Management of Water Resources in Urban context of Contai Municipality using Geoinformatics, West Bengal, India

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Abstract:

Water is the key parameter of urban development. Contai urban area is faced to suitable water, due to high amount of carbon in ground water is unused and short period of rainfall, so urban depends on the out sources. The present study focuses on the water supply planning through geoinformatics data base i.e. ETM+, Ikonos data and other satellite data also toposheets, ward map of the study area. For the urban planning require nearly continuous. Acquisition of data to formulate governmental policies and programme . These policies and Programme might range from the social, economic and cultural domain to the context of Environmental and natural resource planning. Quantitative and Qualitative description of the characteristic and geometry for transport network, drainage System, population estimation, housing quality studies, traffic, and site selection processes, and urban change detection. Middle parts are under development trend, where as the northern parts & southern parts of this area are not developed as other parts of the city, Water supply or drainage facility. The study concluded that proposed water supply map, integrated sewerage system in the municipal area, soak pit constructed in many buildings and planning the wastewater directly recharge by surface drain.

***Key words**: Remote sensing, GIS, ETM$^+$, TM, Ikonos, SRTM, Urban change detection.*

Introduction: Urban planning is the study of the form of human settlement and the process of their formation and transformation. Urban landscapes are composed of diverse assemblages of materials, arranged by human in complex ways to build housing transportation system, commercial and industrial facilities, and recreational landscape. The study seeks to understand the spatial structure and character of a metropolitan area, City, town, or village by examining the patterns of its component part and the process of its development.

This can involve the analysis of physical structure at different scales as well as patterns of movement, land use, Ownership or control and occupation. Planning of the physical form focuses on drainage, transportation, water supply, settlement, commercial pattern, sometimes referred to collectively as grain. Special attention is given to how the physical form of a city changes over time and to how different cities Compare to each other. Another significant part

of this subfield deals with the study of the social form which is express in the physical layout of a city.

Aim & Objectives: Management of Water Resources in Urban Area.

- To get better knowledge of the study area.
- To identify problems of the study area.
- To extend of the draft development plane of urban planning of contai municipality from (2012-13 to 2017-18).
- To get the way of solving problems for a sustainable development of the study area.

Location of the study area: My study area is Contai Municipal Corporation area. It is a historical city in east Midnapur District in West Bengal state. Study area geographically located at 21°47' N, 87°45' E to 21.78°N 87.75°E. It has an average elevation of 6 meters (19 feet). It is about 160 km away from Kolkata and 30 km from the beach town Digha. The main Contai town is mainly divided in to Wards no- 8, 9, 10, 11, 12, 13, and 14. Rest area mainly covered by agricultural land or sandy dunes.

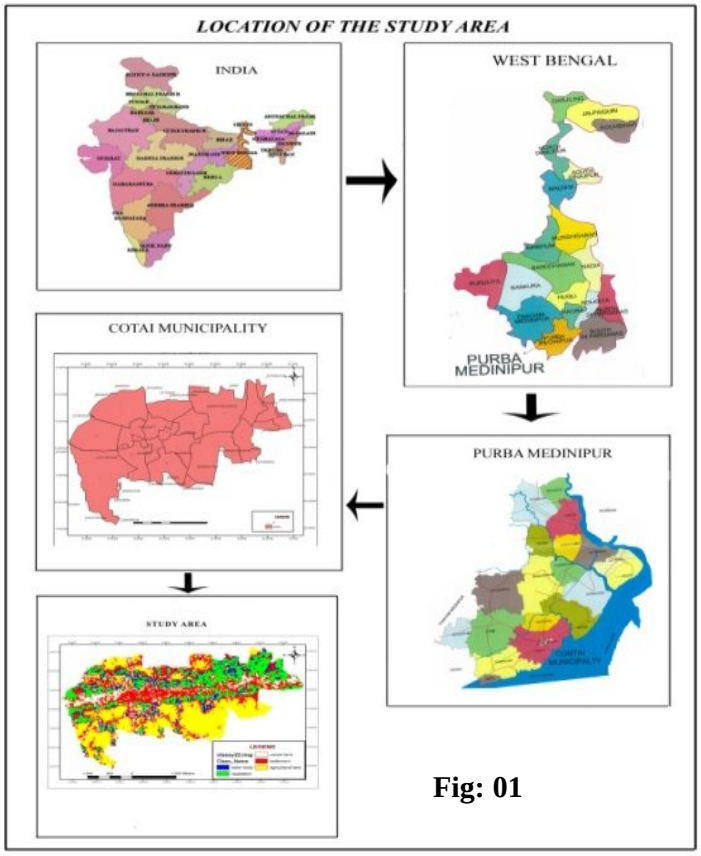

Fig: 01

Basic Information of the Contai town:
Location: (Linkage of Rail, Road and Seaport)
Year of Establishment - 1958
Name of Town - Contai
Administrative Status - Local body
Sub-Division - Contai
Hierarchy in District Administration - District Magistrate Purba Medinipur
Area - 142559m, No of ward – 18

About study area

Climate conditions: The climate of this area is fair being neither hot nor too cold. The highest mean temperature recorded in summer is around 25°C the end of April and beginning of May. The average annual rainfall in the aria is about 250 m.m. along with thundershowers and stormy weather which occurs due to depression in the Bay of Bengal. In winter, temperature comes down at the mean daily minimum temperature at 9^0c.

Soil and Ground Water: Soil formation of this municipality comprises of two types. In east and western part of the township it is completely sandy however in northern and southern part of the township soil is mixed with sand and mud.

At contai municipality, ground water is not used as drinking water because due to presence of 3.5% carbon in the microstructure.

The internal cement mortar lining protects inner surface against aggressive water.

The internal cement mortar lining does not allow tuberculation & corrosion Product growth inside the pipeline.

Water bodies: At contain municipality, there were 560 numbers of ponds dispersedly located all over the study area, but now there is available most 572 numbers of pond (Fig: 02) .One canal is found at the west side of the study area. Sewage disposal is another source of concern. Not all drains are covered either, thus causing a profile ration of disease causing flies and mosquitoes. However as many other coastal and humid low-lying towns of West Bengal, this problem is not as acute.

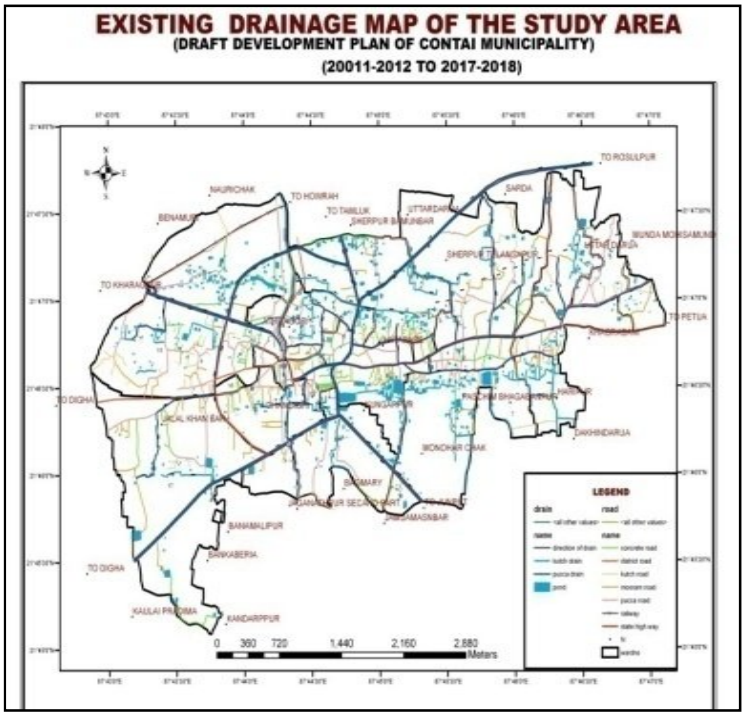

Fig: 02

Economic & Transport Condition: Conventionally a city is identified by the predominant economic activity carried out within its boundary.-Therefore that is understand that a city's spatial structure the distribution of urban resource is to be analyzed. This municipality is an agriculture-based area. Most of the inhabitants based on agriculture or agriculture related activity. The existing commercial conditions are shown fig: 03. Transport network is the major control of urban planning. All the important of roads of this municipality are Bituminous. The link roads and lanes are brick paved and Morum bound but

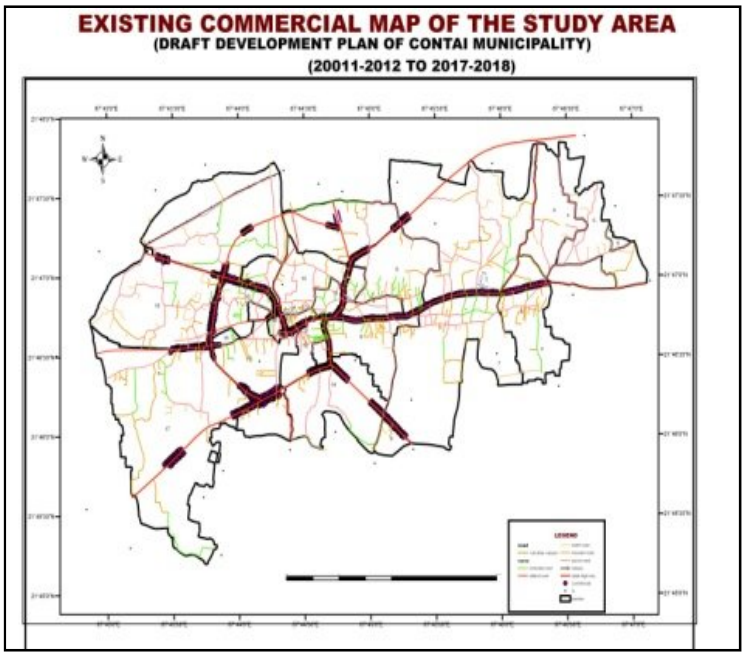

Fig: 03

They are very much narrower which causes traffic jam and certain busy hours. There is one major bus stand, named central bus stand which is situated at bypass of the town. There is also one railway station.

Land use/ land cover: The land use/ land cover of the study area has been obtained by performing a supervised classification on the satellite imagery based with field work data. Accordingly training points identified to represent the various land use classes were marked using GPS during the field visits. These GCP points were used to sample representative signatures for different land use classes. The categories included water body, vegetation, vacant land, Settlements and agricultural land. (Fig: 04).

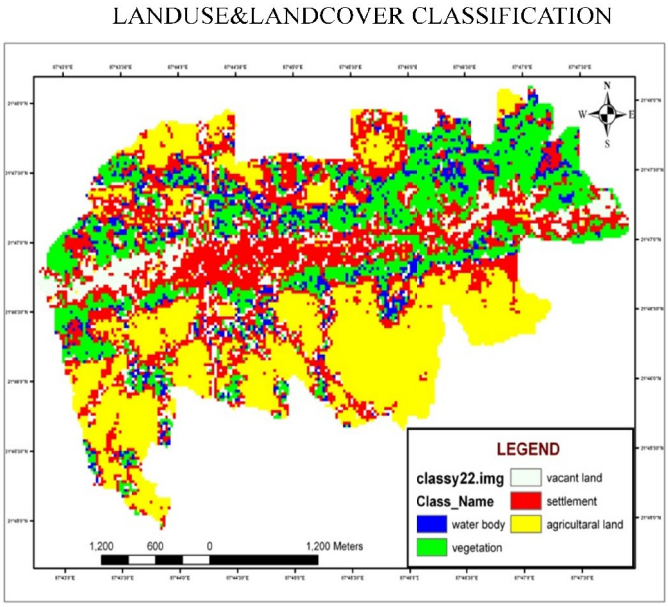

Fig: 04

Table: 01 Classification Report

Class Name	Area (Ha)
Canal	8.60985
Water Body	129.066525
Vacant Land	62.86815
Vegetation	329.93595
Agricultural	470.29275
Settlement	467.774775
Total	**1468. 548**

Demographic growth: Before 1971, study area was not a municipal area. Total area of municipality is 14.2559 sq km. Total area of municipality is not change, but total no of ward is change, before 2001 total no of ward were 18. But recently total no of ward is changed. Now total no of ward is 20, but there is no information about these area.

The population of contai Municipal Corporation in 1971 was 22824 (Table: 03). Population is consequently increase to reach to 53425, in 2001 total population is 77497 (as per census data). It is estimated that the protected population.

Health Center: Despite the emergence in recent years, the healthcare scenario paints a picture that in many ways unsatisfactory. A large percentage of the poor, particularly in far off areas lacks access to essential health care system. Few Nos. of private nursing homes have come up but that does not

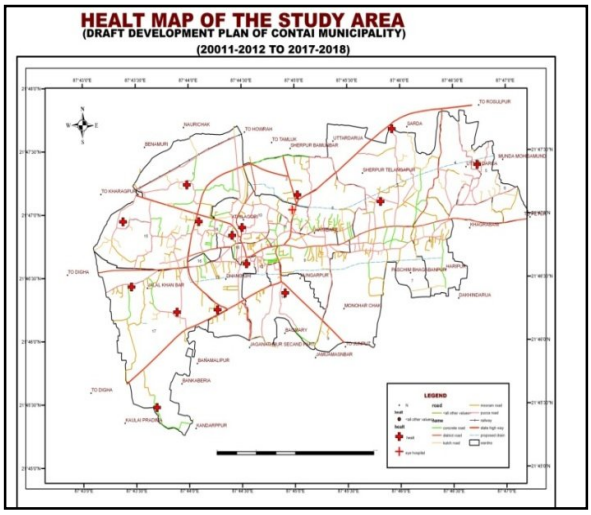

Fig: 05

indicate any happy scenario of health-care system here. Lack of sanitation, poor hygiene adds to the disease burden especially in slum areas. This affects disadvantaged policy development to address these concerns, and it is critical that this policy development be participatory to take into account the tradeoffs in terms of economic benefits and casts facing individual stakeholders. Contai Sub-divisional hospital situated at the extreme eastern part of the township (Fig: 05). Beside this now a day's nurse of private hosp- ital sprang up and NGOs like Red-Cross Society, Lians' Club and other Clinical and Pathological laboratories along with huge nurse of practicing Doctors are there.

Education: There are numbers of well-known schools and colleges in Contai-I (Fig: 06). For higher education, besides the Prabhat Kumar College under the Vidyasagar University, there is an Ayurvedic Coliege, a Polytechnic Engineering College, a Veterinary College, etc. The literacy rate of Contai subdivision is as high as 95%. Major schools in Contai are Contai High School, Contai Model Institution, Contai K. M. Bidhyabhaban, Contai Hindu Girls' School, Chandramani Brahmo Girls School, Kishorenagar Sachindra Siksha Sadan etc. There are 20

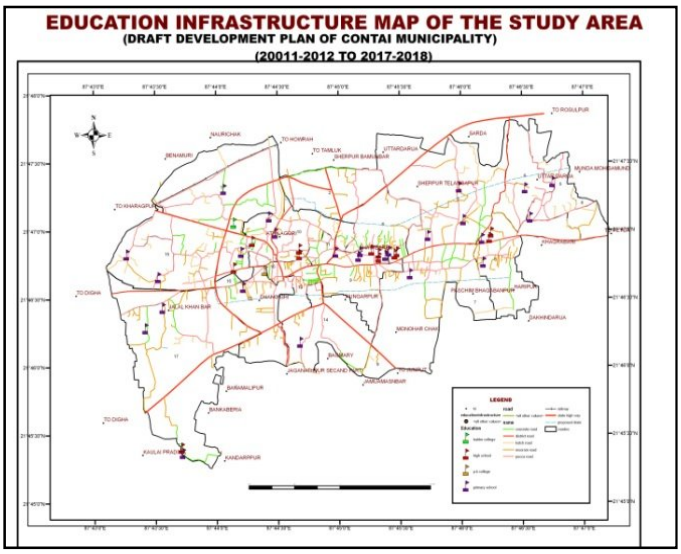

Fig: 06

Primary Schools, 20 Shisu Shiksha Kendra (SSK Centers) situated in this municipality along with numbers of Computer Training Centre, Motor Training Schools and other commercial Center.

Transport network: Transport network is the mjaor control of urban planning. All the important of roads of this municipality are Bituminous. The link roads and lanes are brick paved and Moorum bound but they are very much narrower which causes traffic jam and certain busy hours. At the previous time transport network was as-

Contai well connected by roads/ highways with other nearby cities and towns like, Digha, Dantan, Kharagpur, Tamluk, Haldia, Howrah, and Kolkata. The town connected by a rail link to Howrah/Kolkata, which extended to Digha.The rail line believed to

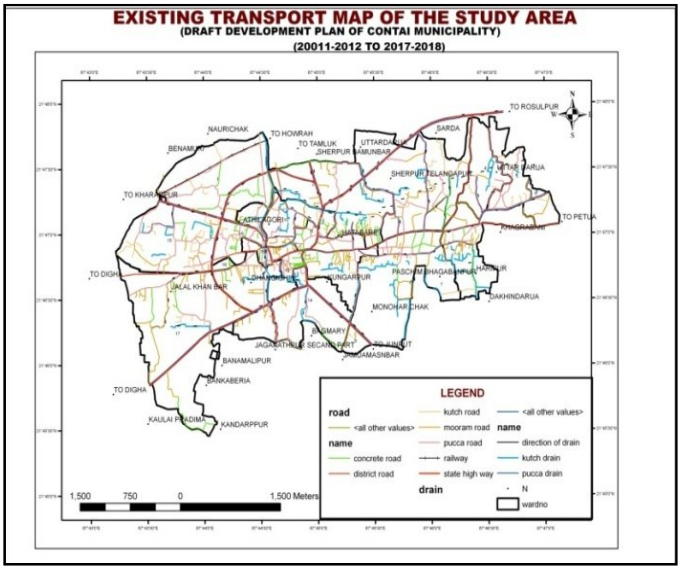

Fig: 07

have given a rise to the local economy. For local transportation, bus, mini-bus, taxi, and cycle rickshaws are available. The opening of Central Bus-stand has eased the traffic congestion within the city to a great deal. The region holds great potential in tourism (Fig: 07).

Materials & Methodology:

Table: 02

Imagery	Year	Sources	Collateral Data	Sources
ETM +	2006	Download from NET	Ward boundary, Road map	Contai Municipality Development offices
SRTM (90Mt)	2002	GLCF	Health center & Education instauration location	Field Survey
Geo EYE	2010	Google Inc.	Census data	Census office, Kolkata
DPMS	2010	NATMO- Kolkata	Toposheets (1971)	SOI- Kolkata

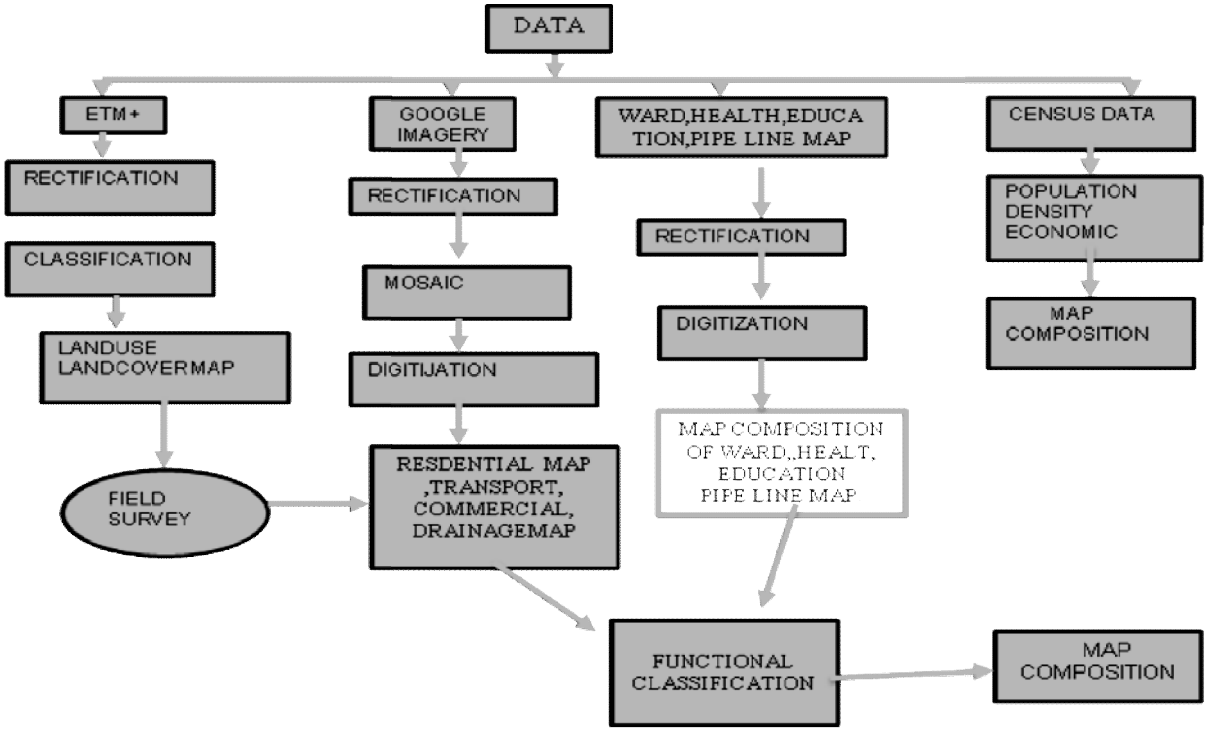

Fig: 08, Flow Chart of the work.

(For Laboratory work used listed software: PCI Geomantic, ERDAS IMAGINE & Arc GIS)

Result & Discussion

DEMOGRAPHIC GROWH: Before 1971, study area was not a municipal area. Total area of municipality is 14.2559 sq km. Total area of municipality is unchange, but total no of ward is change; before 2001 total no of ward was 18. But recently total no of ward is changed. Now total no of ward is 20, but there is no information about these area.

The population of contai Municipal Corporation in 1971 was 22824. Population is consequently increase to reach to 53425, 2001 total population is 77497, in 2011 total population 101962 (as per census data.), and 2012 it increased 124952 population. Side by side the population density increased from 1991to 2012, 3747, 5436, 7152, 7783, and 8764 respectively.

TABLE:03 FOR POPULATION GROWTH PATTERN

YEAR	AREA	POPULATION	POPULATION DENSITY
1991	14.2559 (KM^2)	53425	3747
2001		77497	5436
2008		101962	7152
2011		110962	7783
2012		124952	8764

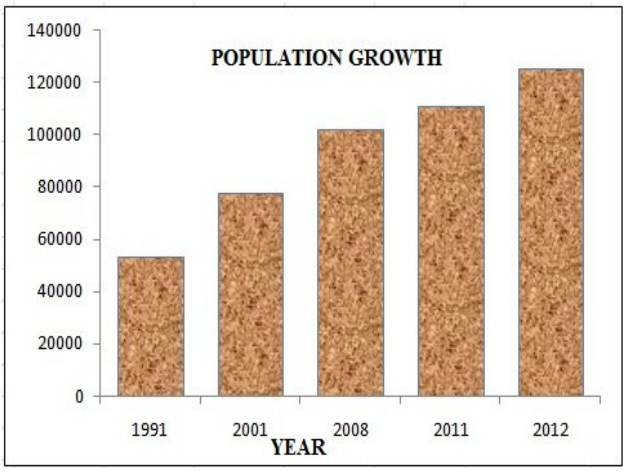

Chart: 01

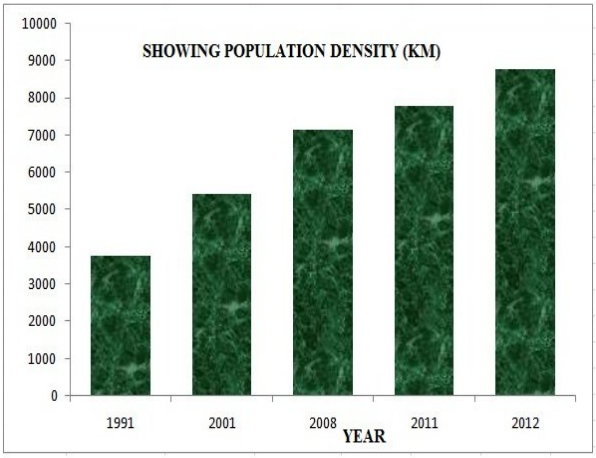

Chart: 02

Proposed Drainage: The figure 09 planed the proposed drainage map. The proposed drainage system naturally addresses impacts to an existing man made or natural drainage system from a planned improvement. This can take the form of new ditches and culverts or it can take the form of improving existing water problem in the area. Keep in mind that any improvement to an existing drainage system will more than likely affect surrounding drainage

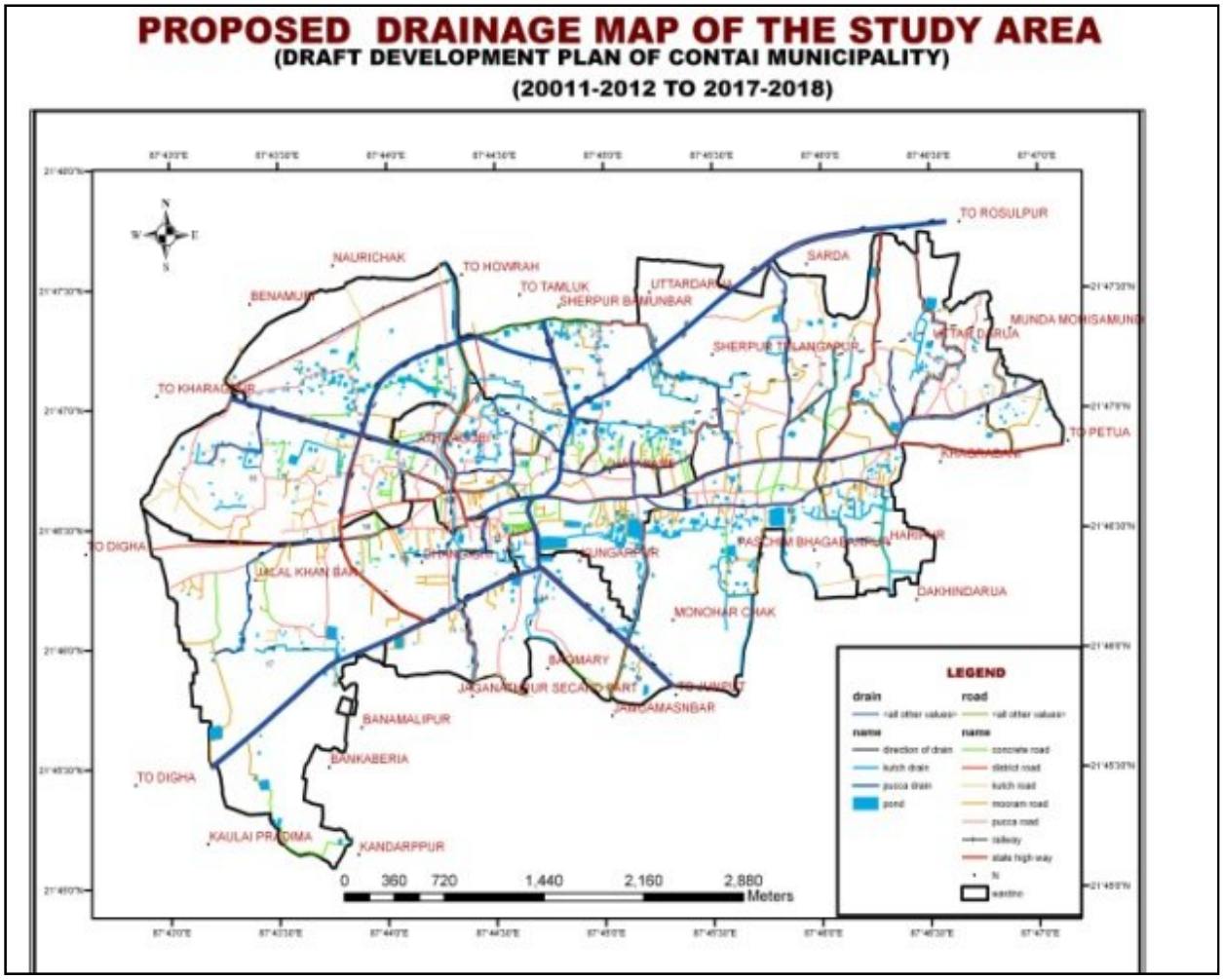

Fig: 09

Patterns and elevations on adjacent properties. In the northern & southern part some proposed drain is planed, so that drainage problem may solve.

Proposed Water supply: The main source of water supply in this area maintained by the PHE department. But at this municipality ground water is not used as drinking water because due to presence of 3.5% carbon in the microstructure. As the iron content of the tube well water from tube wells will be high, so water from tube well will be sent to IEP through separate rising main. There are 3 OHR.

OHR–source from 1.Majna- 2.Mukundapur 3.Dauki- distance from source to OHR=8000M. For resolve the burning problem projected some tape and pipe line based on the exiting present distribution (Fig: 10).

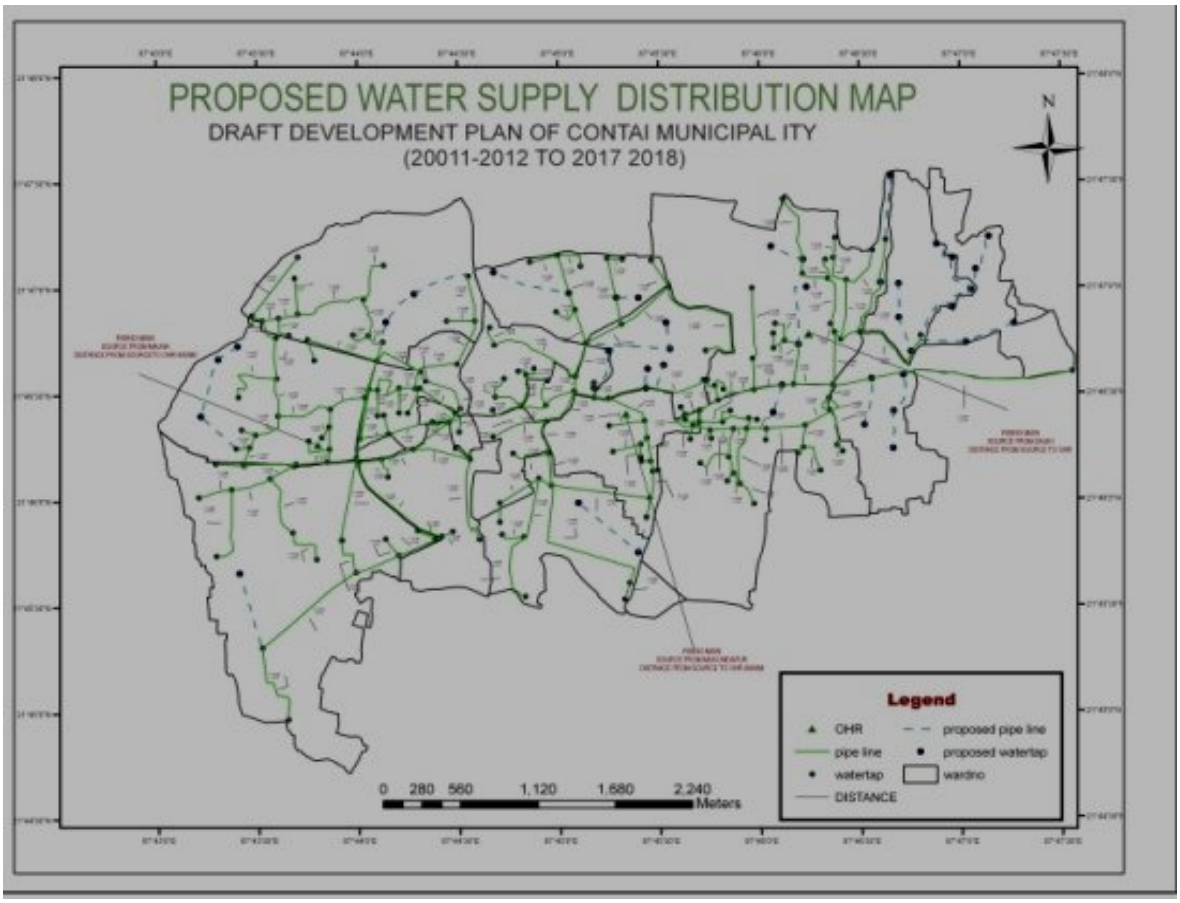

Fig: 10

CONCLUTION

From the study it is observed that Contai municipality area is increased day by day. At present the middle parts are under development trend, where as the northern parts & southern parts of this area are not developed as other parts of the city. Water facility, drainage facility, health facility and transport facilities are not in satisfactory state. There is no integrated sewerage system in the municipal area, no soak pit constructed in many buildings and the wastewater directly discharged into the surface drain. The land of northern& southern parts are mainly used for cultivation low residents are there. These areas are mainly considered as semi-planned area.

Some suggestions and recommendation

- To reach the goal for development plane with in the town should be develop the northern part& southern Part of the study area.
- The transport network, drainage system and water supply of the town should be developed in such a way that all service centers have sufficient and good accessibility.

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