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Planning Rural Development Programmes Using Decision Support System

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ABSTRACT

Village level planning needs lot of factual data for implementing Rural Development Programmes. A database system is devised which lends itself to GIS with village as basic unit. In this GIS, spatial database is created for the administrative divisions of the villages, residential areas, road networks and water features etc. Attribute databases are created for each of the facilities in ArcGIS. Programs are developed in Oracle for handling each of the databases and answer to the relevant queries. Certain queries made through the systems and the corresponding answers just demonstrate the scope of GIS. A composite Rural Development Index (RDI) is formulated after assigning proper weightages to the various indices of the facilities. Through RDI, the villages are categorised based on degree of development. A planning module is developed which can list the villages in the order of priority for plan implementation. Out of villages in Kothur Mandal, Kothur village is found to be model village and there are 88% of moderately developed and 6% of undeveloped villages.

1. INTRODUCTION

Next only to China, India has the largest population in the world with more than 75% of them living in rural areas. From this one can easily infer that any meaningful upliftment of the country as a whole, development of the rural population is essential. To this end in view Government of India has initiated various programmes viz., Integrated Rural Development Programmes (IRDP), National Rural Employment Programme (NREP), etc. through five year plans since the last four and half decades. The network of National Informatics Centre (NIC) spread throughout the country is an added advantage for a computer based GIS wherein the local requirement and availability are thoroughly and efficiently analysed and resources distribution is made optimally.

With the advancement in technology like high speed large storage computers, Digital Mapping Technology and Remote Sensing which can speak out dynamicity in change of land resources, now the question is not whether to have an Information System, but it is when to have the system. Hence an attempt has been made to develop an Information System for planning at village level using index criterion.

2. STUDY AREA

Kothur, is a village and a mandal which is located at 17.144727°N 78.288574°E in Mahbubnagar district in the state of Andhra Pradesh in India comprising 16 villages were selected for this study and it is shown in figure 1. It is situated about 36 km from Hyderabad, the state capital, nearby Hyderabad International Airport in Hyderabad to Bangalore NH-7. Kothur Grampanchayath includes Kothur, Kummariguda, Fathimapur and Kothur industrial area.

INDIA

ANDHRA PRADESH

Figure 1: Study Area Map

3. METHODOLOGY

The study has been carried out in the sequence as depicted in the flow diagram given in figure 2. The relevant Topographical maps, administrative divisions maps, statistical data and census data were collected from the respective offices. Topographical maps and administrative boundary maps were digitized in MICROSTATION. The .DGN files were then exported to shape format in ArcGIS Environment, wherein the above map layers were overlayed.

Attribute databases for each facility were created in ArcGIS. Programs were written in Oracle to compute various indices, making use of the databases. Programs also classify the villages as per the value of indices. A planning module was generated in which the villages in priority order will be listed out so as to implement any given development programs. By interfacing the above databases with Rural Development Planning module, various queries could be raised to the Decision Support System to generate textual and graphical outputs.

3.1 Data Collection

The relevant topographical sheets were collected from various offices of Survey of India and statistical data at Hyderabad. The administrative boundary maps are collected from Revenue department.

3.2 Creation of Attribute Database

Attribute databases of Statistical data viz. Demographic Data, Educational Data, Medical Data, Drinking water Data, Proxim-

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ity Data, Bank Data, Employees Data, Socio-economic Data, Land use Data, Accessibility Data have been created as per the requirement and specifications.

3.3 Creation of Spatial Database

Spatial data includes position of point data like huts, wells, springs, village blocks, line elements like roads, rivers, administrative boundaries, railway lines and aerial elements like rivers, cultivation, tanks etc. Spatial databases for kothur mandal was created by using ARCGIS

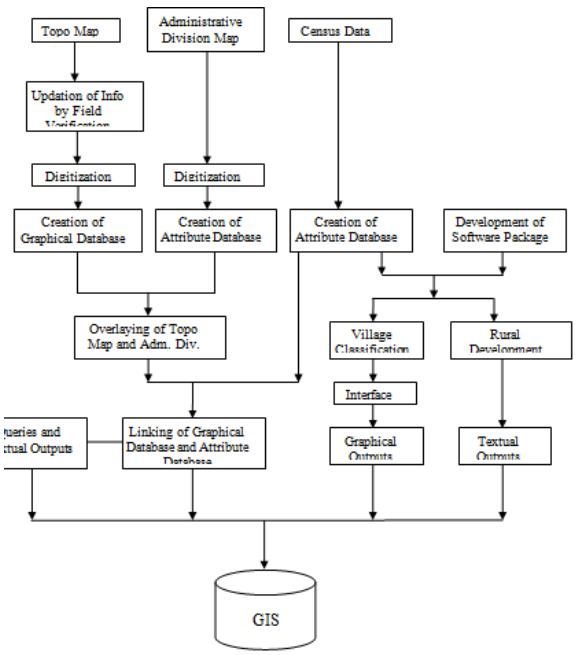

Figure 2: Flow Diagram of Methodology

3.4 Artificial Intelligence to GIS

An Artificial Intelligence was introduced to improve the capability of GIS to quantify the development of each village in more of scientific way and arrive at an efficient Decision Support System.

3.4.1 Defining various indices:

From the attribute database files, various indices viz. Literacy Index (LITI), Primary School Index (PRSI), Upper Primary School Index (UPRSI), High School Index (HISI), Medical Index (MEDI), Drinking Water Index (DWATI), Proximity Index (PROXI), Bank Index (BANI), Employees Index (EMPI), Socio-economic facilities Index (FACI), Cultivable Waste Land Index (CLWLI), Land Load Index (LALDI) and Accessibility Index (ACCI) were arrived at, weighted appropriately and assigned a value of 0 to 5 for each attribute. Finally a composite Rural Development Index (RDI) was arrived at by taking weighted mean of the above indices based on which the villages were classified. This index will reflect the overall degree of development in terms of all facilities available in that particular village.

2.5 Development of software in ORACLE

Programmes on ORACLE were written to carry out the computation of various factors Indices which reflect the degree of development. The capability of ORACLE in linking more than two databases was utilized in generating the programmes. Each index is the representative factor which reflects the degree of development of the village with respect to that attribute.

3.5.1 Classification the villages

Based on the indices computed, the villages were classified into six categories viz. model, largely developed, developed, marginally developed, poorly developed and undeveloped villages which is shown in Table 1through programming.

Table1: Classification of Villages

RDI	Classification
5	Model village
4	Largely developed village
3	Developed village
2	Marginally developed village
1	Poorly developed village
0	Undeveloped village

3.5.2 Planning and Decision Support System

The information system developed by integrating the topographic, thematic, socioeconomic and all other data can output the answer for any queries posed by the users. The program lists the villages in the order of priority for implementing certain projects/programmes in the mandal by sorting the villages as per value of composite index in ascending order. The Decision Support System caters for planning ten aspects as listed below.

1. To organise literacy programme
2. To construct primary school
3. To construct upper primary school
4. To construct high school
5. To construct hospital
6. To construct water tank
7. To extend bank facility
8. To improve socio economic facilities
9. To organize agricultural programmes
10. To improve transportation system.

3.5.3 Master Program

Finally, a master program was developed which is user friendly in controlling 27 programs with menu options for the user to select the mandal, update the databases and to run the programs displaying necessary messages to guide the user. The master program has also the capacity of invoking a planning module program for various Rural Development Schemes.

4. RESULTS AND DISCUSSIONS

Stored data of kothur mandal was analysed and manipulated using the programs developed in ORACLE and the results were obtained in the form of graphical output and textual outputs. The spatial database and attribute database were linked up in MicroStation for both graphical and textual representation. Queries covering various applications were raised to the Information System through terminal and the results were obtained in standard forms.

4.1 Analysis of Indices

From the indices arrived at by the programs, various inferences were drawn for each village with respect to various facilities. Typical bar chart to compare the indices is given in figure 3. The composite index namely Rural Development Index (RDI) was also computed considering all necessary requirements of a village. This index (RDI) reflects the overall development of the villages.

Based on the Rural Development Index, the village have been classified into various levels of development to indentify the villages clearly to implement various development programmes. From Figure 5.2, which shows the village classification for kothur mandal, it can be seen that in Kothur mandal, there are 6% of model villages and 13% of largely developed villages, 13% of developed villages, 44% of marginally developed villages, 19% of poorly developed villages and 6% of undeveloped villages.

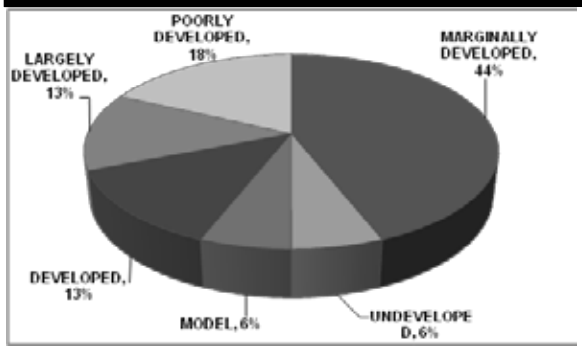

Figure 3: Comparison of Indices for Kothur Mandal

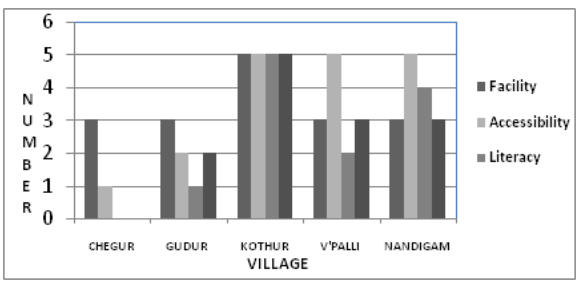

Figure 4 : Village Classification for Kothur Mandal

4.2 Analysis of Planning Module Results

The results of planning module program as given in table 2, shows that the top priority to Khajiguda and last priority to Kothur should be given while planning to improve Socio-economic facility in Kothur mandal.

5. SUMMARY AND CONCLUSIONS

The village Kothur of Kothur mandal was found to be model villages, possessing almost all necessary facilities. The village Khajiguda in Kothur mandal was basically undeveloped which need proper improvement programmes to implement. Population density in Kothur is literally higher than the surrounding villages since it has all the facilities. Hence migration of people towards such developed village can be avoided by implementing Integrated Rural Development Programmes (IRDP) in the villages appropriately. In about 70% of villages in Kothur mandal, the service sector is very poor which can be improved by Integrated Rural Employment Programmes (IREP) etc.

Data collection for the development of GIS should be at the lowest possible Government level (i.e. village level) that has the technical ability to collect it accurately and efficiently. Such information system can then be aggregated up to form the higher level information systems to meet the district, state or national planning considerations. If a GIS developed with modern concepts and technology for efficient management of the various resources, to be a successful, it should meet the aspirations and expectations of the village officials and rural people.

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