HALDIA REGION VISION & UP-GRADATION OF PERSPECTIVE PLAN

UPGRADATION OF PERSPECTIVE PLAN

for the

HALDIA DEVELOPMENT AUTHORITY

By

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CONTENTS

ABBREVIATIONS

ADB	: Asia Development Bank
AoI	: Area of Interest (demarcated by HDA for this study)
BDO	: Block Development Officer
BOD	: Biological Oxygen Demand
CESC	: Calcutta Electric Supply Corporation
COD	: Chemical Oxygen Demand
CPHEEO	: Central public Health and Environmental Engineering Organization
EWS	: Economically Weaker Section
GoI	: Government of India
GoWB	: Government of West Bengal
HDA	: Haldia Development Authority
HDC	: Haldia Dock Complex
HH	: Households
HPA	: Haldia Planning Area
KMDA	: Kolkata Metropolitan Development Authority
KoPT	: Kolkata Port Trust
KW	: Kilo Watts
LIG	: Low Income Group
lpcd	: Liters per Capita per Day
MIG	: Middle Income Group
MLD	: Million Liters per Day
MUD	: Ministry of Urban Development
MW	: Mega Watts
NH	: National Highway
NW	: National Waterways
PCPIR	: Petrochem, Chemical and Petro-Chemicals Investment Region
pph	: Persons Per hectare
PWD	: Public Works Department
SEZ	: Special Economic Zone
SH	: State Highway
UDPFI	: Urban Development Plans Formulation and Implementation

TABLE OF FIGURES

LIST OF TABLES

1. INTRODUCTION

1.1. Background to the project

The Haldia Development Authority (HDA) vide its memo number NIT/ NO. 39 /HDA/EC OF 2005-06 has decided to upgrade their perspective plan for the next twenty five years. According to the HDA the perspective plan would have a "*vision*" to chart out a "*road map to rapid progress*" for the next twenty five years.

Prior to this, a perspective plan had been prepared by the HDA for the earlier demarcated region comprising of the Haldia Subdivision. However, now the region has been extended to incorporate the Tamluk Subdivision and has a total area of 1768 sq. km.

This report follows the VISION stated in the First Volume of the "**Haldia Region Vision & Up-Gradation Of Perspective Plan"** and is not only intended to include the extended areas, but also to consider the following aspects which characterize the region and its people.

- ***There is an OPPORTUNITY***: The locational advantages of the area with rivers on three sides, access to the national corridors and nearness to other metropolitan and educational centres make the region attractive for being considered as a GROWTH CENTER

- ***It is necessary to USE LAND OPTIMALLY:*** The present fragmentation of fertile agricultural land among growing families has made it difficult to earn sufficiently to maintain a family and reasonable standard of living. This would necessitate an intensification in the use of land as it be would be required to serve the existing population of nearly 2.3 million and the future population with newer and larger demands in the coming twenty five years in the region.

- ***There is a PROBLEM***: Haldia Port which is the driver of the present industrial economy has a growth constraint because of heavy siltation. The existing industries are highly port dependent and hence the economic base is at a risk. Thus a new set of economic activities need to be encouraged in this region.

- ***There is a requirement of a NEW IDENTITY***: Haldia today is an Industrial centre and has a grey landscape of being a dusty polluted town. One of the aims of this plan is to generate a distinct and new identity apart. Along with being an industrial centre, the plan aims at developing the region in the finance, commerce, knowledge and entertainment sectors.

1.2. The Area of Interest

The Area of Interest (AoI) for the study, demarcated by the HDA consists of the Haldia and Tamluk Subdivisions in the East Midnapur District of West Bengal. Presently this region has a population of 2.38 million with an area of 1768 sq.km. The AoI is located on the eastern coast at the mouth of river Hoogli and river Haldi, very close to the Bay of Bengal. It is an entry point to the eastern, northern and north eastern region of India. It has an advantage of being located near the East Asian economies. Presently it is the fifth largest port of the country.

Industrial and mineral rich centres in Bengal and Jharkhand are at a close distance from Haldia. Renowned educational centres like Kharagpur, Joka and Kolkata are

in close vicinity and are reasonably well connected with rapidly developing urban centres.This will enable a rich well trained human resource.

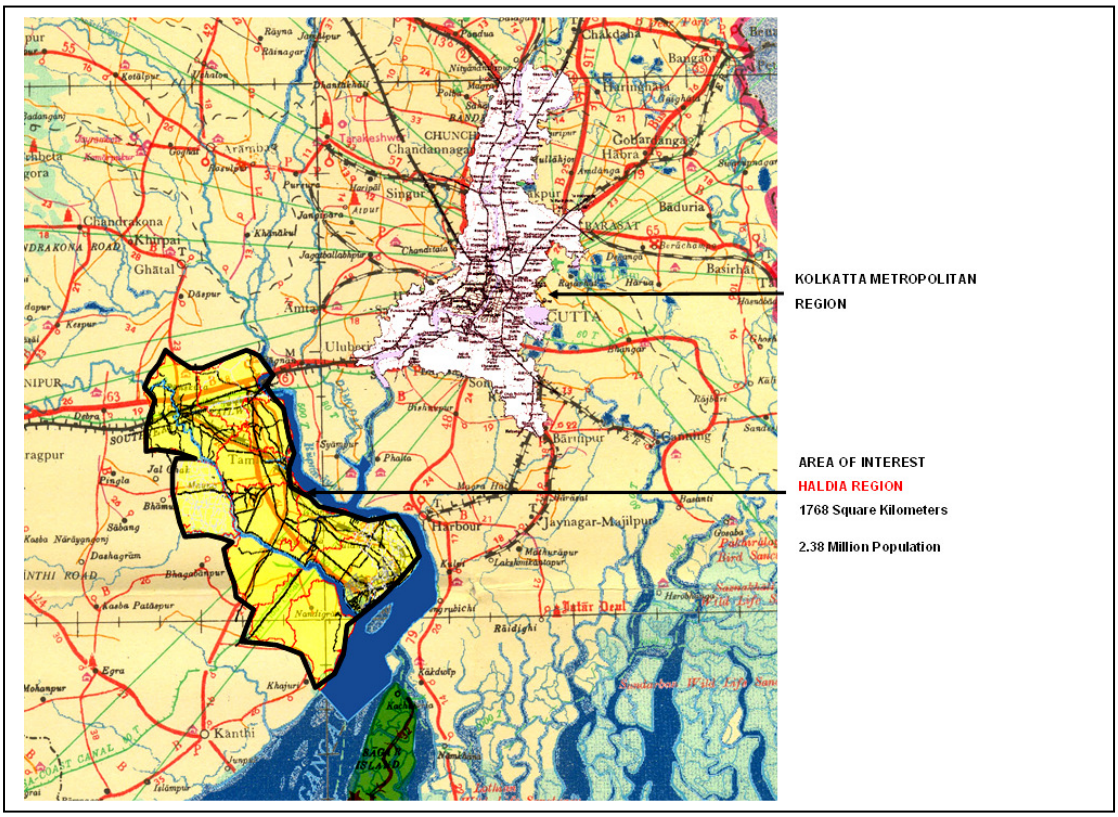


Figure 1.2. The Area of Interest

1.3. Aims

In keeping with background of the project and HDA.'s vision , following are the aims of this project :

- To develop a physical plan for a growth oriented economy that would leverage the local capacities and improve the standard of life and quality of life of the region. The focus of the project is to make Haldia THE GROWTH CENTER of the East – economically throbbing and internationally competitive.

- To maximise locational advantages not only with improved connectivity, but also using the local competitiveness of the AoI

- To integrate existing natural and human resources to establish a GREEN CITY, probably the FIRST such growth centre in the world.

- To create a NEW IDENTITY for Haldia, that is distinct and so as to becomes a FOCUS in the eastern region.

1.4. Methodology of Study

Data Assembly and Analysis

Collecting and compiling of Data has been extremely difficult as this was scattered amongst various departments of the Government. All data was assembled from secondary sources. The list of main and important data Sources is as follows:

Table 1.1. List of Data Sources

1	STATISTICAL DATA • District Statistical Handbook, 2004 by Bureau of Applied Economics and Statistics, Govt. of West Bengal • A Socio-Economic Study of Households in Haldia Planning Area: 1999 – 2000 by Aariz Aftab and Dr. Animesh Halder, Haldia Development Authority
2	TECHNICAL REPORTS • Draft Perspective Plan for Haldia Planning Area (HPA) for Year 2025: Final Report Part 2; Draft Landuse and Development Control Plan for HPA: Volume 1; Financial Planning for the Developmental Projects proposed to be carried out in HPA; Development and Annual Plan for HPA. All these documents were prepared *by Consultation Engineering Services Private Limited in 2002.* • Draft Annual Plan – 2005-2006 on Agriculture of Purba Medinipur District *by the Office of Principal Agricultural Officer, Purba Medinipur, 2005* • Project Report for Bridge of River Haldi connecting Haldia and

	Nandigram, *by Gherzi Eastern Limited, 2005* • Detailed Project Report on the Integrated Waste Management Complex in Haldia • Rapid Environmental Impact Assessment for the Site at Haldia to be Developed as Treatment, Storage and Disposal Facility for Hazardous Waste, *by Institute of Wetland Management and Ecological Design* • Draft Feasibility Report of Costal Road from Haldia to Dhiga *by West Bengal Consultancy Limited, 2004* • TERI Report No. 2004EE23: Area Wide Environmental Quality Management Plan for Haldia, *by TERI, 2004* • Report for the West Bengal Corridor Development Project, *by the President, Asia Development Bank 2001* • Metrological Data of Haldia from 1982 to 1999 (received from the Special Land Officer, HDA) • Block Profiles of several Blocks were collected from the Block Development Offices
3	MAPS • Map of the Area of Interest prepared by the office of Chief Executive Officer, HDA, (Hardcopy blue print at scale 1: 63360) • Map of the Flood Zones for the AoI prepared by the office of Executive Engineer, Irrigation and Water Ways Directorate (Hardcopy blue print at scale 1 inch : 4 miles) • Map of the Canal Systems for the AoI prepared by the office of Executive Engineer, Irrigation and Water Ways Directorate (Hardcopy blue print at scale 1 inch : 1 mile) • Draft plan for the Petrochem, Chemical and Petro-Chemicals Investment Region (PCPIR) prepared by the office of Special Land Officer, HDA (Photocopy of a hand drawn plan in A3 size) • State Map of West Bengal prepared by the office of Survey of India (Hardcopy at scale 1: 10,00,000) • District Map of Purba Medinipur prepared by the office of Survey of India (Hardcopy at scale 1: 1,15,000) • Map of the Sandheads: Paradip to Raimangal River prepared by the

	office of Hydrographer of the British Navy (Photocopy of the map) • Maps of the Blocks (Various Photocopied maps as different scales were provided by the Block Development Officers of all Blocks) • Maps of Blocks with road networks prepared by the office of the Public Works Department (Cad format soft copy drawings) • Maps from Google Earth and Wiki Maps were extensively used in the project
4	WEBSITES • Haldia Development Authority: www.hdaindia.com • Census of India: www.wbcensus.gov.in • Port of Haldia: www.kolkattaporttrust.gov.in/hdc_T12.html • The Committee on Infrastructure: GoI: www.infrastructure.gov.in • TERI: www.teriin.org • Central Public Health and Environmental Engineering Organisation, Ministry of Urban Development, GoI: http://cpheeo.nic.in • Ministry of Urban Development, GoI: www.urbanindia.nic.in • Kolkata Metropolitan Development Authority: www.cmdaonline.com • Ministry of Water Sources, GoI: www.cgwber.nic.in

Along with the above secondary sources, data was also assembled from several stakeholder meetings where structured interviews were conducted. The authors of this report would like to thank these stakeholders without whom this report would have remained incomplete. A list of stakeholders met is as follows:

Table 1.2. List of stakeholder consultations

25 Aug 2006	• Gautam Chakravarthy, Special Land Officer, HDA (Haldia) • Masud Kandhekar, Asst. Planner, HDA (Haldia)
27 Aug 2006	• Mahadeo Lohar, BDO, Mahisadhal • Ashok Behra, Sabhapati, Nandigram (Nandigram)
28 Aug 2006	• Surendra Gupta, Chief Executive Officer, HDA (Haldia) • Lakshman Seth, Chairman, HDA (Haldia) • Amal Dutta, Dock Administrative Manager, Haldia Dock

	Complex, Calcutta Port Trust (Haldia)
29 Aug 2006	• Samit Biswas, BDO, Tamluk (Tamluk) • Satopada Bhatacharjee, Joint BDO Panskura (Panskura) • Sanjay Kumar, BDO, Kolaghat (Kolaghat)
30 Aug 2006	• Somu Bhatacharjee, BDO, Shahid Matangini
31 Aug 2006	• Sabhapati, Sutahata (Sutahata)
04 Sep 2006	• Bikalo Mandal, BDO, Sutahata (Sutahata) • Sukumar Sarkar, Project Development Officer, HDA (Haldia) • Subroto Rai, Licence Inspector, Haldia Municipality (Haldia) • Amal Dutta, Dock Administrative Manager, Haldia Dock Complex, Calcutta Port Trust (Haldia)
05 Sep 2006	• Ashish Tripathi, Principal Agricultural Officer, Purba Medinipur District (Tamluk) • Marketing Officer, Agriculture, Purba Medinipur District (Tamluk) • Kushadwaj Bag, District Officer, Food Processing and Horticulture, Purba Medinipur District (Tamluk) • Hrishikesh Maji, Sabhapati, Nandakumar (Nandakumar)
06 Sep 2006	• Gautam Chakravarthy, Special Land Officer, HDA (Haldia) • Sukumar Sarkar, Project Development Officer, HDA (Haldia) • Masud Kandhekar, Asst. Planner, HDA (Haldia) • F. Mishra, Engineer, HDA (Haldia) • Prashant Bhatacharya, Asst. Engineer, HDA (Haldia)
07 Sep 2006	• Surjeet Mitra, Tourism Officer, HDA (Haldia) • Bimal Chakrabarty, Rehabilitation Officer, HDA (Haldia) • Pratik Kumar Mandal, BDO, Chandipur (Chandipur) • Ashok Behra, Sabhapati, Nandigram (Nandigram) and Ashok Sarkar, BDO, Nandigram (Nandigram) • Swaroop Kumar Malik, BDO, Haldia (Haldia)

08 Sep 2006	• Debashis Chatterjee, BDO, Moyna (Moyna) • Dilip Mandal, District Fishery Officer, Purba Medinipur District (Contai)
27 Oct 2006	• Meeting with Lakshman Seth, Chairman, HDA and other officers of the HDA (Haldia)
30 Oct 2006	• Ashok Bhera, Sabhapati, Nandigram (Nandigram) • Gautam Chakravarthy, Special Land Officer, HDA (Haldia) • Sukumar Sarkar, Project Development Officer, HDA (Haldia)
31 Oct 2006	• Mahadeo Lohar, BDO, Mahisadhal (Mahisadhal) • District Magistrate, Purba Medinipur District, (Tamluk) • Officers of the Irrigation and Waterways Directorate, Purba Medinipur District, (Tamluk)
01 Nov 2006	• Meeting with Sabhadipati and officers of PWD, Agriculture Dept, Horticulture Department (Tamluk)
02 Nov 2006	• Presentation to Perwez Siddiqui, Chief Executive Officer, HDA (Haldia) • Gautam Chakravarthy, Special Land Officer, HDA (Haldia) • Sukumar Sarkar, Project Development Officer, HDA (Haldia) • Officers of the Irrigation and Waterways Directorate, Purba Medinipur District, (Tamluk)

Elaborate photographic documentation was also undertaken of the whole AoI. Rapid Appraisal methods were used for site analysis and involved visiting the site and going to different strategic places within the region and doing a quick assessment of the existing fabric, infrastructure, housing, etc.

Since the data which was compiled from several sources was fragmented, it took a considerable time to make a master database for the study. All hardcopy and softcopy maps were assembled and stitched into a single soft copy map in dwg format. This database will be submitted to HDA in soft format so that it can be updated and subsequent layers of information for the region can be added as and

when available. Further, the collected data was analysed towards formulation of Situation Assessment for determining of locational characteristics, competitive / comparative advantages, opportunities and potentials within the area. The chapter "Existing Conditions and Development Issues" presents the data collected and the analysis.

Projections and Strategy Formulation

The stage involved overlapping of the suggested vision on the existing condition and projecting various demands that the implementation of the vision will create. Planning Concerns were articulated to guide the overall development. Further, conceptual strategies were formulated to match the planning concerns and the projections. The conceptual strategies were informed by the database and analysis enabling the design team to create strategies for broad based land-use, infrastructure plan, and based on a clear articulated scenario for planning prepared by the team.

This stage involves further detailing out strategies and their resultant implications on different areas in the Haldia region. It shows implications on the ground of different strategies and testing the nature of development brought about by each so as to facilitate the desired master plan.

2. EXISTING CONDITIONS & DEVELOPMENT ISSUES

2.1. Regional Context and Potentials

2.1.1. Location and Surrounding Context

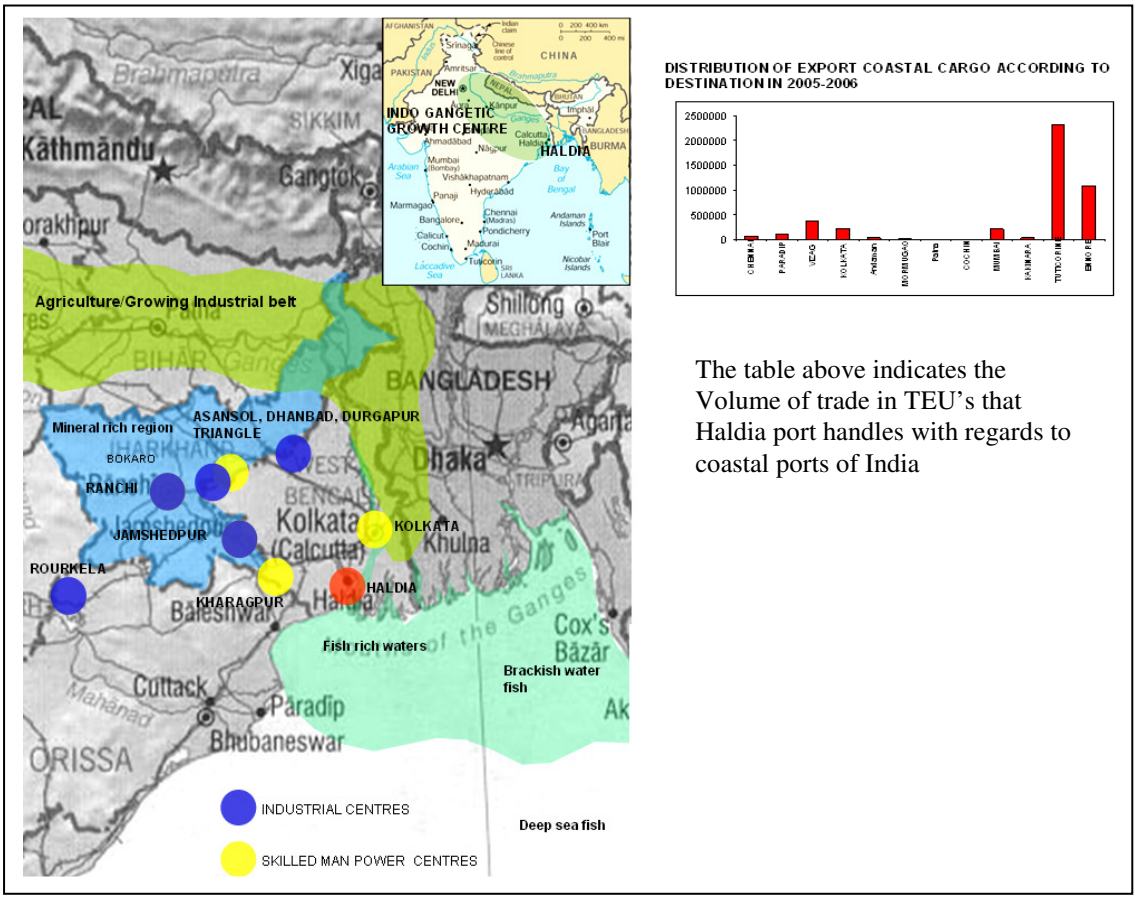


Figure 2.1. Regional Contexts

The region is located strategically in the delta of the Ganges with the rapidly growing Gangetic states of Bihar, Uttar Pradesh as its influence area. The port and industrial town of Haldia is supported by its hinterland of industrial and mining centres in Jharkhand, Orrisa and West Bengal like Jamshedpur, Bokaro and Rourkela. The region is also close to the intellectual manpower centers like Kharagpur and Kolkata.

As per vision document, "The GDP of the Gangetic states, viz. Uttaranchal, U.P., Bihar, Jharkhand and West Bengal, which form the natural hinterland of Haldia, is

projected to touch $ 300 billion by 2025, provided it matches the current All-India rate of growth of 9%. The Foreign Trade potential of this region is expected to exceed $100 Billion, and most of this can be expected to pass through Haldia"

The region lying in the estuarine belt of the Ganges is intercut by canals, and surrounded by the rivers and sea which have an immense potential for fishing and allied activities. The Sundarbans and the Sagar island which lie close by have high potential for tourism.

2.1.2. Regional Potential

While the study explores Haldia's potential within India, it should also explore its position in the globe. Haldia's location makes it the gateway for the growing economies in the eastern part of Asia like Singapore, Vietnam, Hong Kong, Korea as shown in the adjoining map.

As per the vision document submitted "For the past few years, the Government of India has been actively following a "Look East" policy to strengthen our economic, trade, and cultural ties with the countries of Southeast and East Asia. The Haldia Region will gain enormously once India is integrated with this large and fast growing region of Asia."

DELHI-HOWRAH FRIEGHT CORRIDOR

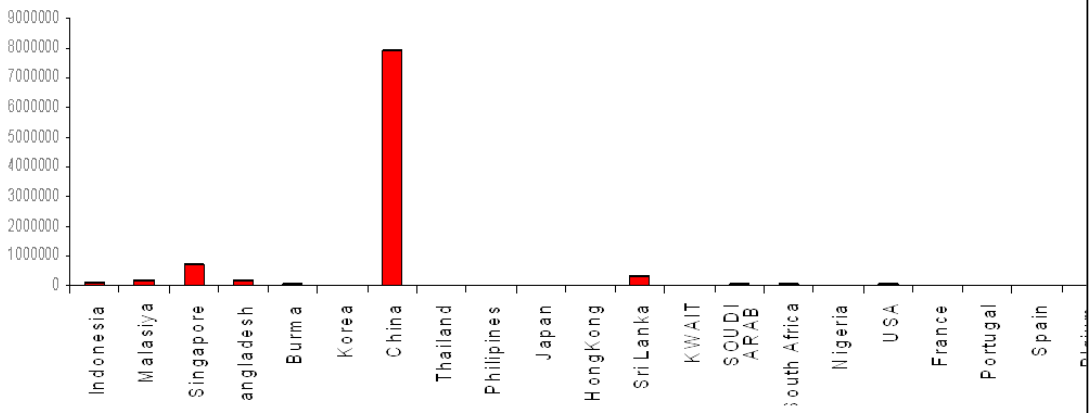
As part of the Golden Quadrilateral project, the Central Government has decided to undertake the Kolkata-Delhi Freight rail corridor which will connect to the proposed deep sea port.

Haldia with its already existing and functioning port and facilities will be placed in a strategic position with regards to these developments and can play a major role as a logistics centre.

Figure 2.2. Details of Delhi – Howrah Freight Corridor

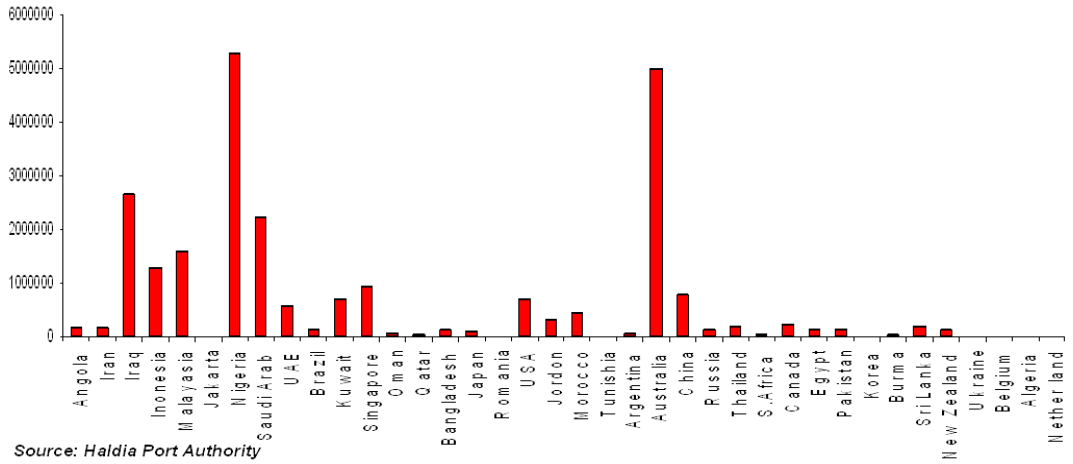
Mp showing intensity of trade in 2005-2006 between Haldia Port and South East Asian countries.

HALDIA PORT 'S EXPORT TRADE IN 2005-2006



Source: Haldia Port Authority

TOTAL EXPORT OVERSEAS CARGO ACCORDING TO DESTINATION 2005-2006

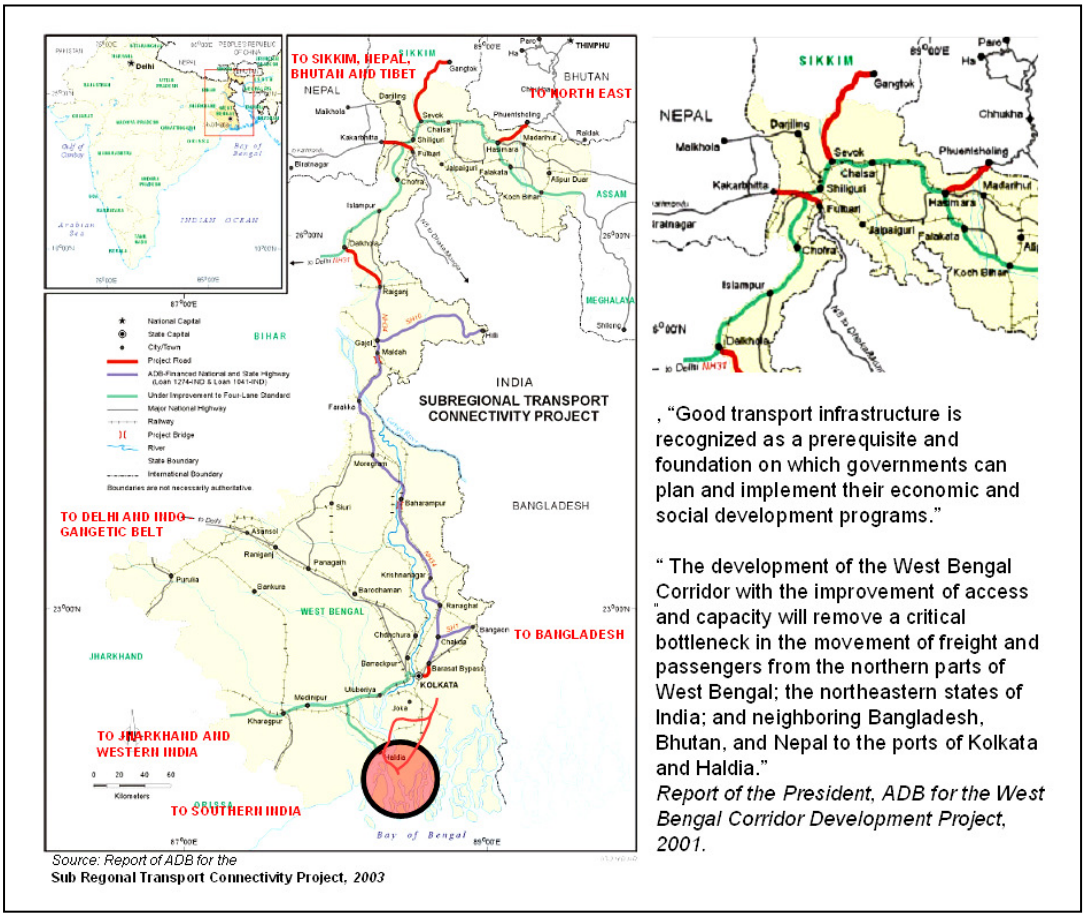


Source: Haldia Port Authority

DISTRIBUTION OF IMPORT OVERSEAS CARGO TO ORIGIN REGIONWISE IN 2005-2006

Figure 2.2. Global Potential

2.1.3. Regional Connectivity and Trade



, "Good transport infrastructure is recognized as a prerequisite and foundation on which governments can plan and implement their economic and social development programs."

" The development of the West Bengal Corridor with the improvement of access and capacity will remove a critical bottleneck in the movement of freight and passengers from the northern parts of West Bengal; the northeastern states of India; and neighboring Bangladesh, Bhutan, and Nepal to the ports of Kolkata and Haldia."
Report of the President, ADB for the West Bengal Corridor Development Project, 2001.

Source: Report of ADB for the
Sub Regonal Transport Connectivity Project, *2003*

Figure 2.3. Sub Regional Transport Connectivity Project, 2003

During the last 5 years the Asian Development Bank has been encouraging the development of transport infrastructure project in and around North Eastern India, Bangladesh, Bhutan, Nepal and China. Though the project proposed by the ADB explores the development potential of North Eastern India and the surrounding countries it becomes evident that Haldia would play an important role.

Also the reopening of the trade route to China (Tibet) through Nathula Pass after a gap of more than 40 years will further strengthen Kolkata-Haldia's locational advantage as it can re-emerge as the natural trans-shipment point for the old Silk Route. Tibet's trade is now almost entirely carried out through Tianjin Port, which is more than 4000 kms away. The distance between Lhasa and Kolkata through the Nathula corridor is around 1200 kms. This corridor can generate economic dividends for both countries.

2.1.4. Regional Road and Rail Networks

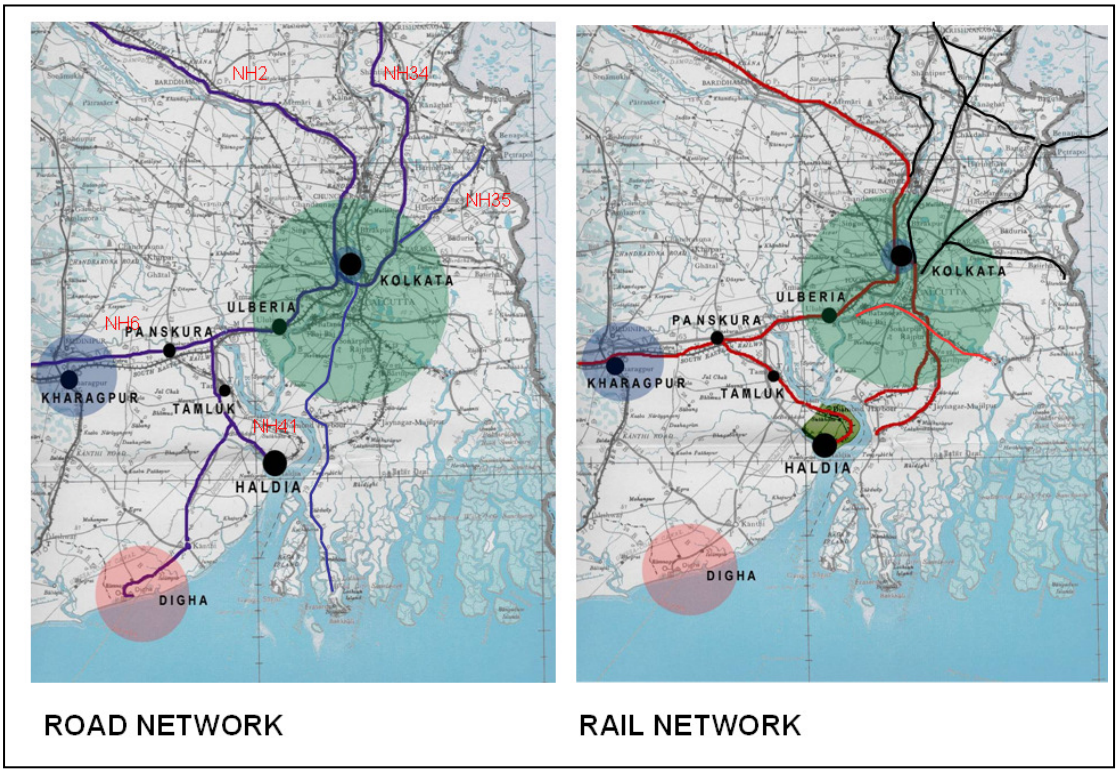


Figure 2.4. Regional Road and Rail Networks

Presently Haldia has reasonably good road infrastructure. The NH-41 connects the region to the Mumbai - Kolkata Highway and also the southern part of India. However the connection to Delhi and the Indo Gangetic states are circuitous through Dankuni. There is a state highway which connects NH-6 to Pannagarh on the highway to Delhi. However, this route is not well developed. The regions connection to the North East is also not so well developed but with the Haldia-Uluberia Expressway and the bridge from Raichak to Kukrahati the connection to NH-34 would improve. There is also a proposal to construct a costal road from Haldia to Digha through Nandigram. For this a bridge has to be constructed from Haldia to Nandigram.

Presently the rail network to Haldia is through a single line between Panskura and Haldia. This joins it to the South-Eastern railway. From Panskura the goods and people are distributed to other regional centers in the north and the north east. This rail network needs to improve substantially if Haldia has to become a growth centre for the region.

2.2. Physical Characteristics and Natural Resources

2.2.1. Climatic Conditions

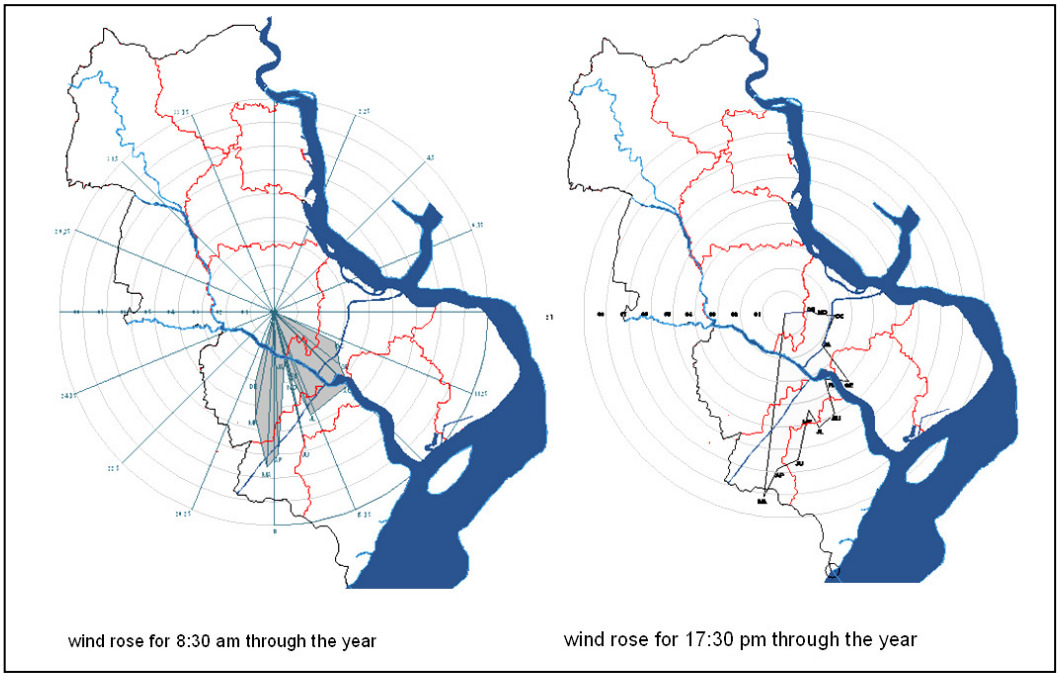


Figure 2.5. Wind Rose Diagrams for the AoI

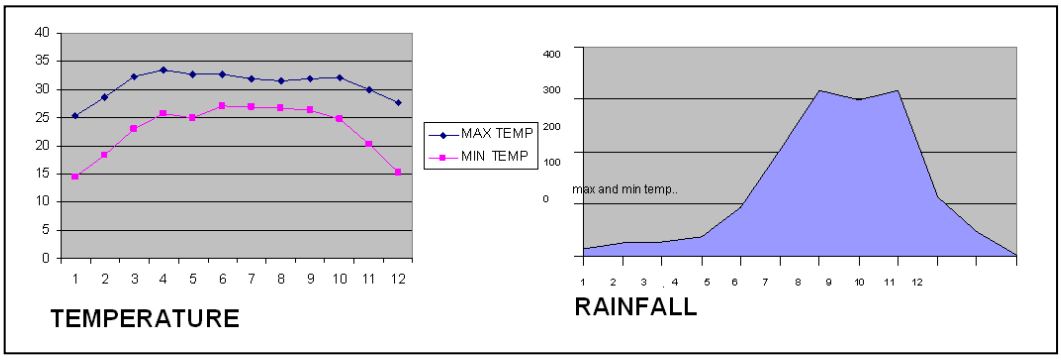


Figure 2.6. Temperature and Rainfall in the AoI

The land in this region is flat and the ground level is generally 7 to 11 feet above mean sea level.

The climatic data for a ten years period from 1989-1999 has been compiled and averaged out to prepare these diagrams showing wind direction, wind speed, maximum-minimum temperature and also monthly rainfall.

The climatic data clearly shows that strong winds blow from the southern to the eastern quadrant which means that any chemical industries should be carefully located in this region otherwise the air pollutant due to such industries will directly blow inland.

The variation in the diurnal range of temperature is not very high which results in humid conditions. Also the total rainfall that this region receives averages around 1489mm. This is quite high and considering that the nature of soil is impervious and evaporation low due to high humidity most of the water remains on the surface causing flooding.

2.2.2. Topography

The Main Rivers

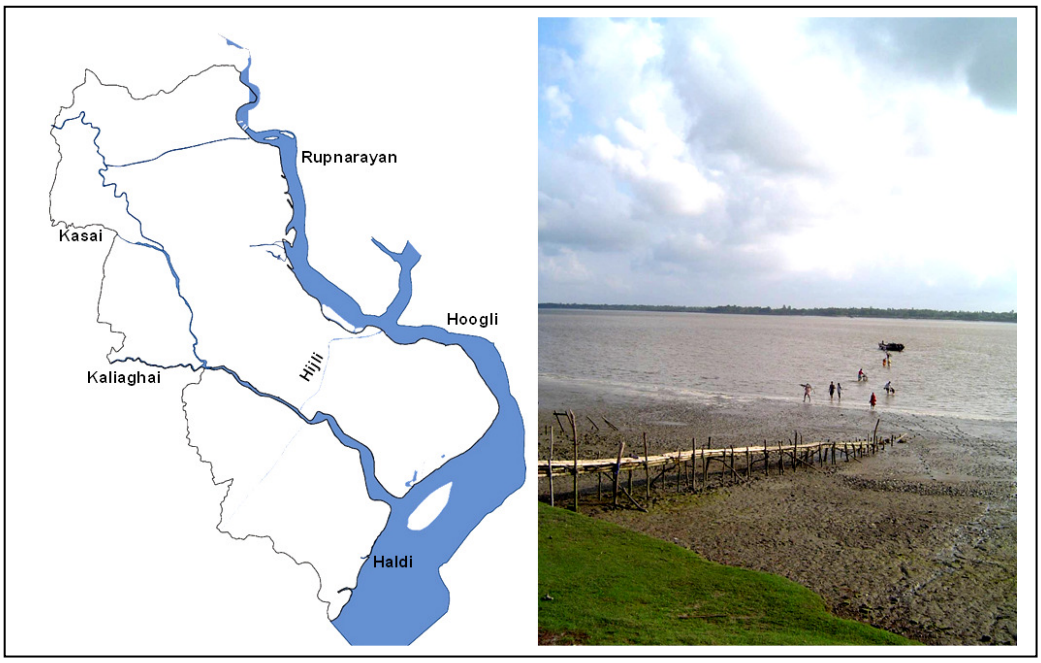


Figure 2.7. The Main Rivers

The region forms part of an estuary with two large rivers meeting the sea . As they are in an estuarine condition, these rivers are heavily influenced by tidal forces.

In the southern part of the region, the Hooghly and the Haldi, due to their proximity to the sea; have high saline content. This salinity decreases the fertility of the area but makes the area suitable for brackish water fishing which is carried on presently in pockets. However, there is no organized infrastructure available for the fishing activity. Since the low tide and high tidal level differences are high, transportation on the river is affected by these tidal conditions.

These rivers also carry a lot of silt along with them which leads to constant formation and erosion of lands mass and shifting banks. These make development along this river edge very uncertain. As a result, most of these river edges have high embankments to protect internal land masses and settlements along the bank.

The Fertile Areas and the Saline Areas

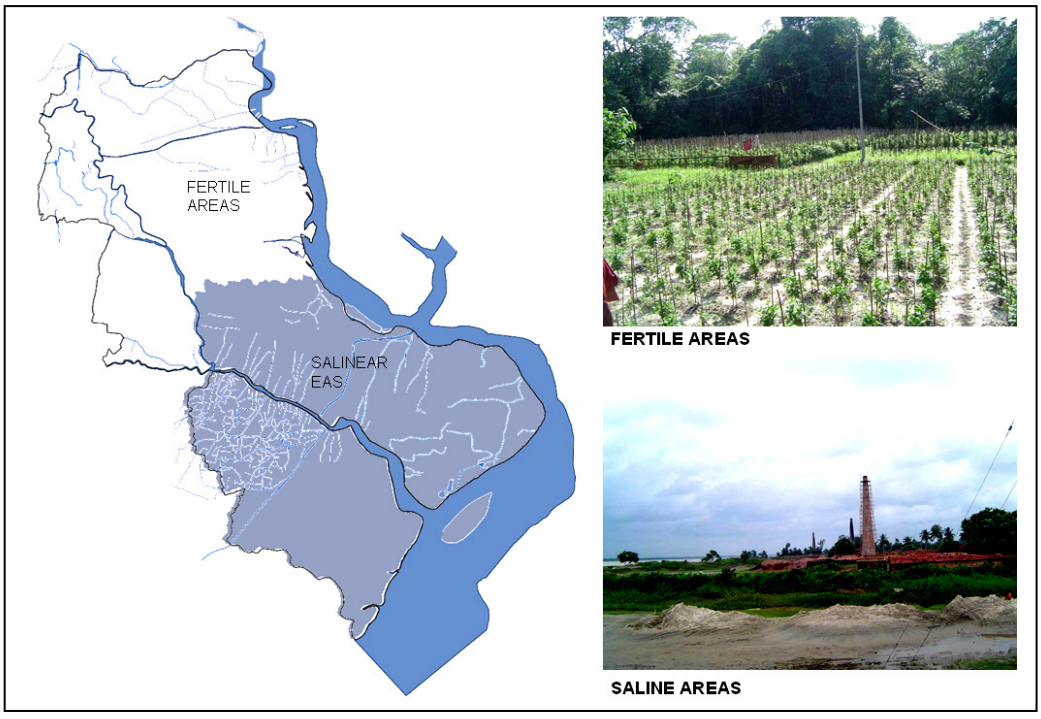


Figure 2.8. The Saline and the Fertile Areas

As discussed earlier due to the salinity present in the river where it meets the sea, the region shows a distinct saline character in the southern part. These

saline areas are used for mono-crop cultivation and also as brick kilns that use the clay rich silt deposited by the rivers. However the northern areas are extremely fertile. These fertile lands have more than one crop and have a rich potential for horticulture and floriculture.

The Canals and the Water Networks

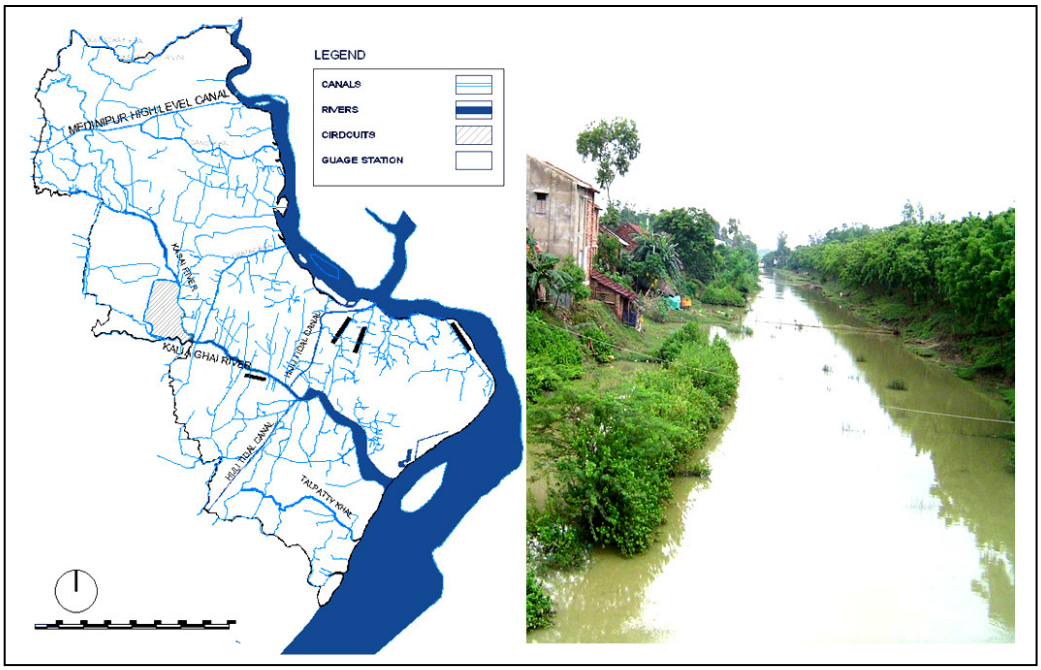


Figure 2.9. The Canals and the Water Networks

The region is low lying with negligible slopes. Moreover, because of heavy siltation by the rivers and heavy rainfall it is a flood prone area. To manage this The Irrigation and Waterways Directorate has established a network of canals the primary function of which is to safeguard the region from flooding.

Some of the major canals connect the two rivers. There are others which also form circuits with embankments around land masses so as to drain the excess rain water.

Thus, the canals are primarily used as a storm water management system. They are simultaneously used for irrigation, fishing and sometimes transport.

The Floods

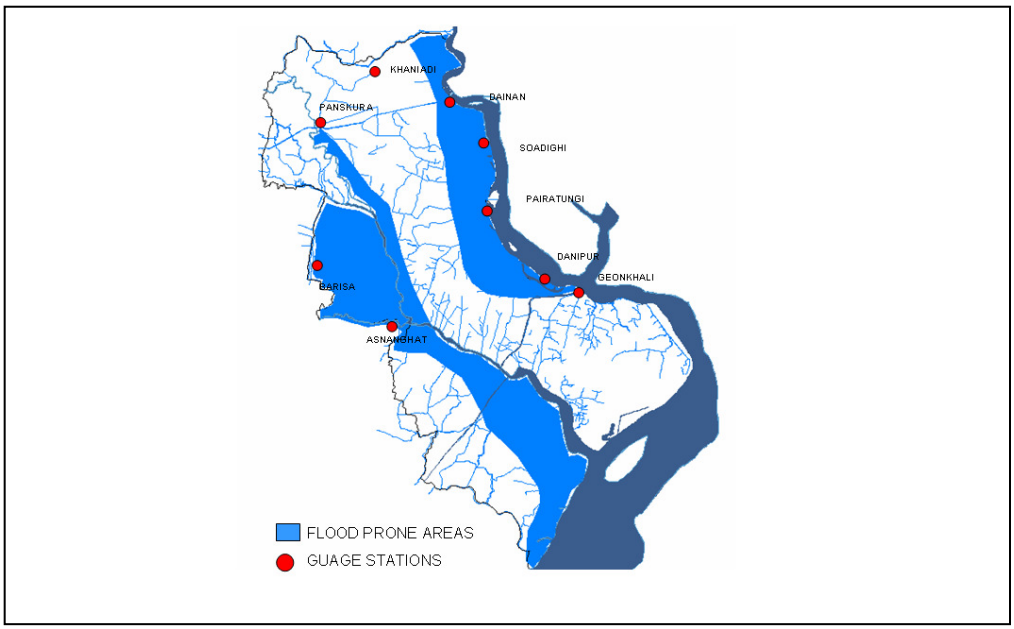


Figure 2.10. Flood Prone Areas

Source: Directorate of Irrigation and Waterways.

The region has certain flood prone areas which get flooded during the rains when waters from the upstream dams on these rivers are released. Thus the banks along the river Kasai get flooded when water from the Kangsabati Dam is released. Water from the Durgapur barrage inundates the bank along the Rupnarayan river. The Moyna block is a basin and extremely flood prone. The farmers of this region use this to advantage by growing shrimps and rice simultaneously.

2.2.3. Existing generalised land use

Growth Centres

Apart from Tamluk and Haldia towns, smaller primary settlements have developed as dense cores around the main highways and important roads of the region. These have facilities such as health centres, educational facilities and administrative centres that serve the nearby areas. They also act as the main markets for produce from the surrounding areas with weekly bazaars that

occur here. These have an important role to play in the planning of the region as they have the potential to become important growth centers.

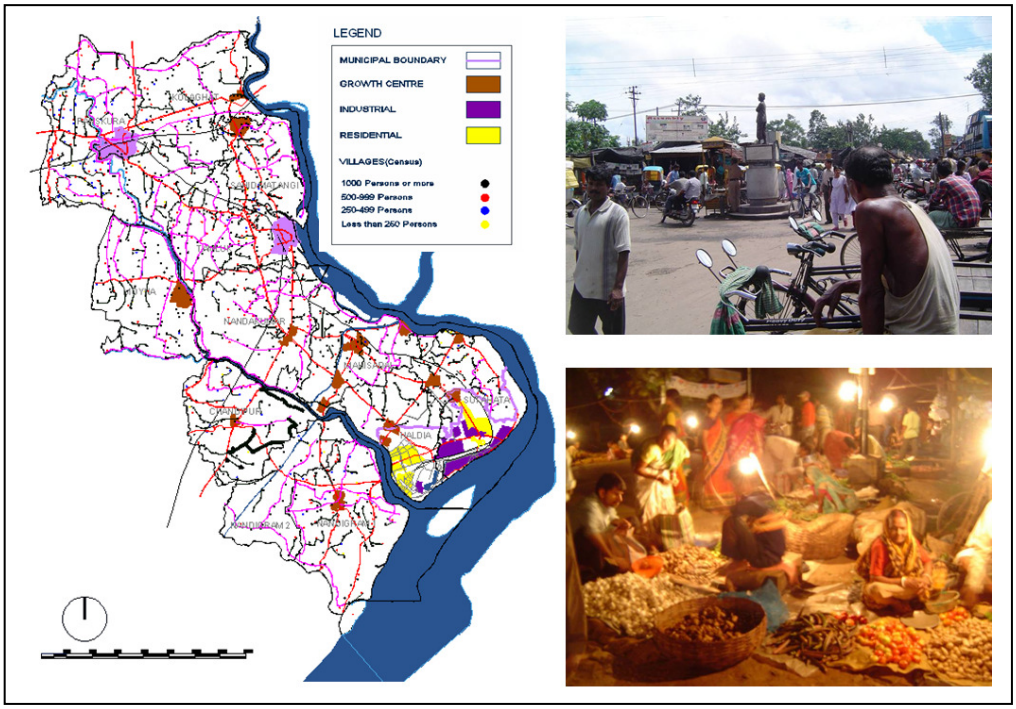


Figure 2.11. Existing Growth Centres

Agrarian Settlements

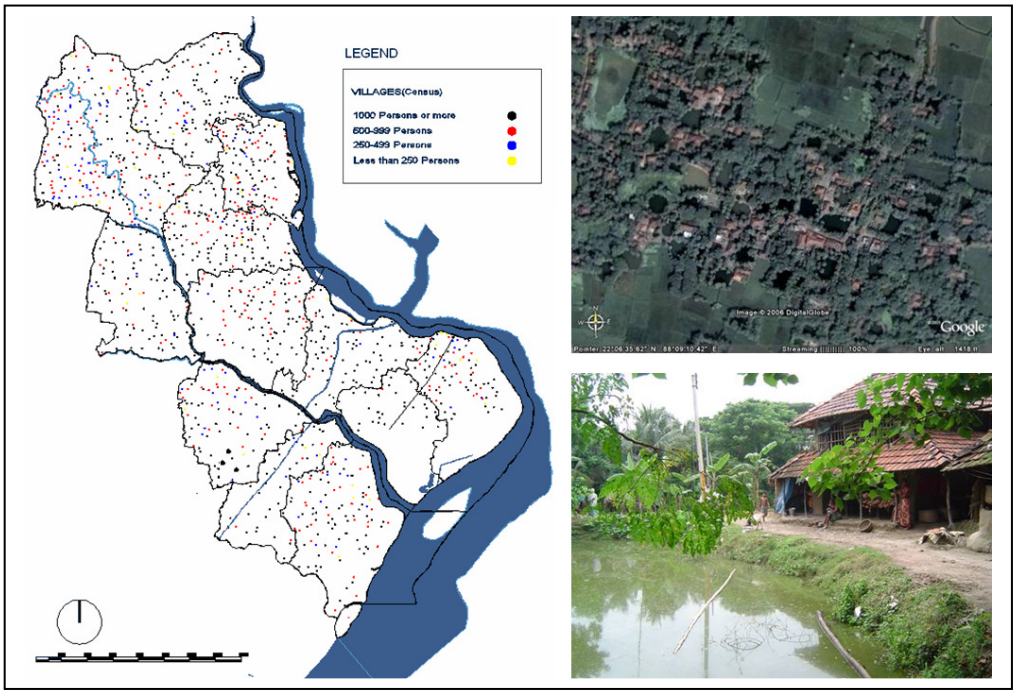


Figure 2.12. The Agrarian Settlements

The next in the hierarchy are the agrarian settlements which are clustered around ponds surrounded by land under agriculture. The location of settlements in each block is shown in the attached drawing along with annexure sheet showing details of the population, health, education facilities, the level of connectivity and the physical infrastructure which each of these villages have.

While, (as seen from the data given on these settlements) they lack adequate infrastructure, these villages have an immense potential for agriculture and agro based industries which need to be exploited. This is especially true for the fertile villages in the northern areas of the extended region.

2.2.4. Environmentally Sensitive Areas

The region is a part of the Gangetic delta, the land is flat and interlaced with tidal canals and rivers which carry flood waters and drain the area.

The sediment/silt laden rivers cause drastic changes to landforms through deposition and erosion. The rivers are subject to tidal variations with the mixing of saline and fresh water giving rise to unique brackish water systems. The unique characteristics of the ecological structure and balance of the region have to be integrated into any development planned in this region.

Nayachar Island, Mayachar Island

These estuarine islands formed through siltation are extremely unstable and vulnerable to erosion and submergence.

Nayachar island is at present being used primarily for fisheries and promoted as a tourist destination. The mangroves and water systems that make the breeding of fish possible, and the unique landscape of the island have to be integrated into the tourism development plan.

Mangroves

The mangroves that are formed due to tidal effect along the coast are a complex and fragile ecosystem that support a variety of aquatic life. Mangrove swamps are extremely important breeding grounds for many fish.

Another major ecological role of mangroves is also the stabilization of the shoreline and prevention of shore erosion.

Canals And Rivers Prone to Siltation

The role of the rivers and canals in flood control and protection of landmasses is crucial. Heavy siltation in the canals, needs constant monitoring to prevent floods.

The natural and man made drainage network which is critical for the region has to be incorporated as a system and can form the structure for development planned in the region.

2.2.5. Heritage, sites, buildings and areas

Table 2.1. List of Heritage Assets

No.	Name	Location	Year of establishment	Significance	Present condition
1	Geonkhali	Junction of Hooghly and Rupnarayan	Appears in Pilot Chart of 1703 as Ganga Colle and is also shown in Renell's Atlas	Was a Trading Centre	Still functions as a trading centre
2	Hijli Tidal Canal	Connects Haldi and Rupnarayan Rivers	1873	Was an important navigational route which was used to export surplus rice to Kolkatta.	Used for irrigation
3	Mahisadal Rajbari	To the West of Hijli Tidal Canal, within Mahisadal P.S.	16th Century	Residential Place, campus has a temple and two palaces	Dilapidated
4	Nabaratna Temple	P.S. Sutahata, Moza: Deobhog	18th Century	Place of Worship	Place of Worship

5	Rathajatra Festival Ground	P.S. Mahisadal	Mentioned by L.S.L.O. Malley in Bengal District Gazeteer in the year 1901.	Rathajatra of Lord Jagannath	Rathajatra Festival takes place here
6	Moynagarh	Moyna P.S.		Moyna garh has Hindu temples (vaisnavas, saivas, shaktas), the Buddhist shrines (Holy place of lord Dharma), Mazhar -sharif of the Muslim saint (sufi Manikpir)and the mausoleum of the Mahanta (sripat Gopiballavpur).It is surrounded by two moats.	Residential area and place of worship.
7	River Front of Hooghly	Coastal stretch within 100 M from Hight Tide Line		Place of Scenic Beauty	The riverfront is already substantially built up with the port and idustries occupying most of the prime land along the coast. There has been an attempt to develop this edge as a recreational public space.The river edge has some amount of social forestry.
7	Haldia Utsav Ground	KPT area		Fairground and playground. The Haldia Utsav is held here every year.	Use to be continued and site to be upgraded with all necessary infrastructure.
8	Gadiara, Noorpoor	Confluence of Rivers		Places of Scenic Beauty	Tourism
9	Sagar island			On the island there is a Lighthouse built in 1808. The southern sea face is the site of the festival of Ganga Sagar. There is a sea beach, fairground, marine park	Tourism
10	Nayachar island	At the confluence of the rivers		Place of Scenic Beauty	Used extensively for pisciculture.

Source: Perspective Plan for Haldia Planning Area,2025 by C.E.S., site visits and Tourism Development Cell of the H.D.A.

2.3. Demography

2.3.1. Existing Population and Migration

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As seen from the trend, the population of the whole region under consideration has increased from 20 lakh to 23 lakh from 1991 to 2000. The population of

Haldia town in this period has increased from one lakh to 1.7 lakh. Thus while there is a 28.43 % growth rate of population from 1981 to 1991 there has been a fall of growth rate to 15 % in the region's population in the last ten years from 1991 to 2001.

Also the growth rate for Haldia municipality which was 375% through 1981 to 1991 has fallen to nearly 70%. In terms of population density the northern parts of Kolaghat ,Tamluk and Haldia Municipality have the highest densities and the Nandigram area has the lowest population densities.

Table 2.2. Population, Area of Blocks and Households

	2001	2001	2001	1981	1991	2001
C.D. Block / Municipality	Mouza	Households	Area		Population	
			sq km		Number	
Tamluk	107	37992	123.50	1,43,072	1,82,404	2,04,422
Sahid Matangi	87	33106	97.82	1,22,010	1,54,749	1,76,307
Panskura	247	57751	246.92	2,05,414	2,57,891	2,98,139
Kolaghat	112	49232	147.92	1,82,261	2,27,443	2,56,882
Moyna	85	36801	154.51	1,39.224	1,74,309	1,96,502
Nandakumar	100	42610	165.70	1,55,643	1.98.523	2,29,462
Chandipur	114	29247	137.58	1,11,407	1,40,867	1,59,914
Tamluk (M)		8851	10.36	29,367	38,688	45,830
TOTAL (Tamluk)	852	295590	1084	10,88,398	13,74,874	15,67,458
Mahisadal	75	33847	146.48	1,26,193	1,58,620	1,82,191
Nandigram 1	99	30432	181.84	1,16,159	1,47,798	1,74,691
Nandigram 2	41	18993	105.74	78,909	95,438	1,04,637
Sutahata	81	19698	79.54	89,346	99.067	1,06,338
Haldia	24	15644	65.44	94,869	97.928	81,619
Haldia (M)		36161	104.90	21,122	1,00,347	1,70,673
TOTAL (Haldia)	320	154775	683.94	5,16,598	6,99,198	8,20,149
TOTAL	1172	450365	1768	16,14,996	20,74,072	23,87,607

Source: District Statistical Handbook published by the Bureau of Applied Economics and Statistics, Govt. of West Bengal, 2004.

Migration

Note: The following information on Migration and Household Characteristics has been sourced from " A socio-economic study of households in Haldia Planning Area:1999-2000" by Aariz Aftab, CEO, HAD and Dr. Animesh Haider Dir. (Socio Economic Planning), CMDA .published by The HDA. The data for the remaining extended region beyond the Planning Area, with regards to migration and household characteristics, is not available. The data on the rural households will be used to understand the characteristics of rural households till such time that details are not available.

Place Of Origin: Among the migrant households, about 25% of households in HPA have migrated from other urban areas of West Bengal, another 67% from rural West Bengal. Thus the total of west Bengal urban and rural accounted for 92% of the households.

Reason For Migration: Only about 5% of the migrants had come to HPA in search of employment another 2% to take up some gainful occupation. The overwhelming majority of 91% had come to stay with spouse or parent or guardians or children. Employment was the single factor (considered as pull factor) bringing about migration to the city since most of the migrants had accompanied those migrants who had come to HPA for employment. The percentage of migrants who had come in search of "gainful occupation" was highest in Haldia Municipality.

2.3.2. Household Characteristics

The following information on Migration and Household Characteristics has been sourced from "A socio-economic study of households in Haldia Planning Area:1999-2000". The data on household sizes, and types was available only for the Haldia Planning Area. The data can be used to understand general characteristics of households in the region, especially rural households.

Table 2.3. Types and Sizes Of Households

Distribution of Percentage of Households by Household Type in HPA	Haldia (M)	Growth Centres	Rural	HPA
Single Member	2.4	10.2	1	1.9
Nuclear Family	78.4	49.2	65.6	72.3
Extended Family	1.7	9.8	2.9	2.1
Joint Family	17.5	30.8	30.4	23.7
Total	100	100	100	100
Average Family Size				
Single Member	Haldia (M)	Growth Centres	Rural	HPA
Nuclear Family	1	1	1	1
Extended Family	4.4	5.2	4.9	4.7
Joint Family	7	5.2	6.1	6.3
Total	7.2	8.1	7.8	7.7
	4.8	5.8	5.8	5.4

The overall Average Family Size in the Planning Area is 5.4 members. Nuclear families form the largest group covering 72.3%. The average family size in municipal area was found to be smaller (4.8) than that of rural areas (5.8) The percentage of single member households was only 1 for rural areas while it was highest for growth centres(10.2)

Table 2.4. Place Of Origin

Percentage Distribution of Households by Place of Origin	**Haldia (M)**	**Growth Centres**	**Rural**	**HPA**
West Bengal: Urban	59	0.6	0.5	25
Rural	22.2	99.4	99	67
Bihar :Rural	0.1	0	0	0
Other Indian states: Urban	9.6	0	0	4
Rural	7.3	0	0.5	3.1
Other Countries: Urban	0.5	0	0	0.3
Rural	1.5	0	0	0.6
Total	100	100	100	100

Duration of Stay

Percentage Distribution of Households by Duration of Stay at present address in years

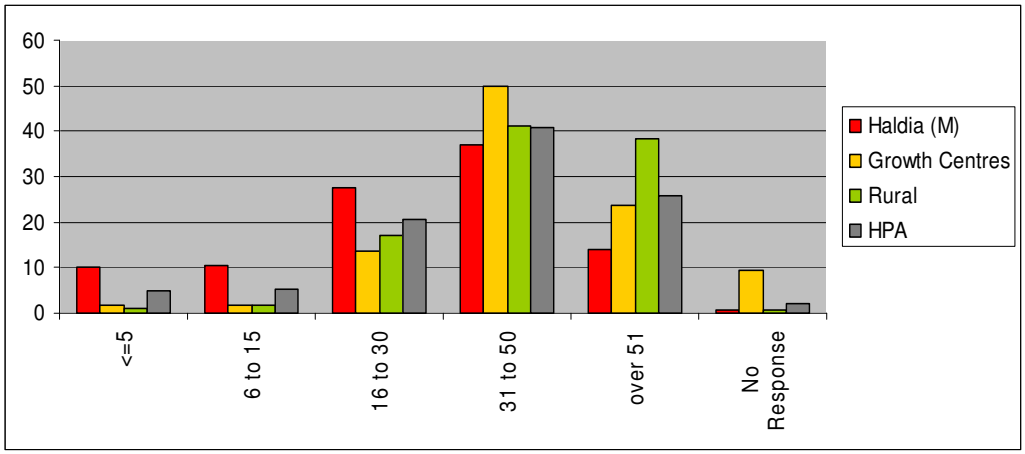


Figure 2.13. Duration of Stay of families (in years)

In rural areas, more than 38% of the households had been living there for more than five decades, another 41% between 31 to 50 years.

The establishment of the port in 1972, and the growth of the industrial base in and around Haldia Municipality in the 90's shows the rapid growth of population through in-migration in recent periods.

Household Income/Expenditure Characteristics

The following information has been sourced from " A socio-economic study of households in Haldia Planning Area:1999-2000". The data on household expenditure was available only for the Haldia Planning Area. The data can be used to understand general characteristics of households in the region, especially rural households.

The average monthly income for Haldia Municipality was Rs. 3732 and for rural areas was Rs. 2703 while for the growth centres it was Rs. 3109. The average monthly expenditure for Haldia Municipality was Rs. 2692 or Rs. 600 per capita and for rural areas was Rs 2087 while for the growth centres it was Rs. 2428.

Table 2.5. Household Expenditure

Percentage Distribution Monthly Household Income Class	**Haldia (M)**	**Growth Centres**	**Rural**	**HPA**
<=499	2	3	2	2
500-999	5	5	7	6
1000-1999	19	25	34	26
2000-2999	24	28	27	26
3000-4999	20	25	18	20
5000-7499	19	8	8	13
7500-9999	6	2	2	4
10000+	4	4	2	3
Average Monthly Family Income	**Haldia (M)**	**Growth Centres**	**Rural**	**HPA**
<=499	111	76	128	108
500-999	643	703	767	713
1000-1999	1481	1456	1451	1461
2000-2999	2226	2298	2282	2263
3000-4999	3560	3488	3620	3567
5000-7499	5853	5601	5895	5838
7500-9999	8223	8525	8234	8260
10000+	12574	14229	14244	13285
All	**3732**	**3109**	**2703**	**3200**

2.4. Economic Base and Employment

2.4.1. Agriculture

The state of West Bengal has over the years done well in the field of horticulture, floriculture and paddy. A study done by the Agency of International Business Cooperation, MEA, Netherlands shows that the state has a very high potential in agriculture. The northern parts of the region are especially rich in agriculture .A wide range of vegetables which include betel vine plantations, cabbage, brinjal, etc. are grown. There has been a shift to floriculture which provides for better returns with coxcombs, roses, etc. being

grown. The market for flowers however is limited to Kolkata. There is a need for more organized infrastructure and assistance for the production, processing, transport of farm produce to a wider market. There is a great potential for agro-based industries and export of flowers from this region.

1.12 Five most important Agricultural States in India

In a country so diverse in its agricultural practices and produce it is not possible to identify five most important agricultiral states based on a single factor. Accordingly, provided below is a listing of top 5 ranked states on several parameters:

	Top 5 ranked states				
Share of agricultural output on an all India basis	Uttar Pradesh	Maharashtra	West Bengal	Andhra Pradesh	Karnataka
Share of agriculture in Gross State Domestic Product	Punjab	Bihar	Uttar Pradesh	Haryana	Assam
Infrastructure availability (number of wholesale agri markets)	Maharashtra	Uttar Pradesh	Karnataka	Madhya Pradesh	Punjab
Commercially surplus generators	Punjab	Gujarat	Tamil Nadu	Haryana	Maharashtra
Irrigation potential	Maharashtra	Uttar Pradesh	Andhra Pradesh	Madhya Pradesh	Gujarat
Commodity wise production					
- Fruits	Maharashtra	Andhra Pradesh	Uttar Pradesh	Tamil Nadu	Karnataka
- Vegetables	West Bengal	Uttar Pradesh	Bihar	Orissa	Maharashtra
- Flowers	Uttaranchal	Karnataka	Tamil Nadu	Andhra Pradesh	West Bengal
- Spices	Andhra Pradesh	Rajasthan	Gujarat	Karnataka	Tamil Nadu
- Rice	West Bengal	Uttar Pradesh	Andhra Pradesh	Punjab	Tamil Nadu
- Wheat	Uttar Pradesh	Punjab	Haryana	Rajasthan	Bihar
- Coarse Cereals	Karnataka	Maharashtra	Uttar Pradesh	Rajasthan	Andhra Pradesh

From the above matrix, the following five states have been identified as most important agricultural states in India, as they appear most number of times in the above matrix:

- Punjab
- Uttar Pradesh (North-Central India)
- Maharashtra
- Karnataka (South)
- West Bengal (East)

Figure 2.14. Comparative status of Agriculture in Indian States

Source: Agency of International Business Cooperation, MEA, Netherlands

As shown in the crop intensity diagram the northern parts of the region has high potential for agriculture development, the southern region in spite of having low crop intensity and saline water shows a lot of people being involved in agriculture.

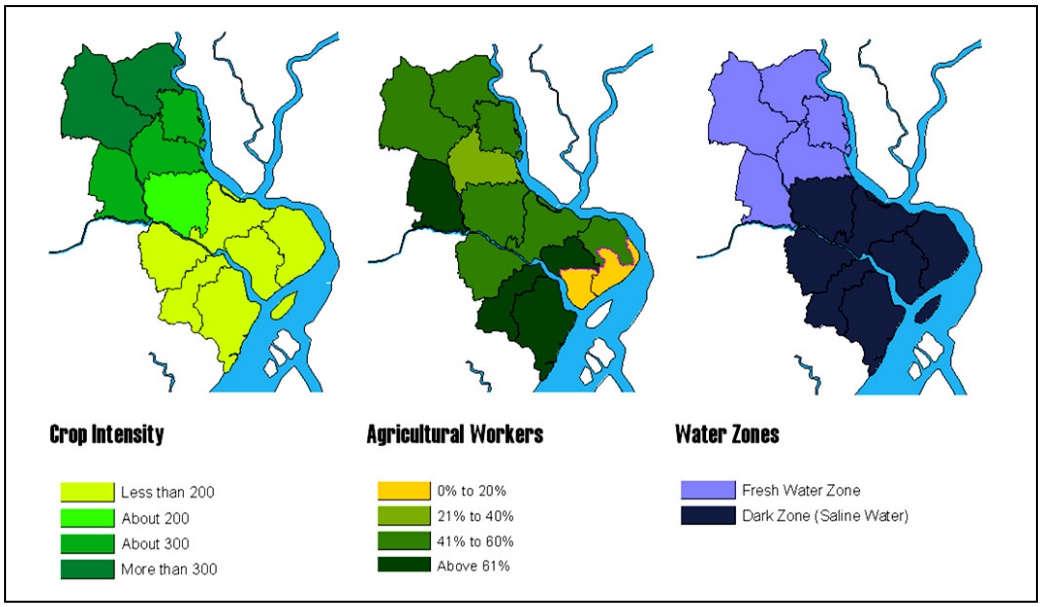


Figure 2.15 Agriculture Status in various Blocks

However there are problems which agriculture in this region is facing. The land holding which each family has is small. The average land holding is 0.07 Ha (0.18 acres) while the big land holdings are an average of 1 to 1.5 Ha.[*Source: Interview with Principal Agricultural Officer*]. In comparison the national average in 2002-03 was 1.06 Ha. (*Source: Ministry Of Statistics And Programme Implementation, Government Of India)*

Figure 2.16. Agricultural Products in the AoI

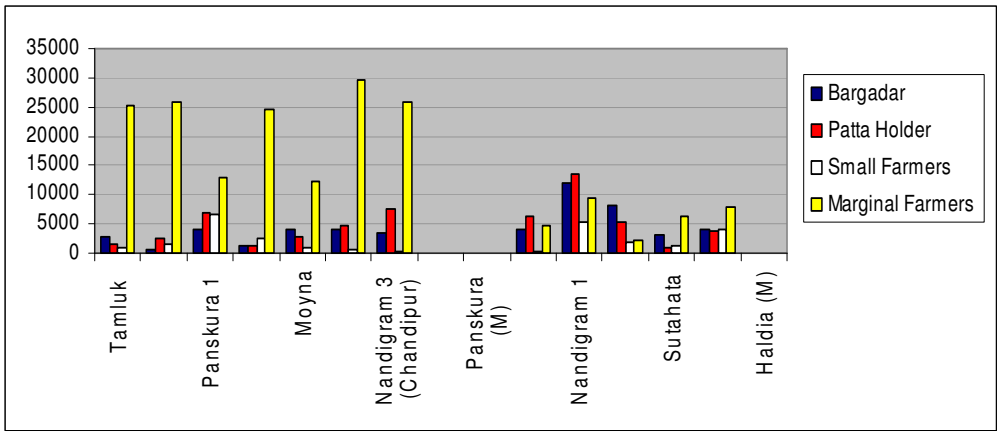


Figure 2.17. Percentage distribution of population by size of land holding. (Small farmers-1.0 to 2 Ha; Marginal Farmers – Below 1 Ha)

There has been no organized effort to irrigate the land. The canals in this region are used primarily for flood control and not for irrigation.

The back-up infrastructure and logistics needed for the consumption of the agrarian surplus like warehousing and cold storages are negligible. But this region and the northern part of Midnapur district have a huge potential for agriculture which should be exploited. This has to be integrated into our spatial strategy so that we can diversify the economic base and also strengthen the local economy. The attempt should be to organize agriculture on a industrialized scale so that it increases the present profit margins for farmers.

2.4.2. Fishery

The region shows a high potential for pisciculture with a lot of area available for fisheries. It has an advantage of having fresh water, brackish water as well as deep sea fishing potentials. Presently the Tamluk subdivision has a higher land under pisciculture than the Haldia subdivision. However Haldia subdivision has a higher potential for brackish water fishing than the northern region. The island of Meendeep in Haldia subdivision has a large prawn farm which is leased by BENFISH to private operators. However the infrastructure

available for fishing is dismal. There are no storage and packaging facilities for the present fish catch.

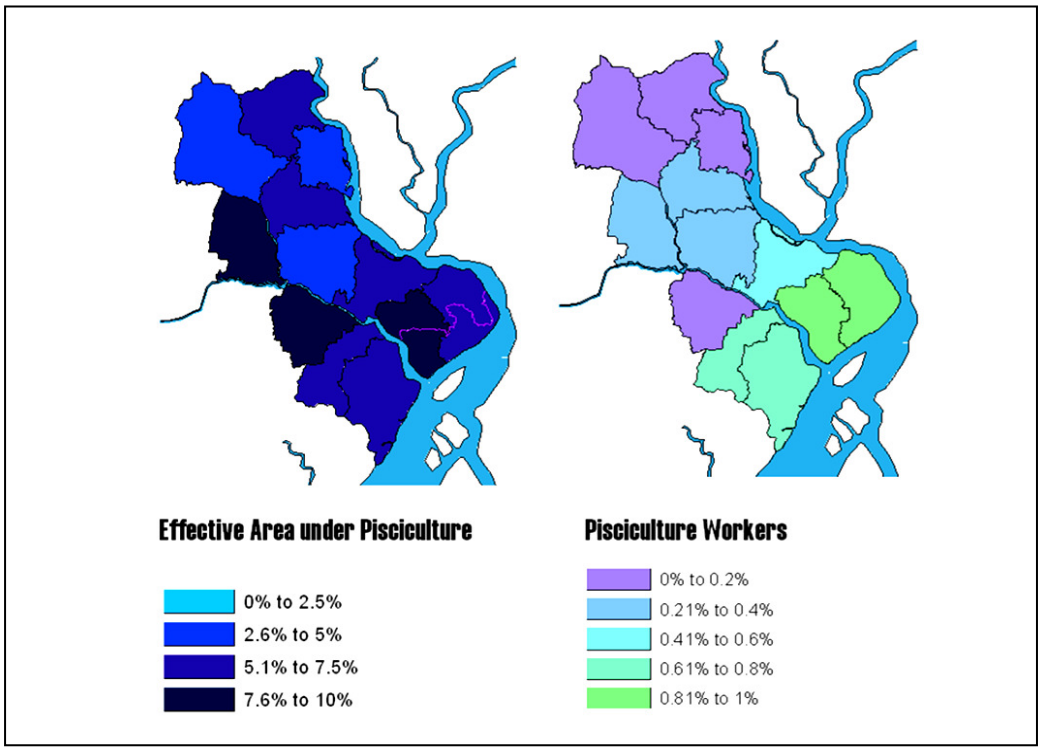


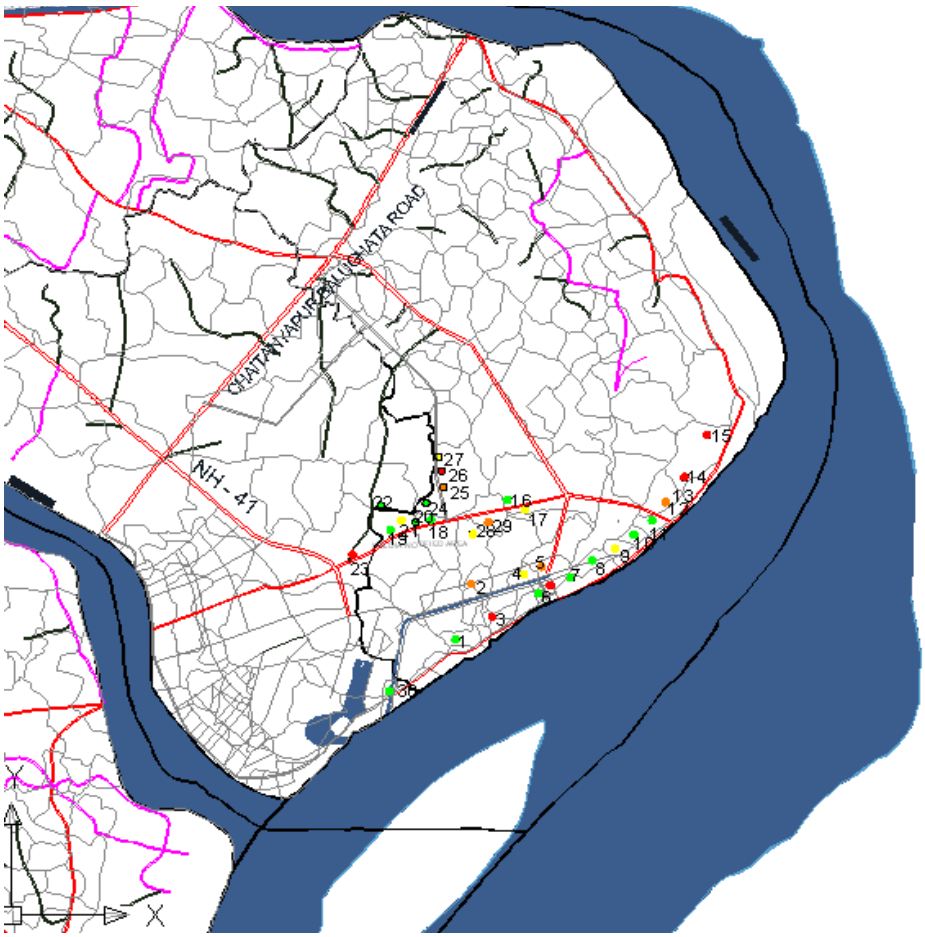
Figure 2.18. Fishery Status in the AoI

Table 2.6. Fishery Ststus in AoI

C.D. Block / Municipality	Net Water Area under Pisciculture,1996 (HA)	Aprrox annual Prodn' in QTL.	Number of schemes operated	No of Persons engaged in the fisheries.
Tamluk	519	6447	4	
Sahid Matangi				
Panskura	1076	13358	4	
Kolaghat	646	8012	4	
Moyna	879	10906	4	
Nandakumar				
Chandipur	780	9678	3	
Tamluk (M)				
Mahisadal	423	5255	3	
Nandigram 1	1077	13360	4	
Nandigram 2	638	7913	4	
Sutahata	600	7449	4	
Haldia	650	9493	4	
Haldia (M)				

Source: District Statistical Handbook published by the Bureau of Applied Economics and Statistics, Govt. of West Bengal, 2004.

2.4.3. Industries



1. Indian Oil Corporation
2. Petro Carbon Chemical Limited
3. H.F.C. Limited
4. M.P. Glychem
5. Exide Industries
6. Bharat Petroleum
7. Shaw Wallace
8. Consolidated Fibres and Chemicals Limited
9. Tata Chemicals
10. Hindustan Lever
11. Hindustan Petroleum
12. Indo Burma Petroleum
13. Polba Agro genetics
14. Mitsubishi India Corporation
15. Hindustan Seals Limited
16. South Asian Petro
17. R.D.B. Rasayans
18. Marcus Oil Chemical
19,. I.O.C. Lube
20. Triton Corp Limited
21 Reliance Petroleum22. TCG Refinery
22. Triton Corp
23. Shamon Ispat
24. I.O.C. Petronas Limited
25. H.B. Crude Pipeline
26. IOC Marketing
27. Electro Steel
28. Haldia Petrochemicals
29. H.PL COGENERATION
30. H.D.C.

Figure 2.19. The Industries in Haldia

With the establishment of Haldia port, a large number of industries were established, such as Indian Oil Corporation, Hindustan Lever, Shaw Wallace, Consolidated Fibres and Chemicals, etc. The major industrial units in Haldia presently are indicated in the map.

The Port

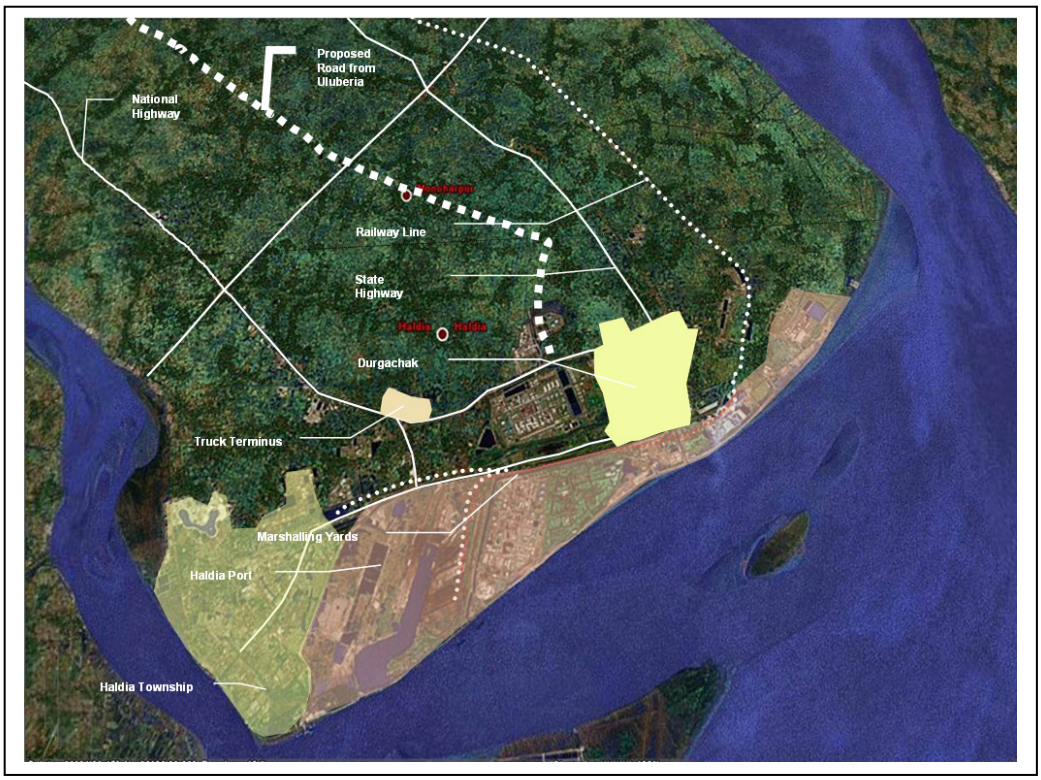


Figure 2.20. The Port of Haldia

Area and Infrastructure

The port is spread over 6367 acres including land allotted to industries and other port facilities. It is an impounded dock with riverine oil jetties. At present the port handles a large amount of bulk cargo. It has a total of fourteen berths of draft 12.2 M , three of which can handle containers. In addition to this it has storage facilities inside the port area which consist of a transit shed, hardstand and vacant land as well as storage facilities outside the custom bonded area and three railway sidings.

Port Traffic

Presently the port handles a reasonable amount of oil and bulk cargo. Out of the total of 4,20,33,966 tonnes of cargo handled in 2005-2006, 95% was in the form of dry liquid and break bulk and only 5% was containerized cargo.

The port receives also very little container cargo as compared to other ports in India and there has been a gradual decrease in container traffic at Haldia Port as seen in the graph below.

Increasing containerization is already the major mode of global movement of goods. Haldia will have to take up this challenge in the near future so that it can efficiently receive and move its container traffic in the surrounding region, especially in far of places like China.

The backup infrastructure of the port such as the marshalling yards, truck terminal, road and railway though adequate for its present set of activities will be inadequate if it has to function as a growth centre.

Many major port based oil and chemical industries such as MCCPIA, South Asian Petrochem Ltd. etc. Many downstream industries such as Capstan Shipping & Estates Ltd, Hindustan Seals Ltd. Mancus Oil & Chemicals Ltd., Indian Oil Blending Ltd. However, the dependence on port and oil based industries limits Haldia's potential for growth. There is a need to diversify to other industries which can move it up the value chain.

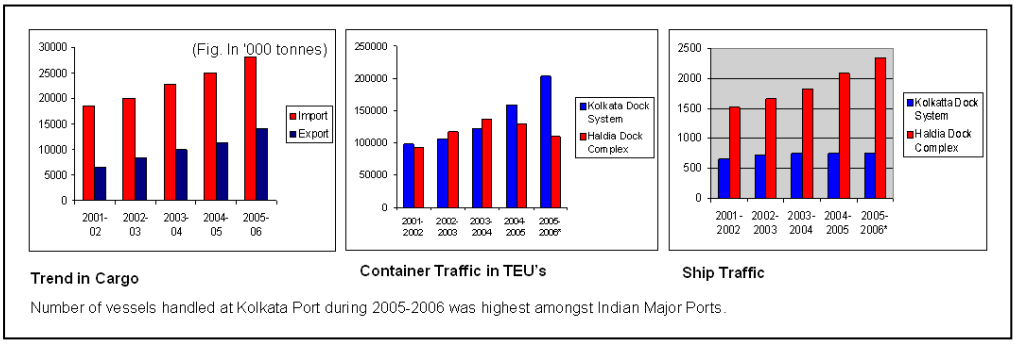


Figure 2.21. Cargo Trends in Haldia Port

Table 2.7. Finance of the Haldia Port

Port finances	**2005-2006**	**2004-2005**
Income (In Rs. crores)	903.32	808.31
Expenditure (In Rs. crores)	652.83	576.02
Operating Ratio (In percentage)	68	60
Surplus (In Rs. crores)	(+) 250.49	(+) 232.29

Source- Administrative Report Year 2005-2006, Haldia Dock Authority.

Port Labour

As of March 2006, the port itself employs a total of about 3964 persons.

Table 2.8. Cargo Handling and Non-Cargo Handling workers in Haldia Port

No. and category of officers		No. of non-cargo handling workers			No. of cargo handling other than shore workers		No. of cargo handling shore workers			No. of casual workers,if any	Total
Class-I	Class-II	Class-III		Class-IV	Class-III	Class-IV	Category	Category	Category		
		Clerk	Others				A'	B'	C'		
199	110	207	303	544	1202	1399	-	-	-	NIL	3964

Source- Administrative Report Year 2005-2006, Haldia Dock Authority.

Critical Factors That Influence The Potential Of The Port

1. The present port is located 104 kms downstream of Kolkata and 130 kms upstream from Sandheads, with average pilotage time of 3 hrs.

2. *Draft Depth and Turnabout Time***:** The channel has a draft depth of 8m during high tide only, thus making the turn about time very high - up to 3 to 4 days.

3. *Siltation***:** This channel also has problems of heavy siltation which has will only allow it to function only for a certain period of time. The port being the main generator of economy this problem needs to be addressed immediately. It is an indication that Haldia should now diversify its economic base if it has to remain as the focus of the Eastern Region.

4. Also in relation to port infrastructure, the KoPT has already been debating the notion of a deep sea container port which the region should leverage for its own growth.

2.4.4. Distribution of Labour

Table: 2.9. Distribution of workers in the AoI

C.D. Block / Municipality	**Total Workers**	**% TW**	**Cultivators**	**% cult. To TW**	**Agri. Lab**	**% Ag. Lb to TW**	**HH Indus. Workers**	**%HHW to TW**	**Other Workers**	**%OW to TW**	Marginal Workers	%MW to TW
	Number											
Tamluk	92272	45.1	17621	19.1	18601	20.2	12484	13.5	43566	47.2	31755	34.4
Sahid Matangi	82293	46.7	22718	27.6	17202	20.9	4299	5.2	38074	46.3	29380	35.7
Panskura	105960	35.5	26987	25.5	30086	28.4	10030	9.5	38857	36.7	28549	26.9
Kolaghat	87110	33.9	18122	20.8	17399	20.0	8165	9.4	43424	49.8	21948	25.2
Moyna	77822	39.6	27274	35.0	26483	34.0	4442	5.7	19623	25.2	30022	38.6
Nandakumar	89951	39.2	28395	31.6	23347	26.0	10058	11.2	28151	31.3	26082	29.0
Chandipur	54673	34.2	13195	24.1	17995	32.9	4473	8.2	19010	34.8	22307	40.8
Tamluk (M)	15275	33.3	349	2.3	644	4.2	194	1.3	14088	92.2	1240	8.1
Panskura (M)												
TOTAL (Tamluk)	**605356**	38.6	**154661**	25.5	**151757**	25.1	**54145**	8.9	**244793**	40.4	**191283**	31.6
Mahisadal	68363	37.5	15753	23.0	22858	33.4	3485	5.1	26267	38.4	23825	34.9
Nandigram 1	50325	28.8	10598	21.1	19791	39.3	1907	3.8	18029	35.8	20039	39.8
Nandigram 2	36212	34.6	10207	28.2	12932	35.7	1127	3.1	11946	33.0	16796	46.4
Sutahata	32197	30.3	4487	13.9	11679	36.3	1029	3.2	15002	46.6	13158	40.9
Haldia	25111	30.8	5334	21.2	10017	39.9	564	2.2	9196	36.6	10065	40.1
Haldia (M)	52754	30.9	1804	3.4	5871	11.1	774	1.5	44305	84.0	11463	21.7
TOTAL (Haldia)	**264962**	32.3	**48183**	18.2	**83148**	31.4	**8886**	3.4	**124745**	47.1	**95346**	36.0
TOTAL (Region)	**870318**	36.5	**202844**	23.3	**234905**	27.0	**63031**	7.2	**369538**	42.5	**286629**	32.9

Source: District Statistical Handbook published by the Bureau of Applied Economics and Statistics, Govt. of West Bengal, 2004.

2.4.5. Incomes and Occupations

The following information has been sourced from " A socio-economic study of households in Haldia Planning Area:1999-2000". The data on percentage distribution of population according to profession and average incomes was available only for the Haldia Planning Area. The data can be used to understand general characteristics of income.

Table 2.10. Percentage distribution of earners by Principal Occupation

Occupation division	Haldia (M)	Growth Centres	Rural	HPA
Professional, technical workers,	10.6	7.4	8.5	0.1
Administrative and managerial	3.9	4.2	2.7	3.4
Clerical and related workers	5.7	5.8	3.7	4.8

Sales Workers	7.3	8.7	4.3	6.2
Service Workers	16.4	2.7	2.5	7.6
Farmers, Fishermen etc.	28.7	55.6	62.5	48.8
Production workers, transport equipment operators etc.	23.9	14.7	14.7	18.1
Not reported	3.5	0.9	1.1	1.9

Table 2.11. Average Monthly Income distribution by occupation.

Occupation division	Haldia (M)	Growth Centres	Rural	HPA
Professional, technical workers,	3824	4422	2505	3355
Administrative and managerial	3758	3195	2227	3084
Clerical and related workers	4444	3711	3742	4041
Sales Workers	3036	2321	1949	2514
Service Workers	5381	4772	3018	4995
Farmers, Fishermen etc.	1661	1483	1493	1527
Production workers, transport equipment operators etc.	2691	2231	2228	2452
Not reported	3848	1918	2220	3290
Total	3165	2178	1855	2394

The proportion of professional and technical workers is highest in the Municipality with an average income of Rs. 3824, as is the proportion of service workers with an average income of Rs. 5381. The highest earners in HPA were physicians and surgeons, with an average monthly income of Rs. 7010 and nurses with an average monthly income of Rs. 6060. In rural areas the proportion of farmers and fishermen, being obviously much greater, the average income of this group was of Rs. 1527 per month.

On the whole, for Haldia Municipality the average monthly income of earners was Rs. 3165, as there is a higher proportion of white collar workers in the area, while for rural areas it was Rs. 1855.

(Data has not been available for livestock, industrial workers, household industries, commerce and informal sector)

2.5. Housing and Shelter (Formal and Informal)

Type of Dwelling Unit

The following information has been sourced from " A socio-economic study of households in Haldia Planning Area:1999-2000". The data on percentage distribution of type of dwelling unit and possession was available only for the Haldia Planning Area. The data can be used to understand general characteristics of housing.

Table 2.12. Percentage distribution of households by type of possession

Type of Possession	Haldia (M)	Growth Centres	Rural	HPA
Owned by occupant	69.8	91.2	78.1	76.9
Owned by relatives	11.9	8.6	21.5	15.3
Office Quarters	14.5	0.2	0.1	6.1
Other Rented	2.6	0	0	1.1
Others	1.1	0	0.2	0.6
Not Reported	0.1	0	0.1	0
Total	100	100	100	100

Table 2.12. Percentage distribution of households by type of dwelling unit

Type of Possession	Haldia (M)	Growth Centres	Rural	HPA
Pucca	33.9	18.1	6.5	19.9
Semi- Pucca	25.9	21.9	21	23.2
Katcha	39.8	59.4	72.2	56.5
Not reported	0.4	0.6	0.3	0.4
Total	100	100	100	100

Majority of households live in their own houses or houses owned by their relatives. Only a very small section lived in rented houses or in official quarters.

In the rural sector and growth centres almost 99 percent of the households occupied houses that were self-owned or owned by relatives.

In Haldia Municipality about 15% of the population lived in office quarters and 4 percent living in other rented accommodations.

The percentage of katcha houses rose steadily from about 43 for Haldia Municipality, through 60 for growth centres, to 72 for the rural sector.

The slum population in Haldia Municipality, as per the 2001 census was 14.4% with 24 thousand persons living in slums.

The main issue in rural areas is the building of safe pucca houses and in the municipal area, the rehabilitation of slums.

Housing providers and delivery mechanisms

Port And Industry

Within Haldia Municipality, the Port and Industries provide housing to the formal workforce.. These are in the form of allotted quarters that are primarily apartment complexes organized according to the hierarchies of the workforce. For example, as is indicated in the chart, the Port has as per the year 2005-2006, 2719 quarters for its workers of different classes, on land belonging to the port.

Table 2.13. Housing Provided by the Port

Category of Employees	Type of Quarter - Numbers						
	D	C	B	A	Officers' Hostel	Dormitory	Chummery/ Improved Chummery
Class - I	48	178		-	40	-	-
			428				
Class - II	-	-		-	-	-	-
Class - III	-	-	-		-		
				1601		144	280
Class - IV	-	-	-		-		
Total	48	178	428	1601	40	144	280

Source- Administrative Report Year 2005-2006, Haldia Dock Authority.

Haldia Development Authority

The H.D.A. plans and develops rehabilitation housing for the households displaced by its projects such as the rehabilitation colonies at Khudiramnagar, Debhog, Kashbere, Hathiberia. Those rendered homeless due to acquisition of land are provided a plot of land for rehabilitation in a colony planned and developed by the H.D.A.

Table 2.14. Land allotted to rehabilitated families

Land originally owned	**Land allotted by HDA for rehabilitation.**
Within 4 decimals	A plot of 4 decimals (0.16 Ha)
4-5 decimal plots	5 decimal plot (0.2 Ha)
Beyond 5 decimal plot	6 decimal plot (0.24 Ha)

In these schemes, the housing is self-constructed and land provided is developed land. Agricultural land is compensated and any other existing structure is compensated for its value or cost.In cases such as Khudiram Nagar where the evictions happened for the construction of the HPL pipeline, the cost of land was paid for by HPL. In addition to this, H.D.A has built several housing complexes for different income groups.

VAMBAY

The HDA is initiating projects under The Valmiki Ambedkar Awas Yojana (VAMBAY) which is a scheme sponsored by the GoI, aimed at providing housing to the urban poor. It allows for in-situ redevelopment or relocation of slum families. Funds are available to upgrade the existing housing units, or if that is not possible, for the construction of alternate dwelling units. There is a sub-component of the scheme which provides for basic services such as sanitation and water supply. The amount allocated for the building of a new house is Rs 40,000 to Rs 60,000.

(Information on the share of private developers in the provision of housing is not available)

2.6. Transportation

2.6.1. Roads

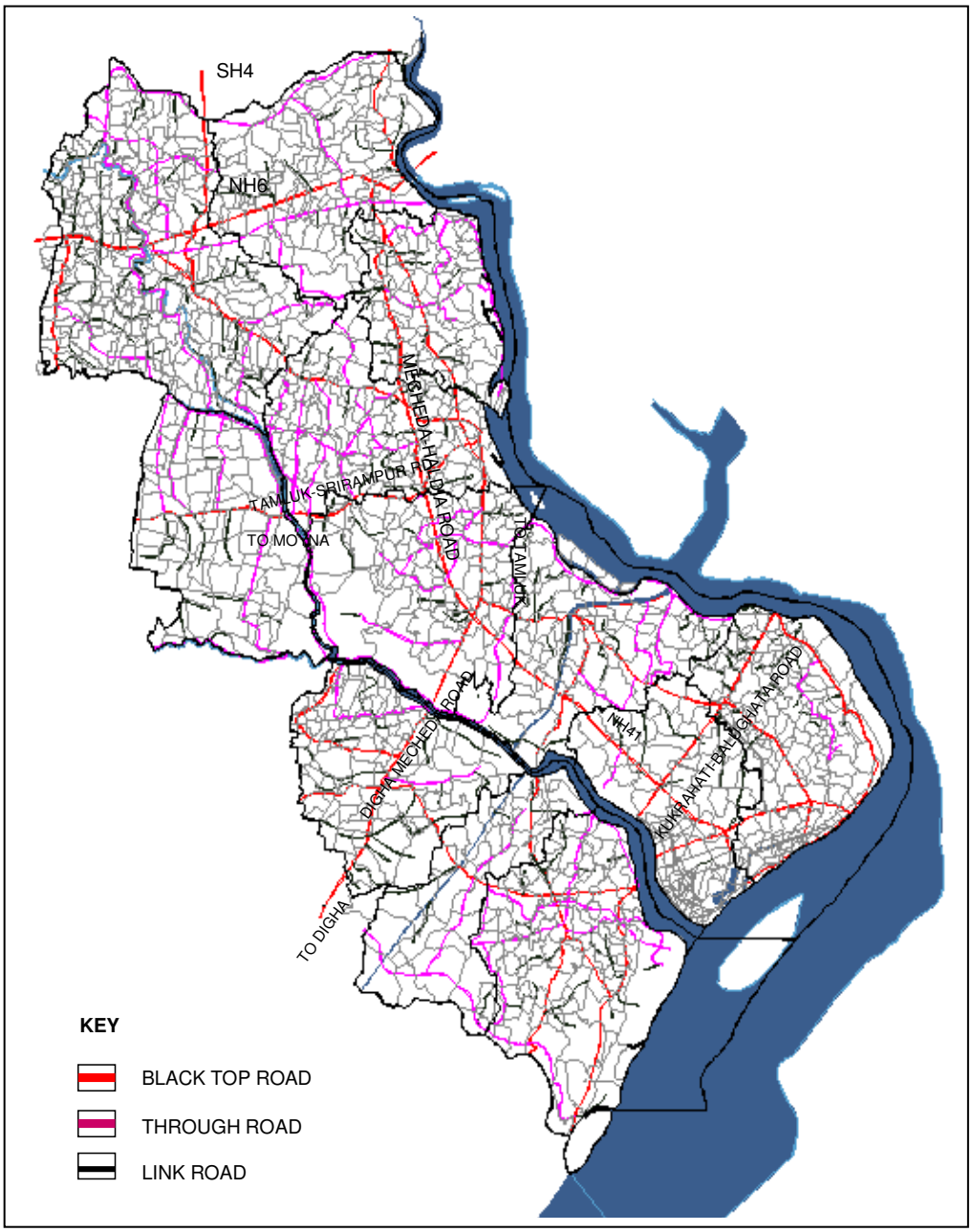


Figure 2.22. Existing Road Network in the AoI

The Region has existing networks of national and state highways which carry the maximum load of traffic movement. The two main state high ways in this region are one which connects Haldia town to NH-6 and the other which goes toward Digha from NH-41. While Haldia town is reasonably well connected

and has a grid of roads, the other parts of the region do not have good road infrastructure.

The next level of important roads are the Balughata-Kukrahati road, the Mahisadhal Geokhali Road, the Chandipur–Nandigram road and the Nandigram - Khejuri Road which is being constructed.

There are other levels of roads which go to the agrarian settlements which are not always pucca. Some of these are being strengthened under the Pradhan Mantri Gram Sadak Yojna.

Table 2.15. Roads in the AoI under the Pradhan Mantri Gram Sadak Yojna.

Name of Block	**Length of Roads for Connected Habitations of Core Network (in Km)**				
	Total				
	Black Top	**Water Bound Macadam**	**GRAVEL/MOORUM**	**TRACK**	**TOTAL**
TAMLUK	47.60	0.00	60.05	31.50	139.15
SAHID MATANGINI	23.00	1.50	17.80	52.25	94.55
PANSKURA - I	53.07	13.00	130.00	68.33	264.40
PANSKURA - II	42.30	0.00	50.00	46.15	138.45
MOYNA	19.00	4.50	67.75	47.45	138.70
NANDAKUMAR	56.50	0.00	27.25	63.50	147.25
CHANDIPUR	32.40	4.50	39.75	38.10	114.75
	273.87	**23.50**	**392.60**	**347.28**	**1037.25**
MAHISHADAL	48.43	3.50	38.75	39.00	129.68
NANDIGRAM - I	48.00	0.00	84.50	23.25	155.75
NANDIGRAM - II	19.92	4.00	17.50	41.78	83.20
SUTAHATA	33.26	6.00	18.25	26.50	84.01
HALDIA	31.75	0.00	13.00	13.50	58.25
	181.36	**13.50**	**172.00**	**144.03**	**510.89**
Total	**455.23**	**37.00**	**564.60**	**491.31**	**1548.14**

Source: PWD, Tamluk

(Data on Transportation is not available)

2.7. Social Infrastructure

2.7.1. Education

Table 2.16. Education Facilities in the AoI

Name of Revenue/Census Villages	Total Population	Primary School	Middle School	High School	Intermidiate School (Plus Two)	Degree College/Vocational School	Number of Primary Schools per 1000 population
Tamluk	206537	127	8	17	5	0	0.61
Shahid Matangini	185911	117	5	12	5	0	0.63
Panskura 1	298137	194	14	12	8	2	0.65
Panskura 2	260363	177	9	21	17	4	0.68
Moyna	195051	124	11	19	0	1	0.64
Nandakumar	226472	143	1	14	6	2	0.63
Chandipur	131489	94	10	20	5	0	0.71
Tamluk (M)	45830	34	2	2	2	4	0.74
Total	1E+06	883	52	100	43	13	0.66
Mahisadal	185976	128	3	15	5	2	0.69
Nandigram 1	181467	98	6	8	7	2	0.54
Nandigram 2	105255	82	9	11	8	0	0.78
Sutahata	106491	84	6	8	7	1	0.79
Haldia	81570	57	7	8	1	0	0.7
Haldia (M)	170673	74	4	9	8	5	0.43
Total	831432	523	35	59	36	10	0.63
Total for Region	**2E+06**	**1406**	**87**	**159**	**79**	**23**	**0.65**

Source: Public Works Department, The statistics for Haldia and Tamluk Municipalities are sourced from the district Statistical Handbook 2004

The table above shows that the Tamluk subdivision has more number of educational institutions at all levels. The number of primary school per 1000 people is far below the UDFI norms of 2 per 1000.

2.7.2. Health

Table 2.17. Health Facilities in the AoI

C.D. Block / Municipality	Hospitals	Health Centres	Clinics	Dispensaries	Total Beds	Doctors	Family Welfare Centers	Beds per 100 persons
Tamluk	0	3	34	1	22	4	34	0.106518
Sahid Matangi	0	3	31	1	22	4	31	0.118336
Panskura 1	0	3	44	2	31	4	44	0.103979
Panskura 2 (Kolaghat)	0	3	39	1	25	4	39	0.09602
Moyna	0	3	35	2	19	4	35	0.09741
Nandakumar	0	3	40	2	14	4	40	0.061818
Nandigram 3 (Chandipur)	0	3	28	2	14	4	28	0.106473
Tamluk (M)	1	1	0	2	291	42	1	6.349553
TOTAL (Tamluk)	**1**	**22**	**251**	**13**	**438**	**70**	**252**	0.326074
Mahisadal	1	2	30	2	38	6	30	0.209404
Nandigram 1	0	3	30	2	31	4	30	0.294523
Nandigram 2	1	2	19	0	37	7	19	0.347447
Sutahata	0	4	20	4	20	4	20	0.245188
Haldia	0	3	17	2	27	4	17	0.158197
Haldia (M)	1	0	0	0	250	24	1	0.300686
TOTAL (Haldia)	**3**	**14**	**116**	**10**	**403**	**49**	**117**	

Source: District Statistical Handbook published by the Bureau of Applied Economics and Statistics, Govt. of West Bengal, 2004.

The health facilities include service centers, dispensaries, Maternity clinics, public health centres and veterinary clinics. The number of beds per 1000 people has been established in each block and has been found to less than the UDPFI standard of 2 beds per 1000 people. Only Tamluk Municipal area has more number of hospitals than the above mentioned standard.

2.8. Infrastructure

2.8.1. Water

The main source of water for this region is surface water from the Hooghly. The 20mgd (90.2 mld) water treatment plant at Geonkhali supplies water for industrial and domestic use to the region. As seen in the table below, the drinking water supply for the region is adequate.

Table 2.18. Water Supply status in AoI

C.D. Block / Municipality	No Of Mouzas having Drinking Water	% of Mouzas with drinking water
Tamluk	107	100.0
Sahid Matangi	85	97.7
Panskura 1	244	98.8
Kolaghat	112	100.0
Moyna	85	100.0
Nandakumar	100	100.0
Chandipur	114	100.0
Tamluk (M)		
TOTAL (Tamluk)	**847**	99.4
Mahisadal	74	98.7
Nandigram 1	99	100.0
Nandigram 2	39	95.1
Sutahata	80	98.8
Haldia	23	95.8
Haldia (M)		
TOTAL (Haldia)	**315**	98.4
TOTAL (Region)	**1162**	99.1

However, the Central Ground Water Board is of the view that the underground water situation in Haldia is fragile and advises against indiscriminate sinking of tube wells for fresh water.

According to the CGWB, the ground water in this region occurs under "a characteristic hydrochemical situation in which fresh water group of aquifers occurs within span of 120-300m sandwiched between saline to brackish aquifers. Yield of the tube well varies from 100-150m3/hr. In the coastal tract of Medinipur, the ground water is in general high chloride content in upper aquifer, in Haldia area, Kasai basin 40-115m . Aquifers occurring in the depth span of 125-300m in Haldia area are relatively fresher and chloride content of ground water is within permissible limit."

Source: Website of Ministry of Water Resources, Govt. of India. http://www.cgwber.nic.in/

2.8.2. Power

The main source of power is the 1620 MW thermal power plant at Kolaghat generated from 6 units of 210 MW capacity each. The table below shows that the blocks of Chandipur and Nandigram 1 have a large proportion of mouzas that are not electrified.

Table 2.19. Electrification status in AoI

C.D. Block / Municipality	Number of Mouzas Electrified	% of Electrified Mouzas
Tamluk	106	99.1
Shahid Matangi	81	93.1
Panskura 1	228	92.3
Panskura 2 (Kolaghat)	99	88.4
Moyna	59	69.4
Nandakumar	91	91.0
Nandigram 3 (Chandipur)	51	44.7
Tamluk (M)		
TOTAL (Tamluk)	**715**	83.9
Mahisadal	66	88.0
Nandigram 1	34	34.3
Nandigram 2	33	80.5
Sutahata	73	90.1
Haldia	24	100.0
Haldia (M)		
TOTAL (Haldia)	**230**	71.9
TOTAL (Region)	**945**	80.6

2.8.3. Drainage, sanitation and refuse collection

Drainage

Large areas of the region being low lying and flood prone, the storm water drainage is crucial.

This is effected through the network of canals which is managed and controlled by the Directorate of Irrigation and Waterways, primarily for flood control.

Sanitation

The following information has been sourced from " A socio-economic study of households in Haldia Planning Area:1999-2000". The data on sanitation for the extended region was not available. However the type and availability of sanitation infrastructure available to rural areas, Haldia Municipality and Growth centres within HPA can act as a reference to understand sanitation in the region.

Table 2.20. Percentage distribution of households by type of toilet in HPA

Types of Toilets	Haldia (M)	Growth Centres	Rural	HPA
Connected with Sewer system	15.2	0	0	8.9
Septic Tank	34.1	27.2	13.7	22
Pit	18	14.7	16.2	16.7
Service Privy	0.3	4.7	2.4	1.9
Others	8.7	2.2	7.1	6.9
Open Space	22.2	46.4	58.5	41.3
Not reported	1.5	4.8	2.1	2.3
Total	100	100	100	100

There is a complete absence of a sewerage system in the growth centres and rural areas. In the villages, open spaces are largely used for defecation. The Haldia Municipal area itself has a large proportion (34.1%) being served by septic tanks. The slopes in the region being minimal and average ground level above mean sea level being only 7 to 11 feet, a decentralised system seems to be the most convenient and efficient system for the region.

2.9. Fiscal Resources

Fiscal Resources of Haldia Development Authority

Note: The fiscal resources for Haldia Development Authority have been sourced from the CES report in the year 2002, and current data will be required to make an accurate assessment.

Table 2.21. Income and Expenditure statements of the HDA

Particulars	1997-98	1998-99	1999-2000	2001-2002
Rent and Water Charges	581.49	668.07	1021.86	1264.79
Electricity charges	4.41	5.56	4.46	5.37
Lease rent of Haldia Bhawan and TSTC	0	3.7	3.62	5.25
Lease Rent of Land	0	0	0.45	6.31
Interest on Investments	195.07	94.01	64.28	94.58
Grant from Urban Development (T& CP) for establishment expenses	10.5		0	30.24
Supervision Charges	55.22	0	0	0
Sale of Land		1.56	0	0
Grant for Urban development (T& CP) for widening of roads	0	85.76	0	250
Way leave license fees	0	0	17.63	18.05
Misc. receipts	0.31	1.79	11.1	7.59
Sub Total	**847**	**860.45**	**1123.4**	**1682**

Expenses	**1997-98**	**1998-99**	**1999-2000**	**2001-2002**
Salaries, Bonuses and Allowances	35.68	53.71	60.4	61.95
Contribution of PF and Foreign Service Charges	0.5	1.16	1.41	1.08
Electricity Expenses	134.99	169.28	253.63	302.62
Telephone trunk call and other Admn. Expenses	8.31	11.27	7.37	19.47
Holding Tax	10.29	10.29	0	0
Grant in Aid Subscription	8.48	18.16	75.98	107.76
Fuel, Maintenance and Hire Charges of Vehicles	5.37	17.8	17.69	18.13
Royalty	5.74			
Repairs and Maintenance	132.45	236.6	191.98	349.69
Water Connection Expenses	6.7			
Legal Charges	0.75	1.73	0.46	1.26
Advertisement	1.96	14.4	6.25	6.61

Audit Fees	0.31	0.18	2.97	0
Misc. expenses	2.74	7.68	18.38	41.9
Contingencies and remuneration for LA office	62.52	68.84	33.04	5.35
Consultancy fees		3.58	20.33	12.17
Supervision charges	0	10.33	17.44	1.91
Bank Charges	0.17	0.18	0.27	
Basic Minimum Services		60		
Depreciation	174.43	170.98	167.13	163.91
Interest			0.77	
From LIC W/S Scheme	9.52	8.68	7.93	7.14
From UCO Bank	7			
From WBIDC			3.56	91.47
Interest on CPF A/c	1.43	0.56		1.46
Interest on LICI	73.44	73.44	73.44	
	682.78	**938.85**	**960.43**	**1193.88**
Excess of Income Over Expenditure	**164.22**	**-78.4**	**162.97**	**488.3**

In 2001 H.D.A. generated an income of Rs. 16.82 crores out of which 2.8 crores was in the form of grants. The main expenditures were for 4.88 crores and a cash profit of 6.52 crores. The CES found that there was the rate of increase in operational expenses was higher than operational income(excluding the grants)The balance sheet analysis showed a total fixed asset base of 71 crores against a loan component of 87 crores. The total net worth was Rs. 19 crores. Debt equity was 4.67:1. Asset cover less than one.

Fiscal Resources of Haldia Municipal Corporation

(This information was not available to us and will be required to make an accurate assessment)

Fiscal Resources of The Zilla Parishad , Block Development Offices And Gram Panchayats

(This information was not available to us and will be required to make an accurate assessment)

2.10. Development and Management

Existing Institutional Framework

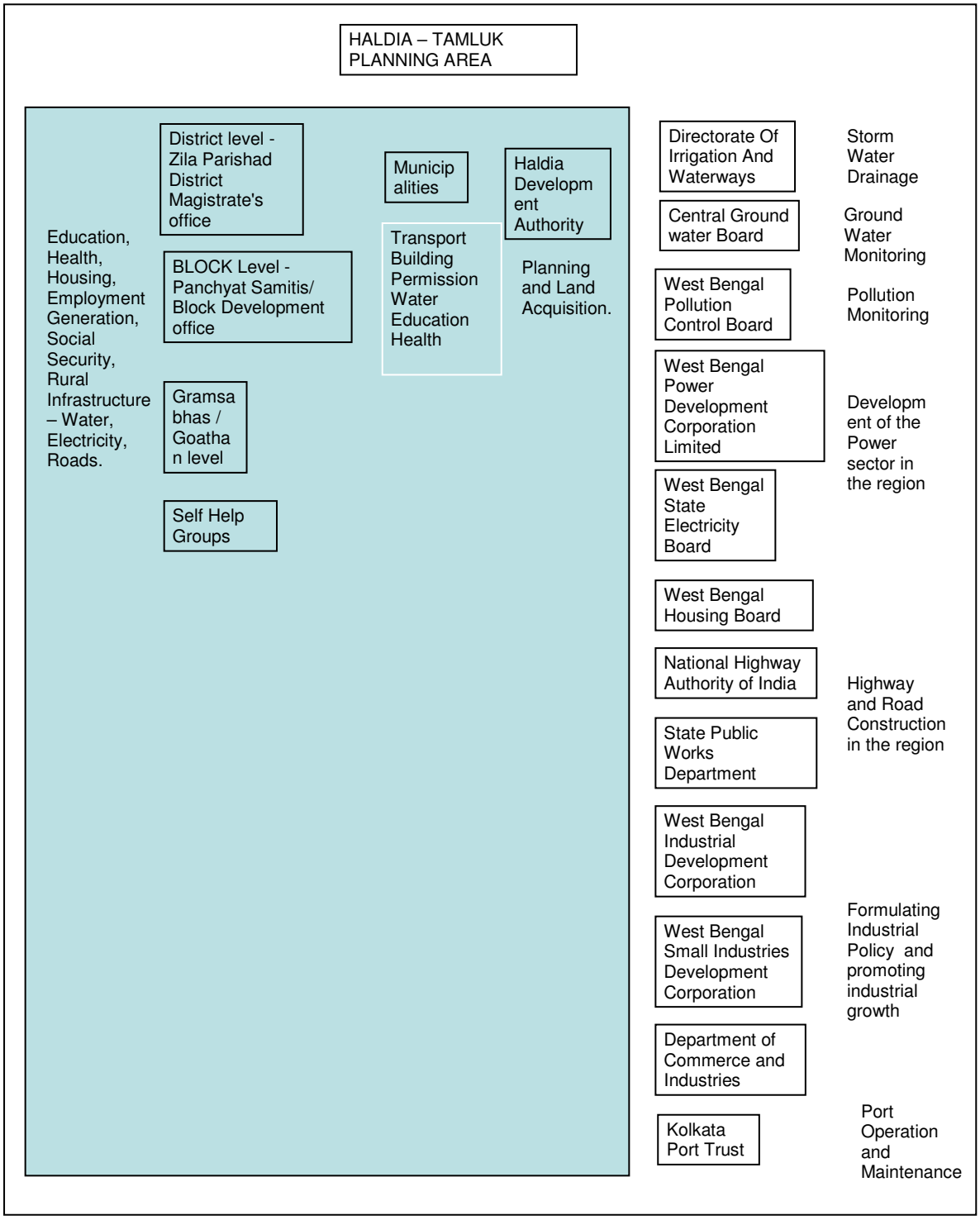


Figure 2.23. Various actors involved in the development process

(Legislative environment has not been assessed due to lack of data)

2.11. Major Policy Issues

The Port

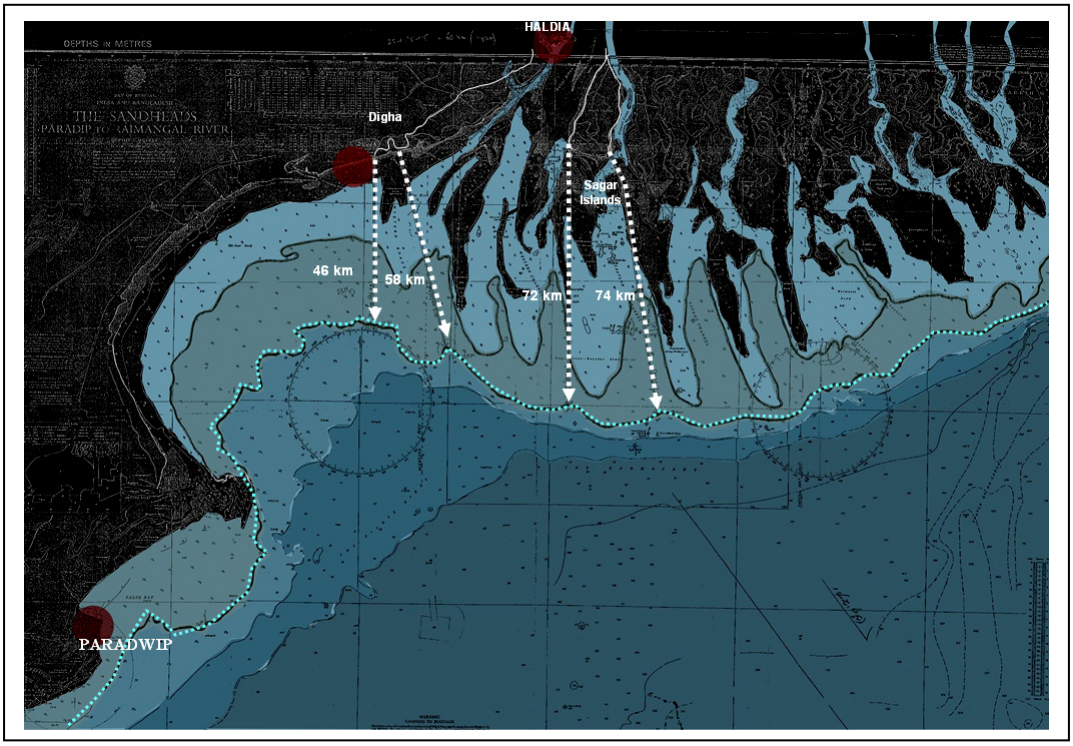


Figure 2.24. The sand-bar in the Bay of Bengal

The Central Government is initiating the process for detailed feasibility study to select a suitable location for setting up a Greenfield port on the coastline of West Bengal with a draft depth of 21m. They are studying possible location off Sagor island and Digha for the location of this port. The distance from both of these points to a point where a draft dept of 21m can be achieved is shown above.

The final choice of locating the deep sea port should however be guided by factors like distance of mainland from the container port, the presence of backup physical infrastructure, hinterland connectivity and the presence of urban centers near its vicinity .

In this Haldia which is a reasonably populated region and has a reasonable backup infrastructure can play an important role in deciding the final decision on the location of the port.

The Petroleum, Chemical And Petrochemical Investment Region (PCPIR)

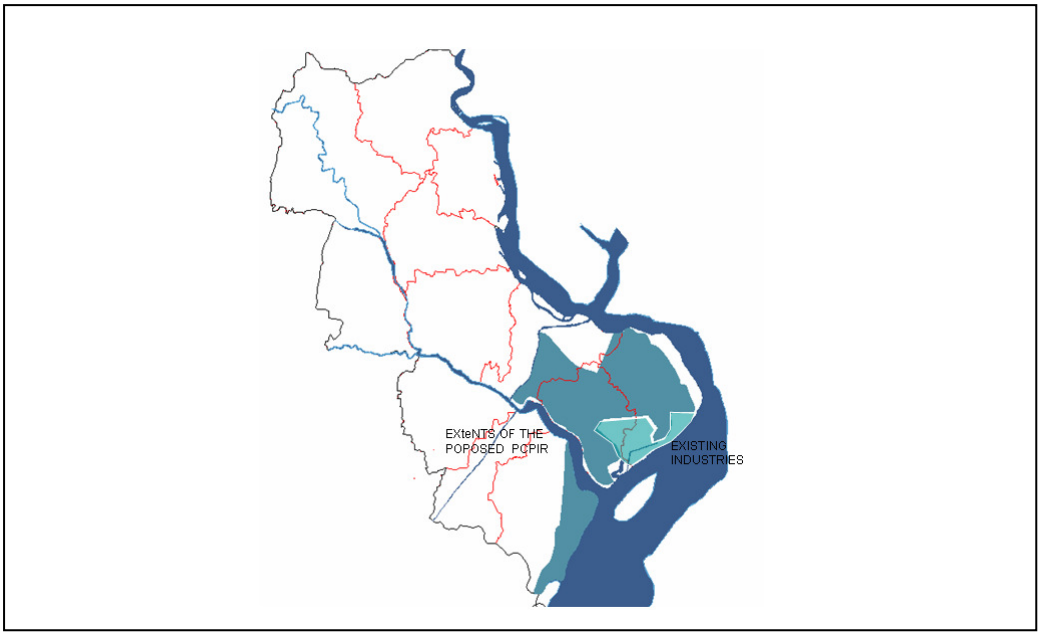


Figure 2.25. Land planned for PCPIR

The existing major industries in Haldia are the Haldia Petrochemichals, Indian Oil Corporation, MCC PTA India Corporation, Hind Lever Chemicals LTD, EXide Batteries, Shaw Wallace, Petro – Carbon and Chemical Ltd., Praxair, Shamon Ispat and Consolidated Fibres and Chemical Ltd etc .

Other industries are down stream industries are dependent on the above. The present set of industries in Haldia are primarily dependent on the port. They are either oil based or chemical industries.

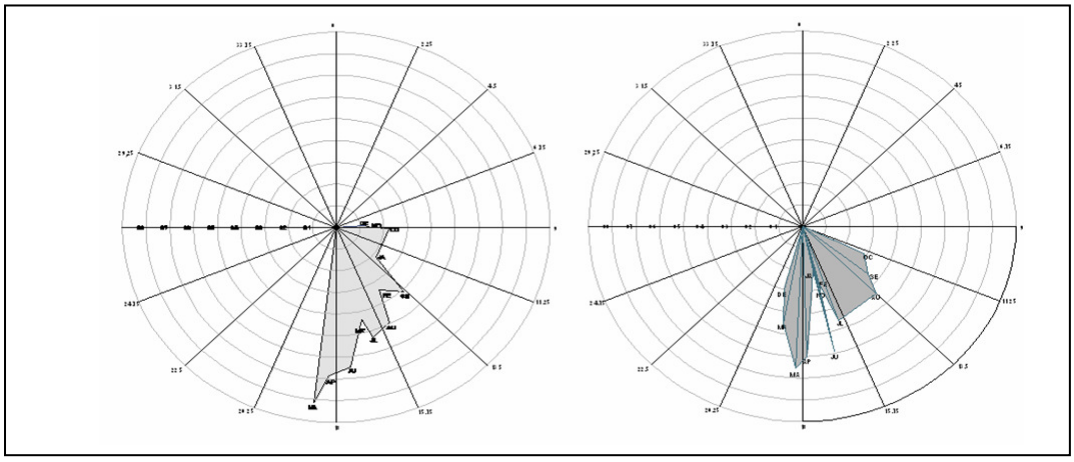


Figure 2.26. Morning time and Evening time Wind rose diagrams of the AoI

However, as has been seen, there are limitations on the port, and hence on port based activities and that Haldia needs to diversify its activities from these industries for its future growth.

Moreover these industries are primarily polluting in nature which take a toll on the fragile ecosystem.

The region should encourage the development of cleaner industries. The wind analysis shows that the placement of these chemical industries cannot be arbitrarily decided.

According to a proposal by the union government, Haldia is likely to be a hub for the Petroleum, Chemical and Petrochemical investment Region (PCPIR). For this a 250 sq. km. area would be designated in the region.

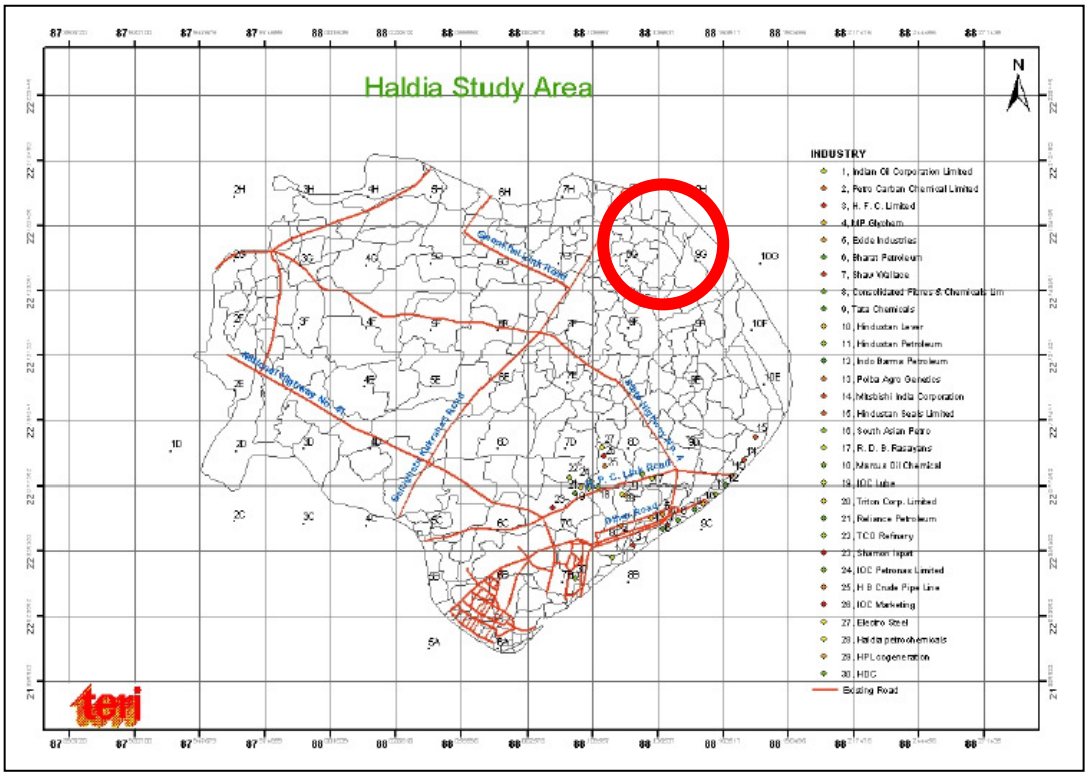


Figure 2.27. Location of Polluting Industries ad per TERI

The tentative location for the PCPIR has been drawn up. Nandigram is indicated to be a part of the processing zone for The PCPIR. An initial wind analysis which

has been done in the climatic study clearly indicated that the air borne pollution, from the proposed PCPIR would be carried inland. This could be disastrous for the region as has been shown through numerous cases in India and abroad. TERI has made similar observations on environmental issues relating to the PCPIR location. It remarks, “In terms of Industrial Development, the perspective plan of HPA mentions highly polluting industries to be proposed in the north east of HPA. This would be appropriate as it would diversify the activities and lead to less stress on air quality… This the grids such as 9G, 9F, 8H and 8F would be ideal for locating the polluting industries”

If the PCPIR is a necessity then its processing zone should be located in the south- eastern corner of the region. This location would allow for a reasonable buffer for the air borne pollution to disperse.

The other alternative possibility for the location of the intensive Petrochemical Investment Region is the Raichak – Kakdweep region across the Hoogli. A Single Buoy Mooring (SBM) at The Sandheads could be connected to this location by an undersea pipeline. Here the wind direction is favorable as it blows towards the river.

3. CONCERNS AND OBJECTIVES

The previous chapter establishes this area as a part of the Gangetic delta plains which is very critical to drain the massive volumes of water from the various rivers of the Ganges. The chapter also establishes various kinds of prevalent agrarian economies that depend on the environmental features.

The previous chapter and the brief from the vision document (Volume 1, Haldia Region Vision & Up-Gradation of Perspective Plan) appear to be in contradiction with other. The investments required to raise the GDP to 25 Billion Dollars would see complete change in the landscape of canals and paddy fields. Further, the vision document also proposes developing various kinds of Special Economic Zones that would see massive construction activity and humongous movement of migrant population into a highly environmentally sensitive area.

However, the concern in this report has been primarily to negotiate the developments envisioned in the vision document and the highly sensitive characteristic of the environment and the local economies. The following three concerns have been articulated to achieve such a negotiation and has driven the up-gradation of the perspective plan:

1. ***Concern about the Terrain*** – As stressed earlier, the region has an extremely sensitive ecology composed of a network of rivers and canals. There is a continuous risk of siltation and floods as the land in many cases is low lying. The proposed up-gradation of the perspective plan aim at undertaking a congruent response to this terrain.
2. ***Concern about the local economies*** – While the local economy in Haldia town comprises mainly of manufacturing industries; the rest of the region (about 80%) depend on agrarian modes of production. These include Agriculture, Horticulture, Pisciculture, and other livestock based economy. The local population has high capacity and traditionally developed methods to undertake the agrarian activities. The plan aims at creating opportunities to harness the local capacities of the population.

3. ***Concern about the Existing Fabric*** – The strong agrarian base and the environmental factors have developed certain social, cultural and physical processes in the lifestyle of the population. The plan aims at making minimum damage to this existing fabric.

While the above concerns give a conceptual direction to the plan; the following objectives are formulated to programme the plan:

1. ***Development of Regional Linkages:*** Connecting with national /international corridors for easy movement of goods and people.

2. ***Physical and Social Infrastructure:*** Planning for mass-scale, sustainable social / physical infrastructure including housing.

3. ***Development of the Port***: Alternatives to improve it's performance.

4. ***Landuse for Existing Economy***: Providing for leveraging of local economies such as agriculture and fishery by planning their industrialisation.

5. ***Landuse for Advantage Economy***: Providing for economies that are de-linked from the port and take advantage of the local capacities and opportunities such as nearness to other metropolitan regions and knowledge centres.

6. ***Landuse for New Economy***: Providing for new high yielding economies that will spur rapid development including special economic zones for multi-products, logistics, entertainment, etc.

7. ***Distinct City Form:*** Developing of a strong city identity through mixing of people, interaction of communities and exchange amongst the population.

8. ***Building Control Regulations***: Developing of Building Control Regulations that encourage use of local and natural resources and optimise the same.

4. PROJECTED REQUIREMENTS

4.1. Population

Population Projection is done by three methods:

1. Trend Line Method
2. Growth Rate Method
3. Economic Generation Method

While the first two methods listed above factor the existing growth rates, the last methods factors other parameters like investments made, land developed, jobs created etc. In this report we use the projections from the last method as it seems most relevant and is in accordance with the vision plan. However, the first two methods describe some important characteristics which are used for the final projections.

Population Projection by TREND LINE METHOD

In this method, the population is projected from existing trends of growth. Here the rate of growth is the only parameter factored and this is mapped in various trends of city growth.

The population of the region is projected by the trend line method and shown as below for the Tamluk Subdivision and the Haldia Subdivision. The population projection for the total region is also shown. The maximum as shown by this method come to a maximum of 3.6 million people in 2021. .

Table: 4.1. Population Project based on Trend Based Method

		Linear Method		Exp Method		Polynomial Method	
	2001	2011	2021	2011	2021	2011	2021
TAMLUK	1567458	1822637	2062167	1913677	2296592	1666150	1670950
HALDIA	820149	982201	1133977	1058287	1333426	879461	877119
TOTAL	2387607	2804838	3196144	2971964	3630018	2545611	2548069

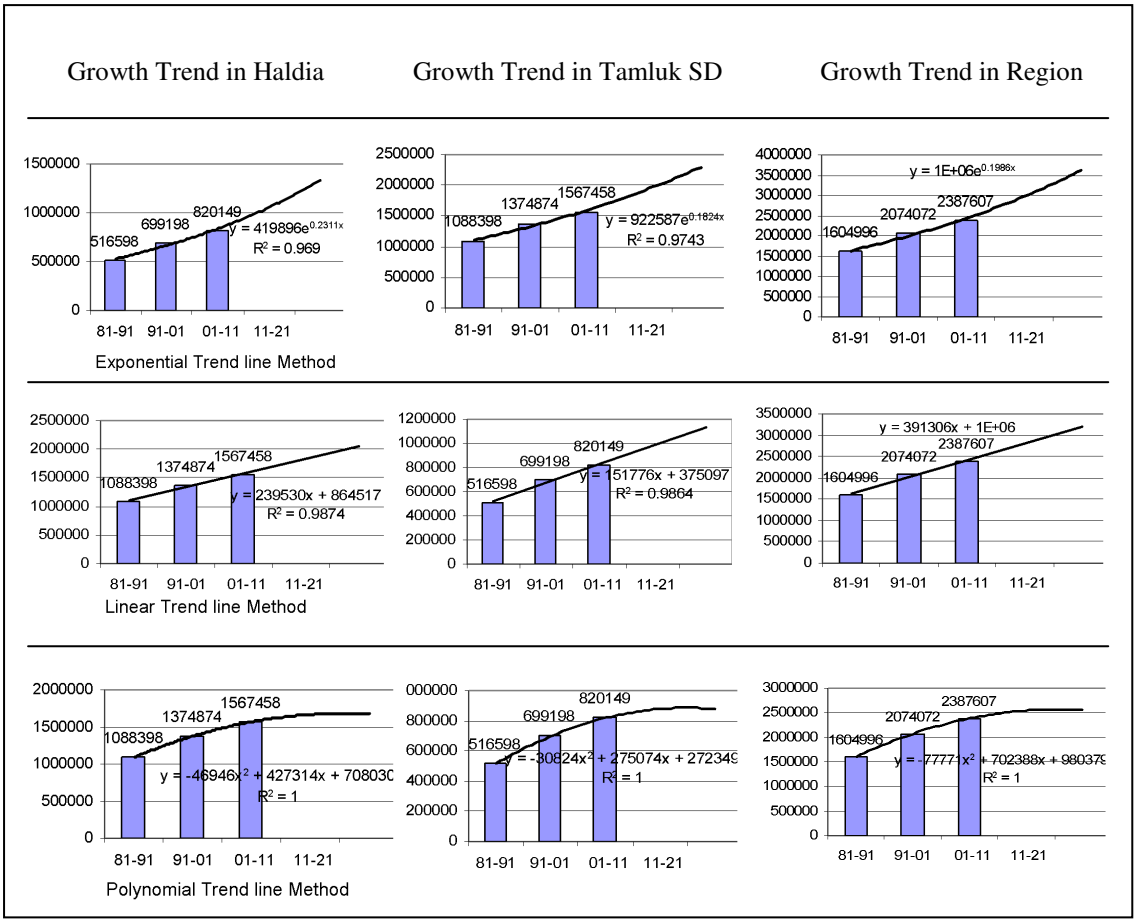


Figure 4.1. Population Projection by Growth Trend Methods

The Trend Line Method depends on the growth rate of the population and projects three kinds of Trends for growth:

1. Exponential Trend: For a rapidly growing city that will continue to growth in the entire considered period.
2. Linear Trend: For a city that shows a stable moderate growth very close to the existing trend in the growth rate
3. Polynomial Trend: For a city that stabilizes the growth after some period as the period of intense migration and investment will be over.

We use the assumptions of the polynomial trend to project the population up to 2021 as the vision document states that investments will be made during these years. Hence, it is expected that the population also stabilizes in these years. In the following parts of this section we estimate the population by other methods – Growth Rate Method continuing from the trend line method and Economic Generation Method where investments are factored to the growth.

Population Projection by GROWTH RATE METHOD

In this method the growth rate is projected to estimate the population growth of the blocks, the subdivisions as well as the region. Through this method the maximum population of the region is estimated to be around 3.7 million.

Table 4.2. Population Projection based on Growth Rate Method

Growth rate methods TAMLUK subdivision													
						Growth rate		Linear		Geometric		Exponential	
						Decadal	Annual	P(t)=p(0)+p(0)rt		P(t)=p(0)(1+r)^n		P(t)=p(0)e^rt	
	1981	1991	Growth rate 81-91	2001	Growth rate 91-01			2011	2021	2011	2021	2011	2021
Tamluk	143072	182404	27.49	204422	12.07	19.8	1.978	244859	285296	248655	302459	249135	303629
Sahid Matangi	122010	154749	26.83	176307	13.93	20.4	2.038	212242	248177	215723	263952	216166	265036
Panskura 1	205414	257891	25.55	298139	15.61	20.6	2.058	359486	420834	365490	448056	366254	449931
Panskura 2	182261	227443	24.79	256882	12.94	18.9	1.887	305347	353812	309676	373319	310220	374634
Moyna	139224	174309	25.20	196502	12.73	19.0	1.897	233771	271040	237118	286129	237540	287148
Nandakumar	155643	198523	27.55	229462	15.58	21.6	2.157	278951	328440	284041	351602	284693	353218
Chandipur	111407	140867	26.44	159914	13.52	20.0	1.998	191869	223823	194901	237542	195285	238480
Tamluk municipality	29367	38688	31.74	45830	18.46	25.1	2.510	57333	68837	58724	75245	58906	75712
Total Tamluk	1088398	1374874		1567458				1883858	2200258	1914327	2338304	1918200	2347788

Growth Rate Methods HALDIA SUBDIVISION													
						Growth Rate		Linear		Geometric		Exponential	
						Decadal	Annual	P(t)=P(0)+P(0)rt		P(t)=P(0)(1+r)^n		P(t)=P(0)e^rt	
	1981	1991	Growth Rate 81-91	2001	Growth Rate 91-01			2011	2021	2011	2021	2011	2021
Mahisadal	126193	158620	25.70	182191	14.86	20.3	2.028	219136	256081	222696	272207	223149	273314
Nandigram 1	116159	147798	27.24	174691	18.20	22.7	2.272	214375	254059	218688	273765	219244	275160
Nandigram 2	78909	95438	20.95	104637	9.64	15.3	1.529	120639	136641	121786	141746	121927	142075
Sutahata	89346	99067	10.88	106338	7.34	9.1	0.911	116025	125712	116432	127484	116480	127590
Haldia	94869	97928	3.22	81619	-16.65	-6.7	-0.671	76138	70658	76301	71330	76318	71362
Haldia Municipality	21122	100347	375.08	170673	70.08	222.6	22.258	550562	930451	1273350	9500155	1580628	14638438
Total Haldia	526598	699198		820149				1296876	1773602	2029253	10386687	2337747	15527938

TOTAL Region	1604996	2074072		2387607				2919556	3451505	2977285	3715688	2984755	3734504

Population Projection by ECONOMIC GENERATION METHOD

The vision document indicates that the region's economic potentials are enormous and the possibilities to attract investment in the region can be made if a correct environment is created. This economic investment can bring in large amounts of migration into the region which both the above methods are not able to factor. This factor will be very critical, especially, for urban agglomerations which will be the prime areas where investments will be made. This can be observed in the case of Haldia Municipal area which has seen a growth rate of 222% from 91-01.

The vision document further specifies certain areas of investment in logistic hubs, knowledge based IT/BPO services, recreation activities and industries ranging from automobile, electronics, textiles, petrochemical, agro-based industries to food processing. These activities are proposed to be spread over the region rather than concentrated in certain areas. The economic generation method is used to project the population of the region based on all the propositions of the vision document. In this section, the set of economic activity and the possible investments are drawn up for the coming 10 years and the next 20 years.

Table 4.3. Investments in various sectors in the next 20 years.

	10 years investment (Rs. in crores) 07-17	**Next 10 years of investment (Rs. in crores) 17-27**	**Remarks**
Multi Product Sez	25000	10000	Would help to diversify from the port based industry
Logistic Hub	20000	10000	Can be developed due to the possibilities of improving regional connectivity
Chemical and oil based Industries	25000	5000	The region should slowly move out of its dependency on chemical industries. Therefore though a huge amount of initial investment would come in, there should be a reduction in the coming years
Electronic Industry	20000	15000	Should be encouraged due to the availability of skilled manpower nearby

Agro Industries	15000	20000	The region has potential to become an agricultural export zone.
Knowledge City	7500	20000	This is another sector which should be encouraged as there is skilled manpower nearby
Recreation	5000	5000	The sector has a potential because of the regions natural and cultural abundance.

An investment pattern for each block has also been drawn up depending on the type of economic activities that can be encouraged in those blocks. This depends on the present set of activities in the block, the salinity level of its soil, the agricultural productivity and its population density.

Table 4.4. Population Increase due to Investment

C.D. Block / Municipality	Activities suggested	Investments in 2007-17 in crores	Projected increase in Population due to investments	Investment in 2017-27	Projected Population due to Investment
Tamluk	Agri and food	2000	1,22,080	2500	1,52,600
Sahid Matangi	Agri and food	1000	61,040	1500	91,560
Panskura 1	Agri and food	2500	1,52,600	3500	2,13,640
Kolaghat	Agri and food	2500	1,52,600	3500	2,13,640
Moyna	Agri and food	1000	61,040	1500	91,560
Nandakumar	Agri and food	1000	61,040	1500	91,560
Chandipur	Agri and food	1000	61,040	1500	91,560
Tamluk (Municipality)	Agri and food and Residential	2000	1,22,080	2500	1,52,600
Mahisadal	Agri and food	2000	1,22,080	2000	1,22,080
Nandigram 1	Residential Non Polluting Industry	22500	9,81,000	12500	5,45,000
Nandigram 2	Non Polluting Industry	22500	9,81,000	12500	5,45,000
Sutahata	Petrochemical zone	15000	2,09,280	2500	34,880
Haldia	Knowledge, Residential	7500	3,27,000	20000	8,72,000
Haldia (Municipality)	Residential, industry	10000	1,39,520	2500	34,880
			35,53,400		32,52,560

This method assumes that the amount of investment per crore of rupees brings in a fixed number of employment per activity. We assume that 1 crore of investment agro based food processing leads to around 7 jobs per crore of investment. We have also assumed that 1 crore of investment in petrochemical industries would create 1.6 jobs and other industries will create 5 jobs (This assumption is based on the Draft Perspective Plan for Haldia Region prepared by Consulting Engineering Services). The number of industrial workers generated from the investment would help us to ascertain the number of workers involved in the tertiary sector. The ratio of the number of industrial worker to the tertiary sector worker is 1:4 as per the UDPFI guideline but in the metropolitan region of KMDA it is 1:1.8. We have assumed it to be 1:1.8 as assumed by the KMDA. Also people dependent on each worker is assumed to be 3.

This then gives us a indication of the population that can be expected in the region and the sub-centres due to various proposed economic activities :

Table 4.5. Projected Population by Economic Generator Method

C.D. Block / Municipality	Population in 2001	Increase in Population due to investments up to 2017	Total Pop'n in 2017	Increase in Pop'n due to investments 2017 -27	Total Pop'n in 2027
Tamluk	204422	122080	326502	152600	479102
Sahid Matangi	176307	61040	237347	91560	328907
Panskura	298139	152600	450739	213640	664379
Kolaghat	256882	152600	409482	213640	623122
Moyna	196502	61040	257542	91560	349102
Nandakumar	229462	61040	290502	91560	382062
Chandipur	159914	61040	220954	91560	312514
Tamluk (Muni)	45830	122080	167910	152600	320510
Total (Tamluk)	1567458	793520	2360978	1098720	3459698
Mahisadal	182191	122080	304271	122080	426351
Nandigram 1	174691	981000	1155691	545000	1700691
Nandigram 2	104637	981000	1085637	545000	1630637
Sutahata	106338	209280	315618	34880	350498
Haldia	81619	327000	408619	872000	1280619
Haldia (Muni)	170673	139520	310193	34880	345073
TOTAL (Haldia)	820149	2759880	3580029	2153840	5733869
TOTAL	2387607	3553400	5941007	3252560	9193567

Thus the whole region in the next twenty years would have a population of 9.2 million The Haldia subdivision where maximum number of industries are expected to come will have a population of 5.73 million and Tamluk subdivision which is projected to have investments in agro based industries will have a population of 3.45 million.

Another assumption made is that the rate of population increase by this method depends on migration. Though we assume that migration will be high during an initial period it will stabilize within the coming 10-15 years after which it will exhibit natural growth characteristics. It implies that the existing population at that time would have enough skills to address the job requirements of the region. Thus the population of the region has been calculated for the coming 25 years by this method. For the report we will assume these figure for projecting the future jobs, house holds, their economic profile as well as demands for physical and social infrastructure.

4.2. Economic Base and Employment

Employment

As several kinds of new economic activities are planned in the Area of Interest, new kinds of employment will be created. From 4.1. above, it is estimated that in the coming twenty years nearly 1.7 million jobs are going to be generated.

Table 4.6. Activities Suggested and Jobs Created in various Blocks

C.D. Block / Municipality	Activities suggested	Projected increase in jobs in each block	Projected increase in jobs in each block	Total creation of Jobs
Tamluk	Agri and food	30520	38150	**68670**
Sahid Matangi	Agri and food	15260	22890	**38150**
Panskura	Agri and food	38150	53410	**91560**
Kolaghat	Agri and food	38150	53410	**91560**
Moyna	Agri and food	15260	22890	**38150**

Nandakumar	Agri and food	15260	22890	**38150**
Chandipur	Agri and food	15260	22890	**38150**
Tamluk (Muni)	Agri, food and Residential	30520	38150	**68670**
Total (Tamluk)		**198380**	**274680**	**473060**
Mahisadal	Agri and food	30520	30520	**61040**
Nandigram 1	Residential & Non Polluting Industry	245250	136250	**381500**
Nandigram 2	Non Polluting Industry	245250	136250	**381500**
Sutahata	Petrochemical zone	52320	8720	**61040**
Haldia	Knowledge city, Residential	81750	218000	**299750**
Haldia (Muni)	Residential, imdustry	34880	8720	**43600**
Total (Haldia)		**689970**	**538460**	**1228430**
Total		**888350**	**813140**	**1701490**

Landuse Projections

The land use projection is made separately for

1. The Urban Growth Centres of Haldia, Sutahata, Nandigram 1 and 2
2. The Agricultural Growth Centres of Tamluk, Sahid Matangini, Nandakumar, Mahisadhal, Panskura, Kolaghat, Chandipur, and Moyna. It is assumed that 25% of the population of agricultural zone would stay in the Agricultural Growth Centres.

In the Urban Areas of Haldia and Nandigram, varied range of activities are planned including industries, recreation zones, knowledge zones, commercial district, transport facilities and residential areas. This would help the city to transform from its present industrial character to a metropolitan centre with its own identity.

As far as the region is concerned, out of 1768 sq km. 381 sq km. would be developable area with the rest remaining as agricultural zone.

Table 4.7. Land Uses in various Blocks

C.D. Block / Municipality	Area under development (Ha) • assuming density of 175pph in Urban Growth Centres • assuming 25 % population of Agri Zone staying in agricultural Growth centres with density of 125pph	Developed Area (Sq. Km)	Industrial area as per UDPFI guidelines @ 14% (Sq. Km)	Non Processing area for SEZ as per SEZ Act of West Bengal,2003 With 50% of total SEZ area to be kept as Non Processing zone comprising of Residential, Commercial and Facilities (Sq. Km)
Agricultural zone + Agro Based Settlements (Tamluk (M), Sahid Matangini, Panskura, Kolaghat, Moyna, Chandipur, Mahisadal, Nandakumar)	7772	78	11	11
Urban Centres	30329	303	42	42
Nandigram 1	9718	97		
Nandigram 2	9318	93		
Sutahata	2003	20		
Haldia	7318	73		
Haldia (Muni)	1972	20		

C.D. Block / Municipality	Remaining Residential zone as per UDFI norm at 23% (Sq. Km).	Recreational zone as per UDPFI norms (Sq. Km)	Institutions @14% as per UDPFI norms (Sq. Km)	Transport and Communication facilities, logistic hub at 15% as per UDPFI norm (Sq. Km)
Agricultural zone + Agro Based Settlements (Tamluk (M), Sahid Matangini, Panskura, Kolaghat, Moyna, Chandipur, Mahisadal, Nandakumar)	18	16	11	12
Urban Centres (Haldia, Nandigram 1&2, and Sutahata	70	61	42	45

4.3. Housing and Shelter

The number of jobs generated will give us an estimate of the demand in housing that this region is going to require in the coming 20 years. While in the coming ten years the region would require additional 0.88 million houses; the subsequent ten years would require another additional 0.81 million houses.

A study was made by the HDA for the Haldia Planning Area to ascertain the socio-economic profile of household in the region (A Socio-Economic Study of Households in Haldia Planning Area: 1999 – 2000). In the absence of any comprehensive data on socio-economic profile of the extended region comprising of the Tamluk Sub-division, this report will assume that the rural region in the Tamluk Subdivision will exhibit similar economic characteristics. This assumption is made for establishing the various income groups that need to be considered for projecting housing demand.

Table 4.8. Monthly Household income class Survey in 1999-2000 in present HPA

Income Rs.	Haldia (m) (% of families)	Growth Centre % of families	Rural % of families	HPA % of families	
<+ 499	2	3	2	2	EWS: 42% (Below Rs. 2500)
500 - 999	5	5	7	6	
1000 - 1999	19	25	34	26	
2000 - 2999	24	28	27	26	LIG: 33% (Between Rs. 2500 and Rs. 5000)
3000 - 4999	20	25	18	20	
5000 - 7499	19	8	8	13	MIG: 17 % (Between Rs. 5001 and Rs. 10000)
7500 - 9999	6	2	2	4	
10000 +	4	4	2	3	HIG: 13% (Above Rs. 10000)

From the household income characteristic of the Haldia Planning Area it is clear that this cannot be used for projecting the housing demand across various economic classes as the activities which are proposed in the study are high end manufacturing industries and services which will bring in a different economic

profile of workers. However this will be the household characteristic which will be assumed for the zone with petrochemical industries. Haldia Municipal Area is the Petrochemical Zone and consisted of 71% LIG, 25 % MIG and 4% HIG in the year 2000. Similarly, in agriculture based areas, the income characteristics show that the population consists of 4% HIG, 10% MIG and 86% LIG or EWS. These break-ups will be used in the areas proposed for Agro-Based Industrial Zone.

To appreciate the effect of uses like multi product SEZ, knowledge city, recreational centres, the findings of a the KMDA study for the metropolitan region of Kolkata is used. In 2025 the household income characteristic are projected to be 10% as HIG, 30% as MIG and 60% as LIG or EWS. Hence , the total housing stock required in the agricultural zone and the city centre area has been worked out in the table below.

Table 4.9. Projected Housing Requirement

C.D. Block / Municipality	No. of new HH (=jobs)	HIG HH	MIG HH	LIG HH
Tamluk	68670	2746.8	6867	59056.2
Sahid Matangi	38150	1526	3815	32809
Panskura 1	91560	3662.4	9156	78741.6
Kolaghat	91560	3662.4	9156	78741.6
Moyna	38150	1526	3815	32809
Nandakumar	38150	1526	3815	32809
Chandipur	38150	1526	3815	32809
Tamluk (Muni)	68670	2746.8	6867	59056.2
Mahisadal	61040	2441.6	6104	52494.4
Total Housing Required In Agri Zone		**21364**	**53410**	**459326**
Nandigram 1	381500	38150	114450	228900
Nandigram 2	381500	38150	114450	228900
Sutahata	61040	2441.6	15260	43338.4
Haldia	299750	29975	89925	179850
Haldia (Muni)	43600	4360	13080	26160
Total Housing Required in City Centre		**113076.6**	**347165**	**707148.4**

4.4. Transportation

The transport projection will try to estimate the trip generation, the trip distribution and modal split to understand the future travel demands. For each of these specific method will be used:

1. Trip Generation – For estimating trip generation for house based work trips the zonal regression method will be used. It means that if X1 = population in zone and X2= number of vehicles in zone, then **Total Trips = 4353.3 + 0.1 X1 + 2.21X2**. The trip generation for every block is estimated. It indicates that Nandigram 1 and 2 which have been proposed for intense development has the maximum amount of trip being generated.

2. Trip Distribution – Trip distribution refers to the given number of travel origins from every zone to the number of other zones of the area. In the case of this study Haldia (M), Tamuk(M), Nandigram, Panskura(M), Kolaghat urban agglomeration need to be considered the zones of the study where we need to estimate the number of trip. For this the growth factor method can be used. It projects the distribution through a simple formulae: **Tij = tij. E**, where Tij=future number of trips from zone i to zone j, tij= existing number of trips from zone i to zone j, E = growth factor. However due to the lack of existing data this need to be ascertained at a later time.

3. Modal Split – Modal split is the proportionate division of the total number of trips between different methods or modes of travel. However since the study does not have sufficient data on traffic, it can only be done at a later stage.

While preparing the modal split the recommendation given by the UDPFI are:

Below 1 million	30% Public transport
Around 1 million	35% Public transport
1.5 million	40% Public transport
3.0 million	50% Public transport
6.0 million	70% Public transport
9.0 million	75% Public Transport (85%: Mass Transit System)

This standard will be used to plan all the main centres and sub- centres in the region.

Table 4.11. Projected Number of Cars and Trips Generated

C.D. Block / Municipality	Households having cars (= HIG HH)	Trip Generation
Tamluk	2746.8	58334
Sahid Matangi	1526	40617
Panskura 1	3662.4	78885
Panskura 2 (Kolaghat)	3662.4	74759
Moyna	1526	42636
Nandakumar	1526	45932
Nandigram 3 (Chandipur)	1526	38977
Tamluk (Municipality)	2746.8	42475
Total (Tamluk)	**18922.4**	
Mahisadal	2441.6	52384
Nandigram 1	38150	258734
Nandigram 2	38150	251729
Sutahata	2441.6	44799
Haldia	29975	198660
Haldia (Municipality)	4360	48496
Total (Haldia)	**113076.6**	

4.5. Facilities

Various Education, Health, Cultural and Other Urban facilities are projected based on the projected population.

Education

Table 4.11. Projected Education Facilities

	Population	Pre-Primary School	Primary School	Senior Secondary School
AREA (ha) →		0.08	0.4	1.60
Standard →		1 for 2500 population	1for 2500 population	1 for 7500 population
Tamluk	479102	192	192	64
Sahid Matangi	328907	132	132	44
Panskura	664379	266	266	89

Kolaghat	623122	249	249	83
Moyna	349102	140	140	47
Nandakumar	382062	153	153	51
Chandipur	312514	125	125	42
Tamluk (Muni)	320510	128	128	43
Total (Tamluk)	**3459698**	**1384**	**1384**	**461**
Mahisadal	426351	171	171	57
Nandigram 1	1700691	680	680	227
Nandigram 2	1630637	652	652	217
Sutahata	350498	140	140	47
Haldia	1280619	512	512	171
Haldia (Muni)	345073	138	138	46
Total (Haldia)	**5733869**	**2294**	**2294**	**765**
TOTAL	**9193567**	**3677**	**3677**	**1226**

	Population	Integrated school without hostel	Integrated school with hostel	School for Handicapped	College	Technical education centre	Professional Education
AREA (ha) →		3.50	3.50	0.50	4	4	60
Standard →		1 for 90000 pop	1 for 90000 pop	1 for 45000 pop			
Tamluk	479102	5	5	11	4		
Sahid Matangi	328907	4	4	7	3		
Panskura	664379	7	7	15	5		
Kolaghat	623122	7	7	14	5		
Moyna	349102	4	4	8	3		
Nandakumar	382062	4	4	8	3		
Chandipur	312514	3	3	7	3		
Tamluk (Muni)	320510	4	4	7	3		
Total (Tamluk)	**3459698**	**38**	**38**	**77**	**28**	**3**	
Mahisadal	426351	5	5	9	3		
Nandigram 1	1700691	19	19	38	14		
Nandigram 2	1630637	18	18	36	13		
Sutahata	350498	4	4	8	3		
Haldia	1280619	14	14	28	10		
Haldia (Muni)	345073	4	4	8	3		
Total (Haldia)	**5733869**	**64**	**64**	**127**	**46**	6	
TOTAL	**9193567**	**102**	**102**	**204**	**74**	**9**	**2**

Health

Table 4.12. Projected Health Facilities

	Total Population	Dispensary	Nursing home	Poly-clinic	Intermediate Hospital (category B) 80 beds	Intermediate Hospital (category A) 200 beds	General Hospital, 500 beds
AREA		0.08ha	.20 ha	.20ha	1 ha	3.70 ha	6ha
STANDARD		1 for 15000	1 for 45000	1 for 100000	1 for 100000	1 for 100000	1 for 250000
Tamluk	479102	32	11	5	5	5	2
Sahid Matangi	328907	22	7	3	3	3	1
Panskura 1	664379	44	15	7	7	7	3
Kolaghat	623122	42	14	6	6	6	2
Moyna	349102	23	8	3	3	3	1
Nandakumar	382062	25	8	4	4	4	2
Chandipur	312514	21	7	3	3	3	1
Tamluk (M)	320510	21	7	3	3	3	1
Total (Tamluk)	**3459698**	**231**	**77**	**35**	**35**	**35**	**14**
Mahisadal	426351	28	9	4	4	4	2
Nandigram 1	1700691	113	38	17	17	17	7
Nandigram 2	1630637	109	36	16	16	16	7
Sutahata	350498	23	8	4	4	4	1
Haldia	1280619	85	28	13	13	13	5
Haldia (M)	345073	23	8	3	3	3	1
Total (Haldia)	**5733869**	**382**	**127**	**57**	**57**	**57**	**23**
TOTAL	**9193567**	**613**	**204**	**92**	**92**	**92**	**37**

Socio-Cultural Facilities

Table 4.13. Projected Socio-Cultural Facilities

	Total Population	Community room	Community hall and Library	Recreation Club	Religious centre	Socio-Cultural Centre
AREA		660 sq m	2,000sqm	1 ha	0.5 Ha,	0.15ha,
STANDARD		1 for 5000	1 for 15000	1 for one lakh	1 for 1lakh	1 for 10 lakh
Tamluk	479102	96	32	5	5	0
Sahid Matangi	328907	66	22	3	3	3
Panskura 1	664379	133	44	7	7	7
Kolaghat	623122	125	42	6	6	6
Moyna	349102	70	23	3	3	3
Nandakumar	382062	76	25	4	4	4
Chandipur	312514	63	21	3	3	3
Tamluk (Muni)	320510	64	21	3	3	3
Total (Tamluk)	**3459698**	**692**	**231**	**35**	**35**	**35**
Mahisadal	426351	85	28	4	4	4
Nandigram 1	1700691	340	113	17	17	17
Nandigram 2	1630637	326	109	16	16	16
Sutahata	350498	70	23	4	4	4
Haldia	1280619	256	85	13	13	13
Haldia (Muni)	345073	69	23	3	3	3
Total (Haldia)	**5733869**	**1147**	**382**	**57**	**57**	**57**
TOTAL	**9193567**	**1839**	**613**	**92**	**92**	**92**

Other Urban Facilities

Table 4.14. Projected Other Urban Facilities

C.D. Block / Municipality	Total Population	Milk Distribution	LPG godowns	Police Station	Police Post	District Jail	Fire Station
Tamluk	479102	96	12	5	12	5	2
Sahid Matangi	328907	66	8	4	8	3	2
Panskura 1	664379	133	17	7	17	7	3
Panskura 2 (Kolaghat)	623122	125	16	7	16	6	3
Moyna	349102	70	9	4	9	3	2
Nandakumar	382062	76	10	4	10	4	2
Chandipur	312514	63	8	3	8	3	2
Tamluk (Municipality)	320510	64	8	4	8	3	2
Total (Tamluk)	**3459698**	**692**	**86**	**38**	**86**	**35**	**17**
Mahisadal	426351	85	11	5	11	4	2
Nandigram 1	1700691	340	43	19	43	17	9
Nandigram 2	1630637	326	41	18	41	16	8
Sutahata	350498	70	9	4	9	4	2
Haldia	1280619	256	32	14	32	13	6
Haldia (Municipality)	345073	69	9	4	9	3	2
Total (Haldia)	**5733869**	**1147**	**143**	**64**	**143**	**57**	**29**
		0	0	0	0	0	0
	9193567	**1839**	**230**	**102**	**230**	**92**	**46**

4.6. Infrastructure

Water Projections

From the type of activities which is projected to come in this region the type of water requirements will be for domestic use (urban and rural), cattle, fire fighting, floating population and industries. As per the Central public Health and

Environmental Engineering Organization (CPHEEO) of Ministry of Urban Development, Government of India, the following standards are specified:

1. The domestic requirement of water for settlements with a population around 1,00,000 is 125-200 lpcd
2. Fire protection is 1% of the total demand, which is around 3 lpcd
3. For floating population and special uses like hotels the amount is around 52 lpcd more. The region will have an higher floating population because of high number of industries that are proposed and also because of tourism potential.
4. For industries the requirement is 47 lpcd.

The total requirement of the region is thus around 1726 MLD.

Table 4.15. Projected Water Demand

C.D. Block / Municipality	Population	Domestic demand in rural area	Cattle	Domestic demand for urban areas	Fire fighting	Industrial use	Floating population	TOTAL
STANDARD		70 lpcd	30 lpcd	150 lpcd	3 lpcd	47 lpcd	52 lpcd	
UNIT		MLD	MLD	MLD	MLD	MLD	MLD	MLD
Tamluk	479102	33.53	14.37					**47.91**
Sahid Matangi	328907	23.02	9.86					**32.89**
Panskura	664379	46.50	19.93					**66.43**
Kolaghat	623122	43.61	18.69					**62.31**
Moyna	349102	24.43	10.47					**34.91**
Nandakumar	382062	26.74	11.46					**38.20**
Chandipur	312514	21.87	9.37					**31.25**
Tamluk (Muni)	320510	22.43	9.61					**32.05**
Total (Tamluk)	3459698							
Mahisadal	426351	29.84	12.79					**42.63**
Nandigram 1	1700691			255.10	5.10	79.93	88.43	**428.57**
Nandigram 2	1630637			244.59	4.89	76.63	84.79	**410.92**
Sutahata	350498			52.57	1.05	16.47	18.22	**88.32**
Haldia	1280619			192.09	3.84	60.18	66.59	**322.71**
Haldia (Muni)	345073			51.76	1.03	16.21	17.94	**86.95**
Total (Haldia)	5733869							
TOTAL	9193567	**272.02**	**116.58**	**796.12**	**15.92**	**249.45**	**275.99**	**1726.09**

Projections for Sewerage, Solid Waste and Power

The region is divided into two divisions

1. One which will have sewerage facilities – Haldia subdivision which will have maximum amount of development
2. Other which is expected to handle sewerage with septic tanks and soak pits - Tamluk subdivision and Mahisadhal which would be agricultural based

The amount of sewerage that will be generated is calculated only for the domestic and commercial uses of the region which is expected to have sewerage facilities. In other areas the sewerage is going to be treated through decentralized methods Industrial waste water is calculated separately as it requires different treatment method. The sewerage generation is estimated at 80% of the water consumption.

The solid waste generation has been estimated at the level of the block because it would require treatment at that level. Only the solid waste of the Haldia - Nandigram region that totals to 2760 tons per day is proposed to be treated together. Solid Waste generation is estimated at 0.25 kg per capita for rural areas and 0.5 kg per capita for urban areas.

The power requirement of the region is estimated at 3830 MW for the all the various uses proposed as per the UDPFI guidelines where 2 KW of power is to be consumed per Household with a family size of 4.8

Table 4.16. Projected Demand for Sewerage and Solid Waste

C.D. Block / Municipality	Population	Total domestic sewerage generated (80% of water consumption) MLD	Total Industrial sewerage generated (80% of water consumption) MLD	Total solid waste generated by each block (1/4 kg for rural town and 1/2 kg for urban areas) Tonnes
Tamluk	479102			119.77
Sahid Matangi	328907			82.22
Panskura 1	664379			166.09
Kolaghat	623122			155.78

Moyna	349102			87.27
Nandakumar	382062			95.51
Chandipur	312514			78.12
Tamluk (Muni)	320510			80.12
Total (Tamluk)	**3459698**			
Mahisadal	426351			106.58
Nandigram 1	1700691	278.91	63.94	850.34
Nandigram 2	1630637	267.42	61.31	815.31
Sutahata	350498	57.48	13.17	175.24
Haldia	1280619	210.02	48.15	640.30
Haldia (Muni)	345073	56.59	12.97	172.53
Total (Haldia)	**5733869**	**870.43**	**199.56**	**2760.34**
TOTAL	**9193567**	**870.43**	**199.56**	

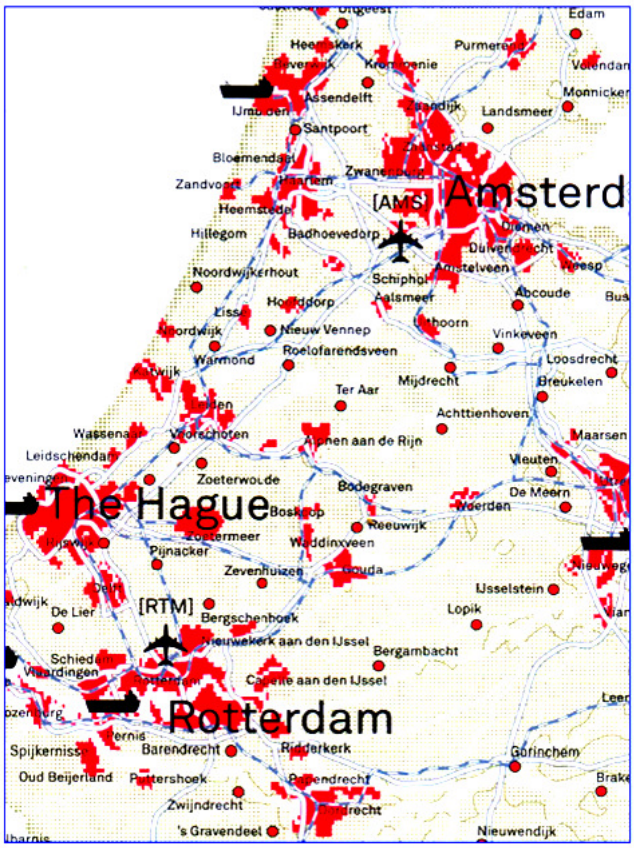
Table 4.17. Projected Demand for Power

C.D. Block / Municipality	Population	Total Electricity requirements at 2KW per family for **domestic, commercial, industrial and other requirements** in MW
Tamluk	479102	199.62
Sahid Matangi	328907	137.04
Panskura 1	664379	276.82
Kolaghat	623122	259.63
Moyna	349102	145.45
Nandakumar	382062	159.19
Chandipur	312514	130.21
Tamluk (Muni)	320510	133.54
Total (Tamluk)	**3459698**	**1441.54**
Mahisadal	426351	177.64
Nandigram 1	1700691	708.62
Nandigram 2	1630637	679.43
Sutahata	350498	146.04
Haldia	1280619	533.59
Haldia (Muni)	345073	143.78
TOTAL (Haldia)	**5733869**	**2389.11**
TOTAL	**9193567**	**3830.65**

5. POLICIES AND PRIORITIES

5.1. Introduction: Formulating New Scenarios and Strategies

After assessing the existing conditions in the Area of Interest, we are in a position to develop a scenario for development. The scenario is based on the need for Haldia to diversify its present set of activities while taking advantage of its location and its local resources. It needs to create a new identity for itself based on these above conditions. Moreover, it is proposed that Haldia should not be envisioned as a mono-functional chemical zone. Haldia's potential is far greater, and needs to be exploited to make it as a growth centre for the East. This can be done by re-casting the Haldia port, diversifying the industrial base of the region and taking advantage of the strong agro-based potential of the area.



Randstad Holland The Netherlands (Year 2002)
Inhabitants – 6,600,000
Total Area – 1419 sq. km.
Population Density – 4,651 inhabitants/ sq. km.

The Case of Randstad, The Netherlands

The AoI is comparable to the Ranstad Region in The Netherlands in size. It has an area of around 1400 sq km and a population of about 7 million people. It is a logistic, trade, business, agricultural as well as an industrial powerhouse for the country. It also has an container port called the Euro-Port which is one of the largest in the world. The region has a poly nucleated structure with Amsterdam, Rotterdam, The Hague and Utrecht being its important cities. Each of these cities are independently managed and are economic generators in themselves. Coincidentally this region is also low-lying like Haldia, with a network of canal and river which safeguard it from flooding. In spite of the intensive development this region has a very strong environmental policy to safeguard it from flooding. In the case of Haldia this is a necessity. A close look at the spatial structure, socio-economic profile and its planning can be taken as a case to learn from.

Figure 5.1. The Case of Randstad, The Netherlands

To achieve the above scenario for Haldia the study will concentrate on the following areas:

1. ***Developing Regional Strategies to Improve Connectivity*** – After analyzing the regional context and taking into consideration the future plan drawn up by various authorities the report indicates a new regional pattern. Further, the report also defines a strategy towards improving the regional connectivity.

2. ***Preparing Policies and Strategies for Strengthening the Economy*** – Based on the vision document and the study of the exiting conditions, the report proposes strengthening of the existing economy and encouraging new economical activities. The report sets frameworks to prepare policies for such strengthening and encouragement.

3. ***Defining Spatial Strategies*** – The spatial strategies are drawn not only to strengthen/encourage economical activities, but also to ensure a sustainable development pattern that is congruent with the environmental sensitivity of the area. These strategies include the land use allocations and transportation networks.

4. ***Defining Strategies for Physical and Social Infrastructure Development:*** The report also proposes strategies for various infrastructure needs of the area: Water, Power, Sewerage, Storm Water, Solid Waste, Health, Education and Other Amenities.

5. ***Preparing a framework for Housing Policy*** – The framework for the housing policy is drawn to make housing accessible to all classes of the population.

6. ***Creating framework for Environmental and Heritage Policy*** – The framework is formulated to not only protect and conserve the Environmental and Heritage Assets of the area, but also to take advantage of them as opportunities.

7. ***Creating framework for Transportation Policy*** – The framework of the transportation policy is drawn not only to handle the trips generated due to the development in the region but also towards encouraging maximum use of public transport.

8. ***Formulating the Management of Implementation:*** The report finally formulates strategies towards implementation of the above developed strategies.

5.2. Regional Strategies to Improve Connectivity

For Haldia to become a growth centre its should consider the following projects apart from other project which are already proposed. These following projects will help the region to bring in a diverse set of economic activities:

1. ***Linking the region to the Indo Gangetic states*** – The NH 41 should be extended to reach Bardhaman on the NH 8 highway which would connect to the states of the Indo Gangetic Plain. As mentioned earlier the Indo-Gangetic Plain is a growing economy and thus this connection is very important if Haldia wants to play an important role as a logistic hub.

2. ***Developing an Airport at Contai*** –The airport would help increase Haldia's connectivity to the world.

3. ***Extending the region*** – As the Deep sea port is being considered in Digha the HDA should think of extending the planning area to that direction.

4. ***Other existing proposal*** already in the pipeline which would help the region are:
    - The Haldia - Uluberia Expressway
    - The Kukrahati – Raichak Bridge connecting Kolkata to Haldia.
    - The Bridge to Nandigram from Haldia

The proposed projects will require the involvement of various authorities in the central as well as the state governments. These agencies should be identified in the next step of the study so that they can be implemented.

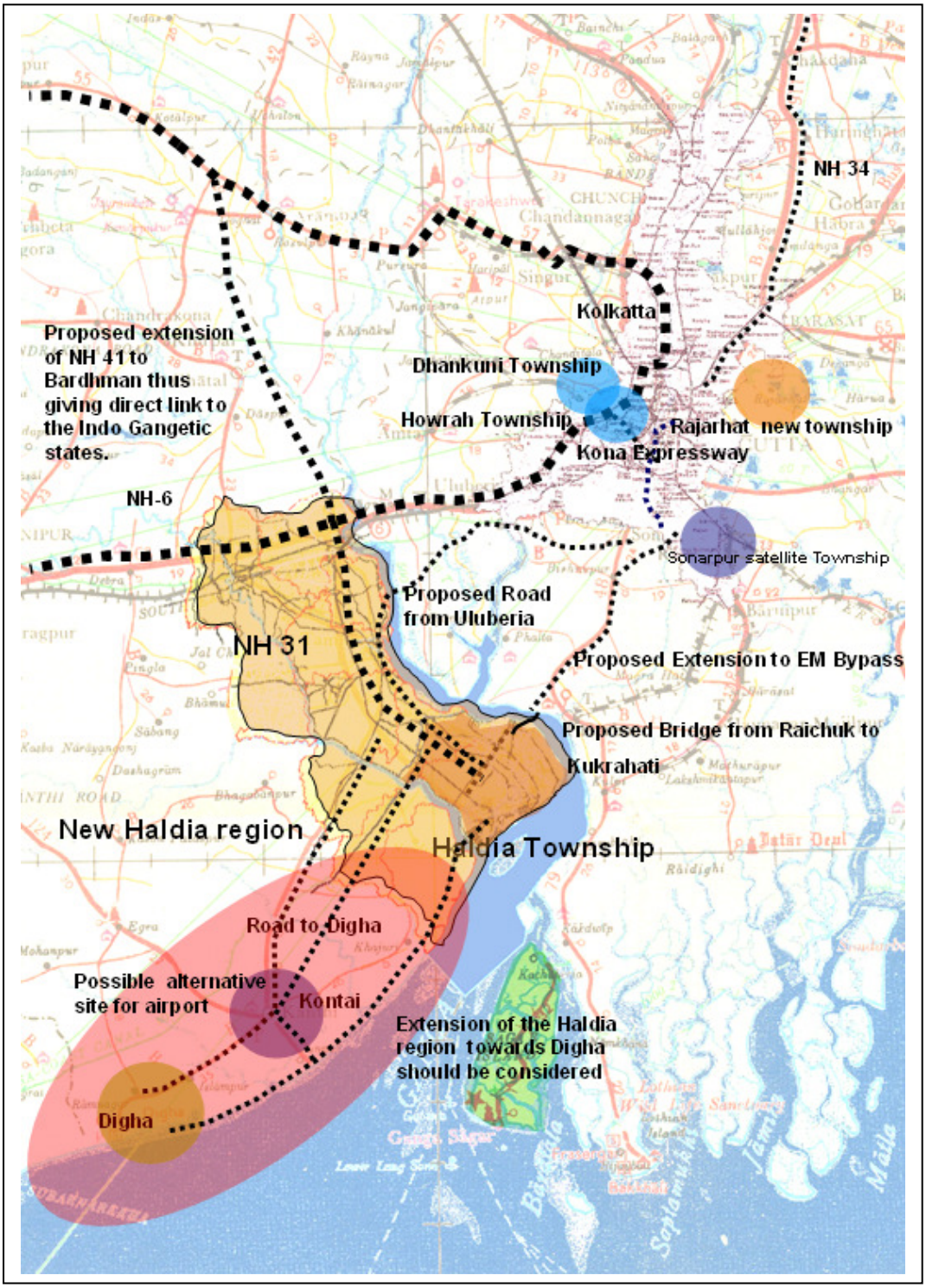


Figure 5.2. Proposed Regional Strategies for Connectivity

5.3. Policies and Strategies for Strengthening the Economy

As per the vision document the existing agrarian economic base would be strengthened along with diversifying the economic base to newer types of industries. In this part we shall look at strategies for strengthening of the agrarian economy, encouraging of new industries, rearticulating the port sector and developing the new Tourism, Knowledge and Entertainment sector.

5.3.1. Agriculture: Policies and Strategy

While about 79% of the land in the AoI is under agriculture, local capacity is substantial in this sector. Thus this activity need to be given a boost. The region and the state as a whole has a potential for horticulture, floriculture and pisciculture. While the state is one of the biggest producers of vegetables and flowers, it clearly lacks infrastructure to exploit this potential. A policy for reforms in agriculture in this region has to be introduced to efficiently use land, improve technologies at all levels and provide access to markets for agricultural produce.

The following strategies need to be implemented to boost agricultural and allied activities in the region:

1. Underutilized lands like brick kilns, low-lying lands, marsh lands should be mapped in the region. These areas should be acquired by the state and pisciculture estates can be evolved (like in the case of Nayachar). These can be leased to farmers. The water bodies formed here can be planned for water storage as well as storm water absorbers

2. Agri-Export Zones (as the one proposed for pineapples in Siliguri district of West Bengal) should be planned for Floriculture and Horticulture products in this region. The northern areas of the AoI as well as adjoining areas are rich in agriculture. These Agri-Zones will include Poly-Houses, Green Houses, Processing Units, Packaging Units, Storage Units,

Auctioning Facilities and other Marketing facilities. The area can take advantage of its connectivity to export the processed products to various national and international destinations. Enabling environment needs to be created to encourage investment in these Agri-Zones.

3. The West Bengal Government is already set to reform its Agriculture Produce Marketing Committee (APMC) Act so as to allow private players to invest in market to buy produce from farmers directly. The planning region should take advantage of this and allow such units to be setup in this region.

4. Establish Technical schools for Agriculture Development in every block to demonstrate cultivation of highly profitable cash crops and train young farmers in advanced methods to raise productivity

5. Introduce a water management strategy for the region to use the present system of canals for irrigation. This should be integrated with the flood control plan drawn by the Directorate of Irrigation and Waterways. Also the waste water from sewage should be treated in oxidation pond and used for agricultural purposes.

6. A study on "Strategy for Economic Reform in West Bengal" (*by Abhijit Banerjee, Pranab Bardhan, Kaushik Basu, Mrinal Datta Chaudhuri, Maitreesh Ghatak, Ashok Sanjay Guha, Mukul Majumdar, Dilip Mookherjee, Debraj Ray*) proposes that the government "should consider schemes for encouraging panchayats and other community organisations to get involved in the development of local agro-processing industries, along the lines of the sugar cooperatives in Maharashtra and the township and village enterprises in China." This can be done easily by existing block office which are very organized. Also private players should be encouraged to open storage facilities and processing industries located strategically in the region.

5.3.2. Industries: Policy and Strategies

The industrial strategy of Haldia is mentioned clearly in the vision document. It states that:

1. Haldia should diversify from the petrochemical industries to high value industries.
2. It should take advantage of the highly skilled manpower available in nearby Kolkata and Kharagpur.
3. Create high value jobs. This will change the present economic structure and would increases the per capita income of the people in the region.
4. Take advantage of the existing economic activity of agriculture, horticulture in the region and the Indo-Gangetic states and propose agro-based industries.
5. Take advantage of the natural and historical assets of the region and propose recreation and tourism based activities.

Potentials of industrial growth has been elaborated in the vision document. As per the document "Based on the economic potential of the Gangetic Plains states and the Influence Regions of Haldia, we estimate that the potential GDP of the Haldia region could be $25 Billion by 2025".

The composition of this $25 Billion GDP, based on the proposed economic-activity focus and extrapolation from estimates provided by numerous industry associations, government sources and business statistics firms such as CII, FICCI and CRISIL is estimated to be as follows:

Table 5.1. Composition of expected GDP in 2025

Economic activity	**Market**	**Share**	**Value**	**Basis**
	$billion		$billion	
Auto sector & components	$100	5%	$5.0	CII Study
Textile industry-exports	$80	5%	$4.0	Ministry of Textiles Textile Committee
IT/BPO - Engineering services	$80	5%	$4.0	McKinsey estimates

Entertainment	$76	5%	$4.0	PWC – FICCI Frames, CAGR 24%
Food processing	$72	5%	$4.0	McKinsey 2005 estimate $40 Billion
Petrochemicals	$200		$4.0	Indian Oil 15 Mn MT refinery
			$25.0	

It is also estimated that the employment potential of the Haldia Region will be about 1,700,000 persons based on the above GDP estimates.

5.3.3. Port: Possible Options

In the port sector the Kolkata Port Trust (KoPT) which operates the Haldia Dock Complex (HDC) will have to plan for container traffic in larger way. As shown in a study done by Drewry Shipping Consultants on the future trends of South – East Asian Ports, Logistics and Shipping, in 2006, Indian container traffic has grown by 13.1 % per annum over the last decade. In the future the cargo of port is projected to increase at 7.7% per annum till 2012 of which container traffic is expected to grow at 15.5 %per annum. Thus the future is in providing for container traffic. Also, the West Bengal government has already started thinking about a deep sea port in the state. Haldia has to redefine itself according to the future plans of the KoPT.

As said earlier a lot will depend on Haldia's ability to take advantage of the deep sea port being planned in West Bengal. From initial analysis Digha seems to be the favourable location for a Deep Sea container terminal because it already has the better backup port infrastructure in nearby Haldia than at Sagor. In such a case Haldia can still continue with its existing activity of receiving bulk cargo and oil and also become a logistic hub for the container cargo coming from Digha. For this the following have to be considered:

- Bigger mother ship docks at Digha (or Sagar, as it already does and transhipps oil on daughter ships to Haldia)

- Container ships docks at Digha and transports containers via road to Haldia which becomes a logistic hub. For this the following need to be considered:
    1. Providing a fast lane road over the Orrisa tidal canal which connects to NH41and then proceed to the states in the Indo Gangetic plain through the link proposed from Mechda to Bardhaman
    2. Providing a fast lane costal road from Digha to Haldia - Kolkata and through NH-34 to the North Eastern states.
    3. A dedicated rail freight corridor form Haldia to Panskura and then to the proposed Delhi –Kolkata freight corridor
    4. Enough backup spaces near Haldia which can become logistic hubs. A logistic hubs can be planned along the fast lane over Orrisa Tidal Canal to NH41- NH6. A Logistic hub can be located along the Digha-Haldia –Kolkata costal road.

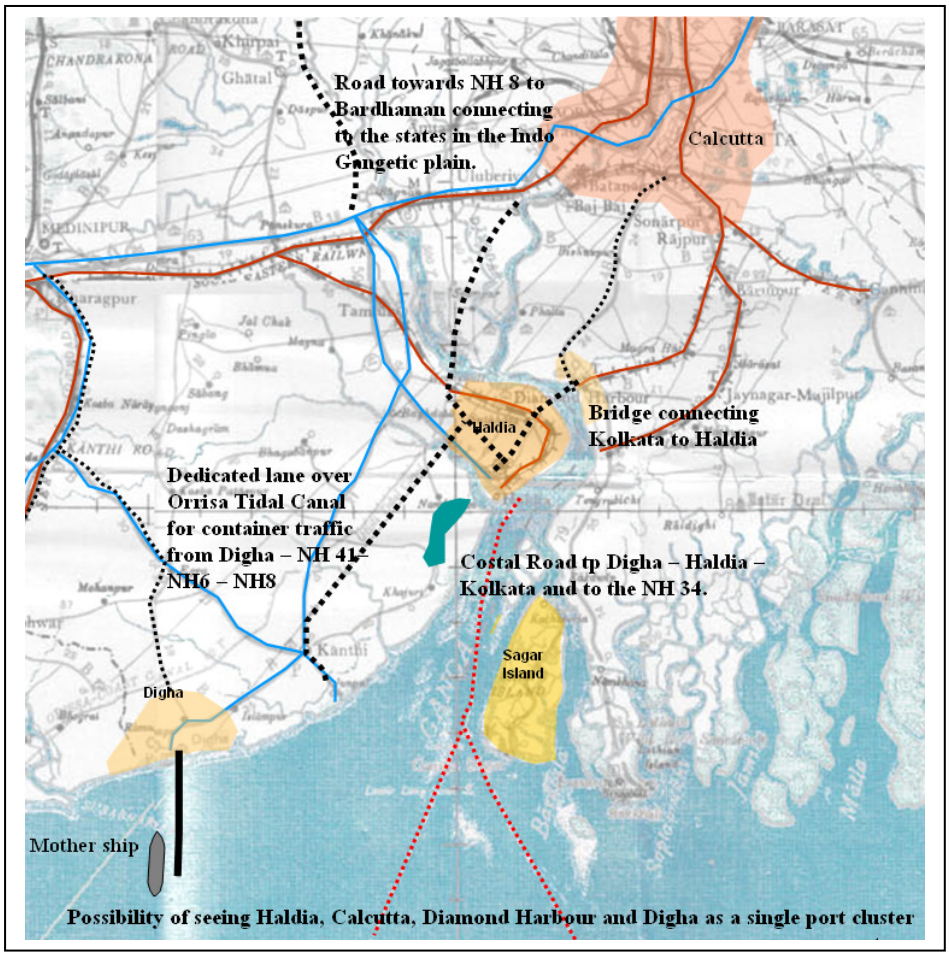


Figure 5.3. Proposed Option for the Port

5.3.4. Tourism, Knowledge and Entertainment: New Possibilities

The locational advantages of the area is proposed to be utilised to develop the sectors of Tourism, Knowledge and Entertainment. This advantages include: the absence of any large entertainment facilities in the region, nearness to large urban and knowledge agglomerates and presence of heritage and environmental assets.

The strategies to develop these sectors include:

1. ***Identification of assets and locations that could be developed for the above sectors***: The AoI is gifted with several natural and manmade assets for tourism and entertainment. These include the river banks, islands, historic sites in Tamluk and Mahisadhal, etc. Further there are also assets for specialised tourists like researchers, students and businesspersons in form of agrarian landscapes and large industries. All such assets and their potential need to be identified.
2. ***Developing a plan for sector development using these assets and locations:*** Specific plans needs to be prepared for the above mentioned sectors. Tourist Routes and Packages; Landuse allotments for facilities like theme parks, hotels, colleges, specialised institutions etc; and Infrastructure development like transportation and tourist and research encouragement facilities need to be planed.
3. ***Developing a marketing strategy to attract investments in these sectors***: The plan thus prepared needs to be branded and marketed not only to the investors to invest on facilities, but also to potential tourists, students and researchers.
4. ***Developing supporting infrastructure for encouragement of these sectors***: Supporting Infrastructure like transportation, preparation of land, electricity and water supply etc needs to developed in the locations identified for the above sectors.
5. ***Providing an enabling environment for developing this sector***: This would comprise of creating institutions and mechanisms for encouraging the above sectors.

5.4. Spatial Strategies

The vision plan envisages a growth of the overall region to achieve :

1. A Blurring of the rural-urban divide by not only directing investment to the town of Haldia but also towards the presently rural region where the nature of agricultural activity should be restructured.
2. A Poly-nucleated Structure: The present agricultural settlement should be strengthened to achieve a poly nucleated structure with Haldia- Nadigram on one side, Paskura – Kolaghat on the north , Moyna - Tamluk and Nandkumar Chandipur in the middlle. This would form as strips which would then be connected by north south connectors.

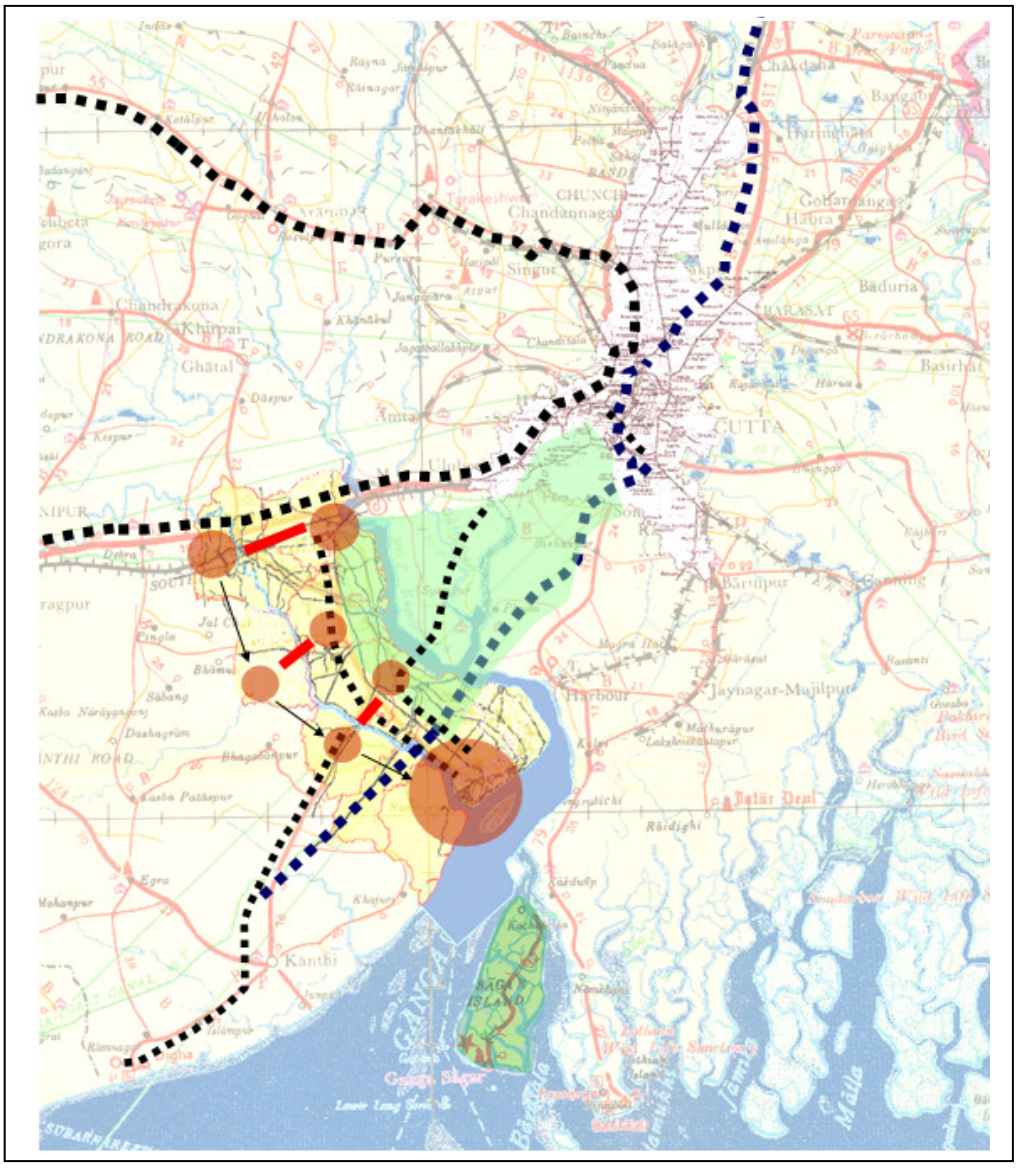


Figure 5.4. Proposed Poly-nucleated Structure

5.4.1. Conceptual Strategies

The structure plan for the region has been envisioned to bring in new activities and integrate it to the local terrain and resources so that minimum damage is done to the fabric of the place. The salient features of the plan are:

1. ***Strengthening existing movement network in the region*** – A dedicated north south road corridor has been proposed on the western side of river Haldi connecting Nadigram to NH-6 directly. Also east west connectors are to be strengthened from Kolkata- Kukrahati – Balughata- Nandigram and Digha. The other east west connector are from Uluberia- Tamluk- Chandipur – Digha and Uluberia – Mahisadhal – Contai over the Orrisa Tidal Canal.

2. ***Encouraging public transport*** – by proposing a dedicated ring rail system for the region connecting the growth centres. Also canal and river would be used to form a net work of river transport systems.

3. ***Safeguarding the environment*** – by carefully locating the petrochemical processing zone is in the South east quadrant of the region to minimize air borne pollution in the region. A buffer zone has been provided in the form of a passive recreation zone to take care of the effect of the petrochemical zone. The existing river system has the recreational green zones comprising of maidans, parks, public spaces on their banks. The bank of the canals are to used as environmental buffers where oxidation ponds can be located. There can be fisheries located on the bank which use the pond water as fish feed. Thus the water discharged in the canal would be free of any organic pollution. Also development along canals would not be so intensive so as it be a threat to it in any way

4. ***Poly-nucleated growth centres*** – The multi-product SEZ and the logistic hub is proposed to be located towards Nandigram. The City Centre comprising of the commercial district, active recreational district, housing and the knowledge city is proposed on the bank of the river Haldi starting

form the Hoogli river to Nandakumar. In the rest of the region agro-based industries will be encouraged to be located connecting nodal settlements. The nature of agriculture needs to be intensified and organized through encouraging cooperative among farmers so as to get maximum returns.

5. ***Encourage Mixed Land Use*** – The overall planning, though designating zones would encourage a mixed land use. Thus within the manufacturing zone itself housing and recreational areas would be provided. Also the knowledge city will interact with the commercial district of the town thus bringing a healthy interaction between both.

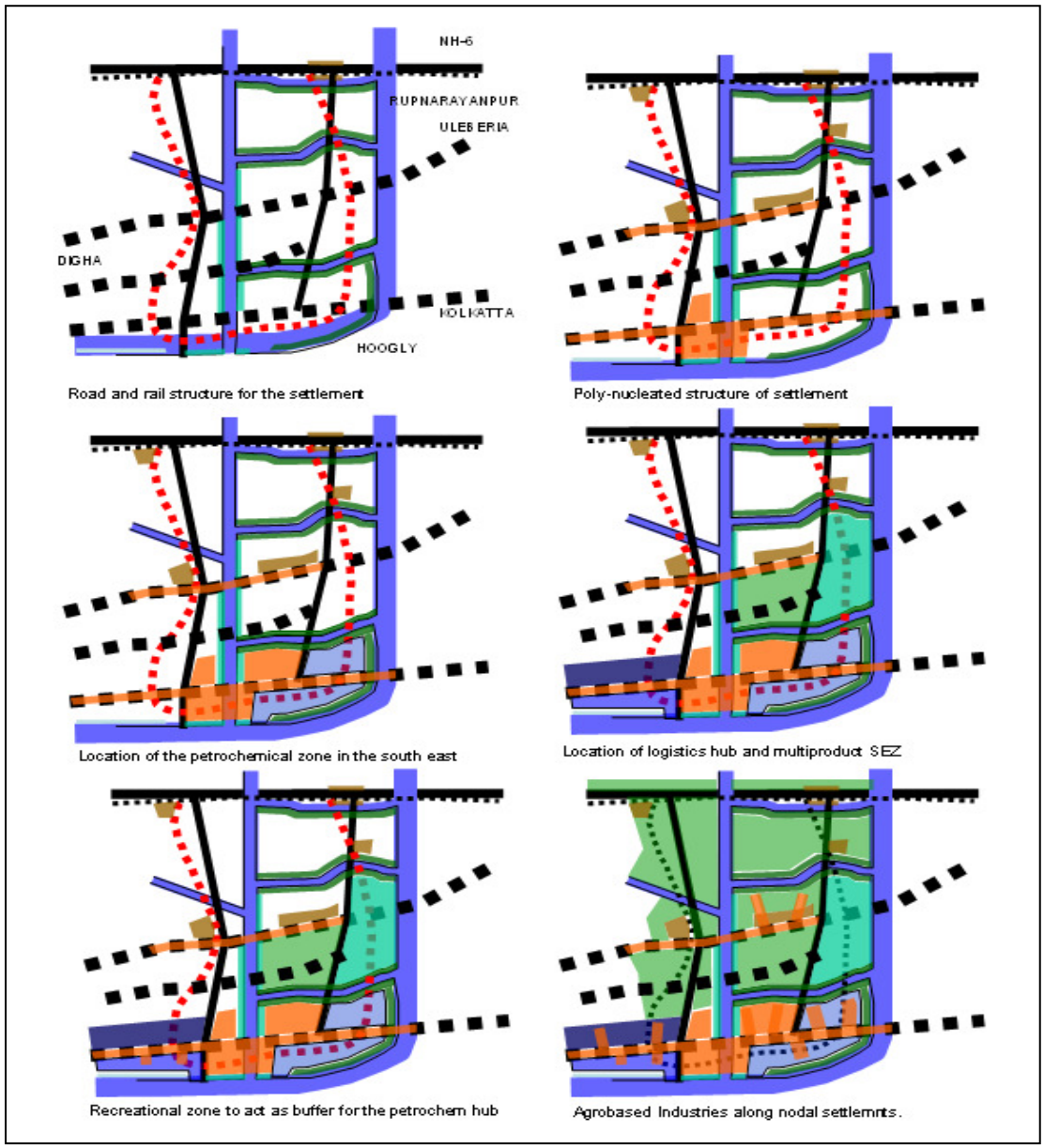


Figure 5.5. Conceptual Strategies

5.4.2. Strategising the Connectivity

This part of the study details the connectivity (Road, Rail and Water Networks) in the region. These are:

ROAD NETWORKS

1. ***NH41-*** This existing highway needs to be made into eight lanes each lane capable of 100Kmph or higher traffic by heavy (18 wheel/ 8-axle) trucks.

2. ***Roads from Howrah District and Kolkata*** – These roads in the form of the Ulberia Haldia Expressway and the Kolkata – Raichak – Kurahati – Balughata – Nandigram road are also important east west connector for the region and they would help in the movement of goods from Digha via Haldia to Kolkata and the north and the north-east.

The new roads which are proposed for the region are:

3. ***6 lane North South Connectors*** – This road would be required to connect Nandigram to the NH-6. It would help in increasing connectivity to Nandigram which is also envisaged as an important growth centre. This road will be made by strengthening the existing rural road system so that it would entail least amount of population displacement.

4. ***Coastal and Embankment Roads*** – These roads are proposed on embankments along rivers and existing canals. Apart from increasing connectivity, these roads would also protect the region from floods and provide growth centers with an image. Such roads are proposed along the river Hoogly from Kolaghat to Haldia town and from Panskura to Haldia Town along the banks of river Haldi. These road need to be minimum four lane roads. There are other roads proposed on both sides of Hijli-Orissa tidal canal. Protaphali Khal and Ganga Khal which would also provide easy east-west connectivity. A costal road from Digha to Haldia is already proposed. This road along with the Orissa tidal canal road would provide

impetus to growth once the deep sea container terminal is constructed. These roads which would carry goods should have 6 lanes.

5. ***East west connector*** – Other east west connectors joining major north south connector of the region need to be provided at intermediate points so as to allow ease of movement. Each growth center would have its own set of internal roads which would be detailed out in the next part of the study.

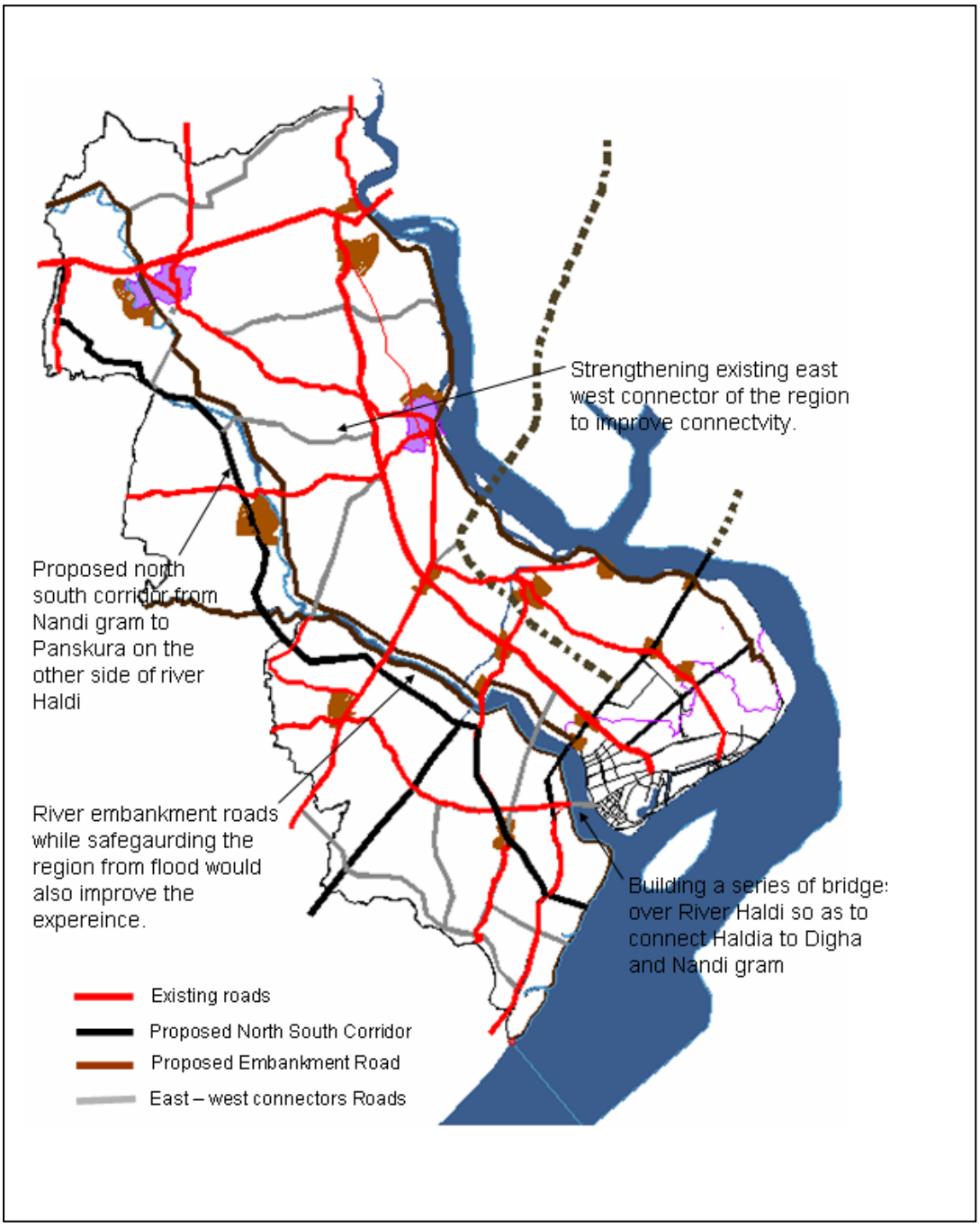


Figure 5.6. Proposed Road Network

RAIL NETWORK

Apart from the road infrastructure a ring rail is proposed to connect all the growth centres of Kolaghat, Tamluk, Haldia town, Nandigram town, Chandipur, Moyna so that it allow ease of movement for people all round these work centres.

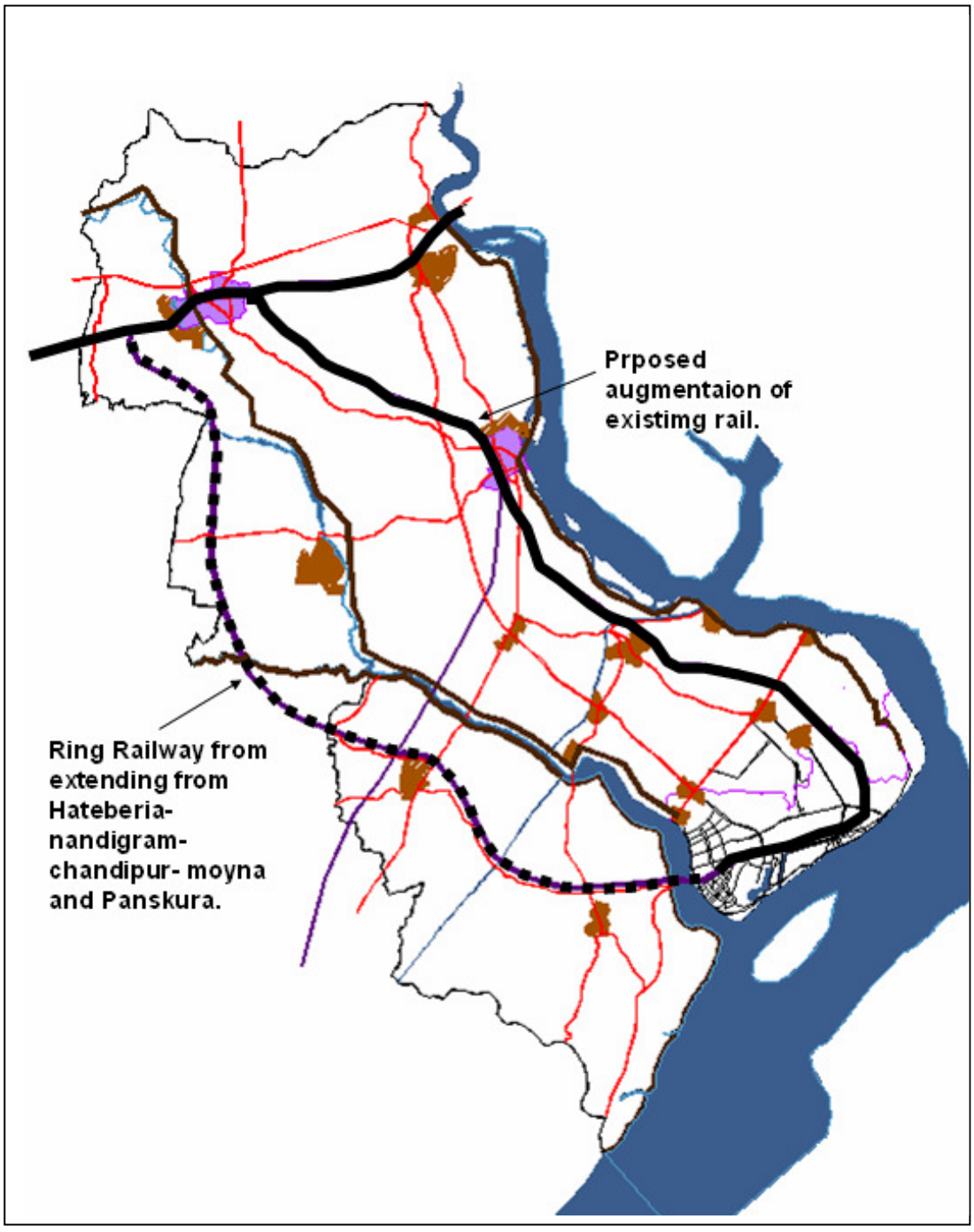


Figure 5.7. Proposed Rail Network

WATER NETWORK

The region has numerous canals which have the potential of being exploited for public transport. One of the waterways the Hijli Tidal Canal continuing as the Orrisa Tidal Canal has been declared as the National Waterway no. 5. The NW 5 will be a 623 km long route from West Bengal's Geonkhali at one end to Orissa's Paradip and Talcher at the other ends, integrating the Hijli Tidal Canal, the East Coast Canal, and the Matai, Brahmani and Mahanadi rivers. The other canals which need to be widened and have potential to be used for water transport include: Protapkhali khal (It connects the Rupnarayan river to Haldi river and has potential for public transport as well as for tourism); Midnapur Khal (The Midnapur Khal connects Kolaghat to Panskura); Ganga Khal and Talpatty Khal

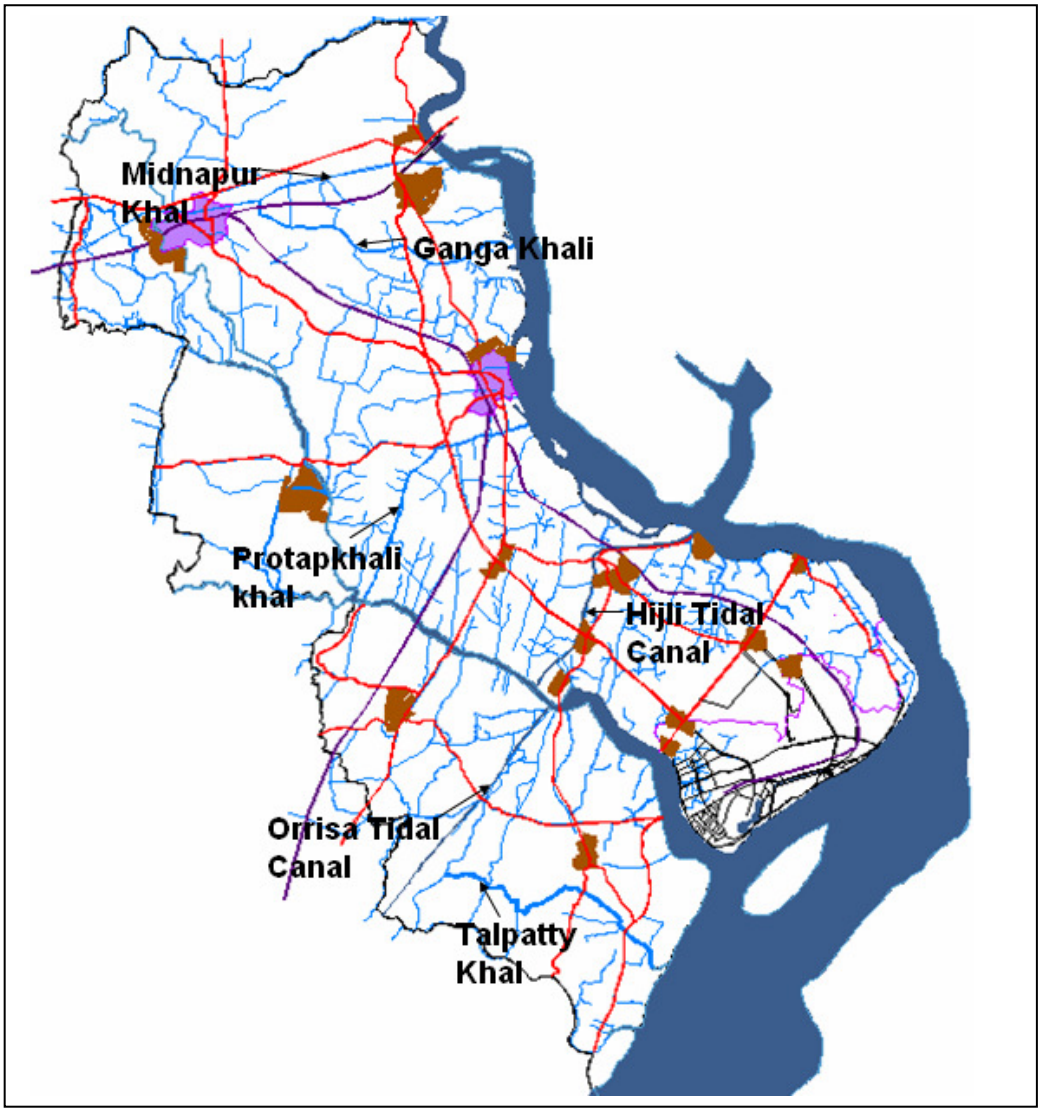


Figure 5.8. Proposed Water Transportation possibilities along the Canals

5.4.3. Landuse

This report presents a broad Landuse distribution based upon the discussions in the earlier sections. The Broad Landuse consists of the following parts:

1. City Centre and Growth Centres: These include largely commercial, residential and institutional activities. The river side of the Haldi, which has the costal roads, is proposed to be used as a public space along with commercial and residential activities. This river side strip would also form the recreational zone of the region. The Knowledge city is proposed to be on the west bank of the river. It could be linked to east bank with river transport. Similarly the canals on the east bank of the river can also be used for internal transport. This development can give the city its identity.

2. Special Zones. These include petrochemical hub, logistical hub, multi-product SEZ, recreational zone and Agro-based Food SEZs. While the Agro-based Food SEZ would be located in the northern part of the area that are agriculturally rich, the other special zones would be located in the southern parts that are expected to have diverse types of industrial activities.

3. Service Greens: These include green areas to house oxidation ponds and other urban service activities. These are very important as they will form the basis for development in the ecologically fragile region. The important canals of this region which run on the east west direction should have low development with mainly service facilities of the city like oxidation ponds and urban agriculture being located along them. The sewage from the city will be discharged in oxidation ponds / constructed wetlands near the canals. It can be used as fish feed after its BOD reduces and later the water will be discharged into the canal. Thus the canals are protected from any pollution.

The City Centre and the Special Zones have mixture of land-uses to include residential, industrial and commercial activities in various proportions. All land-uses will have all amenities and utilities.

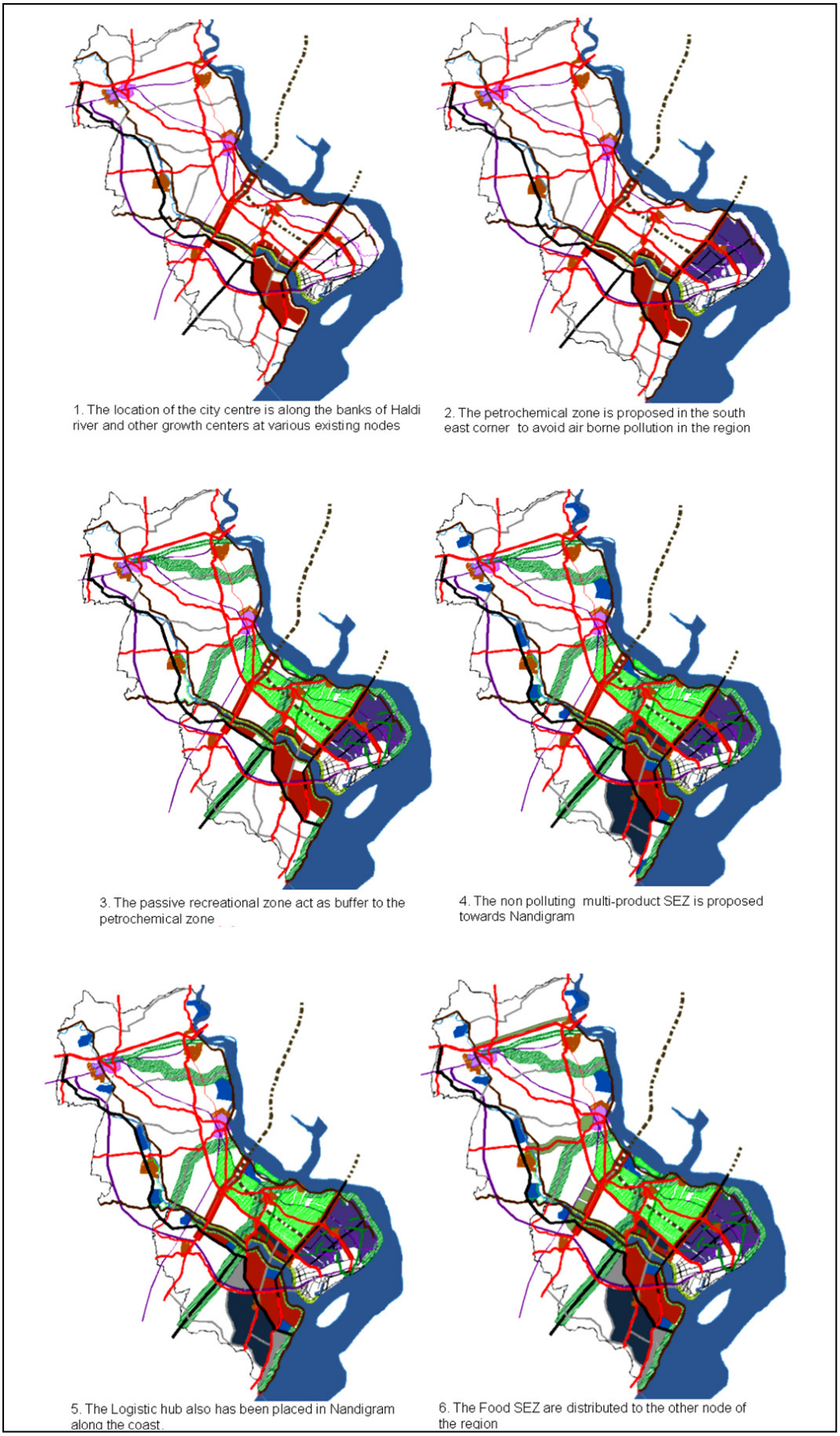


Figure 5.9. Location of various Land Uses

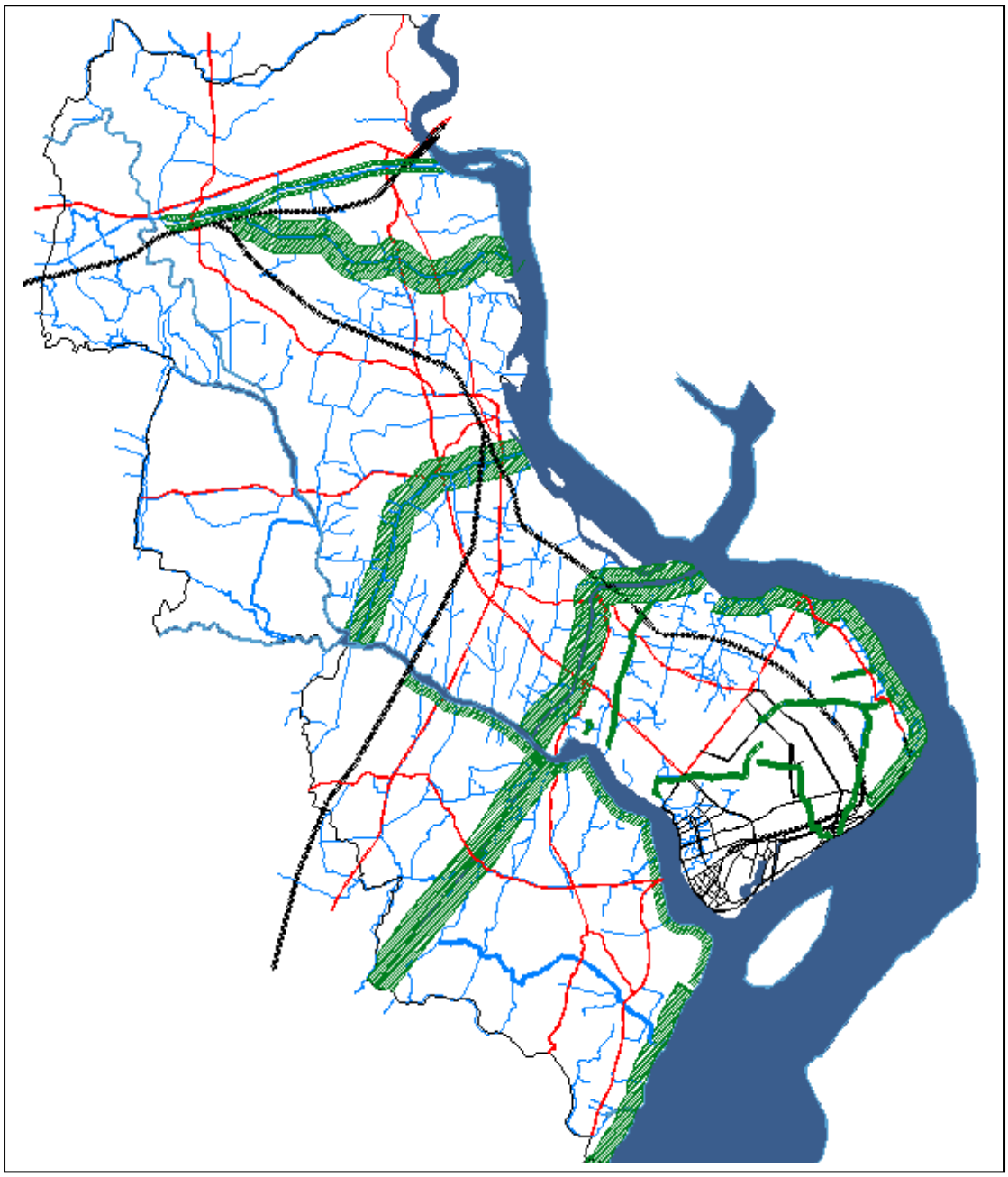
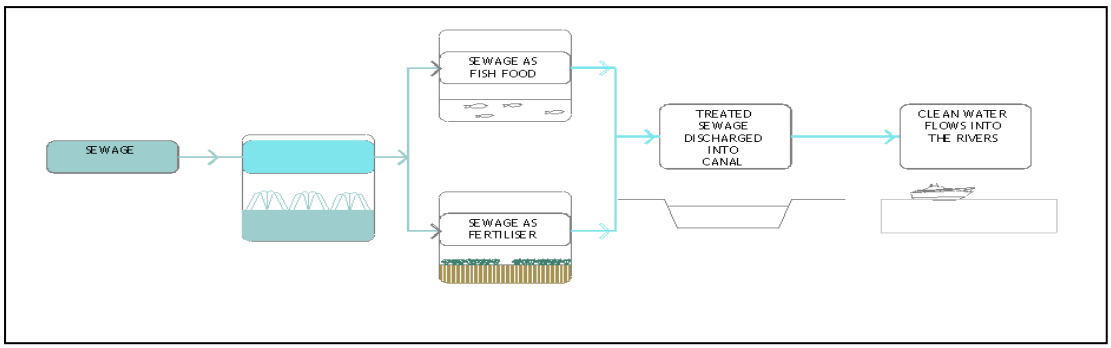


Figure 5.10. Location of Service Greens



A conceptual diagram for the treatment of Sewage effectively and beneficially for the environment. The same can be done with garbage once it has been separated

Figure 5.11. Diagram for Sewerage Treatment

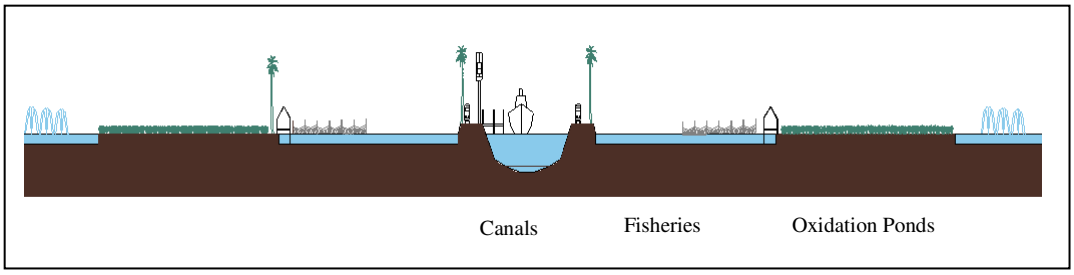


Figure 5.12. Section through Canals

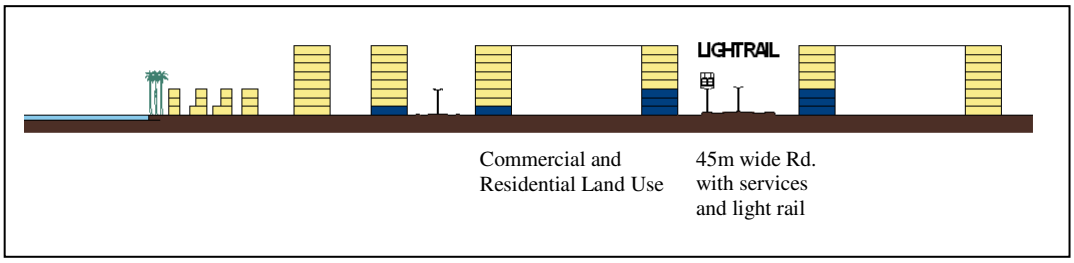


Figure 5.13. Section through Transport Corridor

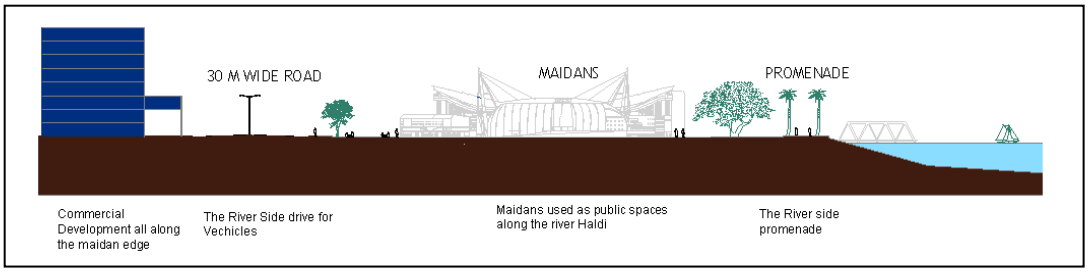
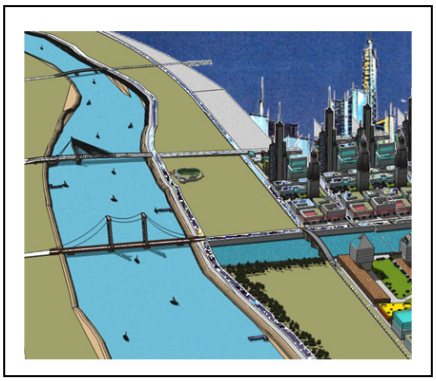


Figure 5.14. Section through the growth centres

The above diagrams show conceptual sections through the city where road and canal form an alternating system in the east west direction. While on the road there is mixed development, the edge of canal is used as oxidation ponds and agriculture. This section will maintain the ecological balance of this city. The low income housing can be placed towards the canal side where small scale non polluting industries or agricultural activity could be encouraged.

The river side of the Haldi is proposed to be used as a public space along with commercial and residential activities. It would also form the recreational zone. Similarly the canals on the east bank of the river can also be used for internal transport. This development will give the city its identity.



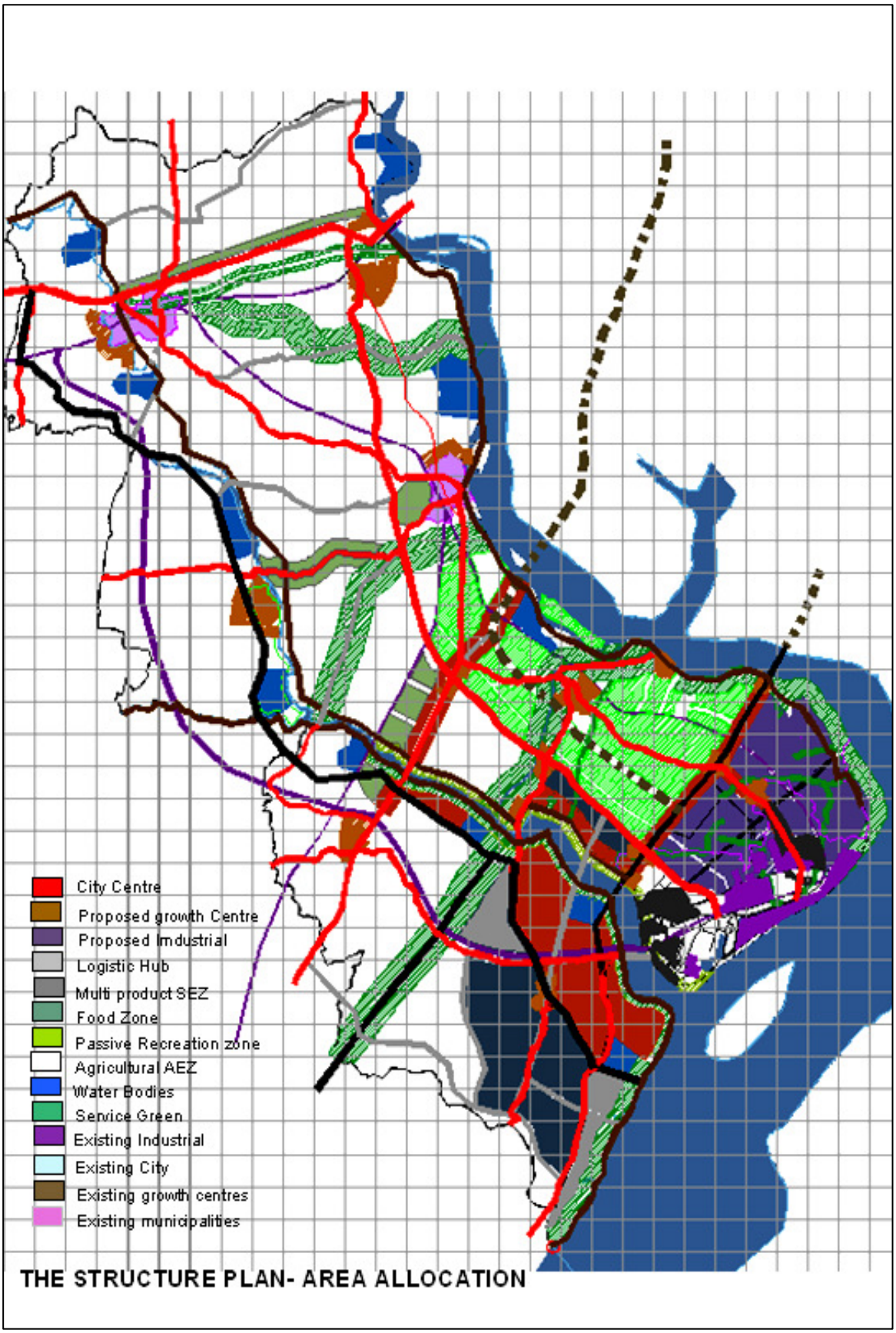


Figure 5.15. Overall Landuse Distribution

Table 5.2. Proposed Landuse Distribution

URBAN CENTRES	Total area.	Industrial area	Residential area	Recreational area	Public institutions	Transport + communication	Agriculture
	Sq. Km	Sq. Km	Sq. Km	Sq. Km	Sq. Km	Sq. Km	Sq. Km
City centre	89		42.6	16.8	12.5	12.6	
Multi + product sez	63	23.9	15.5	8.75	4.8	10	
Logistic hub	20		6.6	2	1.4	10	
Petro sez	70.5	30	14.2	11.7	4	10.6	
Recreational zone	15.6			15.6			
Water bodies	5.5			5.5			
Total	**263.6***	**53.9**	**78.9**	**60.35**	**27.2**	**43.2**	
		20%	30%	23%	10%	16%	
RURAL CENTRES							
Food sez	34.5	15.5	10.23	3.1	2.17	3.5	
New Growth Centres	13		6.62	2.6	1.82	1.95	
TOTAL	**47.5**	**15.5**	**16.85**	**5.7**	**3.99**	**5.45**	
		33%	35%	12%	8%	11%	
Passive recreational zone	95						
Agricultural zone + Service Greens	1361.9						1361.9
Grand Total	1768						

***:** This table shows that the new urban centre has a developed area of 263.6 sq km. as against the requirement of 303 sq. km. for housing 9.2 million people. However this includes the existing settlement also. The percentage of each land-use category is as close to the UDPFI norms for the proposed land-use norms.

Table 5.3. Proposed Landuse Regulations

URBAN CENTRES	Activities Allowed	FSI permissible	Height of Building allowed	Desired Densities
City centre	Residential, Commercial, Institutional, Recreational	1	24m	250-399
Multi product SEZ	Residential, Commercial, Institutional, Manufacturing	.5		
Logistic hub	Transport Activities, Residential, Institutional,	.5		
Petrochemical SEZ	Manufacturing, Residential, Institutional,	.5		
Recreational zone	Recreational activity, infrastructure, Public Institutions	0.2		
RURAL CENTRES				
Food SEZ	Manufacturing, Residential, Institutional	.5		
New Growth Centres	Residential, Commercial, Small Scale Manufacturing,	.5	9m	
Service Greens	Agriculture, Oxidation Ponds, Raw Water storage Tanks,	0.0	N.A.	
Passive recreational zone	Agri, Oxidation ponds, Raw water Storage, Recreation	0.2	6m	
Agricultural zone	Agricultural settlements,	0.05	6m	

5.5. Infrastructure Development Strategies

This part of the study details out the infrastructure requirements for the region and its projected population.

5.5.1. Water Supply

The region should prepare for a supplying 1726 MLD of water for a population of 9.2 million over the next twenty years. The detailed demand of water by various sectors is indicated in the earlier part of the report. Present and future demands of water can be met by the following ways :

1. The Haldia region takes its present water from the Rupnarayan river at Geonkhalli which shows high degree of salinity during the dry season (January to April). The capacity of the plant is 91MLD.
2. A study to take water from the up-stream in Hoogly at Uluberia has already been initiated by Haldia Development Authority. For this a Water treatment plant with a raw water storage can be made in the area designated as the recreational zone in the plan. This would be apart from augmenting the existing treatment plat at Geonkhalli.
3. Haldia has a good amount of rainfall (1500 mm annually). This often causes floods in the region. Low-lying and flood prone areas (which is in plenty in this region) can be used to store rainwater by creating large reservoirs. Moyna which is a basin can be ideally used to create such man made reservoirs. Such reservoirs can also be created along the bank of the river Haldi. A number of such reservoirs which can vary from 5-10 sq km. in size can be created to meet the water requirements of the region. These reservoirs can be strategically decentralized so as to supply water to various designated zones. They would additionally serve as storm water storage areas during the rains thus protecting the region from flood. All these reservoirs will have to be connected to maintain the water and flood levels.
4. Due to the impervious nature of the soil there is no loss of water due to seepage. Also because of the high humidity the loss through evaporation is reduced.

While constructing such water reservoirs the excess soil should be used to construct roads and create higher land for development.

In this plan, a total of 50 sq. km. of water reservoirs is proposed in various location. The water storage capacity of these tanks will be about 264000 million litres (50 * 1000000* 6m Depth*). This can meet the water requirement for 155 days (264000/1700).

These reservoirs allow for a good water storage in the region. These can also be filled by rainfall and augmented by water pumped from Uluberia and Rupnarayan. Each reservoir would then have its own water purification plant.

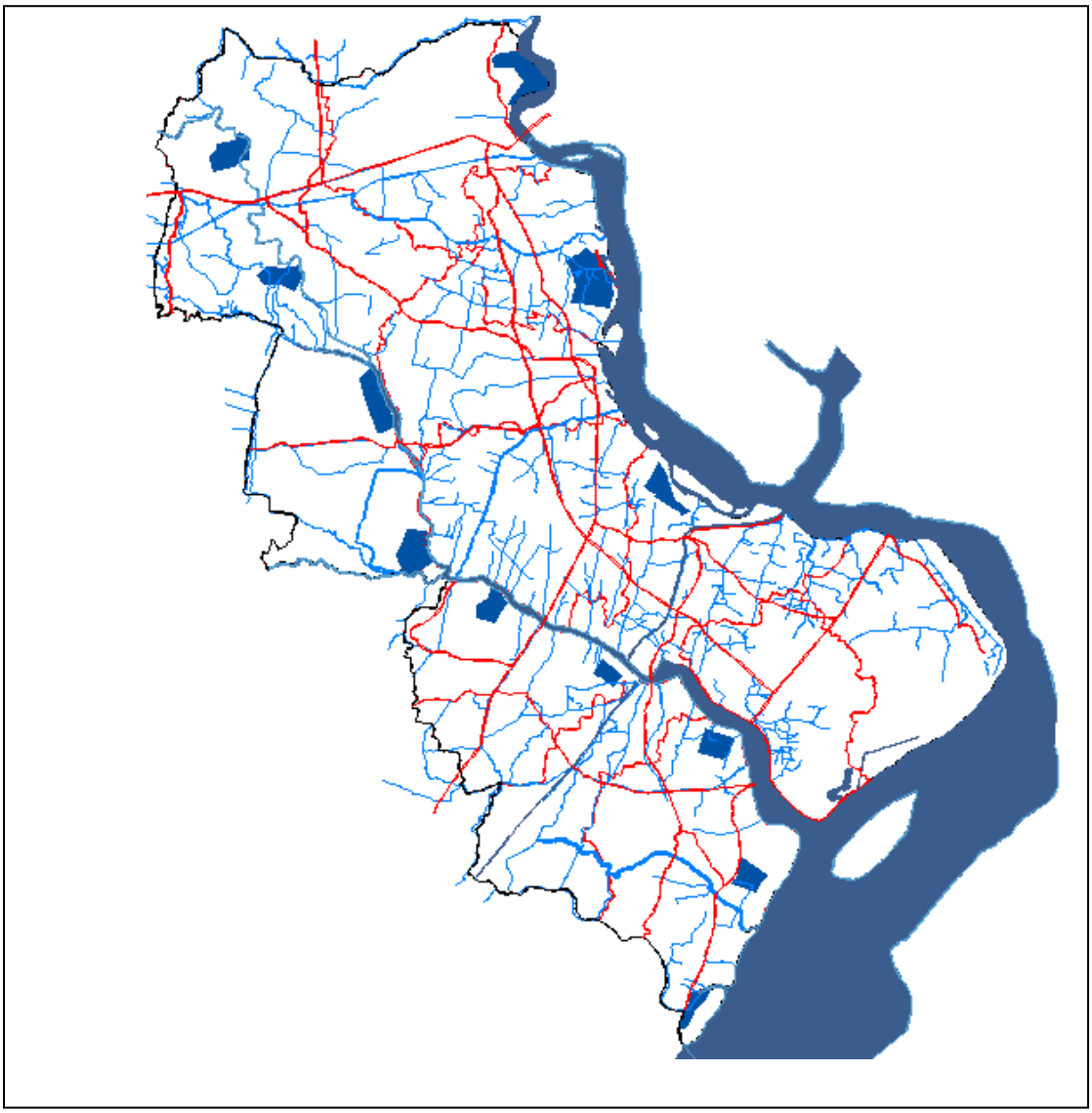


Figure 5.16. Proposed location of Water Reservoirs

5.5.2. Power

As of today, with the existing requirement, power is considered to be a surplus. With the new plan and developments, the new requirement of power would amount to about 3830MW for the region. Sources of additional power requirement can be from:

1. ***Production of power in Haldia –*** CESC Ltd is putting up a 2,000 MW coal-based power plant at Haldia, which would be ready for commissioning within the 11th Plan.

2. ***Pit head plants from the nearby mining belts*** – Thermal power can be sourced from pit-head thermal power stations in the Raniganj coal belt within the State and neighbouring coal-rich states like Jharkhand, Bihar and Orissa

3. ***Hydro Power form north east –*** Hydel power can be sourced from power surplus regions like the North East. Bhutan and Nepal. Already as discussed in the 12th SAARC Summit towards the creation of a South Asian Free Trade Area (SAFTA), progress is being made in the negotiation in four areas with reference to the Framework Agreement for SAFTA. One of the areas is that of energy sharing between these countries. India's Power Grid Corporation has worked out the inter-connections required, their feasibility and the cost-benefits to the participating countries in the South Asia Growth Quadrangle (SAGQ) region consisting of Bangladesh, Bhutan, North East region of India and Nepal. All these inter-connecting channels will very well match the Indian effort to have integration of all regions to form a National Grid in near future.

4. ***Power produced from waste of industries–*** The place has industries which generate a significant amount of waste. This waste can be converted into electricity. Following from the combined-cycle power plants, the emerging integrated gasification combined cycle (IGCC) technology shows great

promise in burning industrial residues to generate low-cost and environmentally friendly electricity.

5. ***Power generated from treatment of wastes***.- The solid waste of the region should be used to generate power. This can be done at the level of the block, As case studies we can explore such treatment plant already installed in various Indian states. There is a biomethanation plant and a pelletization project already completed in Andhra Pradesh. This State is executing three other *Waste to Energy* projects, which is to produce 23.3 MW of power totally from garbage. The Ministry of Non-Conventional Energy Sources (MNES) which has been so long promoting innovative and ecologically sustainable alternatives in energy production like solar and wind power have started showing interest in promoting and supporting *Waste to Energy* projects.

5.5.3. Sewerage

Sewerage infrastructure in this region should be decentralized. Only municipal area should be provided with centralized sewerage infrastructure. The sewerage in this areas is suggested to be treated through passive techniques which are more reliable as well as easily managed. A case study of Kolkata and its sewerage system could be undertaken to understand the working of such a system.

In this system, areas for oxidation ponds / constructed wetlands need to be identified which would bring the BOD to an acceptable limit. In the earlier part of the study areas the location of oxidation ponds/ constructed wetlands is shown in the service greens. The water as suggested earlier can then be used by fisheries as well as for agriculture.

The size of such horizontal treatment plant is around 5 sq mt per capita. An area of around one sq. km. can handle sewerage of around 2 lakh population. This strategy should be used on decentralized scale by municipalities and

dense urban conglomeration in this region. For a population of 5.3 million the capacity of space for sewage treatment required would be 26.5 sq. km. The total amount of service green areas near the Haldi-Nandigram region near Hijli-Tidal canal and along the bank of river Hoogly is around 90 sq.km.

The other parts of this region should continue using the septic tank in combination with the soak pit.

The diagram below shows the working of a horizontally constructed wetland. The inflow is discharged into these wetland where the treated in a passive technique after which they are discharged either for agricultural or to fisheries.

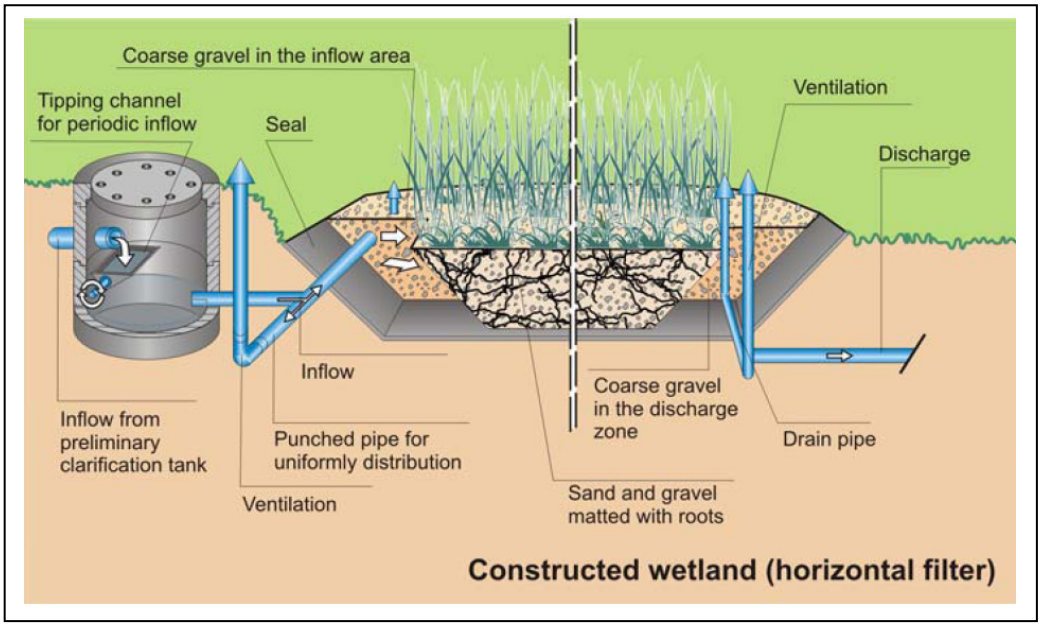


Figure 5.16. Diagram of the horizontally constructed wetland

5.5.4. Drainage

The storm water drainage of this region is controlled by the Directorate of Irrigation and Waterways. The network of canal in this region assists in the draining of storm water from this region. The following have to be provided for apart from the canals to safeguard the region from floods:

1. ***Man Made lakes –*** The study proposes to excavate lakes in strategic locations (flood prone areas as shown in the early part of the study) in the region to collect water. These will be used as storm water collection system. During the excavation of these lakes the excess soil could be transferred to adjacent areas to make roads as well as create high level terrain for development.

2. ***Constructed Wetlands*** – Such wetlands which have been used for sewage treatment can also absorb excess rain water during monsoon months.

3. ***Protection and widening of Canals –*** All along the canals, depending on their importance, only low intensity activity should be allowed for at least 100-500 m. The activities encouraged in such area should be urban agriculture, fisheries, or recreational activities, etc. No kind of intense urban activity should be allowed in such areas. Also these canals should be widened and used for other purposes like transport and irrigation. This will fetch revenue to maintain these canals which are the lifeline of this region.

5.5.5. Solid waste Disposal

For treating solid waste in the region the following should be undertaken:

1. ***Estimating the precise generation of solid waste*** – The perspective plan has been able to estimate the waste generated from rural as well as urban centres. However assessment of the nature as well as quantity of waste generated from sources like industries, commercial establishments, markets, etc needs to be accurately done. This would take up in the subsequently detailing of the report

2. ***Creating Clear zones for solid waste management*** – This could be done at the municipal and bock level which could be further divided into smaller wards.

3. ***Creating awareness on separation and treatment of waste at the household level*** – The system of decentralized infrastructure should be encouraged and necessary incentives should be given to housing societies, commercial establishment, markets, factories, etc. which treat waste at the community level. This can be done by the way of giving a tax relief on property tax to such establishments.

4. ***Encourage house to house collection of waste*** – It is preferable to have a system of door to door collection of waste which is more effective than collection from secondary points as far as required. Thus housing societies, commercial establishment should have their own garbage collection point from where garbage can be taken on a periodic basis.

5. ***Encouraging Plastic and metal Recycling units*** – such small scale industries should be encouraged and land should be allotted to these industries in every block so that they can recycle these waste.

6. ***Encouraging waste to be converted as organic fertilizers or energy*** – Waste should be as far as possible be reused and recycled. Options of converting waste into energy or organic fertilizers should be implemented at municipal and block levels. Landfills in this fragile topography should be avoided as the soil is impervious. This would affect the water network of canal and lakes. If landfill sites are necessary, then the environmental impact should be clearly studied.

7. ***Treating organic waste for agriculture in the region*** – Waste from rural settlements should be encouraged to be vermi-composted and subsequently used as fertilizer for agriculture.

8. ***Compulsory treatment of all industrial waste in the region*** – Companies or group of companies should compulsorily maintain their own waste treatment plants that will neutralize waste before discharging it into canals and rivers. Untreated discharge can be disastrous for the fragile ecosystem.

5.5.6. Social Facilities: Education, health and Recreation

For the provision of social amenities, the urban and the rural areas need to be addressed separately. In the earlier part of the study an estimate has been made on the demand in these areas for health and education facilities. To meet these demands the following aspects should be considered.

Urban Areas

1. Provision of compulsory primary, secondary education and higher secondary education institutions by govt. and non governmental agencies
2. Provision of Higher Education institutions by government and through private agencies
3. Clustering of higher education centres to form the Knowledge city
4. Encouraging industries to participate in providing technical education
5. Provision of basic health services maintained by government and non governmental agencies
6. Encouraging privatization in specialty hospitals

Rural Areas

1. Provision of compulsory primary, secondary education at the level of the Gram Panchayat by governmental and non governmental and community based organizations - The Shishu Shiksha Karmasuchi under the Panchayat and Rural Development Department which has achieved a reasonable amount of success in West Bengal encourages rural communities to own and manage such initiatives. This should compulsorily reach all the Mouzas in this region.
2. Encouraging agro-based and vocational training centre in rural nodes run by government and private organizations
3. Provision of basic health services maintained by community based Self Help Groups.

5.6. Housing and Shelter Development

The housing policy of the region should aim to provide housing to all economic classes of people who come to work and stay in this region. To achieve this objective it should clearly detail out methods of parcelling land for housing; indicate agencies- private and government, which could play an important role of housing; and devise housing delivery systems that these agencies should adopt. The housing demands for each of the various economic sections have been clearly established in the earlier part of the study. The housing stock required has also been estimated for both urban and rural centres. Thus the policy should clearly draw up different set of strategies for both. The housing policy while providing for new demands in housing should also frame a policy for the existing housing stock.

Parcelling Land for Housing

1. In case of urban areas the government should encourage group housing scheme which should be implemented either by private companies for their own workforce or cooperative housing societies. While these companies presently maintain single plot dwelling units and apartments for their own officers, they should also provide for housing for all their workers.

2. The government should develop sites of its own. While some of the smaller parcels on these site can be given to private players for group housing and cooperatives at market price the government can maintain a rental stock of for LIG housing which can with time be bought over by the inhabitants.

3. The size of land parcels should be varied so that big as well as small developers could provide for housing.

4. For all these parcels, the respective agencies should prepare a layout plan or town planning scheme, depending on the size of land parcels, which needs to get approved by the authorities.

5. While the above should be made applicable for municipal limits, in rural growth centres, the government can allow for smaller land parcels or plotted developments by the Gram Panchayats.

Agencies involved in housing

1. ***Private Companies and Industrial houses*** – They can play a very important role in providing housing to their workforce – permanent as well as contractual.

2. ***Private Developers*** – They can play an important role in the delivery of housing. However it should be made obligatory for them to even develop some low income housing stock which could be given to the government for allocation to economically weaker families. In this the experience of the West Bengal Housing and Area Development authority in working with private developers to provide for housing can be utilised.

3. ***Cooperative Housing Societies*** – Housing societies formed by different community group should also be encouraged to develop their own housing schemes.

4. ***Government Agencies*** – The government itself will have to play an important role in the provision of housing to the economical weaker section. For this all the local agencies like the municipal authorities and other local bodies in villages like the Gram Panchyat as well as Zila Parishad have to be involved in providing for basic amenities for housing at the local level.

Delivery Mechanisms

1. ***Site and Service Schemes*** – This mode of delivery should be encouraged as it could allow for incremental housing development as per the ability of families. This housing could be cross subsidized by allowing private developers and cooperative housing societies to building housing for the market.

2. ***Provision of Rental Housing*** – The government should also build their own housing stock which should be given out as rental housing. The range of housing given for rent can be form high end housing given to companies or private individual at market rates to partially subsided housing to the economically weaker section.

3. ***Group Housing Schemes*** – The government should allow the development of housing schemes in allocated parcel of lands to various companies, private developers as well as cooperative housing societies.

4. ***Rural Housing schemes*** – Rural housing and improvement schemes under Indra Awas Yojna, Total sanitation and Vidyuti Karan Scheme have to be implemented by Gram Panchyat with earnestness.

5. ***Slum Improvement schemes –*** For urban centres like Haldia Municipal areas there is already a considerable amount of slums. Slum improvement schemes has to implemented for the provision of basic infrastructure.

Guidelines for Sustainable Housing/Housing units

Municipal governments in this region should draw up bylaws which will encourage the construction of sustainable housing. This involves the use of locally available material, use of ecologically sensitive material, low dependence on centralized city grids for water, solid waste and sewerage treatment and use of passive techniques and integrating local terrain, climate as far as possible in the design of houses and housing. To elaborate on each:

1. ***Site Planning and Development –*** The region's terrain is almost flat with numerous water systems like pukurs and canals. A system of design should be evolved integrating these features. The study recommends the positive use of such features. The landscape plan drawn up should reflect these concerns.
   During the construction process minimum damage should be done to the site. A set of guidelines should be drawn on the standard procedures that should be followed including the safety and amenities provided to construction workers.

2. ***Ensure energy efficiency through appropriate design interventions and material/technology selection –*** This region has a hot and humid climate with abundant rainfall. Thus house designs have to use design strategies which allow for maximum natural ventilation in the house. The use of material and technology can encourage the use of the local. Bricks are abundant in the region and can be effectively use as a walling and roofing system. Such technologies have already been tried out in other regions of the country (like Kerala) and should be encouraged in this region also.

3. ***Introduce Efficient Water Management systems –*** Water harvesting techniques should be made a mandatory for this region. It should be done at the household and community level. Water here should be necessarily kept in pukurs and tanks. The use of ground water should be minimal.

4. ***Solid Waste Management-*** As mentioned earlier solid wastes should be encouraged to be managed at the community and household level. Separation should be carried on at the level of every house. Vermi-composting should be made mandatory for all group housing schemes.

5.7. Transportation

The focus of the transport policy will be to provide affordable and clean means of moving masses in the region. It will based on the following aspects:

1. ***Encouraging public transportation through road , rail and water*** – The modal split for pubic transport as recommended by the UDPFI and discussed in the earlier part of this study for this region should be around 80-85%. To achieve this the major origins and destination have to be established. Though this study will be detailed out subsequently the major nodes between which traffic is distributed in the region are:

Table 5.4. Transportation Strategies

	Present Trip Distribution	Estimated Trip Distribution	Present mode of transport	Strengthening required
Haldia – Tamluk – Kolaghat				
Halida- Tamluk- Panskura				
Haldia- Nadigram				
Haldia-Kukrahati				
Nandigram- Chandipur				
Nandigram to Mahishadal				
Nadigram- Khejuri				
Tamluk – Moyna				

The study will assign public transport modes through road, rail and water between these major nodes.

2. ***Provision of Mass Rapid Transport Systems (MRTS)*** – It is recommended to have a ring rail around the whole region which will connect all the major nodes. The present rail line which connects from Panskura to Haldia should be extended to Nandigram - Chandipur – Moyna - Panskura. Also the line should be quadrupled to provide for easy movement of people and goods.

3. ***Encouraging private players in provision of Public transport*** – Private players who already operate in this region to provide public transport through bus and water should be encouraged to meet the new demand. There may be clear hierarchies of routes established – major routes running along the north south connectors; and feeder services which run on the east west axis.

4. ***Traffic management plan for dense settlements*** – There should be a traffic management plan drawn up especially for growth centres and municipal areas. In this case we should explore possibilities of grade separation, scientific designs of bus stops, flexi-laneing to allow flexibility in road capacity during the peak hours, synchronization of traffic lights, restricting the hours during which large commercial vehicles may enter municipal limits, restricting zones in which different mode of transport should be allowed etc.

5. ***Encouraging Pedestrianisation*** – Certain areas in the municipal limit as well as rural growth centres should encourage pedestrianization.

6. ***A parking plan for urban centres , rural growth centres, transportation nodes*** – A plan to establishing parking areas for all types of vehicles in growth centres and municipal limits should be drawn up.

7. ***Encouraging Cycling*** – Roads should be designed in growth centers and municipal limits to allow for cycle-rickshaw as well as bicycles.

8. ***Provision of truck terminal for port traffic*** – Port traffic in this region should be completely separated from the city traffic. There should be clear lanes designated for freight vehicles. Also truck terminal should be built and off-street parking of such vehicles should not be allowed.

9. ***Strengthening road sections and estimating capacity on roads*** – Roads should be designed to take in estimated capacities and to carry multimodal systems assigned to different sections of the road.

10. ***Encourage the use of eco-friendly fuels in urban centres*** – This will go a long way to control air borne pollution in the region.

5.8. Environmental and Heritage Protection

The sensitive nature of the ecosystem makes it an imperative that an environmental policy is implemented. The objective should be to safeguard the regions environmental assets which include the rivers, canals and ponds (*pukurs*). These are the following steps which need to be undertaken immediately:

1. Extensive documentation of the assets should be made immediately. This includes every water-body which is very important to drain off excess rain water. None of these features should be filled up for developmental purposes. All development should integrate these features in their design.

2. Any project – industrial, housing and commercial should submit a plan indicating the nature of changes made on the topography of the site (like changes in levels) as well as on any natural features if present on the site. This plan should be made mandatory like a building permission plan

2. A set of guidelines needs to be drawn up to safeguard the assets. Important assets like rivers, canals and big ponds should be maintained by the Directorate of Irrigation and waterways. A buffer area should be designated around these features to regulate the nature of development around them. Like in the case of the canal it is suggested that the area should be not be intensively used and a green buffer should be designated around them. The nature of activity in this zone should be either oxidations pond to treat sewerage or agricultural activities. Also the water discharged in these canal or rivers have an acceptable level of BOD and COD.

3. A set of guidelines and strategies to control pollution – due to industrial and other waste should be implemented. In this plan it is suggested that the industrial waste should be treated at source by the industries themselves. They should not be allowed to drain any waste directly into canal or streams. Garbage and sewerage should be treated in a decentralized manner with each designated zone having its own treatment system.

4. An institutional mechanism needs to be drawn up to identify the role of every agency. An agency like the Directorate of Irrigation and Waterways could be a nodal agency which constantly monitors the state of these assets.

5. The region also has considerable amount of historical landmarks. These should be documented and a management plan should be made to suggest way of conserving them. This plan could explore possibilities of tourism in these historical and environmental assets. Already there is some form of tourism in this region in the historical areas which can be further encouraged.

5.9. Management of Implementation

5.9.1. Concept of Management: Bundle of Projects

Implementation of the Perspective Plan Strategies is a challenging exercise especially in the case where huge amount of private capital and structured finance is required. This section of the report deals with the addressing issues related to the management of the implementation.

The concept devised to manage the implementation is to break the strategies into a bundle of projects..

These projects are then broken into tasks. Actors and agencies to execute each task are then identified. These are then prioritised

Further enabling environments of institutions, legislations and financial strategies are articulated

Table 5.5. The Strategies as Bundle of Projects

	Strategies	**Projects, Programmes and Regulations**
A	Development Planning	Formulation and Approval of Perspective Plan
		Augmentation of Development Authority
		Formulation & Approval of Development Plans
		Creation of a Comprehensive Information System
B	Improving Connectivity	Strengthening of Mecheda-Haldia NH-41
		Dum Dum - Kukrahati Expressway
		Bridge over Raichak to Kukrahati
		Finishing of Uluberia- Haldia Expressway
		Digha-Haldia Hijli Canal Elevated Expressway
		Extension of NH-41 to Bardhaman
		Strengthening existing roads State highway to Haldia, State Highway to Digha,
		Nandigram – Panskura Connector
		Bridge from Haldia - Nandigram

		Costal Road from Haldia to Digha
		Creating New Roads. Like the embankment roads and the east – wesr connectors
		Doubling of Panskura-Haldia Railway route
		Quadrupling of Digha-Tamluk Railway route
		Ring Railway from Haldia- Nandigram and Panskura
		Development of East Coast Canal as NW-4
		Development of ProtapKhali Khal, Ganga Khal and Midnapur Canal Waterways
		Strengthening of Village Level Roads
C	Improving Infrastructure	Development of Water Supply Facilities
		Development of Power Facilities
		Implementation of Sewerage Network
		Implementation of Solid Waste Projects
		Development of Storm Water Projects
		Development of Transportation Facilities
		Development of Housing Projects
		Development of Social Infrastructure
D	Developing Economic Base	Developing Port
		Developing Logistics / Warehousing Hub
		Developing Agro Processing SEZ
		Developing Auto-Mfr. SEZ
		Developing Multi-product SEZ
		Developing Knowledge City
		Developing Entertainment Hub
		Developing PCPIR

A. DEVELOPMENT PLANNING

1. Formulation and Approval of Perspective Plan

- Declaration of Intention to form the new region (extended to include Tamluk Sub-Division), call for suggestions and objections and notification of the new region
- Formation of a Committee comprising of members from Haldia Development Authority, Municipal Corporation/Councils, Zila

Parishads, Panchyat Sabhas and Gram Sabhas; heads to relevant Central and state government departments functioning or having jurisdiction over the local planning area; members amongst the residents and representatives of non governmental and community based organisations. The function of this committee is to give suggestions on the perspective plan by Discussing and advising on development aims and objectives; Providing inputs on existing conditions, projections, priorities and major programmes of each department to form part of projected requirements; Ensuring coordination of inter-departmental interactions and cooperation pertaining to plan formulation and integration.

- Preparation of the Draft Perspective Plan for the new region after incorporation of suggestions given by the committee
- Formulation of Draft Final Perspective Plan after calling suggestions and objections. This Draft Final Perspective Plan will then be sent to the Government for Approval and then will become the Approved Perspective Plan.

Table 5.6. Timeframe and Actors in preparation of the Perspective Plan

Steps and Actions	**Actors**	**Max. Time for the Actions**
Declaration of Intent to form the new region, calling of suggestions and objections, hearing and notification of the New Region.	HDA	3 months
Formulation of Development Committee and appointment of Town Planner	HDA, Municipal Corporation/Councils, Zila Parishad, Panchyat Sabhas Gram Sabhas; heads to relevant government departments, members amongst the residents, representatives of NGOs, CBOs and Experts	1 month (simultaneous with above)
Preparation of Draft Perspective Plan	Consultant and Development Committee	4 months (simultaneous with above)
Publication of Draft Perspective Plan	HDA	

(DPP)		
Suggestions and Objections on DPP and hearing	Hearing Officer	3 months
Preparation of Draft Final Perspective Plan	Development Committee	1 month
Approval of the Final Perspective Plan and Publication of the Same	Department of Urban Development, Govt. of West bengal	2 months
Total		10 Months

By the above process, an Approved Perspective Plan will be prepared which will guide the subsequent developments. The contents of this report will largely form the basis on which the Draft Perspective Plan will be prepared.

2. Augmentation of Development Authority

Existing capacity of the development authority to include the following members and departments

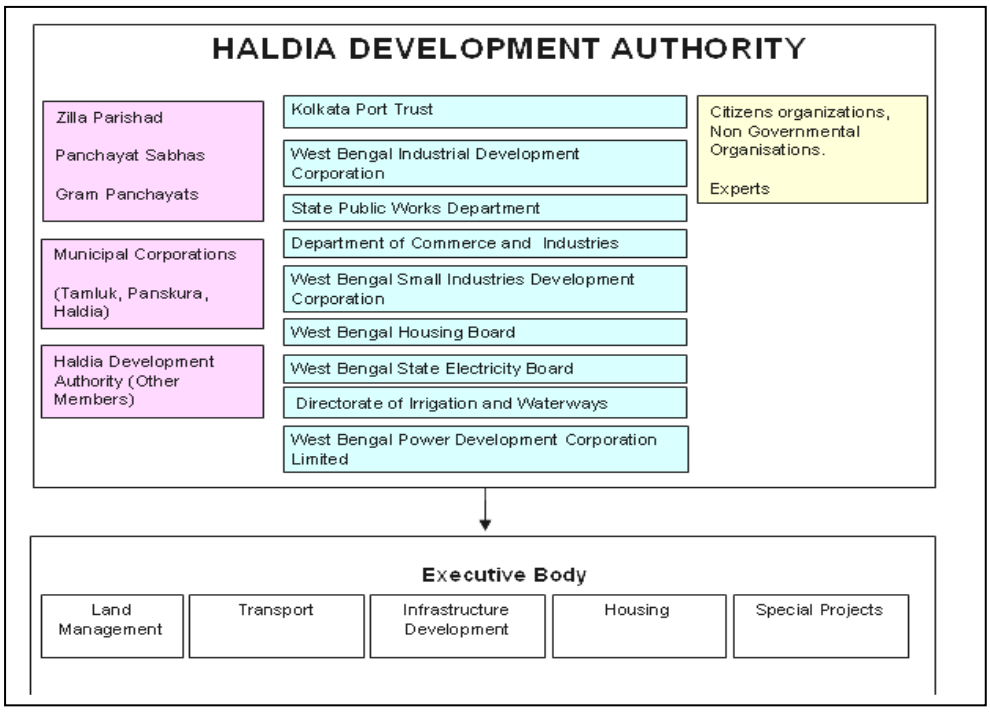


Figure 5.17. The Augmentation of the Haldia Development Authority

The above suggested augmentation is required to include the various stakeholders from the political representatives, civil society organisations, and government agencies

3. Formulation and Approval of Development Plans

Based on the Perspective Plan, various Municipal and Non-Municipal Areas will have to prepare detailed development plans indicating the Landuse allocations and development of Social Infrastructure and development of the development control regulations. The preparation and approval of the Development plan will be completed in one years time.

4. Preparation of a Comprehensive Information System

Simultaneous creation of an integrated database for the region on the following aspects at the level of mouzas: name, area, demographic profile, land-use distribution, agricultural productivity, inventory of roads, inventory of amenities, (5 month)

B. IMPROVING CONNECTIVITY

Table 5.7. Priority & Actors in projects relating to improving connectivity

1	Roads & Bridges	Agencies	Priority
a)	Strengthening of Mecheda-Haldia NH-41	NHAI + Private Agencies	High
b)	Dum Dum - Kukrahati Expressway	Sate Agencies + Private Agencies	High
c)	Bridge over Raichak to Kukrahati	Sate Agencies + Private Agencies	High
d)	Finishing of Uluberia- Haldia Expressway	NHAI	High
e)	Digha-Haldia Hijli Canal Elevated Expressway	Sate Agencies + Private Agencies	Wait till Port projects is initiated
f)	Extension of NH-41 to Bardhaman	NHAI + Private Agencies	Medium
g)	Strengthening existing roads State highway to Haldia, State Highway to Digha,	Sate Agencies + Private Agencies	Medium
h)	Nandigram – Panskura Connector	Sate Agencies + Private Agencies	Medium
i)	Bridge from Haldia - Nandigram	HDA	High
j)	Costal Road from Haldia to Digha	Sate Agencies + Private Agencies	Medium
k)	Creating New Roads. Like the embankment roads and the east – wesr connectors	HDA	High
2	**Railways**		

a)	Doubling of Panskura-Haldia route	Indian Railways	High
b)	Quadrupling of Digha-Tamluk route	Indian Railways	Wait till Port projects is initiated
c)	Ring Railway from Haldia- Nandigram and Panskura	HDA + Private Agencies	Medium
3	**Waterways**		
a)	Development of East Coast Canal as NW-4		Medium
b)	Development of ProtapKhali Khal, Ganga Khal and Midnapur Canal	HDA	Low
4	Improving Local Roads		
1	Strengthening of Road at Local Level	Municipality + Panchyat Sabhas with the assistance of the State PWD	High
2	Creating New Roads.	Municipality + Panchyat Sabhas with the assistance of the State PWD	High
3	Preparation of Site infrastructure		High

B. IMPROVING INFRASTRUCTURE

In the implementation of projects relating to infrastructure, appointment of consulting agencies, preparation of detailed projects reports, acquisition of land, executing of construction, operation and maintenance of the executed work will have to be undertaken.

Table 5.8. Priority & Actors in projects relating to improving infrastructure

		Coordinating Agency	Priority
1	Development of Water Resources (construction of Reservoirs, Construction of treatment systems and Laying of distribution system)	HDA	Medium
2	Development of Power Generation & Distribution Facilities (construction of power plants)	Central Agency	Low
3	Development of Sewerage Network (construction of oxidation ponds, laying of sewerage network)	HDA	Medium
4	Implementing of Solid waste Projects (construction of 'waste to energy plant', development of collection system)	HDA	Medium
5	Implementing of Storm Water System Projects (augmenting the capacity of canals, laying of new drains wherever necessary)	HDA	Medium

6	Implementation of Transportation Projects (developing agency to run the road, rail and water transportation systems)	HDA	Medium
5	Implementing of Housing Projects (Building of Housing Stock)	HDA	Medium
6	Implementation of Social Infrastructure (Schools, Hospitals, Police stations, Fire Stations, Cultural centres) as per the Development Plans	Local Agency	Medium

D. DEVELOPING THE ECONOMIC BASE

Table 5.9. Tasks involved in developing the Economic Base

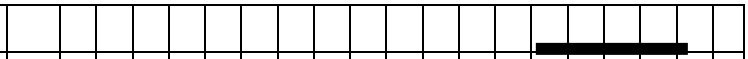
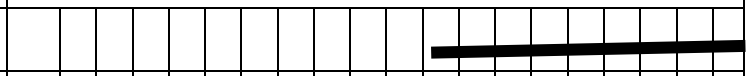
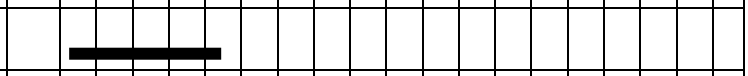
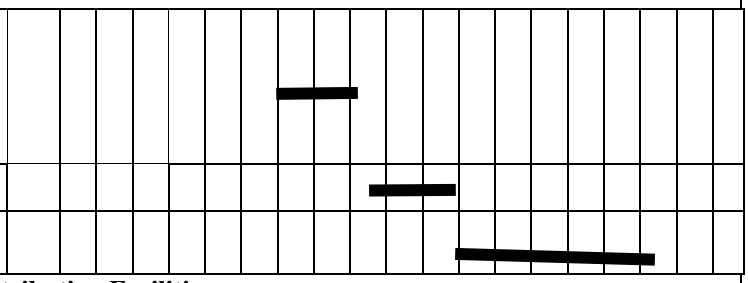
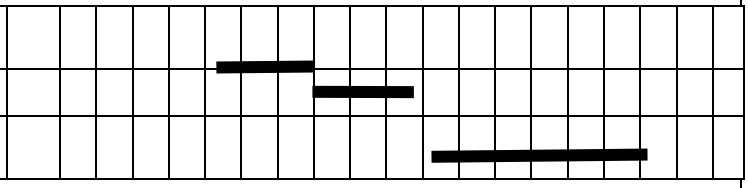
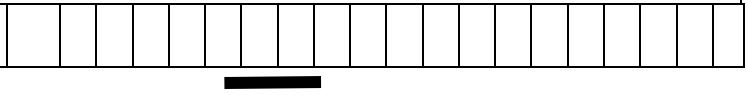
	Tasks	Activities	Coordinating Agency
1	Acquisition of Land	Identification, Declaring	HDA
		Compensation and Resettlement	HDA
2	Marketing	Preparation of Website and other documentation	HDA
		Road Shows at all major cities in India	HDA
		Investor's Meet in Haldia	HDA
		Invitation to Invest	HDA
		Formulation of Contracts	HDA
3	Economic Rehabilitation	Training Programmes	HDA
		Developing Financial and Other Institutes for Enterprise generation	HDA
		Formulation of Regulatory frameworks for Enterprise	HDA
4	Development of Industries and other large Economic generating activities	Getting Approval of plans, Detailed Project Reports, Environmental Impact Assessment	Investing agency
		Building of internal infrastructure	
		Operation and Maintenance	

5.9.2. Phasing of Projects

The projects identified in the earlier part have been worked for a period of five years. This is a fair time till which necessary actions arising out of this perspective plan to be addressed. After this the status of the project need to be reviewed and necessary action taken. The following table work out works out a project schedule which need to be considered for the next five years for the above projects.

Table 5.10. Phasing of various Projects

	Activity	2007	2008	2009	2010	2011
Perspective Plan Formulation and Approval						
1.	Formation of a Committee					
2.	Suggestions on the perspective plan					
3.	Incorporation of suggestions					
4.	Simultaneous creation of an integrated database					
5.	perspective plan to the state government for approval					
Legal Formulations						
6.	Environmental documentation and regualation					
Non – Legal Aspects						
7.	Land Assembly					
8.	Housing for the Rehabilitation					
Capital investment programme						
	Roads & Bridges					
9.	Strengthening of Mecheda-Haldia NH-41					
10	Dum Dum - Kukrahati Expressway					
11	Bridge over Raichak to Kukrahati					
12	Finishing of Uluberia- Haldia Expressway					
13	Digha-Haldia Hijli Canal Elevated Expressway	Can be initiated only after the port project is decided				
14	Extension of NH-41 to Bardhaman					
15	Strengthening existing roads State highway to Haldia, State Highway to Digha,					

16	Nandigram – Panskura Connector	
17	Bridge from Haldia - Nandigram	
18	Costal Road from Haldia to Digha	
19	Creating New Roads. Like the embankment roads and the east – wesr connectors	
	Railways	
20	Doubling of Panskura-Haldia route	
21	Quadrupling of Digha-Tamluk route	Can be initiated only after the port project is decided
22	Ring Railway from Haldia-Nandigram and Panskura	
	Waterways	
23	Development of East Coast Canal as NW-4	
24	Development of ProtapKhali Khal, Ganga Khal and Midnapur Canal	
Development of New Port		
25	Site Selection	A lot will depend on the decision taken by the central government committee to study the future of the port in the state.
26	Detailed Project Report by Consultant	
27	Environmental Impact Assessment (EIA)	
28	Engineering Procurement & Construction	
Development of Water Resources		
29	Detailed Project Report (DPR) by Consultant for creation of lakes for water storage both in upper reaches of Rupnarayan and at Haldi	
30	Land acquisition & EIA	
31	Construction of such storage and supply facilities	
Development of Power Generation & Distribution Facilities		
32	Detailed Project Report (DPR) by Consultant	Will have to be followed up with the West Bengal Power Development Corporation Limited
33	Land acquisition & EIA	
34	Engineering Procurement & Construction activities	
Development of Sewerage Network		
35	Detailed Project Report (DPR) by Consultant for municipal areas	
36	Land acquisition & EIA	
37	Engineering Procurement & Construction activities	
Implementing of Solid waste Projects		
38	Detailed Project Report (DPR) by Consultant for municipal areas	

	and panchyat sabhas for waste to energy generation projects	
39	Land acquisition & EIA	
40	Engineering Procurement & Construction activities	
41	Finishing of Construction of Treatment, storage and disposal facility for Hazardous waste	
Implementing of Storm Water System Projects		
42	Detailed Project Report (DPR) by Consultant for municipal areas	
43	Land acquisition & EIA	
44	Engineering Procurement & Construction activities	
Simultaneous preparation of comprehensive development plan by municipal councils/ panchyat sabhas		
45	Formulation of Development Plans	
46	Approval Of development Plan	
Implementation of Legal Aspects		
47	Development control regulations	
Implementation of Non-Legal Aspects		
48	Preparation of a Housing Strategy for Urban as well as rural areas	
49	Preparation of a Urban Renewal Plan	
Capital investment programme		
50	Preparation of a marketing strategy	
51	Road Shows to investors	
52	Investor's meet in Haldia	
Development of Local Level Connectivity and Infrastructure		
53	Strengthening of Road at Local Level	
54	Creating New Roads	
55	Preparation of Site infrastructure	
Logistics / Warehousing Hub		
56	Appointment of Developer & Financial Closure	Will depend on the decision taken on the deep sea port.
57	Land acquisition & EIA	
58	Construction	
Agro Processing SEZ		
59	Appointment of Developer & Financial Closure	
60	Land acquisition & EIA	
61	Construction	

62	Appointment of Developer & Financial Closure	
63	Land acquisition & EIA	
64	Construction	
Multi-product SEZ		
65	Appointment of Developer & Financial Closure	
66	Land acquisition & EIA	
67	Construction	
Knowledge City		
68	Appointment of Developer & Financial Closure	
69	Land acquisition & EIA	
70	Construction	
Entertainment Hub		
71	Appointment of Developer & Financial Closure	
72	Land acquisition & EIA	
	Construction	
PCPIR		
73	Appointment of Developer & Financial Closure	
74	Land acquisition & EIA	
75	Construction	

Some basic conclusions can be made from this chart.

1. The works can be clearly developed into larger general headings.

- Phase1 – Approval process of perspective plan. Some of the projects which have already been approved should be fast tracked in this stage. These include – Haldia Uluberia Expressway, Dum- Dum Kukrahati Expressway, Bridge from Haldia to Nandigram, Costal road to Digha, strengthening of the Hijli Tidal Canal, doubling of the Panskura - Haldia Railway.
- Phase II – Implementation of project as per the outcome of the perspective plan and formulation and approval of comprehensive development plan by each block and municipality. The above two components of the work can be simultaneously done. The project which will be initiated at this stage will include – Mechada - Bardhaman Expressway, strengthening of NH-41, Nandigram - Panskura Connector, ring rail from Panskura, Haldia – Nadigram –

Panskura, emabankment raods and strengthening the water ways. Also the project in the water, swerage, storm water, solid waste will be initiated at this stage.

- Phase III – Implementation of the recommendations of the comprehensive development plan and also a marketing strategy for SEZ's to attract private investors.

2. There are some activities in the chart which is not within the HDA jurisdiction and would require a lot of interaction with state and central government authorities before they can be started.
3. After five years, a review of the stated activities need to be made and a new action plan need to be drawn up at that stage.

5.9.3. Creating Enabling Environments (Institutions, Financial sources, and Legislation)

An enabling environment needs to be created for the projects which have been mentioned above. In the following section some enabling environments which already exist and are created by various government agencies have been explored. Every sector at regional as well as local levels has been listed to understand the enabling environments which already exist and those that need to be created.

For Development of Roads

National level highways – This sector is controlled by the National Highway Authority of India (NHAI) whose primary mandate is to construct and finance the highway network in the country. As per the website of the NHAI Finances are available through various options. It sates that "Major policy initiatives have been taken by the Government to attract foreign as well as domestic private investments. To promote involvement of the private sector in construction and maintenance of National Highways, Some Projects are offered on Build Operate and Transfer (BOT) basis to private agencies.

After the concession period ,which can range up to 30 years, this road is to be transferred back to NHAI by the Concessionaries. NHAI funds are also leveraged by the setting up of Special Purpose Vehicles (SPVs).The SPVs will be borrowing funds and repaying these through toll revenues in the future. This model will also be tried in some other projects. Some more models may emerge in the near future for better leveraging of funds available with NHAI such as Annuity, which is a variant of BOT model."

The Region needs to use the strength of the NHAI to construct important roads which will have the status of important national highways such as the Mechda-Bardhaman Highway,

State Highways – A majority of the important roads in this region can be made by the state government by attracting private sector participation. However presently the West Bengal Government does not have any institutional mechanism under which it can attract private participation for the construction of state highways. But some existing states have already made progress in this which can be studied.

BOX: A case study of private sector participation in the state highway sector

There is a wide and growing divide between some States that are making real progress in attracting private sector participation (PSP) to the highway sector, while the majority of States have little or no experience and seem unlikely to do so for the foreseeable future. Madhya Pradesh, for example, has made good progress concerning PSP in roads having entered into a number of 'Maintain and Transfer' concessions with the private sector (see Table 8). The States of Andhra Pradesh, Gujurat, Maharashtra, Madhya Pradesh, Rajasthan and Tamil Nadu have already entered into BOT concession arangements, each using a fairly standardized model for BOT projects (See Annex 2 for the risk allocation framework for small road projects in Andhra Pradesh). As a typical example of how these work at the state level take Madhya Pradesh. The MP Bridge Corporation uses a grant-based BOT model in which upto 50 percent of a BOT project's cost is provided by the Corporation in the form of a grant to enhance commercial viability. The grant amounts required for implementation of 14 key state highway stretches on this basis have been raised through borrowings largely from HUDCO. The amounts thus raised are accordingly leveraged through the individual project companies

Some States have set up Project Development Funds, such as the Andhra Pradesh Infrastructure Initiative Fund, for funding the preparation of road projects for private involvement. While the concept is good and should help facilitate PSP, such Funds have not yet played a significant role.

Some states identify road projects for development and maintenance through Strategic Options Studies commissioned by the respective road agencies. States that have attracted BOTs have adopted a two-part bidding procedure, involving invitation of technical and financial proposals from bidders. After evaluation of bidders' technical proposals, parties meeting the minimum technical requirements are "pre-qualified". The project is eventually awarded purely on the basis of the most attractive financial proposal, as is the norm for contracting by the Central and State Governments in India. Depending on the PSP model being adopted by the State Government, the most attractive financial proposal may imply

the lowest grant requirement (such as in Madhya Pradesh), or the shortest concession period (such as for small projects in Andhra Pradesh). As the tolls for each State are pre-determined, there is no case for financial proposals being expressed in terms of the required toll structure.

Thus the West Bengal Government needs to set up a state body which will be able to generate fund through private sector participation in the lines of what the other states. Possible Case studies are listed below.

Table 5.11. Agencies undertaking road development in various states

	Extent of Private Participation	**Agency and PSP Mechanism**	**Approx Length Constructed Km[1]**	**Value of Private Funding Rs Cr**
Andhra Pradesh	Some, but in very small size projects	Andhra Pradesh Road Development Corporation (APRDCL) Debt to APRDC and BOTs	Bridges and ROBs plus 36 Km	188
Gujurat	Limited although many are under preparation.	Gujurat Road Development Corporation SPVs and BOT	110	
Karnataka	Limited in new construction but maintenance of most of core network outsourced on term basis	Karnataka Road Development Corporation Ltd. (KRDCL) Debt to KRDCL	Nil	Nil
Madhya Pradesh	Significant, but only a few of the projects envisaged have progressed to financial closure & construction	MP Bridge Corporation Debt to MPBC and BOTs	2000 (Re-habilitation only)	
Maharashtra	Many toll based projects being implemented but limited private investment	Maharashtra State Road Development Corporation (MSRDC) Debt to MSRDC and BOT		
Tamil Nadu	Significant but few projects have reached financial closure	Tamil Nadu Road Development Corporation TNRDCL	180	300
West Bengal	None	Under discussion	Nil	Nil

City Roads, Rail and Water Transport – While Haldia being a port can attract a lot of finance from the central government to improve its national and state connectivity, it should also look towards creating a mass transport system for the region. This can be implemented along the lines of Mumbai Urban Transport Plan which is an integrated city plan for road and rail transport system. Haldia should also include water transport into this has

been suggested in the earlier part of the study as an important mode of transport.

Rural Roads – The rural roads can be improved under the Pradhan Mantri Gram Sadak Yojna (PMGSY). As per their website "Poor road infrastructure affects economic growth in rural areas. It impacts negatively on domestic and local trade, on the final cost of goods, competition and competitiveness, logistics in general, movement of people, inward investment opportunities, and ultimately on employment. Poor road connectivity has a strong link to poverty. Past neglect of the rural road network has cut off rural communities from mainstream economic centers in the country and even locally. Poor connectivity has resulted in slow development, and in some cases a faster than needed exodus of young people to cities. The Government is trying to redress this problem under PMGSY. Assam, Orissa, and West Bengal, which are first targeted under the Investment Program, are among the 10 states with large rural populations that lack adequate coverage in terms of all-weather road connectivity. The poverty head count rates in these states are among the highest in India".

The website then goes on to describe the the PMGSY, its sources of funds and the area of allocation of this fund.

"PMGSY is funded by the central Government, with the Ministry of Rural Development (MORD) acting as the overall coordinating ministry. State governments have responsibility for state planning and implementation, as well as for planning, funding, and executing maintenance. The latest estimated total cost of PMGSY to provide all-weather connectivity to eligible habitations is about Rs1,320 billion (about $30 billion equivalent). A 50% share of the special excise duty (cess) on high-speed diesel oil (about Rs24 billion or $0.5 billion annually) was initially identified for the development of rural roads under PMGSY; this was increased by 50%.4 From fiscal year (FY) 2001 to FY2005, a total of Rs120 billion was allocated from the cess on high-speed diesel oil. The Government approached external agencies, including the Asian Development Bank (ADB) and the World Bank, for financing for the PMGSY scheme in 10 core states5 with large numbers of unconnected habitations. ADB's first loan, Rural Roads Sector I Project (RRSI) for $400 million, was to finance

the construction and upgrading of rural roads in the states of Chhattisgarh and Madhya Pradesh and related project management and implementation support.6 The World Bank's first loan-credit for $400 million was approved in September 2004 to finance road improvement under PMGSY in Himachal Pradesh, Jharkhand, Rajasthan, and Uttar Pradesh"

The state PWD is already working out the road network which needs to be strengthened for the whole of the East Midinipur region. The HDA should interact closely with the State PWD to integrate the road network for the entire Region.

Water and Sewerage Systems – Effort should be made to retain the "public good" characteristic of the Water Supply System. Hence creating a fund to implement projects in this sector the HDA should explore the possibilities of issuing bonds as has been done by Municipal Council / Corporations in other Indian cities.

BOX: Case Ahmedabad: local government municipal bonds

In the mid-1990s Ahmedabad Municipal Corporation (AMC) was in financial deficit, but needed to carry out major improvements to services, especially investment in water and sanitation infrastructure. It set about a programme of increasing the efficiency of its tax collection. The main source of revenue was from an 'octroi' tax levied on imports into the city: AMC updated the rates of tax, employed extra collectors, stamped out corruption – and as a result increased the amount of money collected by 60%. Within property taxes, the next major source of revenue, the council created a computerised database, imposed sanctions on people who were not paying, and strengthened the collection staff – and tax collected increased by 55%. AMC also computerised, modernised and professionalized its accounting system. It then drew up a capital investment programme worth Rs 5,973 million ($150m), mainly for water supply and sewerage schemes, based on financing 30% of it from revenue and raising the rest through loans and a municipal bond. In 1998 Ahmedabad became the first city in India to issue a municipal bond, which was given a credit rating of AA. The most significant investment was the Raska Project, a bulk water supply scheme which now supplies water to 60% of the city's population. It was completed in a record five months, and financed 20% from the proceeds of the bond, with the other 80% coming from a loan from the national government's Housing and Urban Development Corporation. Other Indian cities followed suit: by 2002 six other municipalities (Bangalore, Ludhiana, Nasik, Nagpur, Madurai and Indore) had issued bonds worth Rs. 550 crores: (one crore is 10 million) all of which were over-subscribed.
(extracted from 'Public Services Work!' Public Services International (PSI) September 2003 (http://www.world-psi.org/)

Solid Waste – For this sector the government should explore the possibility of generating funds for the "waste to energy" program as has been suggested in the perspective plan. As per the Ministry of Non-Conventional Energy

Sources website it offers financial incentives as part of the National Programme on Energy Recovery from Urban & Industrial Waste. It offers the following incentives in this sector:

- Interest subsidy and annual discount rates for commercial projects
- Up to 50% capital costs for demonstration projects
- Up to 50% of the incremental capital cost for generation of power from biogas.
- Financial incentives are for urban local bodies to provide free garbage and a nominal land lease for projects as well as financial assistance to prepare the detailed project report or Techno-economic feasibility report
- Financial incentives are for state nodal agencies for promotion, co-ordination and monitoring of projects
- Financial assistance for resource assessment studies
- Financial assistance for organisation of Training Courses, Business Meets, National Workshops and Seminars, creation of awareness and publicity

Apart from the above agencies the following are some of the agencies which would provide loan and assistance in this sector. These include: Indian Renewable Energy Development Agency Ltd., Housing & Urban Development Corporation, Industrial Financial Corporation of India, Industrial Credit & Investment Corporation of India, Industrial Development Bank of India, Small Industries Development Bank of India, Gujarat Industrial Investment Corp. Ltd., Pradeshiya Industrial Investment and Credit Corporation of UP Ltd., Tamil Nadu Industrial Development Corporation Ltd., SICOM Ltd., Punjab National Bank.

As far as possible it reduces the financial dependency of the projects on internal surplus which HDA has and tries to generate money through external sources for its projects. A compilation of the all the possible sources of finance for the various project is made in the following chart:

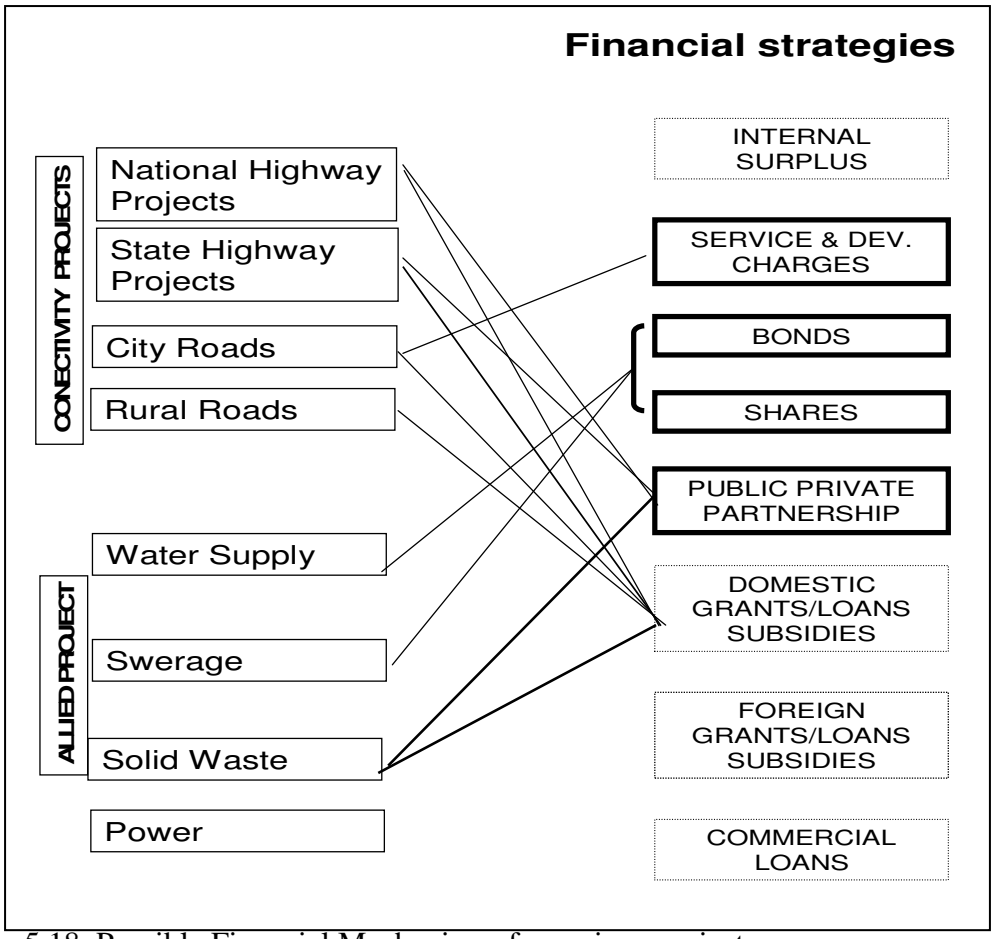


Figure 5.18. Possible Financial Mechanisms for various projects

5.9.4. The Next Steps

The following are the critical first steps towards Phase I of the implementation of the Perspective Plan

- The formation of the Development Committee for suggestions on the Perspective Plan for the Region. The development committee will also direct plan implementation through its executive bodies.

- Suggestion to the state Government for setting up a road corporation for funding and executing important expressways and roadways for the region.

- The creation of an electronic database for the Region with all relevant details to the level of the Mouza. Details regarding, name, area, demographic profile, land-use distribution, agricultural productivity, inventory of roads, inventory of amenities will be essential for informing and refining the plan.

- Documentation of existing environmental and heritage assets for the region so that the plan can integrate regulations regarding these.

- Exploring with national and State level Government agencies, the possibility of improving regional connectivity while simultaneously identifying and exploring private operators who may be interested in bidding for major projects.

- Approaching State and Central Government or other bodies for facilitating innovative sewerage and solid waste management strategies. Visiting some successful cases of these in the country.