Geographic Information System for Micro Level Planning

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Overview

1. Introduction

The governments both at central and state level formulate and implement development programmes in rural areas. These programmes fail to make expected impact on the rural areas as these programmes fail to consider the local resources and requirements. One of the reasons attributed to this sorry state of affairs is non-availability of information about rural areas.

This type of micro level planning exercise requires systematic and scientific collection, documentation and representation of relevant data for present and future use. There is a need for a comprehensive information system for storage, retrieval and processing for planning at block level.

In this context, the present exercise is an attempt to study comprehensively the available information systems for block level planning and design an information system for a block suited to the requirements of the potential users viz, panchayat leaders at gram panchayat/panchayat union leaders, academicians, researchers etc.

2. Objectives of the study

a. To review the existing information systems and locate the gaps in data availability for rural development at block level based on the views of officials and elected panchayat leaders,

b. To conduct awareness programme to elected panchayat leaders on the use of information in panchayat planning and organise training programme to village panchayat functionaries on use of formats for data collection and coding,

c. To consolidate the database and portray the available and generated data in a spatial framework and

d. To design an information system for rural development planning at the block level.

3. Review of Ongoing Rural Development Programmes

A study was undertaken about the rural development programmes implemented at the block level in order to prepare a list of data required for better decision-making at block and village panchayat level. The rural development programmes implemented in Athoor panchayat union of Dindigul district are as follows.

- **Rural Roads**
  - Prime Minister's Gram Sadak Yojana
- **Rural Housing**
  - Indira Awass Yojana
  - Prime Minister's Gramodaya Yojana: Gramin Nivas
  - Innovative Scheme for Rural Housing
  - Other Housing Programmes
- **Water and Sanitation Programmes**
  - Rural Water Supply Programme
  - Central Rural Sanitation Programme
- **Employment Generation Programme**
  - Jawahar Gram Samrithi Yojana
  - Employment Assurance Scheme
- **Social Assistance Programme**
  - National Social Assistance Programme
  - Old Age Pension Scheme
  - National Family benefit Scheme
- **Free Supply of Cereals**
  - Annapurna
- **Self Employment Programme**
  - Swarnajanathi Gram Swarojgar Yojana
- **Area Development Programmes**
  - Integrated Wasteland Development Programme
  - Drought Prone area Development Programme

- **Programmes of Elected Representatives**
  - MLA's Constituency Improvement Programme
  - MP's Constituency Improvement Programme

Based on the review the data required for the better implementation of these rural development programmes are being collected from Athoor panchayat union office.

4. Review of Existing Information Systems

A brief review of Information Systems established by the government, voluntary agencies and the academic institutions is presented in the following paragraphs with a view to assess their content, applicability and sustainability.

Rural Knowledge Centres of MSSRF : A rural level data bank experiment has been conducted by M.S. Swaminathan Research Foundation (MSSRF) at Pondicherry to provide electronic medium based knowledge to the poor, covering ten villages in the Pondicherry union territory. A hybrid wired and wireless network consisting of PCs, telephones, VHF duplex radio and e-mail connectivity through telephone links the region. Village knowledge Centres were set up based on participatory rural appraisal (PRA) exercise. These exercises were conducted to elicit people's participation for providing space for the establishment of knowledge centre and volunteers to manage the centre. The MSSRF supplied hardware, software, training and data but not money.

The project has been designed to provide knowledge on demand to meet local needs using World Wide Web and through a bottom-up process. The process started with volunteers' teams gathering of data, feeding them in Intranet and provide access through nodes in different villages. The significant aspects include value addition to the raw data/information, use of local language, participation of local people and multimedia. All these centres evolved to meet the information demands of the community. The data available in these centres are grouped under women's health information, advice on growing local crops and protecting them from diseases, daily market prices for agricultural produce, local weather forecasts, development programmes implemented by the central and state governments for different sections of the society etc. The centres are demand driven, managed by villagers and thus they are self-supporting and self-sustaining.

Telecentre of TANUVAS : Tamil Nadu Veterinary and Animal Sciences University (TANUVAS) established a telecentre at Kuzhumani, a small hamlet located about 15 km away from Tiruchi. The project is to assess the problem and need of a village as expressed by the community themselves and prioritizing them. A Hub centre was established at TANUVAS, Tiruchi which collects the data from the various government departments and translates them into a software portal and hosts them into university website. This provides the needy villagers access to Internet, e-mail etc. This centre also acts as a training centre to the villagers. At present the telecentre is used by the villagers and particularly students for browsing and receiving e-mails.

Internet Connection for Villages by Govt. of Tamil Nadu : The department of information technology of government of Tamil Nadu has proposed to provide Internet connectivity to 1500 villages in 10 districts. For this purpose initially, the department identified seven districts viz., Madurai, Theni, Coimbatore, Kancheepuram, Nagapattinam, Vellore and Salem. The self help groups (SHGs) will be trained to man these village information Internet kiosks and the SHGs have to use the existing sources of finance for purchasing hardware, software and other accessories. A project has also been implemented in Melur on pilot basis, which has utilized wireless in local loop (WLL) for connectivity. The project enabled the local farmers to have access to agriculture and market related information for their produce.

Panchayat Resource Information System of IRS : Geographic Information System (GIS) is a powerful tool used to manipulate, integrate and analyse the spatial and attribute database. Institute of Remote Sensing, Anna University, Chennai has implemented a project on 'Panchayat Resource Information System' (PRIS) in Salem and Thanjavur districts. The PRIS has been designed on Arc View 3.1 environment, wherein attribute databases were created in MS Access 97 using panchayat level data. The information system basically has two sets of data viz., natural and socio-economic databases. Nature databases provide information about earth and earth related parameters while attribute databases furnish data collected from different departments like drinking water, health, education etc. The databases were created based on the data generated and documented by the government of Tamil Nadu and supplemented with satellite data. In both the districts, the government machinery is making use of PRIS.

National Informatics Center : National Informatics Centre (NIC) conceived by government of India, has nucleated in 1976, as a high priority plan project under the Department of electronics communication/ department of electronics. NIC has been playing a catalytic role in creating computer awareness and promoting systems approach in data collection, organisation, processing and its online accessibility. It has started extending its computer based information service to the state governments and district administration since 1985-86. In 1988, NIC was transferred from the department of electronics to national planning commission.

In 1986, NIC initiated Computerised Rural Information System Project (CRISP), with the aim of facilitating monitoring of poverty alleviation programmes implemented by district rural development agencies. It was revised many times and the latest in the series is Rural Soft. It is being used in 15 districts in the country.

Another software designed by NIC for panchayat raj institutions for accounting purposes is called as Priasoft. It was developed to monitor the allocation of funds, expenditure pattern, local revenue generation and transmission of reports to other monitoring agencies. Ruralbazar is a Web store showcasing the creations of rural artisans to the e-world, thereby assisting the rural artisans to improve their marketing capability. In addition, 199 taluk information systems were established while touch screen based kiosks are functioning at 30 model taluks in Tamil Nadu State.

The rural knowledge centers of MSSRF and telecentre of TANUVAS are being manned and used by the local villagers as these centres are located in their villages and also they supply the data/ information required by them. On the other hand PRIS of IRS and Melur project of government of Tamil Nadu and Priasoft, Ruralsoft and Ruralbazar are located at the collectorates. These softwares are used primarily by the district bureaucracy and to a lesser extent by the villagers because these facilities are not easily accessible. Thus, it is clear that there is a need for a comprehensive information system located at villages for providing the data collected by the government departments, satellite imageries, maps of Survey of India etc., as required by the villagers.

5. Collection of Data

The data required for the project were collected both from Primary and Secondary sources.

5.1 Collection of Primary Data: The project office prepared an interview schedule. This field-tested interview schedule was used for collecting data from 22 village panchayats in a face-to-face paradigm. The interview schedule was prepared with a view to collecting data related to general information about the panchayat presidents, role of information in panchayat planning, data required for decision making, use of natural resources, sources of data, availability of adequate and latest data etc. Besides, awareness about computer center of NIC and softwares of NIC, problems faced by them during data collection and their suggestions for solving them were also colleted.

The major findings of the analysis of data collected from 22 panchayat presidents are:

6. General Information

- More then 45 percent of the panchayat presidents are aged between 41 and 50 and another 36 percent between 31 and 40 years. Half of them educated up to 10th standard.
- The family size of nearly 82 percent of the panchayat presidents is less than five members.
- As far as occupation is concerned more than three-fourth of them are farmers and less than one fifth of them are housewives.

7. Use of Data in Decision Making

- The panchayat presidents are making decisions on daily basis based on the urgency in areas like drinking water, road, repairing of hand pump, drinking water pipe line and drainage facilities.
- On long term basis, they take decisions related to road, drainage facilities, school, public toilet etc.,
- The panchayat presidents take decisions in these fields based on the size of population demanding these facilities (95.5 per cent), availability of finance (95.5 percent) and the data available at local schools (18.2 percent).
- The major areas of decision making include facilities like drinking water, drainage, public toilet etc. As their planning area is a hamlet they were able to manage with the data available in their office and furnished by the local people and school teachers.

8. Use of Natural Resources

- All the respondents said they make use of natural resources available in their village panchayat.
- Tamarind trees and tanks were auctioned for generating income for the panchayat, under groundwater and soils were tested for agricultural purposes.
- They identified these resources with the help of government officials, water diviner and villagers.

9. Sources of Data

- The panchayat presidents identified the resources by using the data collected from Collectorate (45.6 per cent), district rural development agency (86.4 percent), panchayat union office (100 per cent), village panchayat (72.7 per cent) and local people (32 per cent).
- According to 13.6 per cent of panchayat presidents the data required by them are not available from the above sources.
- All these 13.6 per cent panchayat presidents manage the situation, by manipulating the available data, passing new resolutions in the panchayat meeting according to the availability of funds and depending on local conditions.
- With regard to sources of data, 82 per cent of them opined that the required data are not available from single source and therefore they have to depend on different sources for data.

10. Adequacy of Data

- In the opinion of 36 percent of panchayat presidents, the data collected by them are inadequate. They manage the situation, by manipulating the data

collected by them, passing new resolution in place of old ones and manage it in consultation with members.

- Of the total respondents, 91 per cent of them could not collect the latest data. They managed with old data with the cooperation of gram sabha and also by meeting concerned officials in their office.
- Eighty six percent of the panchayat presidents could not collect the required data on time. The presidents used to postpone the decision making till they collect the required data (68 per cent), some of them pass resolutions according to available data.

NIC Computer Center :

- None of them are aware of functioning of computer center managed by NIC.
- They are also not aware of softwares like Ruralbazar, Ruralsoft $_{2000}$, Priasoft and Touch Screen Information Kiosk.

11. Problems faced during data collection

- The problems faced by the panchayat presidents during data collection include non-availability of data (91 percent), repeated visits for collecting existing data (77 percent) and availability of outdated data (73 percent).

12. Suggestions

- Separate information centre is required (77 per cent)
- It should be manned by trained officials (73 per cent)
- Latest data should be collected and stored in the information centre (68 percent)
- Once in a year panchayat wise data should be collected and stored in the information centre.

13. Information System

- All the respondents are for starting a new and separate information system for Athoor block.
- Panchayat presidents will support and cooperate with GRI (77 per cent)
- Panchayat presidents will furnish data (64 per cent)
- Panchayat presidents will use the data for decision making (50 per cent)

14. Collection of Secondary Data

In the light of the review of the rural development programmes implemented in Athoor panchayat union the following offices were contacted for collection of data mentioned against them. Some of the data which are not available in the reports and documents maintained in the above offices like government lands, watershed details, unemployment, age old people etc will be collected by the respective panchayat secretaries. In addition, satellite data will be used to create spatial databases like geology, geomorphology, land use, soils, location of water bodies, forest, road map etc.

15. Databases created in Access

Following databases were created from the data collected from the above sources for their use in the proposed information system for panchayat planning.

Databases Created

Theme of data	Name of the file
Population	Popu 1991
Land Use	Landuse
Irrigation	Irri2001
Pump sets & Tractors	Pump2001
Cow	Cow2001
Buffaloes	Buff2001
Sheep	Sheep2001
IRDP	IRDP9596
IRDP	irdp9495
Jawahar Rojgar Yozana	JRY9196
Infrastructural facilities	Infra 2000

Maps Prepared

To begin with following maps have been designed in Geo Media Pro- GIS-Software.

1. Density of population - 1991
2. Sex Ratio - 1991
3. SC/ST Population - 1991
4. Child Population - 1991
5. Total Workers -1991
6. Agricultural Workers -1991
7. Non – Workers – 1991
8. Net Area Sown - 2001
9. Non – Agricultural Land - 2001
10. Current Fallow - 2001
11. Lift Irrigation - 2001
12. Cross Breed Cow - 2001
13. Indigenous Cow -2001
14. Graded Buffaloes - 2001
15. She Buffaloes 2001

16. Awareness Programme Conducted

An awareness programme about the use of information in panchayat planning was organized at Gandhigram Rural Institute on 15.5.2002. The village panchayat presidents were the participants of the awareness programme. The aim of the programme was to explain the process of decision-making and the role of reliable and recent data in decision-making. In addition, a demonstration on how the computer technology could be used in supplying information, locating records in a database and sending of information using e-mail to the higher authorities. They were also exposed to (GIS) technology and all of them were given Athoor block map.

For the purpose of creating awareness lectures were

delivered and printouts of the lectures were given to them in Tamil. During the discussion session panchayat presidents came forward to supply the data for entering and storing in the database to be created by the project office.

The major gaps listed during the discussion by the panchayat presidents are

- They were unable to get the required data – for e.g. SC population.
- The officials withheld information related to the developmental/ welfare programmes.
- The panchayat secretaries are not sharing even essential particulars for decision-making. For e.g. minutes of panchayat meetings.
- In their opinion the prerequisite for the establishment and use of computerized information system for panchayat planning is creating awareness and providing training to the panchayat secretaries.

17. On-Going Activities

In addition to reporting formats the documents and registers maintained as mentioned below in the office of the village panchayat were studied in detail. The formats for entering the data generated at village panchayats' level are being prepared in MS - Access. These MS Access databases will form part of other databases used in the information system.

- House tax Demand Notice
- House tax Receipt Book
- Pending House tax demand Register
- Profession tax Receipt Book
- Profession tax demand Register
- Miscellaneous Receipt Book
- Panchayat tax and other tax collection Register
- Subsidy Grant of Panchayat and others earmarked in income Register
- Chitta
- Pending collection demand Register
- Cash Book
- Panchayat Advance Register
- Approval Statement Register – Head-wise
- Fund Receipt Register
- Estimate and Allocation of Fund for the work
- Assets and Tools Register
- Maintenance Register
- Stock Register
- Voucher
- Cash Receipt
- Stock Register of unserviceable article
- Project work Stock Register
- Cash Book
- Government subsidy classification Register
- Estimate and Allocation of fund for the work carried out by the Panchayat
- Cash Book of Projects
- Income and Expenditure Register of Project Accounts – head wise
- Project Work Register
- Project Beneficiaries Register
- Monthly Accounts Form
- Financial Statement of Account
- Resolution Book
- Resolution Copy
- Resolution Copy (Additional)

18. Future Activities Proposed

An Awareness - cum – Training Workshop : After the creation of formats for data entry and reporting as well as maps in GIS for Athoor block, the secretaries of all village panchayats will be called for an awareness - cum – training workshop at Gandhigram. During their presence in Gandhigram, they will be shown the advantages of computerizing their day-to-day activities related to development of their village panchayat. They will also be trained in data entry in the formats created in MS Access based on the analysis of documents and registers maintained by them.

Purchasing of Digital Data : Discussions are on to purchase data from National Remote Sensing Agency, Hyderabad. Soon after the purchase of the data it will be processed at Gandhigram. It is proposed to prepare the following maps for creating databases in GIS. Due to shortage funds we could not purchase the satellite data.

Consolidation of Databases : It is proposed to consolidate the data collected form government departments, NIC, panchayat union office, satellite imageries, maps of Survey of India etc., and use them as databases in information system for panchayat level planning.

Final Workshop : It is planned to conduct a final workshop with elected panchayat presidents, secretaries and also panchayat union officials to demonstrate the information data base contained in the information system created by the project including the capability of generating maps in GIS.

At present the GIS of Athoor block is being used by the village panchyats, block bureaucracy, local nongovernmental agencies and research scholars. The GIS will take its final shape on conclusion of the project.

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