



A STUDY ON INFRASTRUCTURAL DEVELOPMENT USING GIS IN RESOURCE MANAGEMENT

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ABSTRACT—The purpose of this study is to improve the utilization of resources in construction industry. Resource planning is a critical task for management. Resource planning is a critical task for management. It identifies the various resources are needed for building throughout its life period. Effective resource management increases profitability of optimum utilization of resources in and around construction industry. This system provides a technical support for the full & effective management and use for the transportation of resources. This can be done with the use of emerging field, Geographical Information System (GIS). GIS is a tool, which has an ability to handle both spatial and attributes. This platform provides a sophisticated facility compared to available tool, which helps to interlink various resources to be allocated effectively. This facility provides the manager, to a new experience in construction industry.

Keywords— map, GIS, resources.

1. INTRODUCTION

1.1 GENERAL

The construction industry faced serious local shortage in construction materials such as cement, sand, electrical resources, transport routes and the sewage networks. The object of this project is to assess the waste performance regarding the resources such as location, material, water conversation, energy uses and greener materials are effectively utilized by considering the population growth. It is done by considering the spatial relationships for social, economic and natural resources available.

The Geographical Information System (GIS) is a tool used to gather, display, analyse and output data related to the construction site environment, can provide planners with certain data sets, in order to manage the resources in construction industry. GIS is participatory context, of providing valuable tool is capable to make it possible to create, analyse and process different scenarios, using the information stored in the computer (Jordan & shrestha, 1999) and the geographic location to create meaningful, clear and attractive maps that can be applied to development needs. Due to the spatial nature of



resources, the GIS technology can facilitates the inclusion of resources in decision making process.

This present paper reviews the work carried out to date by various researchers were utilized the numerous resources for the building and shows the system facility to prevent the over allocation of resources through help of Geographical Information System.

GIS technology can give accurate result for analysis by interlinking the various resources in present study area. The geomorphic resources, population census, traffic survey details and the land use land cover resources are the important parameters are playing the deterministic role in allocating various resources in the study area.

1.2 GEOGRAPHICAL INFORMATION SYSTEM (GIS)

Geographical information system is computer-assisted system for acquisition, storage, analysis and display of graphical data. This system consists of a set of computerized tools and procedures that can be effectively encode, store, retrieve, overlay, correlate, manipulate, analyze, query, and many more. System has the ability to control over both the spatial and non-spatial data. This in terms helped to differentiate the different data feed into the system. GIS is a technology fed by data. Raw data are transformed into information through initial processing. This implies that the data, as the basic components of a library of data – a data bank – are in the form that is useable by computers. When the data is converted into machine-readable form, invariably as a set of digits, they become digital data. The raw data may come in a variety of numeric scales of measurement-nominal, ordinal, interval and ratio. The use of word GIS suggests an analogy to an organism as an adaptive system, speaking of system boundaries, articulation with the environment, homeostasis (stability), equilibrium and regulation.



GIS geographic data are referenced in such a way as to allow its retrieval, analysis and display on any spatial criteria, these tasks are handled by data processing subsystems, data analysis subsystems and information use subsystems. The GIS therefore it is an integrated set of computer programs for handling spatial data. GIS is said to represent a convergence of technological fields and traditional disciplines. It has been called an 'enabling technology' because of the potential it offers to the wide variety of disciplines which must deal with spatial data with each field providing some technique that make up GIS. While some fields emphasize data collection, GIS emphasized data integration, modelling and analysis-leading some to claim it as the science of spatial information.

1.3 CURRENT STATUS OF GIS IN INDIA



There is increasing recognition that no development programmes can be economically and socially viable unless natural biological systems are preserved. In the Indian context, a number of national agencies are in the process of implementing GIS projects, mostly oriented towards ecological development at district levels. An example of this emphasis is in land management. 'Wastelands' refers to degraded land comprising more than 25 percent of the total area of India - this is a high priority area in national development. The Planning Commission of India has recognised GIS as "an invaluable planning tool in land use and wastelands development.., for identifying treatment areas and models, making trade-off calculations in choosing from competing land uses, and carrying out simulations and impact assessments.

Since the late 1980s, a number of similar GIS projects have been initiated. In addition, other agencies are playing facilitating roles, for example, the Survey of India is establishing the digital cartographic database for the country, and the National Remote Sensing Agency is collecting and disseminating satellite imagery. Other government agencies are using GIS to address domain specific applications - for example, the forest wing of the MOEF, The Census Department, Geological Survey of India, Town and Country Planning Organization, Bombay Metropolitan Development Authority, Wildlife Institute of India, and the Coast Guards. A few private sector firms like Hindustan

Levers are using GIS as a tool for decision support. Recently, a national Geomatics society was established to provide professionals interested in the issue of spatial location with a common platform for interaction.

1.4 RESOURCE MANAGEMENT PROCESS

In organizational studies, resource management is the efficient and effective deployment of an organization's resources when they are needed. Such resources may include financial resources, inventory, human skills, or production resources.

In the realm of project management, processes, techniques and philosophies as to the best approach for allocating resources have been developed. These include discussions on functional vs. cross-functional resource allocation as well as processes espoused by organizations like the Project Management Institute (PMI) through their Project Management Body of Knowledge (PMBOK) methodology of project management. Resource management is a key element to activity resource estimating and project human resource management. Both are essential components of a comprehensive project management plan to execute and monitor a project successfully. As is the case with the larger discipline of project management, there are resource management software tools available that automate and assist the process of resource allocation to projects and portfolio resource transparency including supply and demand of resources. The goal of these tools typically is to ensure that: (i) there are employees within our organization with required specific skill set and desired profile required for a project, (ii) decide the number and skill sets of new employees to hire, and (iii) allocate the workforce to various projects.

Some of the resources used in buildings:

- | | |
|---------------------|----------------------|
| ❖ Location | ❖ Water conservation |
| ❖ Materials | ❖ Air quality |
| ❖ Greener materials | ❖ Energy uses |

1.5 CORPORATE RESOURCE MANAGEMENT PROCESS

Large organizations usually have a defined corporate resource management process which mainly guarantees that resources are never over-allocated across multiple projects.



1.6 RESOURCE MANAGEMENT TECHNIQUES

One resource management technique is resource levelling. It aims at smoothing the stock of resources on hand, reducing both excess inventories and shortages. The required data are: the demands for various resources, forecast by time period into the future as far as is reasonable, as well as the resources' configurations required in those demands, and the supply of the resources, again forecast by time period into the future as far as is reasonable. The goal is to achieve 100% utilization but that is very unlikely, when weighted by important metrics and subject to constraints, for example: meeting a minimum service level, but otherwise minimizing cost. The principle is to invest in resources as stored capabilities, and then unleash the capabilities as demanded. A dimension of resource development is included in resource management by which investment in resources can be retained by a smaller additional investment to develop a new capability that is demanded, at a lower investment than disposing of the current resource and replacing it with another that has the demanded capability.

1.7 OBJECTIVES OF THE STUDY

The objectives of this project is to

- ❖ Plan the utilization of resources using Geographical Information System (GIS) for our infrastructure development.
- ❖ Develop and manage the human, natural and financial resources by using GIS.

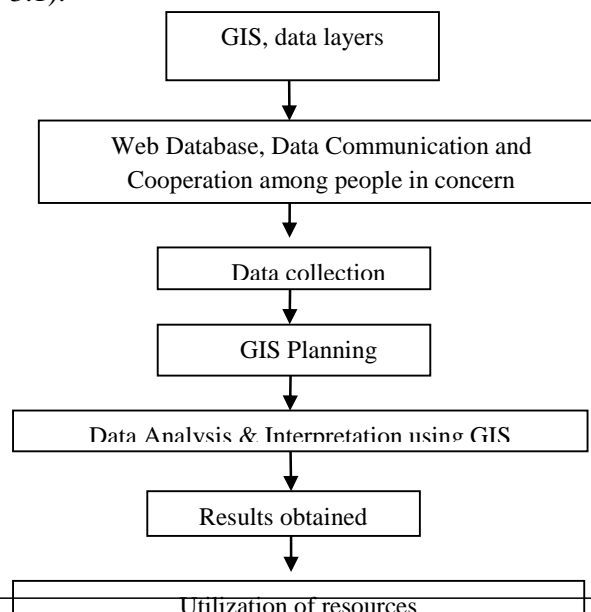
1.8 SCOPE OF THE STUDY

This study mainly aims to link the various construction activities of allocating of resources in the GIS environment. The method of controlling the project only lies on the work flow progress. By using this system, the sewage system can be effectively achieved.

The project management software package helps in controlling the method to enhance the possibility of linking spatial and the non-spatial data is very much essential.

2 METHODOLOGY

The proposed methodology of the study is dramatically represented through the flow chart (Figure 3.1).





3.1 DATA COLLECTION AND PLANNING

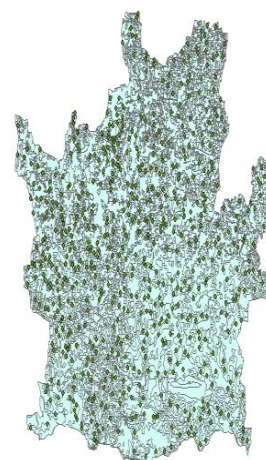
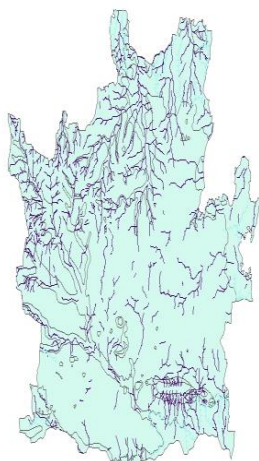
The various data were collected as follows:

- Collection of maps
- Collection of population census
- Collection of traffic survey

3.1.1 COLLECTION OF MAPS

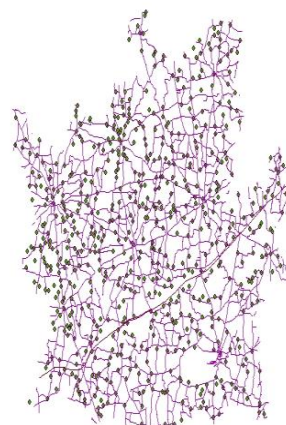
- Geomorphology map
- Land use & land cover map
- Reserve forest Map
- River & Drainage Map
- Road Map
- Population Map
- Settlement Map
- Location Map
- Village Map
- Soil Map
- Vehicle survey in surrounding area
- Watershed Map

GEOMORPHOLOGY,DRAINAGE & CANAL-PERUNDURAI TALUK



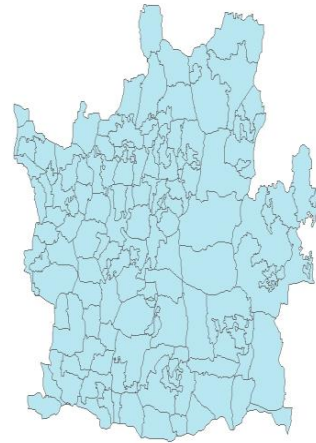
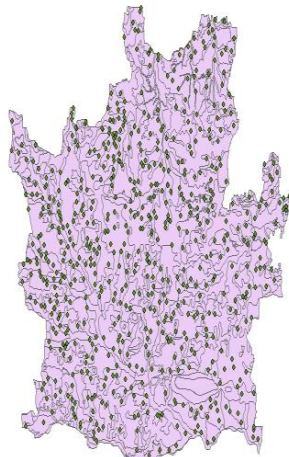
ROAD, RAIL WITH SETTELEMENT – PERUNDURAI TALUK

LAND USE AND LAND COVER MAP – PERUNDURAI TALUK



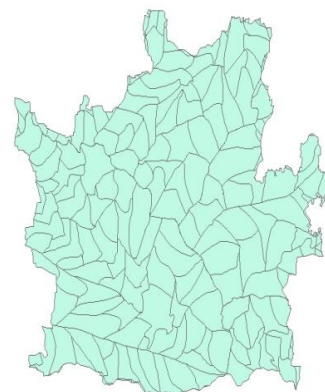


**SOIL WITH SETTELEMENT MAP-
PERUNDURAI TALUK**



**WATERSHED MAP – PERUNDURAI
TALUK**

**VILLAGE & TALUK– PERUNDURAI
TALUK**



COLLECTION OF TRAFFIC SURVEY

PROFORMA - III
TRAFFIC CENSUS WEEKLY TRAFFIC SUMMARY

Circle : Tiruppur
Division : Erode
Date : From 15.04.11 to 22.04.11
Details of Census Point : KM 33/2

Classification : SH 81

District of the C.S. : ERODE

Kilometrage / Mileage : KM.33/2 [Uppilpalayam peruvu]
Name of the Road : Erode - Perundurai - Kangayam Road.
KM : 110 - 39/0

Period				Fast Vehicles							Slow Vehicles						Remarks
From Date	From Hour	To Date	To Hour	Cars, Jeeps, Vans, Three Wheelers etc.	Light Commercial Vehicles (LCV)	Buses	Trucks	Multi Axle Vehicles Truck Trailer Agri Tractor Trailer	Motor Cycle & Scooter	Total Col 5 to 11	Animal Drawn Horse Drawn	Bullok Cart	Cycle Rickshaw & Tri Cycle	Others Specify	Total Col 12 to 15		
1	2	3	4	5	6	7	8	9	10	11	12	12A	13	14	15	16	17
15.04.11	6.00 AM	16.04.11	6.00 AM	1765	381	132	969	326	1553	5126	-	10	1653	-	-	1663	
16.04.11	6.00 AM	17.04.11	6.00 AM	1695	462	136	1025	155	6049	9722	-	5	1200	-	-	1205	
17.04.11	6.00 AM	18.04.11	6.00 AM	1265	435	126	971	130	4505	7432	-	3	799	-	-	802	
18.04.11	6.00 AM	19.04.11	6.00 AM	1592	496	141	1158	229	5357	8973	-	8	885	-	-	893	
19.04.11	6.00 AM	20.04.11	6.00 AM	1452	532	138	765	152	5163	8202	-	6	796	-	-	802	
20.04.11	6.00 AM	21.04.11	6.00 AM	1652	456	142	898	214	5613	8973	-	4	895	-	-	899	
21.04.11	6.00 AM	22.04.11	6.00 AM	1426	497	131	935	169	4879	8057	-	7	1215	-	-	1222	
Total for the Week				11047	3259	846	6719	1395	33119	56486	0	43	7443	-	-	7486	
Average Daily Traffic for week				1578	466	135	960	199	4731	8069	0	6	1063	0	-	1069	
PCU: 9574				CVD: 1760				NAME AND SIGNATURE OF SUPERVISOR WITH DATE: _____									

Eq. Factor	1	1.5	3	3	4.5	0.5	4	8	0.5	2	
PCU	1578	898	405	2880	897	2366	0	49	532	0	9405
CVD	1760										



PROFORMA - III
TRAFFIC CENSUS WEEKLY TRAFFIC SUMMARY

Circle : Tiruppur
 Division : Erode
 Date : From 15.04.11 to 22.04.11
 Details of Census Point : KM 19/4

Classification : SH 96

District of the C.S. : ERODE

Kilometrage / Mileage : KM.19/4 [Perundurai]
 Name of the Road : Erode - Perundurai - Kangayam Road.
 KM : 11/0 - 39/0

Period				Fast Vehicles							Slow Vehicles					Remarks		
From		To		Cars, Jeeps, Vans, Three Wheelers etc.	Light Commercial Vehicles (LCV)	Buses	Trucks	Multi Axle Vehicle Truck Trailer Agri Tractor Trailer	Motor Cycle & Scooter	Total Col 5 to 11	Horse Drawn	Bullack Cart	Cycle	Cycle Rickshaw & Tri Cycle	Others Specify		Total Col 12 to 15	
1	2	3	4	5	6	7	8	9	10	11	12	12A	13	14	15	16	17	
15.04.11	6.00 AM	16.04.11	6.00 AM	3852	2965	485	2050	179	6756	16007	-	75	5926	-	-	-	6001	
16.04.11	6.00 AM	17.04.11	6.00 AM	2765	3216	503	1992	96	7895	16469	-	65	6152	-	-	-	6217	
17.04.11	6.00 AM	18.04.11	6.00 AM	2893	2762	435	1883	89	7712	15754	-	59	6459	-	-	-	6518	
18.04.11	6.00 AM	19.04.11	6.00 AM	2742	1895	472	2325	88	10253	17773	-	48	7569	-	-	-	7817	
19.04.11	6.00 AM	20.04.11	6.00 AM	3462	2156	415	1962	98	10965	19058	-	72	7213	-	-	-	7285	
20.04.11	6.00 AM	21.04.11	6.00 AM	3125	2102	399	2226	102	11936	19890	-	66	6652	-	-	-	8718	
21.04.11	6.00 AM	22.04.11	6.00 AM	3848	2890	421	2625	105	10785	20953	-	57	9521	-	-	-	9578	
Total for the Week				22485	17886	3130	15043	758	69282	125884	0	442	51492	-	-	-	51934	
Average Daily Traffic for week				3212	2569	447	2149	108	9469	17885	0	63	7356	0	-	-	-	7419
PCU: 24260				CVD: 5274				NAME AND SIGNATURE OF SUPERVISOR WITH DATE: _____										

Eq. Factor	1	1.5	3	3	4.5	0.5	4	8	0.5	2		
PCU	3212	3854	1341	6447	487	4734	0	505	3678	0		24260
CVD	5274											

CHAPTER V

SCOPE FOR FUTURE WORK AND CONCLUSIONS

The further main work is to be carried out is to geomorphology maps from Indian Remote sensing, Anna University, Chennai. Then making use of Arcview Gis 9.0, resources such as population census, traffic details, land use land cover maps and geomorphology maps are analyzed.

CHAPTER VI

SCOPE FOR FUTURE WORK AND CONCLUSIONS

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BIOGRAPHY



Authors have the option to publish a biography together with the paper, with the academic qualification, past and present positions, research interests, awards, etc. This increases the profile of the authors and is well received by international readers.