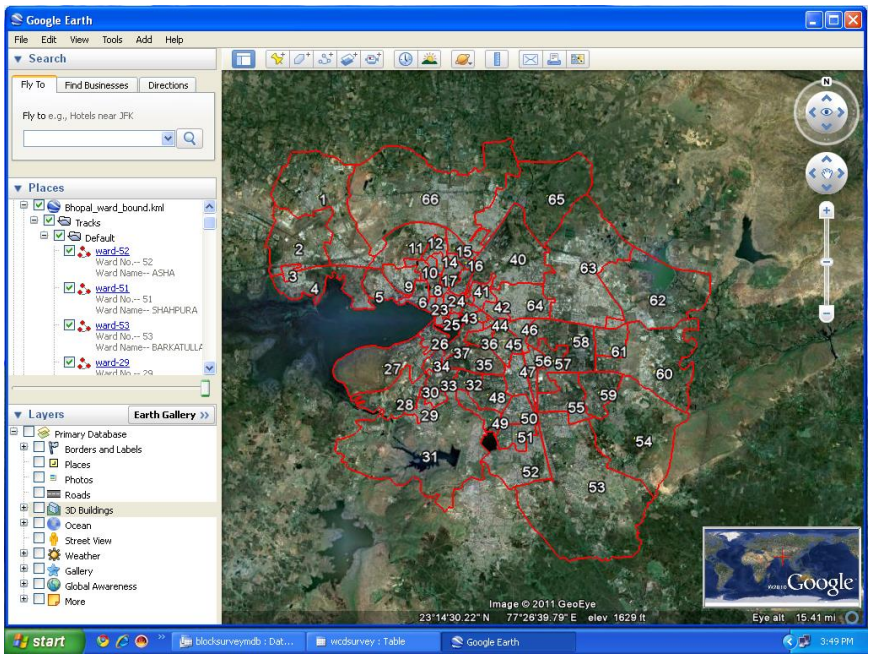


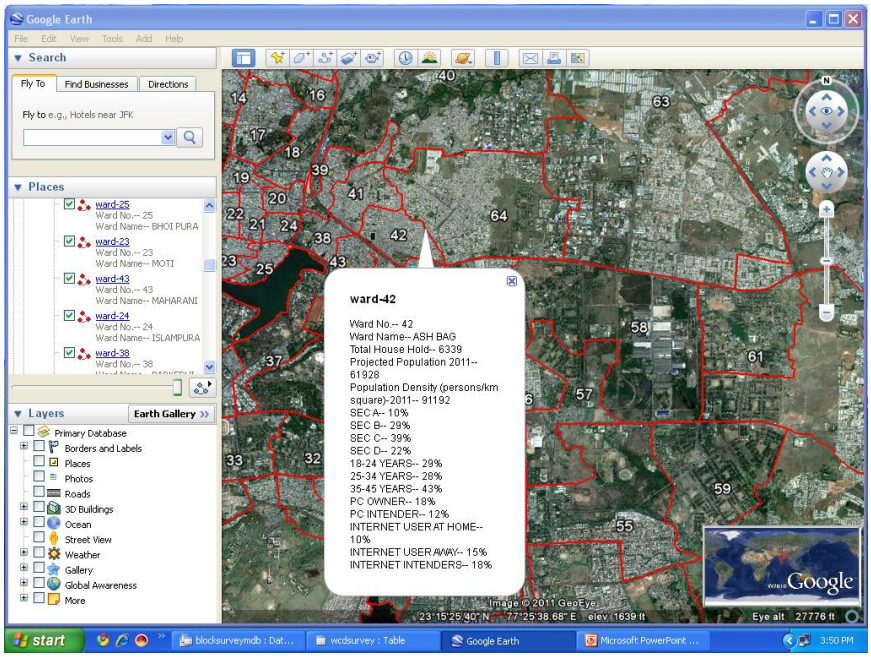
GIS map preparation of reservoirs in Madhya Pradesh related to assessment of tourism potential for **JPS Associates Consultants (P) Ltd., New Delhi**





Prepration of Bhopal ward Map on Google earth map for
TNS Technology and B2B, DLF Corporate Park, DLF Phase III, Gurgaon, India





MIS cum GIS software Development for baseline data and digitization of village social map

Sponsored by Sarathi Development Foundation,Lucknow, Hitaishi Samaj Sewa Sanstha Jhansi, Society for Pragati Bharat, Lalitpur, (U.P.) under the Balbandhu project originally funded by UNICEF

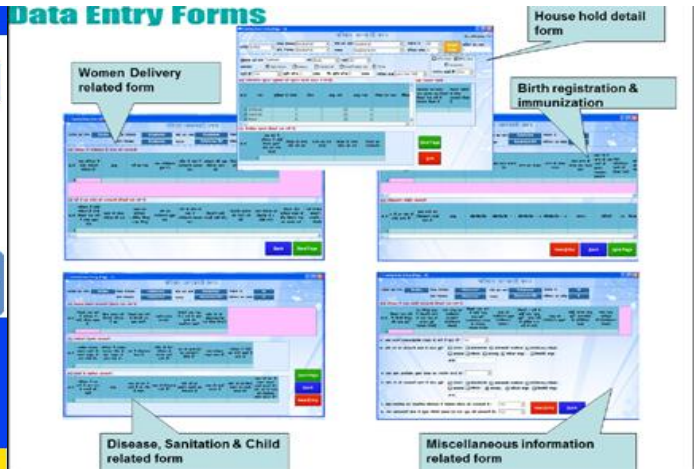
UNICEF supported integrated intervention popular as Bal Bandhu Lalitpur is being implemented in Lalitpur district, UP in as many as 682 villages of six blocks of the district. This project is an attempt to build upon the ongoing processes in sectors of education, health, nutrition, child rights, drinking water & sanitation and HIV/AIDS. It focuses on integrated village planning, expanding capabilities of community to own the responsibilities, intersectoral linkages and convergence with ongoing national and state sponsored programmes. District has demonstrated noteworthy improvements on women and child development related indicators due to ongoing interventions with support of UNICEF. Achievement against baseline on key indicators is testimony to this fact.

A Bi-language GUI based MIS/GIS application developed to trace/monitor the result of children woman and village information with the help of 90 analytical indicators and more than 1500 queries. NCHSE has developed the GIS based analysis system which helps to analyze the more than 70 indicators of children's/woman's and village infrastructure, education and health status in Lalitpur district.

Main features of the project:

To develop a computerized database for each village planning district that can provide the baseline Project objective included the following:

1. Data Generation :
   a) District, Taluka, and village social maps
   b) Data Entry of data, compilation and analysis
   c) Generation of regular reports system to support the MIS system.



2. Software Development

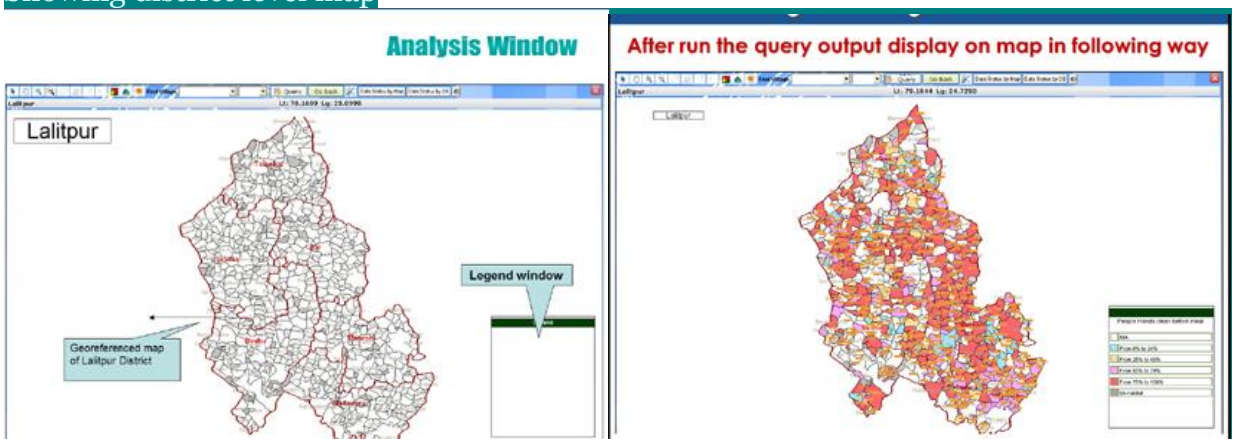
To prepare data processing and analysis software compatible to the information tracking from village planning district has been created. This is a computerized data and GIS mapping software to demonstrate all indicators of village planning included and the baseline works can be tracked by district block and village level.

The analysis component of the software has the features for generating consolidated data tables, graphs/charts and maps showing the coverage and performance level, as follows :

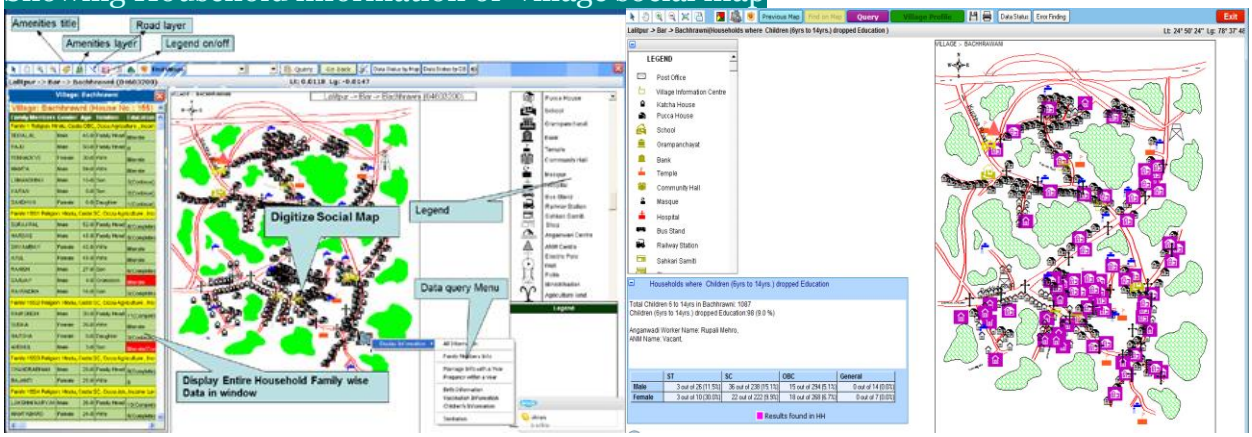
- GIS with facility to view the data of individual household, village and also summation of data at block level, and district level.
- Facility to query the data and monitor outputs against the indicators
- Facilities for viewing, editing and printing functions as available
- Generate the graphs, maps & table based on query

The software provides scope for further upgradation and incorporation of the sectoral indicators and additional data. It is compatible with SPSS and relevant analysis packages. Major indicators are in English and Hindi as well.

Showing district level map

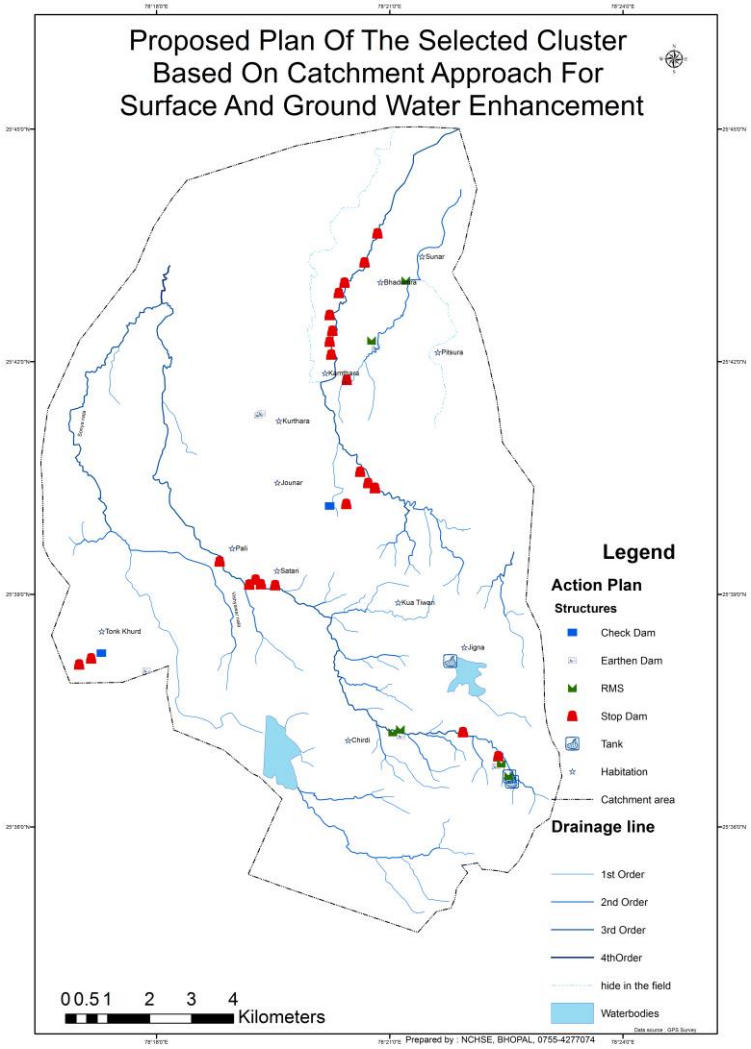


Showing Household information of village social map



Drinking water sustainability based on catchment approach in cluster of villages of Datia district.

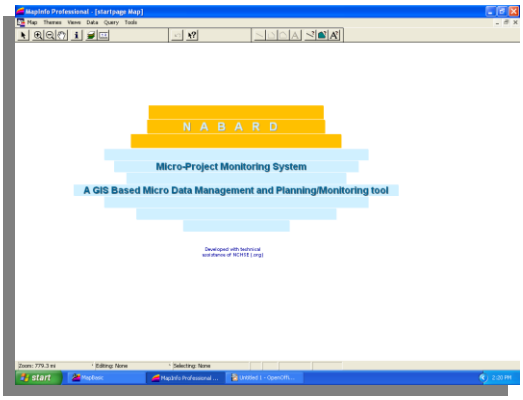
NCHSE provided the technical support and guidance to Parhit organization (Partner NGO of WaterAid) in a cluster of 12 villages from Datiya district based on its long experience of watershed management and also making use of GIS applications. In fact, in the project area benefits coming out of roof water harvesting were limited in nature, therefore, NCHSE extended a technical plan based on catchment approach to address the issue of drinking water sustainability to the organization (Parhit) and WaterAid. It was also felt that this approach would have a long term effect.

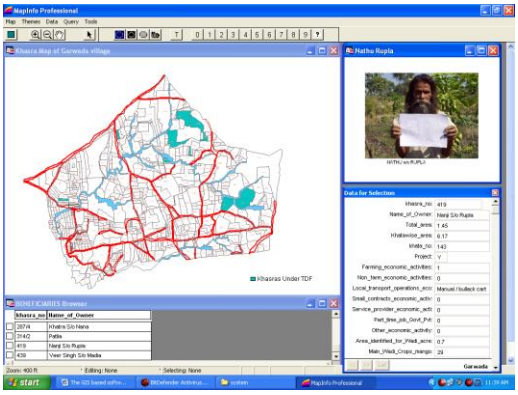


- Area identification of cluster villages on geo-referenced toposheet.
- Superimposing of village boundaries by making use of mazmooli maps.
- Delineation of drainage lines (order wise).
- Delineation of micro watershed (of the catchment area).
- Mapping of the existing drinking water sources with coordinates (by GPS) as provided by the agency.
- Joint field visit to the watershed area (cluster villages) to validate the existing water bodies, drainage lines and possible watershed initiatives (proposed and repairable) for the augmentation of surface and ground water.
- Collection of data related to all existing water sources with the help of GPS.
- Developing data of all possible water sources (proposed and repairable) with the help of GPS.
- Mapping of GPS data to develop the action plan of the selected cluster.
- Indication of water observation sources to monitor the progress of water augmentation.

GIS based monitoring of wadi projects

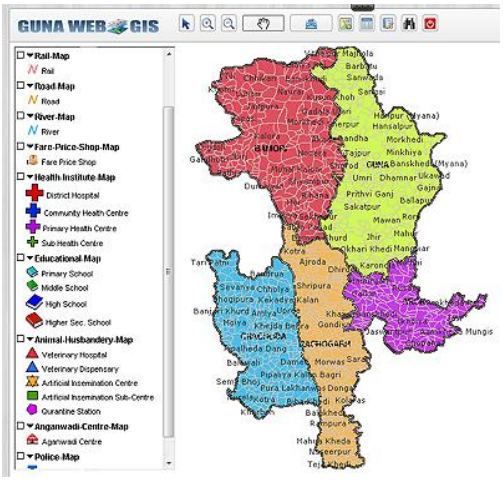
NCHSE has been designated as central GIS processing agency by NABARD for all wadi projects implemented with the support of NABARD Regional Office, Bhopal to 40 NGOs of the State. For carrying out the services of NGOs, NCHSE is providing support in the form of geo referenced digitized village maps, indicating the location of respective wadis, beneficiary profile with wadi details. This is, in fact, a very good and effective software tool to monitor the progress of wadis and its real beneficiaries. It has primarily helped to get correct and proper reporting by NGOs in respect of the wadi projects, if any.

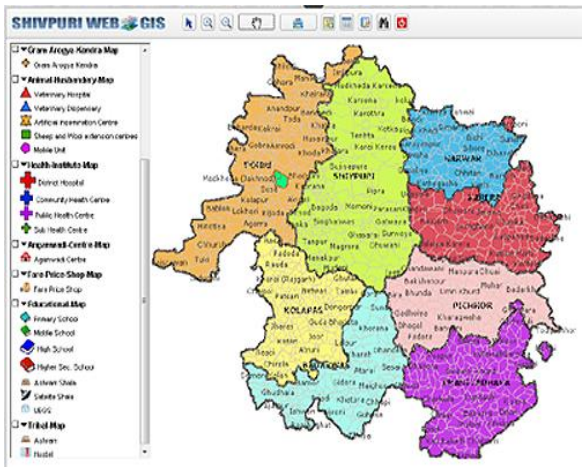




Web-GIS for Guna and Shivpuri districts of M.P.

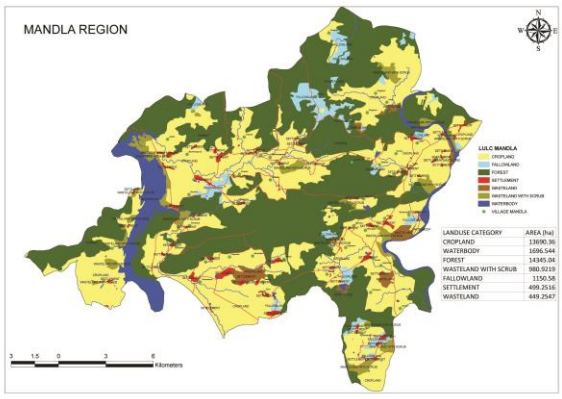
This project is one of the prestigious projects of NCHSE which is completed with the support of UNICEF. The development of Web-GIS for Guna and Shivpuri districts was conceptualized based on the needs and data received from departments. The departments included were of health, education, women and child department, food and civil supplies, Panchayat, Triabl, Police, etc. However, the information as received from the departments was the limiting factor and primary census figures related to 2011. The entire exercise centered around completion of village level information as available in the form of village maps with special features of data view and data queries to make the information further more usable by its end users to get specific results for example the information pertaining to a particular department can now be easily accessed in the visible form instead of tabular form. The special feature of such an exercise also enabled to work out the panchayat boundaries as well which were not attempted earlier in mapping exercise. The websites are www.dpmuguna.org & www.dpmushivpuri.org.

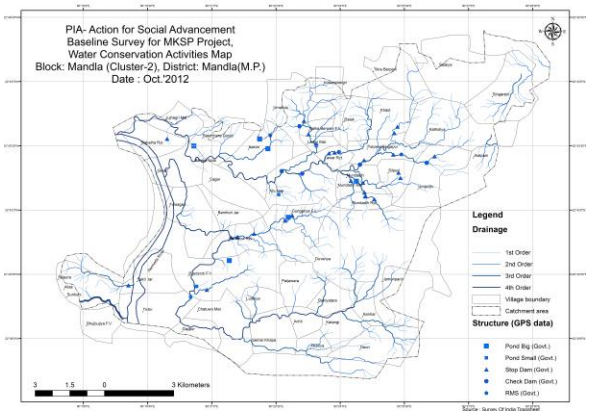




Application of Remote Sensing data to strengthen land use pattern

This assignment is completed by NCHSE for a NGO Action for Social Advancement (ASA) in February, 2013 for its 10 clusters located in six districts – Chhatarpur, Tikamgarh, Jhabua, Alirajpur, Badwani and Mandla where ASA is implementing Mahila Kisan Shashaktikarn Pariyojana (MKSP). All field level information was provided by the NGO in its selected cluster by using GPS. NCHSE made use of field level information in developing water conservation activity maps. The other important part of the assignment was to prepare land use/ land cover maps by making use of Resource Sat-2 data as obtained from NRSC, Hyderabad. The out puts of the land use/ land cover maps provided information of agricultural land, fallow land, wasteland, water bodies, river, roads, etc.



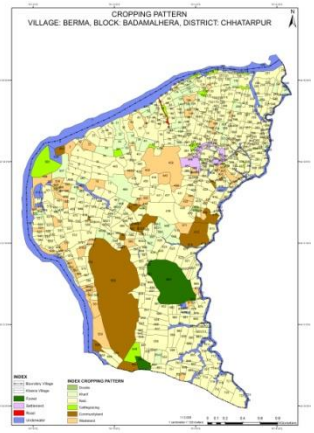


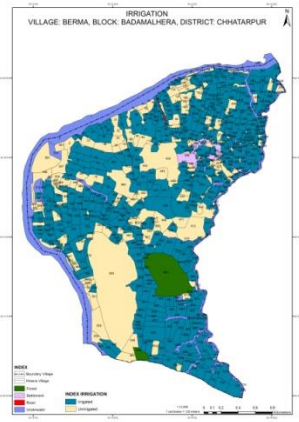
The real impact of this kind of exercise would be useful if such an exercise is carried out regularly after a gap of 2 to 3 years when the project results are evident at the field. Nevertheless, a beginning to measure the transformation of field efforts has been initiated by NGO.

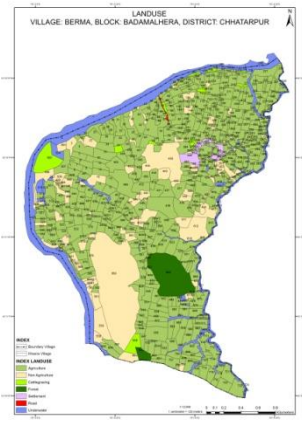
Application of GIS mapping in watershed management

NCHSE has developed an expertise in GIS mapping especially watershed management projects of the Centre as well as for other NGOs and Govt. departments. In fact, there is increasing response and appreciation of GIS mapping that has given a technical support to substantiate field level efforts.

NCHSE extended the GIS mapping support in the year 2012-13 to various NGOs and Govt. departments such as GVT (Ratlam, Chhattarpur and Neemuch), BAIF (Chhattarpur, Gwalior and Tikamgarh), Pradhan (Vidisha), Zilla Panchayat Mandsaur, Zilla Panchayat Alirajpur and Jhabua. This could be possible because NCHSE established the good reputation of its mapping works under its ongoing projects of IWMP-II, Mandsaur, IWMP-II, Rama (Jhabua), IMP (NREGS), Nasrullahganj (Sehore), IMP (NREGS), Bankhedi & Pipariya (Hoshangabad). The field level experiences amalgamated with GIS mapping have attracted college students, personal from corporate sector and govt. officials to come for training programmes and furtherance of technical support through GIS mapping.





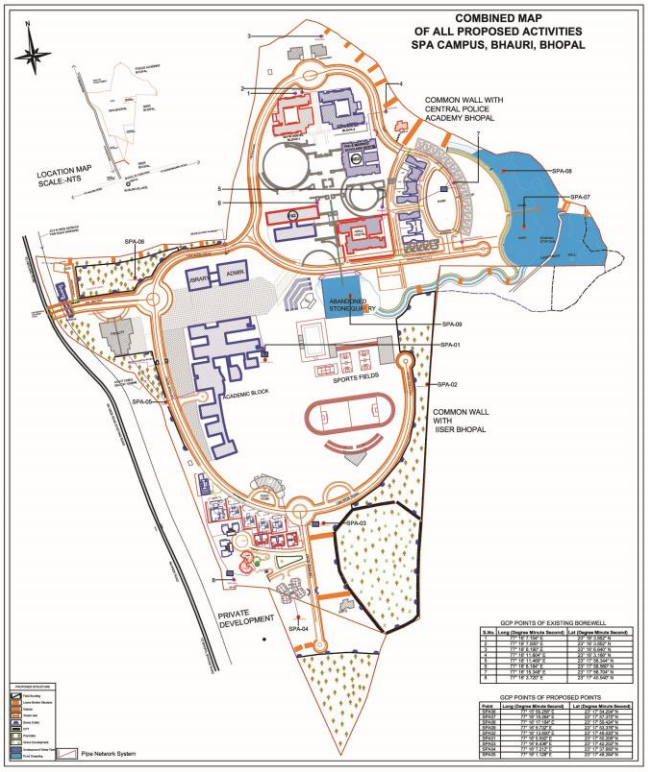


Watershed management initiatives in the campus of School of Planning and Achitecture at Bhauri, Bhopal.

One of the immediate concerns of the SPA area is that water availability at the site is deficient and in the coming time the situation would be more alarming for the rising demand coming from the students and staff of the institute if adequate or alternative measures to cope up the situation are not taken up. The task is difficult with the prevalence of impervious rocks. A solution to this can be searched with the help of possible interventions of watershed management in the available open area in unison with the planned area.

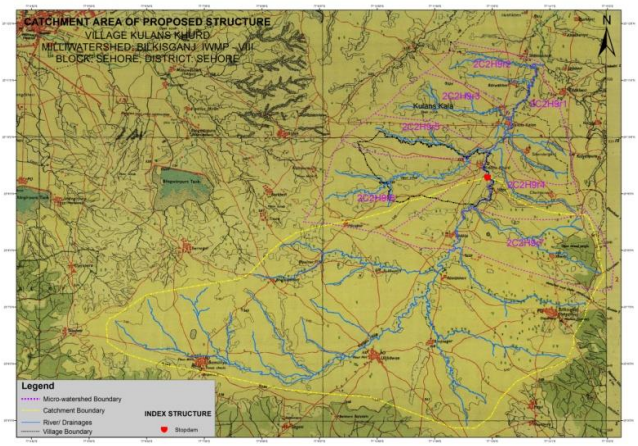
- Action plan and GIS mapping.

  Development of an action plan based on geo-physical survey and field visits.
  Completion of GIS mapping in respect of the following themes:



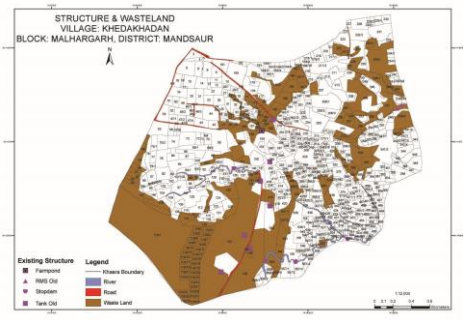
- Slope map of SPA campus to know the direction of flowing water in the area.
- Map indicating existing and proposed bore wells to be taken up for the purpose of underground water recharge.
- Distribution net work for the planning of under ground water recharge of the existing and proposed bore wells through roof top water harvesting.
- Action Plan map indicating watershed activities including bunding, loose boulder structures, gabion structures, farm ponds, vegetation, plantation, etc.
- Complete map of all proposed activities.

Catchment Area Identification



NCHSE GIS Cell extended the support of GIS mapping to finalise the suitability of water bodies – Stop dams, Check dams, Farm Ponds and Nala rejuvenation under its ongoing implementation projects in Bilkisganj, Sehore and Gyaraspur, Vidisha. In fact, this was necessitated to work out the catchment area of each structure based on GPS data collection. This exercise has been carried out in ten out of eleven villages of the project. Similarly, four villages out of twelve project villages in Vidisha district have been covered to find out the catchment area.

Waste Land Identification



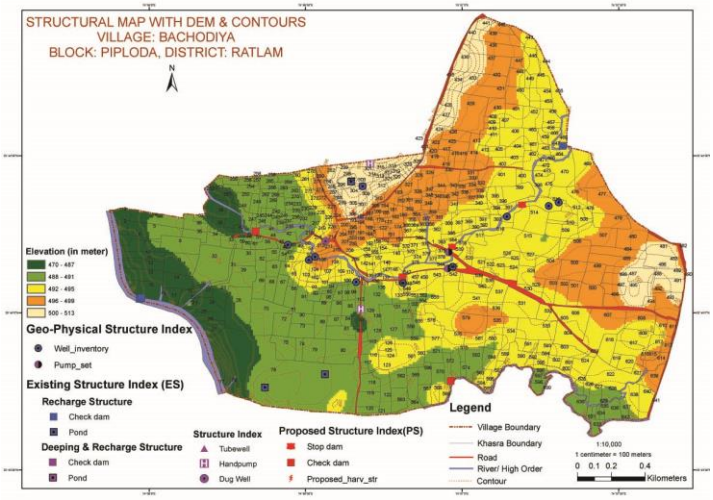
NCHSE completed the task of wasteland identification in 12 villages of Malhargarh block of Mandsaur district for its ITC and Govt. of Madhya Pradesh supported IWMP project with the support of its field level surveyors by making use of GPS and satellite data. The objective of carrying such an exercise was to assist in planning of community plantation in the coming time.

Preparation of Thematic Maps for Watershed DPRs

NCHSE undertook an assignment from Jan Kalyan Sansthan, Dharni, Rajasthan, (partner organization of ITC) to complete the task of Detailed Project Report (DPR) preparation. DPR is to be completed with the support of GIS mapping covering the project area of 21 villages spread over 7628 ha. The following activities have been completed so far :

1. Base maps of 20 villages (base map of one village could not be completed as the information was not provided by the partner NGO).
2. NCHSE field survey team completed household survey and net planning of 20 villages.
3. Based on the field information, GIS based thematic maps of the villages have been completed.

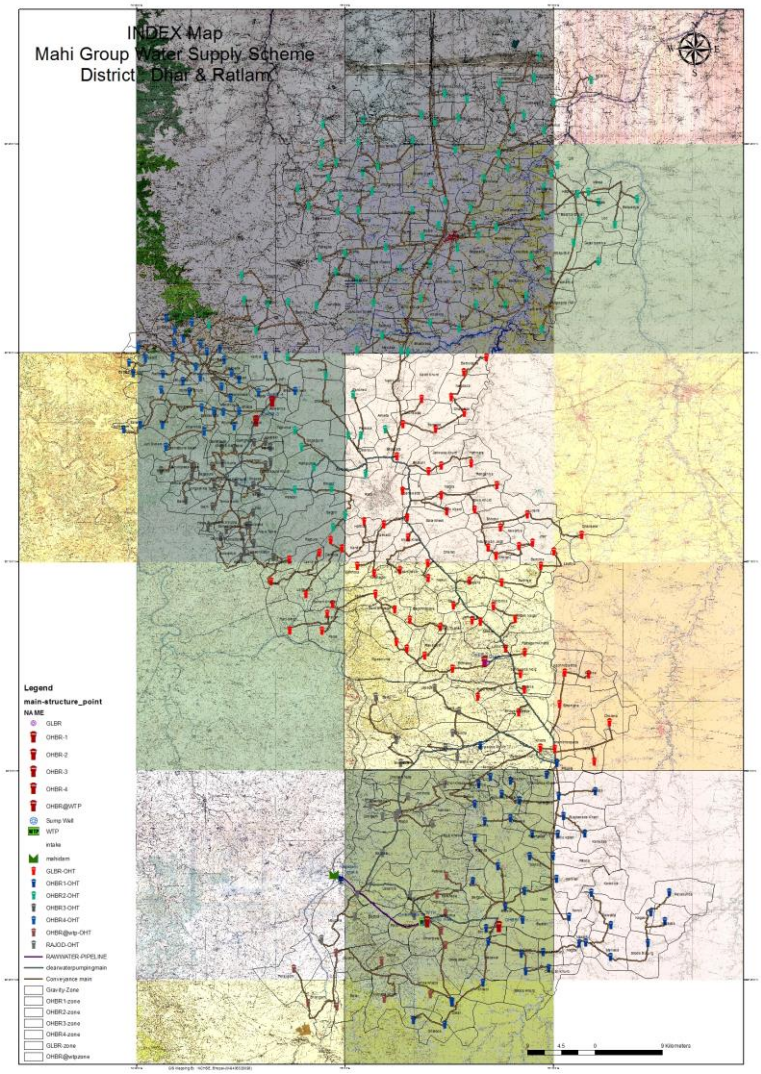
GIS Cell also extended support for an assignment received from GVT, a NGO based in Ratlam in completing GIS mapping for 60 villages under their project. The task involved digitization and geo-referencing, preparation of slope map, slope profile, Digital Elevation Model (DEM), GPS data transformation and geo-tagging with photographs. The preparation of maps for 15 villages has been completed during 2015-16. So far, 28 villages have been completed out of 60 villages assigned by GVT.



Use of Satellite imagery in planning of real time multi village rural drinking water supply

NCHSE provided support to Watsancad Solutions technical agency of Madhya Pradesh in planning of 1073 villages from the districts of Dhar and Ratlam under multi village rural drinking water supply from Mahi dam located at Sardarpur block of Dhar district. The technical support from NCHSE helped to Watsancad Solutions in identifying proper sites of 347 overhead tanks and proposed routes for drinking water supply in all selected villages and in their habitations. NCHSE made use of the toposheets, mazmuli maps and high resolution satellite imageries as available from Google Earth. The technical field staff of the agency is engaged to find out the coordinates with the support of GPS. The information of the field staff is included in the final output which may be for a cluster of villages depending upon the requirement of the agency. These kinds of outputs/ real time data are of extreme utility to the technical agency in working out the cost estimates.

A similar kind of exercise for the same agency has been carried out by NCHSE in two blocks of Panna district namely – Panna and Gunnur to cover 415 villages with 151 overhead tanks through Doodham dam.



NCHSE GIS team provided technical support to Irrigation & Public Health Department (IPHD), Himachal Pradesh for various Group Water Supply schemes in selected blocks of several Districts of Himachal Pradesh started in March, 2018

Topo-sheets and high resolution satellite imageries as available from Google Earth were used for developing maps for planning of real time multi village rural drinking water supply. The field staffs of IPHD provided the coordinates with the help of GPS under guidance of NCHSE team. The information provided by the field staff of IPHD, the final output were generated.

Geo-referencing and AOI creation of SOI topo-sheet

NCHSE has completed the work of Geo-referencing and AOI creation of SOI topo-sheet of entire Madhyra Pradesh for Madhya Pradesh Agency for Promotion Information and Technologies (MAP-IT), a government agency which has been established to propel the growth of Information Technology (IT) in Madhya Pradesh and implement the State IT Policy.

Geo Tagging:

Geo-tagging involves addition of geographical identification metadata to various media such as a geo-tagged photograph or video with geographical coordinates, and can help users to find a wide variety of location-specific information from a device. For instance, someone can find images taken near a given location by entering latitude and longitude coordinates into a suitable image. This technique was applied for all civil works undertaken under Sustainable Project in Gyaraspur Block in Vidisha District.

GIS Training :

NCHSE regularly conducted a forty five day long training programme on GIS Application & Operations. The objective of the programme is to enable the participants to apply GIS techniques in many different ways to project planning, implementation, monitoring and impact assessment.

Besides lectures, hands on training on GIS applications were imparted. Field exposure included use of GPS and Auto level in the field.

Hand on training on GPS application

Gyan Sanchar

The India–Canada Rural Telecommunications Operations Project

"Gyan Sanchar" is a bold and innovative initiative to reach the fruits of the telephony and the IT revolution to the rural hinterland. The prime objective is to provide Information and Communications technology (ICT) - based services to the rural masses at an affordable cost with the ultimate objective of making IT a part and parcel of their daily lives.

GYAN SANCHAR KENDRAS

HOSHANGABAD: Aharkheda, Ari, Bachchwara, Bansikheri, Bhatwara, Budhni, Bikor, Dhansi, Gurla, Kondarwada, Sarrakesri, Sendarwara, Sukkarwara, Tamcharu, Umarkhedi, Babai, Soyat and Raipur.

HARDA: Anjarood Raiyat, Bichpuri Maal, Juna Pani, Junapani Makdai, Kalyakhedi, NeemKheda Mafi, Sawal Kheda, Sirali, Charwa and Chhipabar.

The project helps ruralites communicate with the outside world and improve their knowledge and skill levels. It offers a wide variety of services, ranging from basic telephone to using the net to access relevant information and services.

The project seeks to use ICT as a catalyst for change. By addressing issues relating to health, education, sanitation etc, the project aims to help make the villages a better place to live in. The users also benefit by the vast treasure trove of information that the net would open up for them on subjects relevant to their occupation viz. agriculture, animal husbandry, handicrafts, etc. This, in turn, would translate into better productivity, more efficient management of assets and higher profits.

The Gyan Sanchar centres are located at remote and rather inaccessible villages of the districts of Hoshangabad and Harda, Madhya Pradesh. These centers, alternately named as PTICs (Public Telephony and Internet Centres), are established in 18 villages of Hoshangabad and 10 villages of Harda.

The Institutional backup

The financial wherewithal for the project was provided by CIDA (Canadian International Development Agency) and the physical and IT infrastructure related works were carried out by IBM Business Consulting Services and SaskTel International.

The Indian telecom major - Bharat Sanchar Nigam Limited (BSNL) and Govt. of Madhya Pradesh are the key backers of the project. The BSNL is supporting the project with its vast managerial and technical expertise. It has created a special "Gyan Sanchar cell" in its Bhopal circle office for managing the project. It also supports the project by providing business opportunities, including dealerships, appointing customer service representatives, etc. The company offers tariff discounts to Gyan Sanchar kendras.

The project is being managed by National Centre for Human Settlement and Environment (NCHSE) who are the Local Service Provider (LSP) for the project. The NCHSE is providing technical, sales and marketing services to the project. It prepares the operators by imparting them training in IT skills and mentoring from time to time so that the operators can work confidently on ICT equipment. Besides, the operators are also trained in marketing and in maintenance of accounts etc. NCHSE also maintains liaison with government departments in order to get support for

enabling e-governance services. It manages all kinds of services provided under the project, which involve development of web content, software, databases, etc.

The set-up

The Gyan Sanchar kendras are housed in pucca structures and have a state-of-the-art equipment set-up, making them fully self-contained communication, IT and reprographics units. One or two high configuration, latest computers form the core. The accessories include a printer and a scanner. A photocopier, a fax machine and a Web-Camera are also included. An UPS and a diesel generator has also been provided. The WLL technology is being used for the data and voice transmissions.

The operator, who is a local person, has to double-up as an entrepreneur, as they sell the services to the users at an affordable price.

A one-stop destination

The kendras offer a wide range of services, which can broadly be classified into primary, secondary and tertiary.

***Primary Services*:** are based on the IT and Telecommunications equipment and the Portal of Gyan Sanchar.

Those enabled via portal of Gyan Sanchar (URL: www.gyansanchar.net) are: obtaining Mandi rates, information on Weather, preparing Horoscopes, getting Railway/bus timetables, browsing lists of medical practitioners and health care facilities.

Many an e-governance services have been enabled through the Gyan Sanchar portal such as applying for and/or obtaining the Land Records, Domicile Certificate, income certificate, details of PMRY, Vyavsai Rin (loan) and other government schemes.

The portal also has many useful educational presentations/films on subjects such as agriculture, horticulture, cultivation of medicinal plants, animal husbandry, health and sanitation and consumer awareness.

The PTICs also arrange for entertainment services such as films, computer games etc. which are quite popular amongst children and the youth.

Word Processing, e-mailing and Web surfing are also offered along with Public Telephony for local and STD dialing. Video Conferencing and Tele Health are unique features of the project. Available in 12 villages at present, the video conferencing facility is used by several government departments and district administration for direct interaction with the villagers The villagers, in turn, benefit by the expert opinion available to them via the Video linkage.

***Secondary Services*:** Photo-copying facilities, quite rare in rural areas, are available. And so also, the facility for faxing documents.

***Tertiary Services*:** These include sale counters for vending grocery, stationery, and other household items. The idea is to turn the PTICs into a one-stop shop for securing services and buying things of daily use. Sale of agricultural inputs including fertilizers and electronic items like TVs etc. are also arranged.

The operators also arrange computer training programmes. The project authorities have entered into agreements with reputed institutions, including C-DAC and a couple of universities, to launch diploma courses in Computer applications.

Based on demand, they also organise useful vocational training in embroidery, screen printing, candle and agarbatti making etc. Such services not only generate extra revenues for the PTICs but also afford the villagers an opportunity to learn a new skill from experts within their village.

PTICs also offer the services of soil testing to farmers, in association with Dhanuka- a laboratory at Powarkheda near Hoshangabad.

The project lays special emphasis on gender and social equity (GE SE) issues and as such offline and online content on related topics have been made available.

Collaborations

The State Bank of India (SBI) publicises its credit schemes through the network. The villagers browse through the details of SBI schemes on the Gyan Sanchar portal such as loans, life insurance and pension for farmers.

Tie-ups have been made with commercial organisations like Videocon and Rashtriya Chemicals & Fertilizers ltd. The companies use the Gyan Sanchar network to sell their products. The tie-up is sure to prove a mutually beneficial arrangement for both the PTIC operators and the companies.
Similarly, the PTICs are also vending the "Emami" range of cosmetics and beauty care products. This has been arranged under a special scheme for Self Help Groups.

Tele-health services have been launched in collaboration with the People's General Hospital. The staff of Public health and family welfare department was specially trained to assist the experts at the remote end by providing inputs about the patients' condition.

A great deal of support has been provided by district administration. A sub-divisional magistrate has been appointed as the nodal officer for catering to the complaints received through the Gyan Sanchar network. The villager can simply walk into a PTIC to register his or her complaint, which is immediately transmitted to the nodal officer.

The villagers see the PTIC operators as a trustworthy friend and a dependable guide. In the days to come, this bond can only get stronger. Both the parties are bound to be benefited by this association.

Expansion of network

The Gyan Sanchar network shall be expanded to other districts of Madhya Preadesh, and to other states also. Entrepreneurs and youths seeking for self-employment shall be made part of this network, under self financing schemes. Sponsored networks shall also be created through funding from government or private sector. This way, the mission of enabling the ICT services in rural areas and make it available to remote locations all across, shall be pursued.

ISRO's
Village Resource Centres in Madhya Pradesh

Background

There are more than 600,000 villages in India and around 700 million people live in villages. Many villages are relatively deprived in terms of basic amenities and services, especially those related to education, health, sanitation and empowerment. There is a need to improve the quality of life in villages to achieve overall national development.

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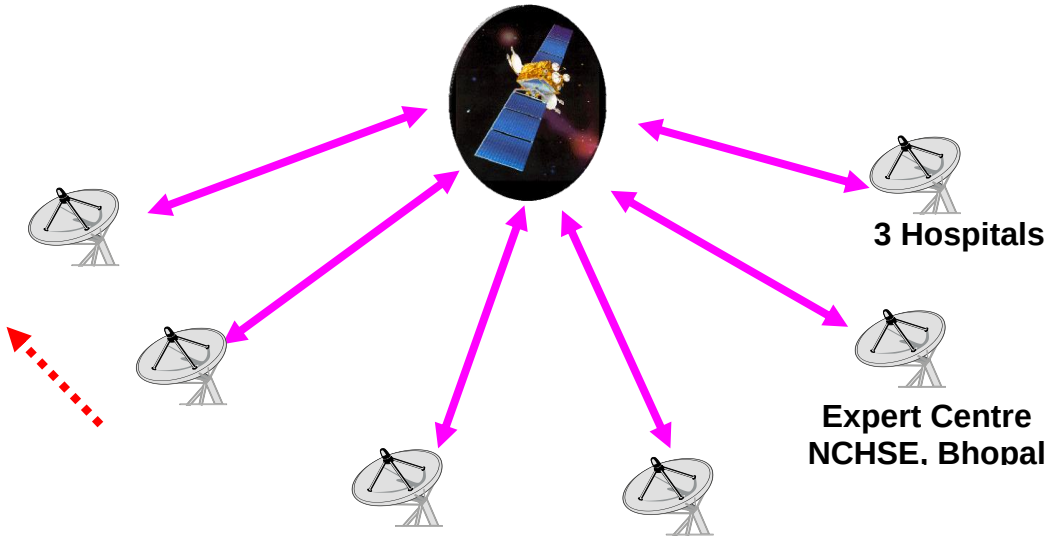

Department of Space (DOS)/ISRO has evolved many useful applications emanating from the Space Technology. While Indian National Satellite (INSAT) system continues to provide regular services in the areas of telecommunications, business communication, broadcasting and meteorological services, several initiatives have been taken to expand the application of INSAT to new areas like Telemedicine. ISRO has also been a champion in demonstrating the use of space technology for societal good and has piloted several socially relevant space application projects like the Satellite Instructional Television Experiment (SITE), the Training and Development Communication Channel (TDCC) and the Jhabua Development Communications Project (JDCP).

To provide space based services to the rural areas, Department of Space has initiated a programme to set up Village Resource Centres (VRCs) in association with concerned State, Central Govt Departments/Agencies, Trusts, NGOs, Universities, and Institutions etc.

Space based services, emanating from Satellite Communication (SatCom) and Remote Sensing satellites hold considerable value to transform village society. Remote Sensing enables providing community centric natural resources information up to cadastral level, suitable sites for potable/drinking water as well as recharge, incidence of wastelands for reclamation through rural employment creation, watershed attributes, environment, infrastructure related information, alternate cropping pattern, water harvesting etc. Synthesising spatial information with other collateral and weather information, Remote Sensing also facilitates locale specific community advisory services. Disaster management support; community based vulnerability and risk related information, early warning and

extreme weather information dissemination mechanisms provide reliable disaster management support at the village level. In order to disseminate the services emanating from the space systems as well as other Information Technology (IT) tools, to the rural communities, a partnership between ISRO and the NCHSE was formed.

NCHSE in association with IRSO is starting these VRC facilities in Ujjain and Hoshangabad districts in MP.

Scope and Objectives

The VRC programme is meant for reaching the benefits of the space technology directly to the communities at the grass root level. It aims to promote a single window delivery of need-based services in the areas of education, health, nutrition, weather, environment, agriculture and alternate livelihoods to the rural population.

Department of Space/ISRO desires to play a significant role in creating a right matrix of bandwidth, services and institutional support, especially in the rural and remote areas. The services emanating from space systems could be dovetailed with other services to make them more effective. The space enabled applications such as telemedicine; tele-education and the natural resource database with resource management advisories will be made available in the VRCs.

Major objectives of the project are to provide the following to rural population:

- Tele education
- Telemedicine/ healthcare services
- Access to space based information on land, water, soil etc
- Advisories on agriculture, land and water management
- Weather information
- Providing information on price, market, pests, diseases, livestock, govt. schemes, job opportunities, e-governance related information etc.

Locations of VRCs

12 locations have been identified by NCHSE, spread over Hoshangabad and Ujjain districts of Madhya Pradesh for setting up VRCs. These locations are Gyan Sanchar Kendras and NCHSE's Branch Offices maintained and managed by NCHSE. These 12 VRCs will be linked to one Expert Centre and 3 specialty hospitals of recognition.

S. No.	Location of VRCs	District
1	Hoshangabad	Hoshangabad
2	Babai	Hoshangabad
3	Itarsi	Hoshangabad
4	Seoni Malwa	Hoshangabad
5	Sohagpur	Hoshangabad
6	Pipariya	Hoshangabad
7	Ujjain	Ujjain
8	Ghatia	Ujjain
9	Tarana	Ujjain
10	Nagda	Ujjain
11	Badnagar	Ujjain
12	Mahidpur	Ujjain

These 12 VRCs will cover around 27,95,247 population in 2048 villages..

Along with these 12 VRCs, one Expert Centre – NCHSE, Bhopal (ICAR, Bhopal, JNKVV, Jabalpur, CEDMAP, Bhopal, MPCON, Gangotri, Bhopal etc. will be connected to the expert center through telephone / internet) and 3 hospitals viz. Peoples General Hospital, Bhopal and 2 District Hospitals will also be linked to cater to the technical expert advisories and tele medicine interaction.

Components of VRCs

Village Resource Centres will become single window delivery mechanism for Tele medicine, Tele education, Natural resources data, Agriculture advisories, Land & water resources advisories; Interactive farmers' advisories; e-governance services and Weather advisories, details of each component are given below:

Tele education: **Focus is on building indigenous skill and imparting training and capacity building, including non-formal and adult education. As a community centric learning centre, VRCs aim to bring access to knowledge at the villager's doorstep.**

Telemedicine: Telemedicine system consists of customized medical software integrated with computer hardware, along with medical diagnostic instruments connected to the VSAT at each location. Generally the medical record/history of the patients is sent to the specialist doctors, who will in turn study and provide diagnosis and treatment during videoconference with the patients end. Telemedicine helps patients in rural areas to avail timely consultations of specialist doctors without going through the ordeal of travelling long distances. To bring the services of district/large hospitals and expert doctors closer, the VRCs will provide connectivity to these centres. The VRCs will be connected to the selected/large hospitals (Peoples General Hospital, Bhopal and 2 District Hospitals).

Land & Water Resources Advisories: VRC will provide spatial information on various themes such as land use/land cover, soil, ground water prospects and will enable the farmers to get query based decision support. GIS databases comprising thematic layers, road network and drainage network will be made available. A simple software package (indigenously developed) will be installed for accessing and querying the natural resource information and related advisories, which will enable farmers to get online decision support.

Interactive Farmers' Advisory Services/Tele agriculture: VRC will enable online interactions between the local farmers and agriculture scientists working at Scientific Institutions. The advisory will cover a wide range of subjects starting from alternate cropping systems, optimization of agricultural inputs – seeds, water, fertilizer, insecticides, pesticides and producer oriented marketing opportunities. Community centred advisories on soil and water conservation, on adopting water efficient cropping patterns, on practices related to rainwater harvesting/ground water recharge, on participatory watershed management, information on market/price, pests & diseases etc will also be made available. Farmers/villagers of one VRC can interact with farmers/villagers of other VRCs/expert centres on crops, pesticides, water harvesting etc.

E-governance services: Services such as governmental schemes on agriculture, poverty alleviation, rural employment, watershed development, health, sanitation, social safety nets – food for work programme and other basic entitlements, animal husbandry and livestock related services, services related to Self Help Group (SHGs) etc, will also be made available at VRCs.

Weather Advisories: Short, medium and long-term weather forecasts and agromet advisories from available sources will be provided at VRCs.

THE CLIENTELE

- **Department of IT, Govt. of India:** A massive GIS Database and software development work was carried out for Ministry of Information Technology, Govt. of India. The work was carried out for Jhabua block.

- **Department of Health, Govt. of M.P.** (through DANIDA)**:** Madhya Pradesh GIS on village level Health Infrastructure sponsored by DANIDA

- **UNICEF:** the village level micro-planning data analysis package was developed for Guna and Shivpuri districts.

- **Karolinska University, Stockhome, Sweden:** The resources mapping for TB control activities in MP for the Karlinska University, Stockhome, Sweden

- **Water and Land Management Institute:** WALMI: The MP GIS software for all villages and towns of MP.

- **Disaster Management Institute:** Rescue action planning for Distaster Management for Khandwa Distt. For Disaster Management Institute. Bhopal.

- **MP Aids Control Society**: Data mapping work for Aids Control Society, GOMP, Bhopal

- **DRDAs, Zilla Panchayats:** Watershed Action planning for various Watershed Implementing Agencies and DRDAs

- **NREGS, Raisen:** The GIS based action plan preparation work for NREGS activities was carried out for 7 blocks of Raisen district

- **Water Resources Deptt. Govt. of MP:** Santha Mapping for Water Resource Deptt. for Kolar Project

- **CAPART, New Delhi, AFPRO, Ahmednagar, SRI, Ranchi:** GIS Software supplies for water shed planning activities to AFPRO, Ahmednagar, M.S, CAPART, SRI, Ranchi.

- **Bhopal Nagar Nigam:** Bhopal Town mapping work and ward level planning for selected places for Bhopal Nagar Nigam.

- **Rajya Shiksha Kendra:** The RSK MIS based on GIS is being carried out for mapping all schools locations in MP.

- **MPRLP:** The GIS based village selection system for the districts under the DFID sponsored MPRLP programme of the state.

- **Karolinska Institutet, Sweden:** The GIS mapping for the Ujjain city for mapping of the health providers. This included placement of health proving institutions, individuals, etc. in situ, on the city map.

- **Water-Aid**

- **School of Planning and Achitecture at Bhauri, Bhopal**

- **ITC**

Other works:

- Numerous GIS Training Programmes have been carried out for various Govt. and private candidates

- Extensive micro level GIS works for Cadastral level mapping regarding requirement under several projects of Integrated Development have been done.

- Data preparation and software work done for UNICEF.

- Project of ISRO on Village Resource Centres based on Satellite based information exchanges.