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Government of Bihar, Urban Development Department, Bihar Urban Development Agency

FINAL REPORT

CITY DEVELOPMENT PLAN FOR PATNA UNDER JNNURM

Submitted by:

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Abbreviations and Acronyms

AIIMS	:	All India Institute of Medical Sciences
ARV	:	Annual Rental Value
BPL	:	Below Poverty Line
BRJP	:	Bihar Rajya Jal Parishad
BSEDC	:	Bihar State Electronic Development Corporation Ltd
BSPCB	:	Bihar State Pollution Control Board
CAA	:	Constitutional Amendment Act
CBO	:	Community Based Organisation
CDP	:	City Development Plan
CE	:	Chief Engineer
DPR	:	Detailed Project Report
DWCUA	:	Development of Women and Children in Urban Areas
EPIP	:	Export Promotion Industrial Park
FAR	:	Floor Area Ratio
FY	:	Financial Year
GoB	:	Government of Bihar
HH	:	House Hold
HSC	:	House Service Connection
IAY	:	Indira Awas Yojana
IIM	:	Indian Institute of Management
IIT	:	Indian Institute of Technology
INTACH	:	The Indian National Trust For Art and Cultural Heritage
IPT	:	Integrated Public Transport
JNNURM	:	Jawahar Lal Nehru National Urban Renewal Mission
LCV	:	Light Commercial Vehicle
lpcd	:	Litres Per Capita Per Day
MGD	:	Million Gallons Per Day
MLA	:	Member of Legislative Assembly
MP	:	Member of Parliament
MT	:	Metric Tonne
NGO	:	Non Government Organisation
NH	:	National Highway
NIUA	:	National Institute of Urban Affairs
NSDP	:	National Slum Development Plan
O&M	:	Operation and Maintenance
PHED	:	Public Health Engineering Department
PIL	:	Public Interest Litigation
PMC	:	Patna Municipal Corporation
PPHa	:	Persons Per Hectare
PPP	:	Public Private Partnership
PRDA	:	Patna Regional Development Authority
PSP	:	Private Sector Participation
PUAA	:	Patna Urban Agglomeration Area
PWD	:	Public Works Department
RCC	:	Reinforced Cement Concrete

SH	:	State Highway
SJSRY	:	Swaran Jayanti Sahari Rojgar Yojana
SPM	:	Suspended Particulate Matter
STP	:	Software Technology Park
STP	:	Sewerage Treatment Plant
SWM	:	Solid Waste Management
SWOT	:	Strength Weakness Opportunities and Treats
TDS	:	Total Dissolved Solid
UDPFI	:	Urban Development Plan Formulation and Implementation
USEP	:	Urban Self Employment Programme
USP	:	Unique Selling Point
UWEP	:	Urban Wage Employment Programme

Executive Summary

1 BACKGROUND

1.1 City Development Plan (CDP) for

The City Development Plan (CDP) for Patna was initiated by Government of Bihar under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), a scheme of Government of India. The objective of the JNNUR mission is to improve the economic and physical infrastructure for the urban population particularly inn the more established parts of the city and where urban renewal is overdue. It also aims to provide essential facilities and services across the fast growing cities through the public private partnership (PPP) process. Thus, the main objective of the mission is Reforms for down-top developmental governance. The projects that qualify under this mission include sub-sectors of water supply, sewerage and sanitation, drainage, solid waste management, roads and street lighting, energy and housing. Also, special projects including urban transit systems, urban expressways, poverty alleviation, heritage and environmental concerns qualify for support thoughts this mission. The CDP primarily focuses on urban reforms to be implemented to improve the health of ailing urban local bodies.

1.2 Objective of City Development Plan

The goals of CDP includes a collective city vision and action plan aimed at improving urban governance and management, increasing investment to expand employment and services, and systematic and sustained reductions in urban poverty.

- Guide the city direction for economic development with the aim of creating more employment opportunities;
- Develop a consensus building process to establish the city's priority, strategies and actions;
- Assist the local authority outline its financing and investment strategies; and, build local capacity for more effective urban management.

1.3 City Development Plan - A Process

A CDP is a perspective of a vision for the future development of a city. The CDP involves the following milestones:

- City Assessment: Analysis of Existing Situation
- Development of a Vision for the City, though a strategic regional agenda
- Evolving Strategies for Development
- Developing a City Investment Plan and Financing Strategy

2 STATUS OF EXISTING SITUATION

2.1 Spatial Development Pattern

a) Patna, the capital of Bihar state, is a city with an ancient past. It lies on the south bank of the Ganga River and has three largish rivers in its vicinity. Today Patna is an important business centre of eastern India. It also invites a lot of tourists to the city and which acts as a gateway to the world famous Buddhist and Jain pilgrimage centers. The Patna urban region also has industries especially at Hajipur and Sonepur where rail facilities are well developed.

b) Administrative Setup of Patna Regional Development Area (PRD Area): The administrative divisions of Bihar is based on the north south division by the

River Ganga. However the existing PRD area is within three districts (Patna Saran and Vaishali) which belong to three different administrative divisions which would eventually cause difficulty in access of funds for the developmental projects. There is a functional relationship between the three districts and therefore a regrouping of these districts into a single administrative division is ideal for the efficient functioning of the Patna Regional Development Authority (PRDA).

c) Constituents of Patna Regional Development Area : The area of jurisdiction of PRDA covers 234.70 Square Kilometers comprising of portions of the districts of Patna, Saran and Vaishali. The PRDA area straddles the River Ganges with the portion of Patna District lying south of the river and the Districts of Saran and Vaishali lying on the northern banks.

The 234.70 sq.km of PRDA area comprises of the following:-

a. **Within Patna District:** The Patna Urban Agglomeration area and Fatwah Nagar Panchayat area, Maner Nagar Panchayat area and 104 villages.

b. **Within Saran District:** Sonepur Nagar Panchayat Area and 19 villages around Sonepur Nagar Panchayat area.

c. **Within Vaishali District:** Hajipur Nagar Panchayat area and 99 villages around Hajipur Nagar Panchayat area.

d. **Constituents of PUA area:** The PUA area is entirely within Patna District and comprises of Patna Municipal Corporation Area (PMC), and its outgrowths of Patliputra Housing Colony, Digha-Mainpura, Sabazpura, Khalilpura and Badalpura; Phulwarisharif (Nagar Panchayat), Danapur Nizamut (Nagar Parishad), Danpur Cantonment Area, Khagaul (Nagar Parishad), and Saidpura (Outgrowth of Khagaul).

   The PUA comprises of 146.16 sq. km of land.

e. **Landuse Assessment:** Within the PUA the most densely populated wards are along the banks of river Ganga. (301 to 900 persons per ha). The wards with lower density are along the southern and western side where the density varies from 100 to 300 persons per ha. The predominant land use in the PUA is residential which constitutes 60.88% of the total area. Of this 91.7% is unplanned. About 52% of the commercial land use is predominant ribbon development along the major roads.

   Within the PMC area, mixed land use dominates along all the major arterial roads. Most of the Government and other Public Sector Undertakings offices are located in the Western part of city. There is a predominance of educational uses and Social infrastructure facilities whereas recreational use constitutes only 1.56%, and industrial use only 1.76%.

f. **Constraints Of Growth Of The PUA:** The PUA being surrounded by three rivers has a constraint of growth on the northern side due to River Ganga, southern side due to River Punpun and western side due to River Sone. Moreover the topography of Patna is like a saucer due to the surrounding three rivers and thus drainage of the city is a major problem, with pumping of water as the only solution at present. The city is thus prone to flooding.

   The natural growth of Patna has been towards the west. The older part of Patna or the core is on the East side of the city (south of the river). This core area faces problems of overcrowding, which has lead to enormous pressure on the physical infrastructure and to traffic congestion. The newer development areas lying in the central and western part of Patna comprise of both plotted development and apartment houses. The apartments in the newly developed area are a strain on the existing infrastructure, as the upgradation of physical infrastructure has not been done in proportion to the

increase in population. This has lead to problems of water supply, sewerage, drainage, solid waste management, parking, etc. On the southern part of Patna there are low-lying areas lined along the bypass road, which again cause a constraint to the development of the area. These areas are being presently used for dumping of solid waste.

g. **Future Growth And Development Options:** The following actions, determine the future growth of the city:

- Renewal of the Core City Area – Inner City
- Future growth towards the west and south-west of the city;
- Development of new/expanded centers in PUA to decongest rapid growth within the PUA area.

The CDP however is for the PUA area with the PMC being the nodal agency for implementation under the JNNURM. By 2021 it is envisaged that the PMC area would be extended to that of the PUA area.

2.2 Demographic Profile

PUA Area had a population of 16.98 lakhs as per the 2001 Census while the PMC had a population of 13.66 lakh (2001 Census). The growth of population in the PUA has increased rapidly in 1991-2001. Thus, using the 1991-2001 decadal growth rate as an indicator, the population of the PUA is expected to be 22.50 lakhs in the year 2011 and 28.01 lakhs in the year 2021. In addition the floating population who commute from the districts to the PUA each day is expected to be 3.00 lakhs by 2021 against around 2.00 lakhs at present.

The population of the PMC constitutes 80% of the population of the PUA. The growth trend of the PUA have been utilized about to estimate the infrastructure requirement for the population to be catered to in the year 2021.

The density of population of the PMC is 137.40 persons per hectare (PPHa). The next highest density is of Khagaul NPP, Phulwarisharif NPP and Digha-Mainpura NPP areas respectively. The areas with high growth rate, which varies from 48-73%, are Saidpura OG, Khalilpura OG, Digha-Mainpura OG, Danapur NPP, Phulwarisharif NPP, the PMC, and Sabazpura OG. The extraordinary growth rate of Saidpura is due to the increase of its area. The growth rates of the outgrowth areas exceed that of the PMC.

2.3 Economic Characteristics

a. Economic Profile

The total workers population of PUA is 25.2% of the total population, whereas the male worker population is 3.8 lakhs (41.4%) and that of females is 0.45 (5.8%). This is lesser than the percentage of workers population in Bihar state which is 33%. Industries are spread over the PUA whereas services and institutions are concentrated in the PMC area.

b. Industries

The large industrial establishments of the PUA include: Shri Lakshmi Cold Storage Ltd., Patna City; Pradip Lamp Works, Patna; The Bihar Cotton Mills, Phulwarisharif; Shri Baidynath Ayurvedic Bhavan Ltd. Patna; Hindusthan Manufacturing & Industrial Corporation Ltd., Phulwarisharif; Ambuja Electocasting Ltd. Patna; Bata India Ltd. Bataganj, Patna; Modi Steels Ltd. There are also several brick kilns lined along the bypass road.

The first Software Technology Park of Bihar has been developed at Patna by the

Bihar State Electronics Development Corporation Limited (BSEDC), the nodal agency for development of IT industry in the State

c. Thrust Industries:

- These are: Information Technology; Energy Generation, Transmission & Distribution; Bio Technology; Export Industries producing Pollution Control Equipment and Non-Conventional Energy Generators; Rice Mills; Tea; Sugar (Including Khandsari Industry).

Industrial growth is expected largely in Hajipur and Sonepur within the PRDA.

2.4 Urban Environment

a. Natural Hazards

Patna lies in seminar zone IV, which is a high-risk zone. Therefore development controls in the area require earthquake resistant buildings and proper enforcement.

Patna also falls in the risk zone of floods. A series of bunds/embankments have been constructed along River Punpun to control the floodwaters. During the monsoons the spillover from River Ganga tends to flood Patna and cause spread of diseases. Therefore, an expensive drainage plan to channelise the river and devise a proper disaster mitigation scheme has been prepared by the state government. Apart an expensive drainage plan from being flood prone Patna is also at risk of cyclones as it lies in the high wind damage risk zone.

b. Air Pollution Levels

The levels of sulphur dioxide (SO_2) is within the permitted levels, however the levels of Nitrogen Oxides (NOx) has exceeded the limits due to vehicular traffic. Even the SPM levels has exorbitantly exceeded the limit due to vehicular pollution and open areas which increase dust and SPM levels. It is also observed that the pollution levels of SO_2, NOx, and SPM are more in Gandhi Maidan area, which has more vehicular traffic.

c. Noise Pollution Levels

The noise levels all over the city exceed the limits of silence.

d. Drinking Water Quality

The parameters of turbidity, total alkalinity, total hardness, Ca, Chloride, Na, K, Nitrate, sulphate, total Dissolved Solid (TDS) and fluorides were within permissible limits but the iron content in water was found to be 0.5mg/L whereas the permissible limit as per CPCB water quality standards is 0.3mg/L. This has an adverse effect on domestic use and water supply storage and distribution structures; however since the limit has not been exorbitantly exceeded it is not a matter of major concern. None-the-less as per PHED, Patna district is an arsenic affected area with 1-10% of Arscenic content of >50 ppt.

2.5 Urban Poor And Slums

a. It is estimated that 63.5% of the PUA population reside in slums,[1]. These are largely identified slum pockets comprising of urbanized villages. It is necessary, therefore, to articulate policies and programmes to mainstream these pockets with the city, both in terms of infrastructure provision and social and economic development. The estimated below poverty line (BPL) population for 2001 is 2.86

[1] Source: Central Statistical Organisation, Compendium of Environment Statistics, 1997, M/o Planning & Programme Implementation, GOI, New Delhi.

lakhs and 93% of this population is located within the PMC area. The BPL population constitutes 16.8% of the total population and 29.4% of the slum population in PUA. The distribution of the number of slums located within the PUA shows that 48% of the slum pockets are located within PMC.

b. Status of Basic Infrastructure And Housing[2]

Water Supply: The source of drinking water in the slums is the municipal supply in 52% of the slums, others are supplied through tube wells.

Sanitation and Solid Waste Management: The sanitation facilities are very poor in the slums areas in PUA as 52% of the slum dwellers use open ground for defecation. There is presently no system of solid waste disposal and the wastes are dumped on to adjoining streets.

Housing in Slum Areas: The number of households residing in slum pockets in PUA is about 40,000 (as per Report on Urban Basic Services for the Poor: Patna District of Bihar, NIC, 2003). A significant portion of the slum population own the houses (69%). The land occupancy is 46% on Government Land and 54% on private land.

c. Environmental Condition and Health Status: All the slum pockets face problems of poor sanitation facilities, poor drainage system and disposal of solid waste. Patna has a significant proportion of informal sector located along the major commercial areas and also along the road primary networks of the city. They occupy the road margins, footpaths etc. and are spread all over the PUA area. For the slum pockets, in situ upgradation is favored by NGO's / BPO's active in Patna. In situ slum reconstruction is also encouraged.

2.6 Heritage And Tourism

a. Heritage Conservation and Urban Renewal

Patna has important heritage sites scattered around the city. The State Directorate of Archaeology protects as many as 28 archaeological sites in Bihar out of which 6 are in Patna, under the provisions of the Bihar Ancient Monuments and Archaeological Site Remains and Art Treasure Act 1976.

b. Major archaeological sites in Patna as identified by the Directorate of Archaeology are:-

- **Agam Kuan, Patna**
- **Durakhi Devi Temple, Patna**
- **Choti Patandevi, Patna**
- **Begu Hajjam's Mosque, Patna**
- **Kamaldah Jain Temple, Patna**
- **Golghar, Patna**

An integrated conservation strategy for these sites along with the urban renewal of the core city area is required for sustainable planning of the Patna Municipal Corporation Area.

c. The Core City Area and Kankarbagh Residential Area

The city core and the Kankarbagh Residential area stand out as areas with overcrowding, decaying building stock, mixed uses, small scale incompatible manufacture, run-down walk-ups, pavement/ door-step dwellers, unorganized street vending, unusable/ overworked service networks, heterogeneous traffic, lack

[2] Data Source: Urban Basic Services for the Poor: Patna District of Bihar, NIC, 2003

of idle parking spaces and, incongruous city level uses. It often needs some orderliness or even organized chaos for phased correctives, proper solid waste management, water, ground, air and noise pollution control, hoarding and street furniture control. These areas have historic footprints and therefore they need proper heritage plans.

d. Tourism in Patna:

Patna presently falls within the following types of ***religious tourism circuits*** which attract both national and international tourists.

- Buddhist Circuit – covering Buddhist sites in UP and Bihar
- Tirthankar Circuit – coving Jain religious sites all over Bihar
- Nirvana Circuit – covering a combination of the Buddhist and Jain religious sites .Patna is thus a tourist interpose

The listing of heritage sits and buildings is to be through the PMC.

2.7 Review of Level Of Urban Services

a. Water Supply

The high surface water potential of River Ganga is unutilized leading to overexploitation of ground water. The utilization of ground water does not require high capital investment nor recurring costs towards treatment, operation and maintenance. The BRJP and PWB are making an effort towards conjunctive use of surface and ground water sources in order to reduce pressure on the ground water sources.

The main problem with the existing system is non-uniform supply in different area and contamination due to various leakages. The UFW loss is above 40% due to poor and old supply network. The pipes are not easily accessed due to heavy traffic. Thus, poor maintenance leads to a loss of carrying capacity, contamination of water, repair and maintenance problems. In many colonies the drinking water and sewerage pipelines intercede each other, with sewer line on top of water line increasing the possibility of contamination.

Coordination between agencies responsible for the production, supply and distribution of water in PUA as weak. The line departments have significant experience in the operation and maintenance of the service delivery systems. Nevertheless, strengthening of the planning, design, and O & M capabilities of the organizations would have to be undertaken. Unviable tariff and inadequate cost recoveries are two critical problems that result in poor performance of water operations in PUA. Under the Acts, urban bodies are empowered to levy a water tax as well as water charge**,** which are generally implemented but are not revised to meet the costs of delivery. Water supply metering is almost non-existent.

b. Sewerage System and Sanitation

- Only 20% of the total households in urban agglomeration areas are covered with under ground sewerage system, increasing the dependencies on the septic tank and low cost sanitation systems.
- These systems support around 80 per cent of households they could pollute in shallow ground water with microbial substance.
    - Public conveniences are not adequate in the city. No user charge is levied. This has deteriorated the condition of the existing system.

- Infiltration of rainwater into sewerage line further aggravates the problem in monsoon months. The partly or wholly untreated effluent flows into open drains.

c. *Storm Water Drainage System*

- Even though separate sewerage system has been adopted in Patna, the same does not function in reality. Storm water drains; open drains and storm outfall carry sullage, septic tank effluent and even untreated sewage.
- When Sewerage network get choked the household usually connects it to the storm drainage system. Therefore open drains get silted.
- The existing drainage pumping plants at Pahari, Jogipur (Kankarbagh), Rajendra Nagar, Antaghat, Kishanghat, Mandiri, Mithapur, Rajapur, Punaichak, SP Verma Road and Kurjee are old and not working to the designed capacity. The construction of unplanned colonies further aggravates the water logging and is a health hazard.
- The Siadpur Pumping station is catering to total central zone drainage system leading to breaching of Agamkaun Nala. The Agamkaun nala is heavily silted; therefore during rainy season the drain overflows and water partially accumulates in its catchments areas and partially finds its way back to the pump house at Saidpur.
- Encroachments, solid waste dumping and silt deposition cover the drainage channel and RCC drains in Central Zone. This lead to water logging in the area.
- The multilateral agencies involved in planning, implementation and operation and maintenance has lead to mismanagement.

d. *Solid Waste Management*

It is important to note that certain initiatives in the form of door to door collection of solid waste in Patna appears to have been initiated under “Chaka Chak Patna Solid Waste Management Programme”. Approximately 680 MT of garbage is being generated every day. Presently most of the city wastes are simply dumped without any treatment in depressions, ditches or by the sides of the road. This practice may lead to air and water pollution, and threat to public health. The waste collection and disposal system are undertaken through phases:-

- Segregation: Presently the waste is not segregated at the household level. The residents dump the waste in the nearby vacant land.
- Collection: At present there are no collection services at place. In PMC, house-to-house collection of solid waste is not in practice. The solid waste is dumped by the individuals in the low lying areas which is then picked up by the local body who collect the garbage on the trolley handcart and dump the waste in an unorganized manner into the roadside vats without any treatment. The waste is kept open at the collection points. There are no specific disposal sites maintained by the PMC.
- Transportation: Transportation of the garbage is in open truck, dumper and tractor. The local body does not have suitable vehicles for the collection of waste or garbage in terms of timely lifting and transportation. At the same time garbage is handled manually which leads to health hazards.
- Treatment and disposal: At present the waste does not undergo treatment and a crude method of dumping solid waste in low-lying areas is in practice.

e. *Roads and Transportation*

The total length of surfaced road in the PUA is 1500km, out of which nearby 90% are ULB roads. The average widths of the surfaced roads in 5 to 6m which is further reduced to 3 to 4m due to encroachments of roads beside pavement. The

road density in PMC area is 13 km/km^2 whereas in Nagar Parishad area it is 3km/km^2.

The physical expansion of PUA is linear from east to west for a length of 30km and width of 3-4km from river Ganga in North and Punpun in South. The overall road network in the city is not adequate as less than 10% of area is under circulation against the standard of 15-20%. The road network system is deficient also in terms of geometric and traffic management.

The major corridors are, Ashok Raj Path, Patna Danapur road, Baily road, Harding road, and Kankarbagh road. The feeder roads to these corridors are not able to serve their purpose because of insufficient road width and poor traffic management at many places. From viewpoint of road network hierarchy, the medium capacity roads are absent. Connectivity of the road network is poor due to haphazard development of residential / commercial localities. The reduced road width leads to increase in accidents,and increases the volume-capacity ratio leading to congestion and vehicular pollution.

The location of wholesale market in north within Patna city and transport nagar on south in the outskirts, leads to heavy movement of the LCVs and other small good carriages for to and fro transportation of goods and commodities from wholesale areas namely Kankarbagh, Ashok Rajpath, and Meethapur.

2.8 Review of Financial Resources

a. Financial Status at a Glance

Revenue income of PMC has declined to a level of Rs. 20.61 cr in the FY 2004-05 from Rs. 23.77 cr in FY 2001-02; the revenue income has declined at annual rate of 3.5 percent whereas the revenue expenditure increased at an average annual rate of 11.9 percent. A major share of capital income is in the form of grants. The capital account has witnessed a surplus-implying utilisation of capital income to fund revenue expenditure. During FY 2004-05, capital expenditure had declined to Rs. 3.58 cr from Rs. 6.03 cr in the FY 2000-01. Around 90% of expenditure was for construction of public conveniences and Wardwise civil works.

b. Danapur NP (DNP)

Revenue income of DNP increased to rs. 1.80 cr in 2004-05 from Rs. 0.65 cr in 2001-02. The rvenue income increased at annual rate of 28.5 per cent whereas revnue expenditure increased at an average annual rate of 21.00 per cent: During 2004-05, capital expenditure increased to Rs.0.07 cr from Rs. 0.05 cr.

c. Khaganl NP (KNP)

Revenue income of KNP increased to Rs. 0.05 cr in 2004-05 from Rs. 0.04 cr in 2001-02. In this perioed, capital expenditure increased to Rs. 0.07 cr from 0.04 cr.

d. Phulwansherif (PNP)

Revenue icome of PNP increased to Rs. 0.23 cr in 2005-05 from Rs.0.07 cr in 2002. In this period , capital expenditure increased to Rs. 0.10 cr from 0.09 cr.

e. Overview of PRDA Finances

The PRDA generates its revenue through development charges/fees, rental income through the properties in its possession, stamp duty, maintenance charges, interest income etc.

During the last five years the grant reduced in first three years but after Year2003 there is substantial increase in the grant. The rental income reduced significantly

from Rs 0.13 cr in 2001-02 to Rs 0.07 cr in 2004-05.

2.9 Urban Governance And Institutional Framework

The ULB's are under the Municipal Administration dept of Government. PMC functions uder the Municipal Corporation Act 1952. After the 74th CAA, PMC is to be vested with power to undertake infrastructure development and city planning However, for the PUA they could be absorbed by the PUA. However, PRDA is the authority for planning The NP's functions under the Bihar Municipality Act. and implementation of development plans and infrastructure for the notified PRDA area, which includes the PUA area. ULB are responsible for planning, operation and maintenance of selected infrastructure. The line departments like the PHED, still play an important role in delivery of services and urban management.

PRDA notified area has both rural and urban characteristics and therefore, involves both urban and rural development agencies. There are several agencies responsible for ULB management. PMC PRDA, PHED, PWD, Bihar Housing Board, BSRTC, Forest department, Tourism Department. However under the JNNURM. PMC has been named the nodal agency for the PUA CDP. For the PRDA area a PMPC is proposed, dominated by elected representatives. The PMC plan is to be disaggregated into zones, wards and even area sabhas for a better PPP and planned development processes.

2.10 The Consultative Process

Consultations were held with the PMC, Nagar Parishads, urban development departments and line agencies on a regular basis through out the study duration to seek inputs on urban infrastructure issues, related information, data etc. The key urban administrative and line departments consulted included:

- Patna Municipal Corporation (PMC)
- Danapur Nagar Parishad (DNP)
- Khagul Nagar Parishad (KNP)
- Phulwari Sherif Nagar Parishad (PNP)
- CityTraffic Police, Patna
- Urban Development Department (UDD)
- Transport Department
- Public Works Department (PWD)
- Bihar Rajya Jal Parishad (BRIJP)
- Patna Regional Development Authority (PRDA)
- Bihar Industrial Association (BIA)
- Automobile Association of East India (AAEI)
- In addition, ward level citizen groups and key associations were consulted. These included professional bodies representing planners and architects.

As part of the consultations, a stakeholder workshop was organized to arrive at a consensus on the key issues identified and to firm up the optional strategies to address the service delivery and financial issues identified. Several NGO's and CBO's were consulted in the formulation of this CDP.

2.11 The Swot Analysis

SECTORS	STRENGTH	WEAKNESS	OPPORTUNITY	THREATS
City Profile details the location and socioeconomic status of the city. It also discusses the area of employment in the Patna city				
City Profile	• Potential for rapid	• Weak Local Economy • Low Literacy Rate	• Developed as agro-	• Physical topographical

SECTORS	STRENGTH	WEAKNESS	OPPORTUNITY	THREATS
	economic growth of the city	• Low Pace of industrial development • Poor Sanitation and Solid Waste Management • Poor Public Transportation	processing and Marketing Center • Nodal Center for Surrounding settlements	constraints in development
Storm Water Drainage System is one of the important infrastructures for PUA. The city growth and development is affected due to frequent floods. Therefore any infrastructure or asset developed as part of the project shall be supported by the drainage system.				
Storm Water Drainage	• Availability of Natural Drainage and Covered Drainage system. • 15 Pumping Station to pump water in rainy season • Zone wise Drainage flow system has been identified	• Area not Served by Drainage system • Old town has damaged drainage system • Pumps are failing to perform • Natural Drainage channels are choked due development in these areas	• The drainage channel clogged due waste disposal are to be cleaned and disilted • The interlinking of drains is possible. • The drainage systems in new areas are not working due to non-operational pumping station. These pumps are to be operationalised.	• Unorganized development in the low lying areas and natural drainage channels are not controlled even though development control regulation are enacted • Storm water drainage is to be pumped • 45% of natural drainage system of city has already been filled for the purpose of development.
Road Network and System is linear. The road network with 4.5% (area under circulation) is less than 5%.. The citizens are concern about the transport system of city. They raised the issues of poor transport network of city resulting in congestion, accidents and other transport problems.				
Road Network and System	• Linear layout of the city from east to west • Right of Way available for widening but encroached. • Road safety and development efforts by AAEI	• Road Network are developed in unplanned manner with non-hierarchy • Improper maintenance of road and parking • Roadside encroachment • No initiative for IPT development	-	• Most of the intersection of city has poor geometry. • Present parking scenario is constantly reducing the road width
Water Supply System is dependent on the ground water sources, which is now affected by the overexploitation and depletion. The citizens are not concern about water as it is easily extracted from the ground water sources but government departments are making an effort toward developing efficient water supply system to generate revenue collection and minimize maintenance of depleted water network.				

SECTORS	STRENGTH	WEAKNESS	OPPORTUNITY	THREATS
Water Supply System	• Highly fertile and productive water belt. • Availability of Surface water	• Depleting ground water level due to excess utilization. • Single Source water supply system-Ground Water • Damaged water supply network lead to intensification private tube wells • Ground water extraction clearance law not applied	• Low lying areas and drainage channels can be used for rainwater harvesting • Usage of Surface Water from River Ganga	• As per the studies Extensive utilization of ground water lead to problem of arsenic • Provision of trunk services is crucial. • Poor water supply system in new colonies are threat to quality of life
Sewerage System	• Model of Low Cost Sanitation and Septic Tanks	• The length of sewerage network is only 25km and make people connect their sewage pipe to storm water system	• The success in implementation of Low cost sanitation system in 1986 is still the only source of sewage disposal	• High population growth can lead to create further pressure on the sewerage system in the future. • Poor sanitation in new colonies are threat to quality of life
Solid Waste Management		• No landfill site earmarked for disposal of waste. • Poor Collection System • No system of waste segregation exisiting		• High population growth can lead to create further pressure on the solid waste collection and disposal.
Urban Heritage is not yet identified in the city except religious structures. There are around 100 structures that have got architectural and historic importance and need conservation.				
Heritage in City	• The city has around 200 build up heritages which need to be conservation	• Lack of proper database management in each sector especially in the Heritage and Infrastructure development. • Lack of awareness among the people towards heritage conservation. • No proper maintenance of the heritage sites	• The city historic heritage can be preserved and developing it as “Transit Tourist Destination”.	• Lack of repair and maintenance of the heritage buildings can lead to loss of the heritage property. •
Urban Slums	-	• Increasing levels of poverty; • Coverage of poverty alleviation programmes inadequate; • Increasing number of	• The state is focused on provision of basic services to the poor that will help in development	• Infrastructure provision in the slums is inadequate that can lead to poor living conditions. •

SECTORS	STRENGTH	WEAKNESS	OPPORTUNITY	THREATS
		slums; • Poor infrastructure facilities in both regularized and unregularised slums;	of the city.	
Institutional and Fiscal Aspects		• Lack of coordination among various state level departments and parastatals like, PRDA • Planning dept., PWD, PHED, ULB's etc. • Non implementation of 74th CAA in spirit-expanded PMC does not have financial/taxation powers. • Budget power to be approved through state Local Self Government department. • Overlapping of functional jurisdictions between PRDA and ULB. • Overlapping of functions even between the state government line departments.	• State government is in process of undertaking institutional and legislative reforms which will support the development	• Capacity building of all the government organizations if inadequate would result in no implementation of several reforms. • Fiscal reforms are a key for carrying out projects and provision of infrastructure in a sustainable manner. • Efficient marketing of the city as well as state needs to be done with the proper placement of the same with its USPs.
City Environment		• Degraded air quality of city. • Depletion of ground water. • Degraded water quality. • Contamination of piped water with sewerage. • Silt deposition in natural drainage system • Extreme Climatic variation. Summers are particularly oppressive.		

3 THE EMERGING PATNA VISION 2021

3.1 Background

Based on secondary data followed by ground level consultations and beneficiary aspirations and a SWOT analysis all in the form of a rapid assessment, the Patna Vision

emerges as below. This necessarily provides the long-term basis for a 7-year investment programme plan as part of a City Development Plan which enables the statutory master plan for the PRDA to be upgraded every 5-years as a rolling plan. The emphasis of the CDP is on urban renewal. Typically Patna Municipal Corporation (PMC) emerges as the JN-NURM nodal agency or the reference point for the PUA CDP as the bulk of its jurisdiction is ripe for urban renewal. In this process, the wider PRDA area for which a perspective plan update is on the anvil, are recipient centres to ensure that the core or inner city (PMC/PUA) is not unduly cluttered and that integrated urban renewal and development takes place – over a wider Patna centric metropolitan region canvas. This requires an intrinsic equation between the PUA area and the PRDA within the 3 districts of the State.

The fact has also to be underlined that Patna which latterly was the capital of a State with three distinct regions, has now to serve two agrarian regions – north and south of the Ganges, having lost the rich mineral and forest based industrialized southern region since reconstituted as the separate state of Jharkhand. Thereby, except for its orchards, the state is not generating surplus produce due to debilitating land mutations and uncontrolled river flows. Patna sits along the Ganges in the middle of this belt/ state as a primate regional city and recipient of an accelerating rural push. Therefore, Patna metropolis is in need of quality investments to galvanize the state as implied in its 5-year plans. For this Patna has to be substantially upgraded on several fronts simultaneously and rapidly. JN-NURM funds offer the incentives for this broad-based vision to be fleshed out.

3.2 The Patna Vision Parametes

a. A vision plan for the expanded Patna Region within 3 districts, (Patna, Saran and Vaishali), of which only Patna District is south of the Ganges. The consultancy hopes that these 3 districts would constitute a new revenue Division with the Ganges as a bond, especially for North and South Bihar.

b. The PUA at the hub of national water way No.1 (Allahabad to Haldia) an expanded airport with an Special Economic Zone (SEZ) nearby and easily accessed quality health, tourism and higher educational services and with dispersed service and household industries at a historic location is an achieveable vision as endorsed through the participatory process. The consultancy has accordingly fleshed out the CDP and the CIP.

c. Within such a region, the national rail and road links for the movement of goods and people is through a proper dispersal of inter urban activities at well developed nodes in all directions. At such nodes inter and intra metropolitan activities would interchange through wholesale distribution centers, inter-state bus and truck terminals, areas for manufacture and the like.

d. It is envisaged that Patna airport would be upgraded for the movement of goods and people for the international and national circuit, cashing in on Patna as a base for tourist traffic to the great Buddhist, Jain, Vedic, Islamic and Sikh heritage areas in and around Patna. Also, near the airport an export promotion zone (EPZ) or SEZ linked with rapid transit to Hajipur can be provided. It is also envisaged that near the airport, an international conference center complete with quality hotels, golf courses and the like be set up.

e. The consultancy envisages a rapid bus transit system linking the airport to major key areas of Patna, and to recreation areas along the river bund, Hajipur and other important modes of manufacture and commerce, trade and governance.

f. With a rapid bus system, multi-modal intra-settlement transport systems by bus

and other motorised public transport systems (4 and 3 wheelers) can be restructured, without discouraging cycle-rickshaws as neighbourhood / zonal modes of point-to-point transport.

g. With its history encompassing Patliputra, Buddhist, Jain, Mauryian, Islamic, Sikh and British periods, Patna has a continuous heritage and distinct footprints on the banks of the Ganges. Great centers of learning and health and culture are embedded within this heritage and which is to be enhanced in quality and improved environments. This would be done in consultation with people through the expanded PMC.

h. Patna's environment needs a face-lift with its penchant to service small scale informal activities by its growing modest to low-income population, a large percentage of whom commute each day from neighbouring villages and small towns. In this process, roadside greenery, street furniture and signage, development of public open spaces, quality recreation along the bund and bridging it with activities on the opposite banks of the Ganges are important components of this vision.

i. With its tradition in education, health and culture, institutions of higher learning need being established at Patna like I.I.T's, I.I.M's, A.I.I.M.S, etc, Also cultural centers and quality hospitals need being encouraged so as to attract not only local and regional clientele but national and international ones as well.

j. Patna's local government base needs being strengthened through well defined wards and ward committees for people's participation. Through wards and local area plans, it is expected that sane environments would emerge, where built space, on plot open spaces, adequate idle-parking within plots and around plots would be provided, and where local citizen groups would monitor developments from local levels upward.

k. Patna has more than its fair share of low income inhabitants. Through a combination of in-situ upgrading, in-situ reconstruction and some rehabilitation they could be catered to so as to make Patna an inclusive city for all income groups. The globally popular sulabh system emanated at Patna and this now constitutes an important system of integrated sanitization and sewage disposal.

l. Skill upgrading at local government level is an important component of this vision as is the improvement of the local government resource base; simplification of regulations, laws and procedures. The NURM aims to made Patna a prime public participatory city through which development, conservation and environmental improvements add to its attractiveness for investments.

3.3 Vision and the PRDA Plan 2021

Though this vision is primarily for the expanded PMC area incorporating the present PUA area, it supports strategies within the PRDA, so as to facilitate the development of the expanded PMC area. Therefore, the following statements from the draft master plan for Patna 2021 are also supported:-

a. Projects for new activity nodes in the PRDA area to relieve the pressure of mother city's urban core and the PUA/ extended PMC;

b. The PRDA and extended PMC to have adequate potable water supply for all at least 145 lpcd ;

c. The PMRA to have an efficient drainage system, which will follow the natural drainage slopes as far as possible so as to reduce the energy consumption.

They should have adequate protection from floods by extending the existing 'bunds' to protect the future growth areas ;

d. The extended PMC to have an efficient, eco-friendly and energy efficient sewerage system and adequate power supply, both for economic growth as well as residential and other uses ;

e. The extended PMC to have an efficient solid waste collection and disposal system where the solid waste will be converted to other products and thus generate revenue

3.4 Regional Actions

For Patna to develop as a regional / state primate city and an identified international destination within the current buoyant national investments climate, several regional actions are necessary, primarily relating to accessibility. These are as highlighted below:-

a. Patna and National Expressways

Patna is nearly 100 Km. away from the National East-West expressway and over 100 Km from the Agra-Kolkata expressway (NH2). Therefore:

i) The Muzaffarpur – Patna and the Patna Bodhgaya links to the expressways need being upgraded to NE standards from SH Level as at present.

ii) Also, Patna needs a second link to Muzaffarpur across the Ganges – from western Patna. Over the Ganges, if could be a road-cum-rail bridge and as proposed in the PRDA Plan – 2021.

b. Patna and National railways

Patna is not yet fully on the Broad gauge double track electrified system of India. Also rail links across the Ganges is via Barauni over 100 Kms to its east. Therefore.

(i) The Patna-Muzaffarpur single track B.G. electrified link be expedited as a double track.

(ii) The B.G. double-track rail link be extended from Patna to Hajipur through a rail-cum-road bridge over the Ganges and as proposed in the PRDA plan 2021.

(iii) The Gorakhpur – Hajipur – Barauni and the Hajipur Muzafapur line be converted to double-track and be electrified.

(iv) This would complete the national level rail centrality of Patna for the rapid movement of goods and people.

c. Patna and River transport

National waterway 1 (NW1) is the 1354 Km stretch from Allahabad to Haldia via Varanasi, Patna and Farrakka. The 236 Km stretch between Allahabad and Varanasi and the 356 Sq. Km. stretch between Varanasi and Patna have draughts of between 1.5 and 2.0 meters and are therefore navigable for most of the year. However from Patna to Farraka (411 Kms) and Farraka to Haldia (351 Km), the draughts are a minimum of 2.00 meters and are therefore navigable throughout the year. However, this cheap and environmentally friendly system of transport for goods and people has not been exploited to its potential. It also has tourism prospects with Patna as a hub. A rail spur from Patna rail junction to the jetty

exists but is economically stagnant and has to be revived. More jetties are also required so as to vastly increase river movements for goods and people especially between Patna and Kolkata / Haldia.

d. Patna and air transport

With Lucknow, Jaipur, Amritsar and Chandigarh emerging as supportive International airports to Delhi, it is necessary for Patna, Gawahati and Bhubaneshwar to be developed as supportive international airports to Kolkatta. This requires a runway of around 9,000 to 10,000 m length and supportive infrastructure for the rapid clearance and movement of goods and people. In addition, precision all weather operations would facilitate related locations for export oriented manufacture and quality hotels, conferencing, business and related recreational and other facilities. The fact has to be underlined that of the four modes of inter settlement transport which Patna enjoys, air is the only one that links this region directly to international destinations. The other three are meant to link Patna to all the other major national nodes with quick international links. The present runway length is inadequate. It is being lengthened but there is doubt if there is sufficient land for airport upgrading to prime international standards. Also the air strip at Gaya is no substitute. Perhaps a new site may be necessary. These proposals however are based on expansion at the current location.

e. The 4 inter settlement transportation modes with upgrading as proposed in para 8 above would enable the regional interchange nodes to develop between intra and inter settlement movements for Patna UA. These nodes are crucial for the restructuring of Patna's inner city in terms of transport and land use, especially as over 20 modes of transportation are used within the UA for the movement of goods and people. The non-motorised varieties like cycle-rickshaws slow down travel time but afford a clean and affordable service apart from livelihood. They however need being channelised as an appropriate point-to-point service. Thus the regional nodes emerging out of a vision is crucial for the urban renewal of Patna M.C. area.

f. Patna as stated earlier is now the capital of just North and South Bihar – separated by the Ganges. Patna is along the southern banks of the Ganges. However it needs a presence in both regions. This is partially catered to by the PRDA which is largely within Patna District and partially in the 2 northern districts of Vishali and Saran. Unfortunitely, the Districts are grouped into Divisions of north and South Bihar. It is necessary that the three Districts within which the PRDA sits form a separate administration division on either banks of the Ganges. Thereby devolution of Plan funds and District revenues would be more Patna centric.

g. The rivers entering the state from the north have not been adequately regulated through dams. Thus floods are an annual feature over vast areas with adverse impacts on food production and regulated use of water. Such a regional regulated system could help in the generation and storage of food surplus and of Patna region serving as the main receipt and distribution centre for the state with other settlement and mandi towns. This regulated system would also encompass an achievable balance of water drawal between ground and surface sources. This is particularly relevant for Patna UA with its rapidly decreasing per capita access to water.

3.5 Projects in the PUA

The projects have been proposed under the following sectors which would involve the following:

a) ***Improvements to Water Supply Network:*** Proposed Tube wells and Pumps, CWR of 100ML Capacity, Rising Main Overhead Reservoirs, Distribution System, Bulk Meter, Civil & Electromechanical Works, Gross Improvement of Distribution pipeline, Strengthening of Water Testing Laboratory at Filter Plant, Establishing Customer Connections Meters, Leak Detection Study and Rehabilitation Program for Water Supply System, Extension of Water Supply to New Colony Areas, Energy Efficiency Study and other Miscellaneous Work.

b) ***Improvements Proposed in Sewerage System:*** Trunk and Main Sewer, Branch and Lateral Sewer, Sewage Lifting Station, S.T.P. (35 MLD Capacity), Sewer Jetting Machine, Flushing of Sewer, Outfall Channel (Effluent), Other Miscellaneous (office set up etc.), Land acquisition, Manholes, Sewage Testing Lab, Afforestation, Public Awareness, Automation, Computerisation and networking of STPs and establishing central control rooms, HRD training of staff, T&P

c) ***Improvements in Storm Water Drainage System:*** Desilting of 70km of Drains, Covering 50km of Open Drains, Construction of New Drains (50km), Improvements in Roads: Construction New Road in the North from Digha to Didarganj, Construction of New Road in the South from Digha to Didarganj, Construction of Road over Drain from Gaighat to Mohinlark Stadium, Road Widening and Developing Feeder Roads, Construction of Road Dividers, Intersection Improvement, Construction of Flyovers, Construction Pedestrian over bridges, Preparation Comprehensive Traffic and Transport Plan, Installation of CCTV and other electronic equipments for traffic management.

d) **Proposals for SWM system:** The projects are prioritized based on their low capital cost, feasibility of project implementation and ability to show desired results in short time. The prioritized projects are as follows:

- First priority shall be given to the implementation of those programmes for which master plans has already been prepared. This will reduce the time consumption for making another study.
- Identification of the dumping ground to a legal and scientific MSW disposal landfill to restrict any further damage to the ground and surface water.
- Procurement of mechanical equipments for cleaning, collection and transportation of wastes.
- Encourage various drives for keeping the city clean and encouraging segregation of wastes at source to the common mass.
- Involving private sector participation in collection, transportation and treatment of MSW facilities.

e) ***Slum Up gradation*** in terms of In-situ up gradation, In-situ reconstruction, and In-situ rehabilitation. PMC has identified 52 pockets of slums, however the Urban Basic Services for the Poor Report prepared by NIC indicates 122 locations out of which atleast 100 are in the PMC area. Therefore the action plan under this head is proposed in two phases, firstly upgradation of the 52 PMC identified slums, followed by the upgradation of the other approximately 50 odd slums.

f) ***Improvement of City Environment:*** Street furniture within the city along the master plan and zonal plan roads (including street furniture along the master plan and zonal

plan roads including paving, lighting, signage, bus stand, dividers, round abouts etc.) and River Front Development

g) *River Front Development:*

- Approximate Length of riverfront promenade to be developed: 10 sq.km. (width 0.5km) –These areas would include the jetties every two kilometers, and around the jetties there would be kiosks and food stalls, street furniture and boating facilties. The extreme east and west jetties would be used for shipment of goods etc. and not for recreational use.
- Area adjacent to Digha-Mainpura to be developed as recreational area: 10 sq. km. – this area may be used for development of a green recreational area and development controls are to be formed for even no development zones.

h) Heritage Conservation:

- Listing of heritage sites (immovable heritage primarily in PMC area which comprises of the above mentioned categories). The list prepared by INTACH may be used PMC so as to ensure that the list gets a legal basis.
- Based on the listing, heritage precincts have to be identified in areas where there is a concentration of listed entries. The precincts to be immediately identified should be Agam Kuan, Durakhi Devi Temple, Choti Patandevi, Begu Hajjam's Mosque, Kamaldah Jain Temple, Golghar, and the Har Mandir Takht. The precinct could be within a radius of 100m from the monuments.
- Projects should involve partners from tourism promotion departments, archaeological and archaeological history institutions and planners who consider conservation as part of the development process
- The plans should be prepared in great detail at 1:1000 scale starting with generation of base maps, surveys, proposals for the built environment (including street and area scapes), circulation, parking and greenery etc.

3.6 Capital Investment Plan

Summary of Capital Investments in the PUA area is as below:

The percentage of funding from the various sources has also been elaborated in the following table.

S.no	Components	Central Government	State Government	PMC	Contribution of Financial Institutions	Total (Rs Crore)
		50%	20%	30%		
I	**SUB-MISSION-1: URBAN INFRASTRUCTURE AND GOVERNANCE**					
A	Water Supply	87.5	35.0	52.5	0.0	175.0
B	Sewerage and Sanitation	222.0	88.8	133.2	0.0	443.9
C	Storm Water Drainage	763.6	305.4	458.1	0.0	1527.0
D	Road Network & Transportation	180.5	72.2	108.3	240.0	601.6
E	Solid Waste Management	30.1	12.0	0.0	32.4	92.6
G	City Environment	0.0	0.0	0.0	317.0	317.0
H	Heritage and Conservation	54.0	21.6	32.4	0.0	108.0
I	Other Development Projects	25.0	0.0	0.0	25.0	50.0
J	Urban Governance	51.4	20.5	30.8	0.0	102.7
SUB-TOTAL		**1430.2**	**562.1**	**815.3**	**609.8**	**3417.9**

S.no	Components	Central Government 50%		SG/PMC 50%	Contribution of Financial Institutions	Total (Rs Crore)
II	SUB-MISSION-2: URBAN POOR AND SLUMS					
F	Slum and Poverty Alleviation	100.0		76	24	200
GRAND TOTAL		1530.2	562.1	891.3	633.8	3617.9

3.7 Investment Sustenance Plan

a) From an overall development perspective, PMC area is the extended area to include Danapur Nagar Parishad; Khagul Nagar Parishad and Phulwari Sherif Nagar Parishad for comprehensive implementation of projects i.e the PUA area.

b) Phasing of Investments

This is shown in tabular form below-

S.no	Projects	Implementation Plan- (2007-12)- in Rs Crore					Total in Crore
		2007-08	08-09	09-10	10-11	11-12	
1	Water Supply	28.8	39.0	46.0	26.7	34.5	**175.0**
2	Sewerage & Sanitation	30.5	106.3	115.5	101.0	90.6	**443.9**
3	Solid Waste Management	1.6	18.2	20.0	24.3	28.5	**92.6**
4	Roads and Transportation	4.0	21.0	166.6	245.3	165.0	**601.9**
5	Storm Water Drains	1.0	347.1	384.3	392.3	402.3	**1527.0**
6	Heritage Conservation	16.3	16.3	21.7	27.0	26.7	**108.0**
7	Slum and Poverty Alleivation	9.1	40.0	52.0	62.9	36.0	**200.0**
8	City Environment	2.6	63.4	63.4	96.0	91.6	**317.0**
9	Urban Governance	9.7	27.7	26.7	23.2	15.4	**102.7**
10	Other Development Projects	8.8	15.0	13.8	7.5	4.9	**50.0**
	Total- Project Costs	**112.4**	**694.0**	**910.0**	**1006.2**	**895.3**	**3618.1**

c) Operation and Maintenance of Projects

The additional O&M cost on the ULB's of the PUA and state departments are Rs. 43.5 crores. The details yearwise O&M cost are presented in the table below :-

S.no	Projects	Implementation Plan- (2007-12)- in Rs Crore						Total in Crore
		2007-08	08-09	09-10	10-11	11-12	12-13	
1	Water Supply	28.8	39.0	46.0	26.7	34.5	0.0	**175.0**

S.no	Projects	Implementation Plan- (2007-12)- in Rs Crore						Total in Crore
		2007-08	08-09	09-10	10-11	11-12	12-13	
a	*O&M Cost-PMC*		*1.4*	*3.4*	*5.7*	*7.1*	*8.8*	*8.8*[3]
2	Sewerage & Sanitation	30.5	106.3	115.5	101.0	90.6	0.0	**443.9**
b	*O&M Cost-PMC*		*2.4*	*10.9*	*20.2*	*28.3*	*35.5*	*35.3*
3	Solid Waste Management	1.6	18.2	20.0	24.3	28.5	0.0	**92.6**
c	*O&M Cost-Private Investor*		*0.1*	*1.0*	*2.0*	*3.2*	*4.6*	*4.6*
4	Roads and Transportation	4.0	21.0	166.6	245.3	165.0	0.0	**601.9**
d	*O&M Cost-PWD*		*0.1*	*0.6*	*4.6*	*10.5*	*14.5*	*14.5*
d1	*O&M Cost-PMC*		*0.0*	*0.2*	*1.1*	*2.6*	*3.6*	*3.6*
d2	*O&M Cost-Private Investor*		*0.1*	*0.5*	*3.8*	*8.7*	*12.0*	*12.0*
5	Storm Water Drains	1.0	347.1	384.3	392.3	402.3	0.0	**1527.0**
e	*O&M Cost-PMC*		*0.0*	*2.8*	*5.9*	*9.0*	*12.2*	*12.2*
e1	*O&M Cost-PWD*		*0.0*	*4.2*	*8.8*	*13.5*	*18.3*	*18.3*
e2	*O&M Cost-BRJP*		*0.0*	*7.0*	*14.6*	*22.5*	*30.5*	*30.5*
6	Heritage Conservation	16.3	16.3	21.7	27.0	26.7	0.0	**108.0**
f	*O&M Cost-ASI & SAD*		*1.3*	*2.6*	*4.3*	*6.5*	*8.6*	*8.6*
7	Slum and Poverty Alleivation	9.1	40.0	52.0	62.9	36.0	0.0	**200.0**
g	*O&M Cost- PMC*		*0.2*	*1.2*	*2.5*	*4.1*	*5.0*	*5.0*
g1	*O&M Cost-UDD*		*0.2*	*1.0*	*2.0*	*3.3*	*4.0*	*4.0*
	O&M Cost-Beneficiary		*0.0*	*0.2*	*0.5*	*0.8*	*1.0*	*1.0*
8	City Environment	2.6	63.4	63.4	96.0	91.6	0.0	**317.0**
h	*O&M Cost-Private*		*0.1*	*3.3*	*6.5*	*11.3*	*15.9*	*15.9*
9	Urban Governance	9.7	27.7	26.7	23.2	15.4	0.0	**102.7**
i	*O&M Cost-UDD*		*0.3*	*1.1*	*1.9*	*2.6*	*3.1*	*3.1*
i1	*O&M Cost-PMC*		*0.2*	*0.7*	*1.3*	*1.7*	*2.1*	*2.1*
10	Other Development Projects	8.8	15.0	13.8	7.5	4.9	0.0	**50.0**
J1	*O&M Cost-UDD*		*0.4*	*1.2*	*1.9*	*2.3*	*2.5*	*2.5*
	Total- Project Costs	**112.4**	**694.0**	**910.0**	**1006.2**	**895.2**	**0.0**	**3618.2**
	TOTAL O&M		***7.0***	***41.9***	***87.7***	***137.9***	***182.2***	***182.2***

[3] The O&M Cost is Cummulative figure for the investments made in the Phased manner. Therefore Total O&M is same as the O&M in Year 2012-13.

S.no	Projects	Implementation Plan- (2007-12)- in Rs Crore						Total in Crore
		2007-08	08-09	09-10	10-11	11-12	12-13	
	O&M of PMC		*4.3*	*19.2*	*36.7*	*52.8*	*67.1*	*67.1*
	O&M of State Govt.		*2.3*	*17.6*	*38.2*	*61.1*	*81.6*	*81.6*
	O&M of Private Investor/Bene.		*0.3*	*5.0*	*12.8*	*24.0*	*33.5*	*33.5*

d) Means of Financing

The projects which are funded by financing institutions are classified under two categories: (i) **Category A projects (Financially Viable Projects-BOOT Projects)**: These projects are River front Development and street furniture development under City Environment- Rs 317 Crores; (ii) **Category B Projects (Annuity Projects)**: Solid Waste Management projects- Composting and Bio-Methanation Plant Development-Rs 92.58 Crore, which will involve initial contributions from government (65 per cent) and 35 per cent is contributed by financing institutions. Refer table below:-

Components	MEAN OF FINANCING					Total Rs. In Crores
	2007-08	08-09	09-10	10-11	11-12	
Govt. of India	44.99	287.94	392.47	447.91	356.90	1530.2
Govt. of Bihar	16.53	105.77	144.16	164.53	131.10	562.8
PMC	26.21	167.72	228.61	260.90	207.89	891.3
Pvt. Sector	11.98	123.39	123.37	172.80	178.26	609.8
Beneficiary Contributions	1.09	4.79	6.24	7.54	4.33	24.0

e) Proposals for Revenue Enhancement

(i) The guiding principles for forecasting income and expenditure items are:

Revenue Income:

- Quinquennial revision of ARV[4] in FY 2006-07 and 2011-12 by fifty per cent;
- Practically feasible (and imperative) revision in water tariff and levy sewerage rentals to be carried out in FY 2007-08 and revision thereafter by fifteen per cent every three years; and
- Sewerage Connection Charges to be raised to Rs 1000 per connection.
- Water Connection Charges to be raised to Rs 2000 per connection.

Capital Income:

There are three main sources of capital income: general grants, Loans and others. For the static forecast purposes, it is assumed that the same trends will continue.

[4] Currently PMC is in the process of revision of its ARV and it is expected that current demand shall be raised by over 50 percent.

For the alternative scenario the grants portion is increased to comprise the grants from the central and state governments as their shares of the new investments.

Revenue Expenditure:

- All current outstanding debt liabilities to be paid from respective accounts;
- While overall establishment expenditure has increased at an average rate of nineteen per cent (during the review period), future projections have been limited to a growth of twelve percent;
- Future growth in power charges is limited to five per cent per annum, despite the steep rise in the recent past resulting in an average annual growth of thirteen per cent.

Miscellaneous:

- Due to inconsistencies in actual realization over the review period, a five-year realization average is considered for projection (e.g., land tax, road cutting charges, school fees, etc.);
- Items indicating a low/negative growth rate have been considered to grow at a minimum of five per cent, annually; and
- Items indicating a high growth, greater than 15 percent, are capped at a maximum of 15 per cent. The criterion for fixing the maximum limit is to maintain consistency with the overall growth of municipal finances.

(ii) The Assumption for Forecasting Income and Expenditure in the expanded PMC is as below:-

No.	Item	Assumption for Forecast	Basis (Current Rate 2005-06)
1. PMC ACCOUNTS-TAX AND NON-TAX REVENUE SOURCES			
A	**TAX REVENUE SOURCES**		
1	**PROPERTY TAX**		
a	Property Tax collection	50% during FY 2007/08 and 2011/12 and Introduction of Self Assessment System of Tax Calculation	Annual Rental Value (ARV) as mentioned in Chapter 9 of the report. The ARV is assessed in 1993-94. The current system of assessment covers only 50-55 per cent of total properties in city
b	Growth in Assessment	10.0%	Current average of 8.8 %
c	Collection Performance	Arrear collections are to be increased to 75 per cent in 2013-14, with 34 per cent in 2007-08 to 65 per cent in 2012-13. The Current collections are to be increased to 85 % in 2013-14, with 43 per cent in 2007-08 to 75 per cent in 2012-13.	Arrear Demand – 24.4 % Current Demand – 38.2 %
2	**Water Charges**		
a	Domestic Tap Rate Charges	Rs 100 per Month	Not Applicable
b	Non Domestic Tap Rates	Rs 150 per Month	Not Applicable
c	New Connection Charges	One time Rs 2000 and 5 per cent increase every 5 years	One time payment of Rs 1000

No.	Item	Assumption for Forecast	Basis (Current Rate 2005-06)
d	Water Consumption Charges	It is included in the property tax. It is 2 per cent of the property tax	2 per cent of the property tax
3	**Sewerage Charges**		
a	New Connection Charges	One time -Rs 700 in 2008-09 and Rs 1300 in 2012-13	Not Applicable, as only 25 per cent of city is covered by sewerage network
4	**Solid Waste Collection Charges**		
a	House to House Waste Collection	Rs 25 per HH to collected from 2007-08 and to be increased to Rs 40 per HH in 2013-14	Not Applicable
5	Professional and Trade Tax	13.70 per cent, but the increase in number of professional and increasing the coverage by amending the municipal Act will enhance the collection	13.70 per cent
6	Taxes on Vehicles and Animals	The high Basis is attributed to inconsistency of the tax collection. Therefore it has been taken as 15 per cent of the total collection	1471.70 per cent
B	**NON-TAX REVENUE SOURCES-** The basic premise of the assumptions are, if the growth rate is less than 3 per cent than it is taken as 3 per cent, if the growth rate is more than 15 per cent than it is taken as 15 per cent and if the growth rate is in between 3 to 15 per cent than it is taken as the actual growth rate		
1	Road Cutting Charges	15.0%	58.4%
2	Parking Fees	3.0%	-26.7%
3	Charges for Use of Public Vehicles	3.0%	-16.1%
4	Miscellenous	15.0%	213.2%
5	Sale of Produce of Lands	15.0%	80.9%
6	D & O Trade Licence Fee	3.0%	-6.5%
7	Market and Abhotoir Fees	15.0%	413.3%
8	Rent of Land, Tourist Banglow and Others	3.0%	-9.1%
9	Mutation Fees	15.0%	66.5%
10	Stamp Fees	3.0%	-68.9%
11	Income from vendors and Stalls	3.0%	-39.7%
12	Lorry & Cycle Stand Fees	3.0%	-12.2%
13	Electric Cremation Fees	3.0%	-6.5%
14	Miscellaneous	3.0%	-60.0%
15	Surcharge on Stamp Duty	11.9%	11.9%
C	**REVENUE EXPENDITURE**		

No.	Item	Assumption for Forecast	Basis (Current Rate 2005-06)
1	Establishment	3.0%	-8.7%
2	Operation & Maintenanace	3.0%	2.0%
3	Collection Establishment	3.0%	-15.1%
4	Communication-Engineering Section	3.0%	-100.0%
5	Health & Medical Services	3.0%	-1.3%
6	Water Supply	3.0%	-29.7%
7	Drainage	3.0%	-13.1%
8	Street Lighting	15.0%	15.5%
9	Public Health - Sanitation & Conservancy	15.0%	-19.4%
10	Remunerative Enterprises	3.0%	-63.3%

f) Proposed Cash Flow Pattern in Expanded PMC

Based on the above assumptions, the cash flow in Rs Lakhs for PMC, based on actuals for F.Y. 2005-06 and projected for the period starting in F.Y. 2006-07 and ending 2012-13, is presented in tabular form below:-

Proposed Income and Expenditure Pattern in Expanded PMC (Rs Crores)

Income	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Opening Balance	**16.4**	**9.9**	**12.2**	**17.1**	**20.5**	**24.0**	**17.7**	**3.5**
A. TAX REVENUE								
Property Tax including Water Tax etc	16.67	25.15	34.49	42.96	57.42	68.13	77.38	85.93
Other Tax Revenue	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Sub-Total	**16.75**	**25.24**	**34.59**	**43.08**	**57.55**	**68.28**	**77.55**	**86.13**
B. NON-TAX REVENUE								
Communications	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Sewage Connection Charges	0.0	0.0	0.3	2.6	3.1	3.6	4.3	5.0
Water Connection Charges	0.0	2.6	3.0	3.5	3.9	4.5	5.1	7.8
Sale of Produce of Land	1.8	2.0	2.4	2.7	3.1	3.6	4.1	4.7
Other remunerative enterprise	0.8	0.9	0.9	1.0	1.1	1.2	1.3	1.5
Government Grants and Compensation	2.6	2.7	2.7	2.8	3.3	3.0	3.1	3.2

Income	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Surcharge on Stamp Duty	4.0	4.5	5.0	5.6	6.3	7.1	7.9	8.9
REVENUE INCOME	**26.1**	**38.1**	**49.1**	**61.4**	**78.6**	**91.4**	**103.5**	**117.4**
REVENUE EXPENDITURE								
Salaries	25.9	27.2	28.6	30.0	31.5	36.4	38.2	40.1
Existing O&M	3.0	3.2	3.4	3.5	3.7	3.9	4.1	4.3
New O&M	0.0	1.6	7.4	17.8	31.2	47.4	63.7	63.7
Debt Servicing-New	0.0	0.0	1.0	2.7	4.5	5.8	7.4	7.4
REVENUE EXPENDITURE	**28.9**	**32.0**	**40.4**	**54.0**	**70.9**	**93.5**	**113.4**	**115.5**
Surplus/Deficit	**-2.9**	**6.1**	**8.8**	**7.4**	**7.7**	**-2.1**	**-9.8**	**1.9**
CAPITAL INCOME								
PMC Contribution in NURM	0.0	0.0	8.4	13.6	14.2	11.0	12.3	0.0
Contribution of State and Centre in form of Grants	0.0	0.0	19.6	31.6	33.1	25.7	28.8	0.0
CAPITAL INCOME	**0.0**	**0.0**	**28.0**	**45.2**	**47.2**	**36.7**	**41.1**	**0.0**
CAPITAL EXPENDITURE								
Capital Works	3.6	3.8	31.8	49.2	51.3	41.0	45.5	4.5
TOTAL EXPENDITURE	**3.6**	**3.8**	**31.8**	**49.2**	**51.3**	**41.0**	**45.5**	**4.5**
Surplus/Deficit	**-3.6**	**-3.8**	**-3.9**	**-4.0**	**-4.1**	**-4.2**	**-4.4**	**-4.5**
Closing Balance	**9.9**	**12.2**	**17.1**	**20.5**	**24.0**	**17.7**	**3.5**	**0.9**

g) Prospective of Reform Initiatives

The urban local body and state government have agreed to undertake the mandatory and optional reforms as suggested in the JNNURM Toolkit in phased manner. The municipal government is in process of undertaking the reforms initiatives for enhancing the municipal revenue streams.

(i) Property tax related initiatives:

- Currently PMC, on average, employs over seven persons per property tax assessment–phenomenally high by any standards Expansion of the property tax base and redeployment of staff, so as to cater to this increase, would solve a dual purpose of increasing revenue and right sizing of personnel.
- The average ARV per property tax assessment is INR 894, which indicates low rentals values– provides scope for expanding the base through identification of under-assessed properties.

- Only forty-three per cent of property tax assessments are covered through house service connections, which provide scope for additional connections, as water and network are available.
- Water charges have not been revised since 1996 revision is warranted at the earliest and appropriate indexation applied so as to address improved recovery of service cost.
- Collection performance of water supply charges needs improvement from current levels.

(ii) Other essential initiatives:

- Discrepancies regarding deduction of dues by GoB loans and outstanding liabilities deducted from grants and compensation needs to be sorted out at the earliest to enable prudent fiscal planning in future.
- PMC needs to update its debt and non-debt liability statements to facilitate fiscal planning.
- Account statements currently show irregularities, which are attributed to non-updating the records. Such lapses need immediate rectification.
- Debt servicing commitments need to be addressed to improve credit worthiness. Currently PMC does not maintain a record of deductions, hence actual liabilities are unaccounted and actual debt due, unknown.
- Advertisement tax and trade licence fee collections are relatively low, in comparison to local bodies of a similar scale and economy. This needs to be addressed immediately.

h) Conclusion

By undertaking prudent fiscal measures and reforms the PMC is able to enhance its revenue from the current level of Rs.26.1 crore to Rs.65.6 Crore in 2012-13. In this scenario it is able to meet the O&M cost of the assets created under NURM. The financial sustenance of the urban local bodies and Parastatal departments are presented in Table below. PMC can sustain the 57 per cent of investment proposed in the project investment plan through undertaking reform measures suggested in the tool-kit. The state government have to take additional burden of Rs 1250 crore, therefore the state departments can sustain only 70 per cent of the proposed investment in the PIP.

S.no	Setorwise Actual investment	Investment in Rs Crore *(inclusive of price escalation of 3 per cent per annum)*					
		Total Investment	Total Sustainable Investment	Total Investment for PMC	Sustainable Investment for PMC	Total Investment by State Deptt.	Sustainable Investment by State Deptt.
A	**ULB and Parastatal Department Investment**						
i	Water Supply	185.7	79.8	74.3	18.6	111.4	61.3
ii	Sewerage	470.9	208.4	168.6	42.1	302.3	166.3
iii	Roads	383.6	187.9	76.3	19.1	307.3	168.8
iv	Storm Water Drainage	1620.0	793.8	324.0	81.0	1296.0	712.8
v	Heritage& Conservation	114.6	63.0	-	-	114.6	63.0
vi	Slum & Poverty Alleviation	191.0	73.2	106.1	26.5	84.9	46.7
vii	Urban Governance	109.0	46.9	43.6	10.9	65.4	36.0
viii	Other Development Projects	53.0	29.2	-	-	53.0	29.2

S.no	Setorwise Actual investment	Investment in Rs Crore *(inclusive of price escalation of 3 per cent per annum)*					
		Total Investment	Total Sustainable Investment	Total Investment for PMC	Sustainable Investment for PMC	Total Investment by State Deptt.	Sustainable Investment by State Deptt.
Sub-Total in Rs Crore		**3127.8**	**1482.2**	**792.9**	**198.2**	**2334.9**	**1284.0**
B	**Private Sector Investment**						
i	Solid Waste Magmt.	98.3	98.3	-	98.3	-	-
ii	City Environment	336.3	336.3	-	-	-	336.3
iii	Ganga Ring Road	254.3	254.3	-	-	-	254.3
iv	Slum & Poverty Alleviation	21.2	21.2	-	21.2	-	-
v	Street Lighting	2.7	2.7	-	2.7	-	-
Sub-Total in Rs Crore		**712.8**	**712.8**	**-**	**122.2**	**-**	**590.6**
Grand Total in Rs Crore		**3816.7**	**2195.0**	**792.9**	**320.4**	**2334.9**	**1874.6**

The total amounts for sustainable investment under jnNURM by PMC are Rs 588 Crore and by parastatal departments are Rs 1971.4 crores. The total amount to be invested for Patna city is Rs 2461 Crore. The financial sustenance will increase if mandatory and optional reforms are taken up positively.

Chapter 1: INTRODUCTION

1.1. BACKGROUND

The **City Development Plan (CDP) for Patna City** was initiated by Government of Bihar under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), a scheme of Government of India. The objective of the JNNURM scheme is to improve the economic and physical infrastructure for the rapidly increasing urban population and also to provide essential facilities and services across the fast growing cities using public private partnership. The projects that qualify under this scheme include sub-sectors of water supply, sewerage and sanitation, drainage, solid waste management, roads and street lighting, energy and housing. Further, special projects including urban transit systems, urban expressways, poverty alleviation, heritage and environmental concerns, water ways would also be covered under this scheme. The CDP primarily focuses on urban reforms to improve the health of ailing urban local bodies. Thus, a crucial objective of the mission is reforms for down-top developmental governance.

To access funds under the JNNURM the mission suggests a set of reforms to be undertaken by states in areas like stamp duty, rent control and repeal of urban land ceiling. The mission would also require commitments of the states on issues such as regulatory framework for civic amenities, accountability standards and e-governance projects for land records, property tax and issue of automobile licenses, etc. The need for public participation and transparency permeates through the mission objectives. Thus reforms in city governance emerges as a major objective of the JNNURM.

The preparation of CDP is the pre-requisite to obtain funding under JNNURM. The objective of the CDP is to identify infrastructure projects to be implemented under this scheme along with the proposed implementation mechanism including the Private Sector Participation (PSP) strategy. The CDP would also focus on urban reforms to be implemented to improve the health of ailing urban local bodies. **As stress is on urban renewal; the pre-master plan intervention city receives priority as a neglected area of development. Accordingly, the State government have named the Patna Municipal Corporation (PMC) as the nodel agency for implementing the mission. The PMC jurisdiction is to be expanded in stages to be co terminus with the Patna Urban Agglomeration Area (PUA Area).**

1.2. CONCEPT AND PRINCIPLES OF CITY DEVELOPMENT PLAN

The City Development Plan is projected both as a planning process and a product, which promotes partnership among the various stakeholders in a city- the city government, the private business sector, civil society, academic, and national government agencies- to jointly analyze growth issues, develop a vision for the future, formulate development strategies, design programmes, prioritize projects, mobilize resources, implement, monitor and evaluate implementation. The CDP is anchored on the following principles of a sustainable city.

a) ***Livability - what can be done to ensure a healthy and dignified standard of living for the city's residents?***
b) ***Competitiveness - how can the cities be more competitive in the global economy?***
c) ***Bankability - how can the cities be more sustainable? How can public-private partnerships be promoted and/or enhanced?***
d) ***Good Governance - how can a city's management be improved? How can accountability, integrity and transparency be made an integral part of a city's management?***

1.2.1. *Objective of City Development Plan*

The goals of a City Development Plan include a collective city vision and action plan aimed at improving urban governance and management, increasing investments to expand employment and services, and systematic and sustained reductions in urban poverty. In order to achieve the above goals, the objectives of the CDP are to:

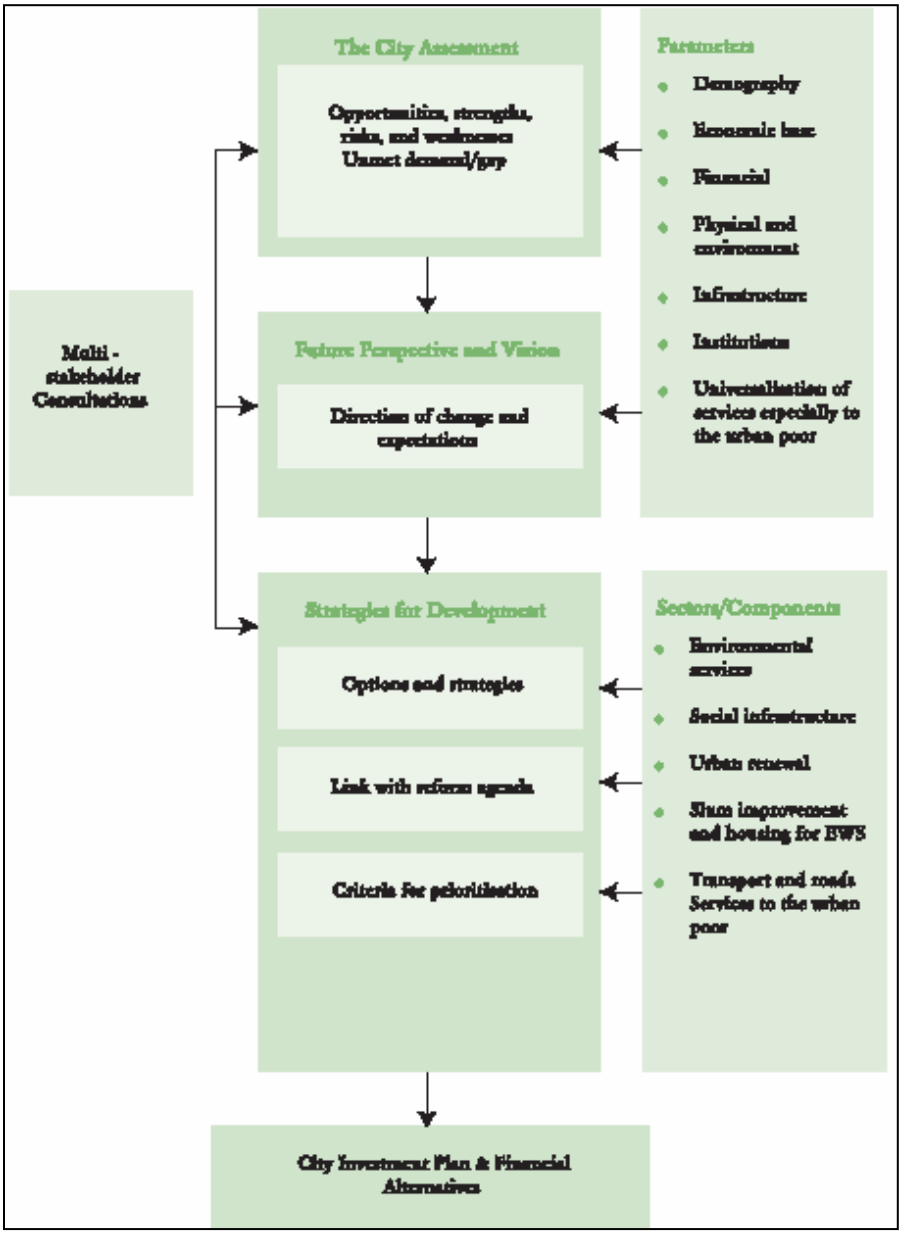
- Guide the city direction for economic development with the aim of creating more employment opportunities;
- Develop a consensus building process to establish the city's priority, strategies and actions;
- Assist local authorities outline their financing and investment strategies; and,
- Build local capacity for more effective urban management.

1.3. CITY DEVELOPMENT PLAN-A PROCESS

A City Development Plan is a perspective of and a vision for the future development of a city. Essentially, it addresses following questions:

a) Where are we now?
b) Where do we want to go?
c) What do we need to address on priority basis?
d) What interventions do we make in order to attain the vision?

The framework for preparing CDP as outlined in JNNURM toolkit is presented in the figure below. The key aspect of preparation of CDP is that of involving community in decision process.



Framework for CDP Preparation under JNNURM

1.3.1. *City Assessment: Analysis of Existing Situation*

The city assessment would involve the assessment of the various sectors for the existing situation. An analysis of the existing situation focuses on demographic analysis and economic activity, land use, financial, urban infrastructure and urban services (like transportation, water supply, and sanitation, sewerage and solid waste management, drainage, transport parking spaces etc), physical and environmental aspects including heritage areas, water bodies etc.

It also involves assessment of the financial status of the City Government and parastatal and other agencies dealing with the service provision including an analysis of their credit worthiness, effectiveness and efficiency of the institutional frameworks. This would also include critical assessment as well as projections of the population growth, infrastructure needs and resource requirements in the short-term, medium term and long-term perspective. Urban poverty, characteristics of slums e.g. social set up, availability of urban basic and social services and on-going slum improvement programmes etc. areas of inner city (urban renewal), which needs to be redeveloped; an analysis of present status of availability of urban basic services including the condition of the infrastructure.

This would look into identification of existing nature of commercial and industrial establishments and identification of those industries and commercial establishments which are not in conformity to the existing land-use planning and zoning regulations in the inner city areas and heritage areas, which includes archaeological heritage, architectural heritage, and architectural conservation areas.

To highlight the "Strengths, Weaknesses, Opportunities and Threats" (SWOT Analysis) of the City Government / parastatal agencies and related Government departments in the City's specific context to provide an understanding of the factors responsible for inefficient and inadequate production and delivery of urban services, their managerial deficiencies and financial constraints and to highlight critical factors which calls urgent remedial measures at the city and State governments level.

For Patna, the CDP focuses on the PUA area within the larger Patna Regional Development Authority area (PRDA). In the process, the CDP looks at participatory implementation in 5 to 7 year tranches, within the larger 20-25 year metropolitan region perspective. For the PRDA area, a Patna Metropolitan Planning Committee (PMPC) is to be established with the PMC as a major player.

1.3.2. *Development of Strategic Agenda and a Vision for the City*

Based on the outcomes of the City Assessment, the second stage envisages development of City Vision to guide the future development of the city highlighting the directions of change and working out an Action agenda within a specific timeframe.

Based on the Vision, strategies are developed for focusing on growth management, urban infrastructure and basic services, social services, housing for EWS, provision of basic and social services for urban poor, conservation of heritage areas, preservation of water bodies, redevelopment of inner city areas, etc for development.

A strategy identifying key strategic issues, risks and opportunities facing the city with focus on reform and reform priorities is to be developed.

The CDP involves development of a Vision in consultation with representatives of stakeholders and civil society in the city. Public consultations are to focus on broad assessment of municipal resources, possible impact on the municipal budget and the proposal for reform to support development.

1.3.3. *Evolving Strategies for Development*

This element of work involves highlighting interventions to operationalize the Vision and future development of the city. This includes:

- Identification of options and strategies and their evaluation keeping in view their contribution to the goals, objectives and the reform agenda of the JNNURM.
- Translating the strategies into programmes and projects and
- Identifying the programmes which have an optimum contribution to the achievement of city's Vision and medium term perspectives.
- Prioritization of the strategies, programmes and projects needs to be done through a consultative process with representatives of stakeholders.

1.3.4. *Developing a City Investment Plan and Financing Strategy*

Preparation of City Investment Plan (CIP) will include the level of investment requirements to implement the CDP by adopting the financial norms or standards for service provision and their upgradation, restoration, relocation etc, and directly estimating the cost of implementing the reform agenda.

Evaluation of financial options and strategies for financing the Vision as enumerated in the CDP. Areas in which city government could finance by mobilizing resources or in association with other tiers of government or financing institutions, access the capital market or enlist the private sector participation and the steps needed to facilitate its participation, etc.

Broad strategies for financial viability of the proposed investments and improving financial sustainability is to be worked out. This would include options for Public Private Participation (PPP) in service delivery and or Operation and Maintenance (O & M), proposal wherever relevant. The investment schedules will layout the costs and revenue estimates of all priority projects in the next seven years of the Mission period. The preparation of CIP would be an iterative process requiring the adjustments and rescheduling to make the whole package work financially.

1.4. REPORT STRUCTURE

The report has been structured in three sections and 17 chapters. The section wise Chapters are presented below:

SECTION- A: CITY ASSESSMENT: ANALYSIS OF EXISTING SITUATION

Chapter 1: INTRODUCTION

Chapter 2: SPATIAL DEVELOPMENT PATTERN

Chapter 3: DEMOGRAPHIC PROFILE AND ECONOMIC CHARACTERISTICS

Chapter 4: URBAN ENVIRONMENT

Chapter 5: URBAN POOR AND SLUMS

Chapter 6: THE HOUSING SECTOR

Chapter 7: HERITAGE AND TOURISM

Chapter 8: REVIEW OF LEVEL OF URBAN SERVICES

Chapter 9: REVIEW OF FINANCIAL RESOURCES

SECTION- B: CITY LEVEL ISSUES AND CHALLENGES

SECTION- C: VISION, PROJECT IDENTIFICATION& INVESTMENT PLAN

Chapter 2: SPATIAL DEVELOPMENT PATTERN

2.1. INTRODUCTION

Patna, the capital of Bihar state, is a city with an ancient past. The history and tradition of Patna goes back to the dawn of civilization. The original name of Patna was Pataliputra or Patalipattan and its history develops from 600 B.C. The city with every new chapter in its history has gone through various names like Kusumpur, Pushpapur, Pataliputra and Azeemabad. Pataliputra was the most enduring of all as it saw the emergence as well as the departure of major India empires. The city had been ruled by some of the most famous rulers for 1000 years, like Ajatshatru, Chandragupta Maurya, Ashok, the Guptas, the Palas, Shershah Suri and Azimush-Shan grandson of Mughal emperor Aurangzeb, who renamed it Azeemabad.

Patna is located between Latitude: 25° 37' North and Longitude: 85° 12' East, and lies on the south bank of the Ganga River. Patna has a very long river line, and it is surrounded on three sides by rivers—the Ganga, Sone, and Poonpun. Just to the north of Patna the river Ganga flows into the river Gandak making it a unique place having four largish rivers in its vicinity. The bridge over the river Ganga, named after Mohandas Gandhi, is 5850m long is said to be the longest single river bridge in the world.

Today Patna is an important business centre of eastern India. It is also a gateway to the Buddhist and Jain pilgrimage centers of Vaishali, Rajgir, Nalanda, Bodhgaya and Pawapuri. This shows that Patna not only played an important part culturally but also spiritually. Apart from attracting business class people the city of Patna also invites a lot of tourists because it acts as a gateway to the world famous Buddhist and Jain pilgrimage centers.

2.2. ADMINISTRATIVE SETUP OF PATNA AND PATNA REGIONAL DEVELOPMENT AREA

The Patna Regional Development Area as constituted by the PRDA lies within the Districts of Patna, Saran and Vaishali as highlighted in **Map 2A.** The divisions of Bihar had been earlier based on the north south division by the River Ganga, which is shown in **Map 2B**. However the existing PRDA boundary covers three districts which belong to three different administrative divisions which would eventually cause difficulty in access of funds for developmental projects. Since the river Ganga acts as the binding force there is a functional relationship between the three districts and therefore a regrouping of these districts into an administrative division is ideal for efficient flow of Patna Regional Centric funds.

Map 2A: Showing the PRDA Districts

2.3. CONSTITUENTS OF PATNA REGIONAL DEVELOPMENT AREA

The area of jurisdiction of Patna Regional Development Authority covers 234.70 Square Kilometers comprising of a large portion of the district of Patna, and some portions of the districts of Saran and Vaishali. The PRDA area straddles the River Ganges with the portion of Patna District lying south of the river and the Districts of Saran and Vaishali lying on the northern bank. The River Son flow near its western periphery and the Punpun towards its south. While organic growth of several single large cities on both banks of a river is common worldwide, a deliberately constituted Urban Regional Development Authority of the nature of PRDA is not very common. The river Gandak also flows through the PRDA area dividing it into three landmasses interlinked by road and rail bridges.

Map 2B: The PRDA Districts divided by the river Ganges

The 234.70 sq.km of PRDA area comprises of the following urban area and villages:

h. **Within Patna District:** The Patna Urban Agglomeration area (PUAA) which comprises of Patna Municipal Corporation Area (PMC), and its outgrowths of Patlipura Housing Colony, Digha-Mainpur, Sabazpura, Khalilpura and Badalpura. Danapur Cantonment Area, Danapur Nagar Palika Parishad area, Khagaul Nagar Palika Parishad area, and its outgrowth of Saidpura, Phulwarisharif Nagar Palika Parishad area. Apart from these it also consists of Fatwah Nagar Panchayat area, Maner Nagar Panchayat area and 104 villages.

i. **Within Saran District:** Sonepur Nagar Panchayat Area and 19 villages around Sonepur Nagar Panchayat area.

j. **Within Vaishali District:** Hajipur Nagar Panchayat area and 99 villages around Hajipur Nagar Panchayat area.

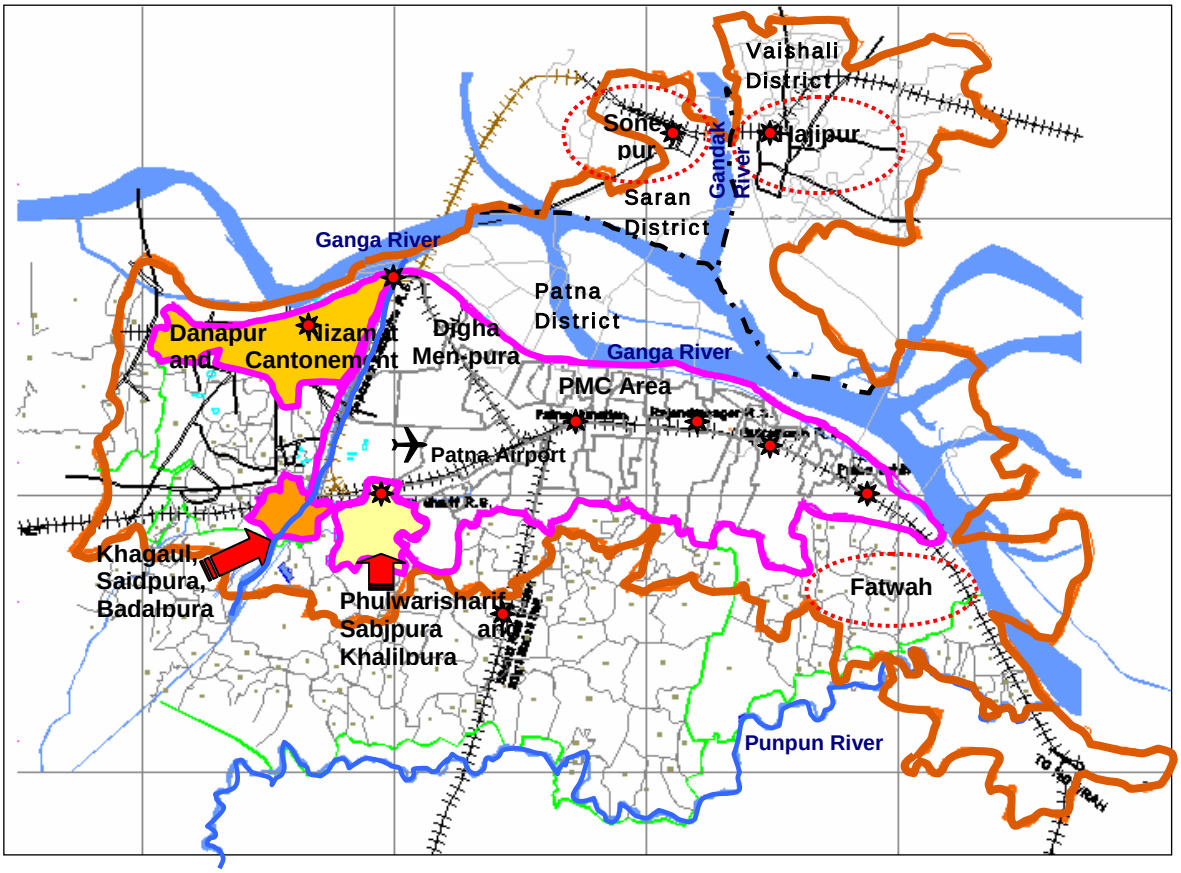
Thus the urban population of the PRDA area in 2001 is as shown in **Table 2.1** below:

Table 2.1: Urban population and constituents of Patna Regional Development Authority

S.No.	Name of Place	Population 2001 (in lakhs)
A	**Within PATNA District**	
	Patna Urban Agglomeration Area	16.97
	Maner Nagar Panchyat	0.30
	Fatwah Nagar Panchyat	0.38
B	**Within SARAN District**	
	Sonepur Nagar Panchyat	0.33
C	**Within VAISHALI District**	
	Hajipur Nagar Parishad	1.19
Total		**19.17**

Source: Census 2001

The 222 villages among them contribute to approximately 2.23 lakh population, giving the estimated population of the PRDA area in 2001 to be 21.40 lakhs. **For this area, the state**



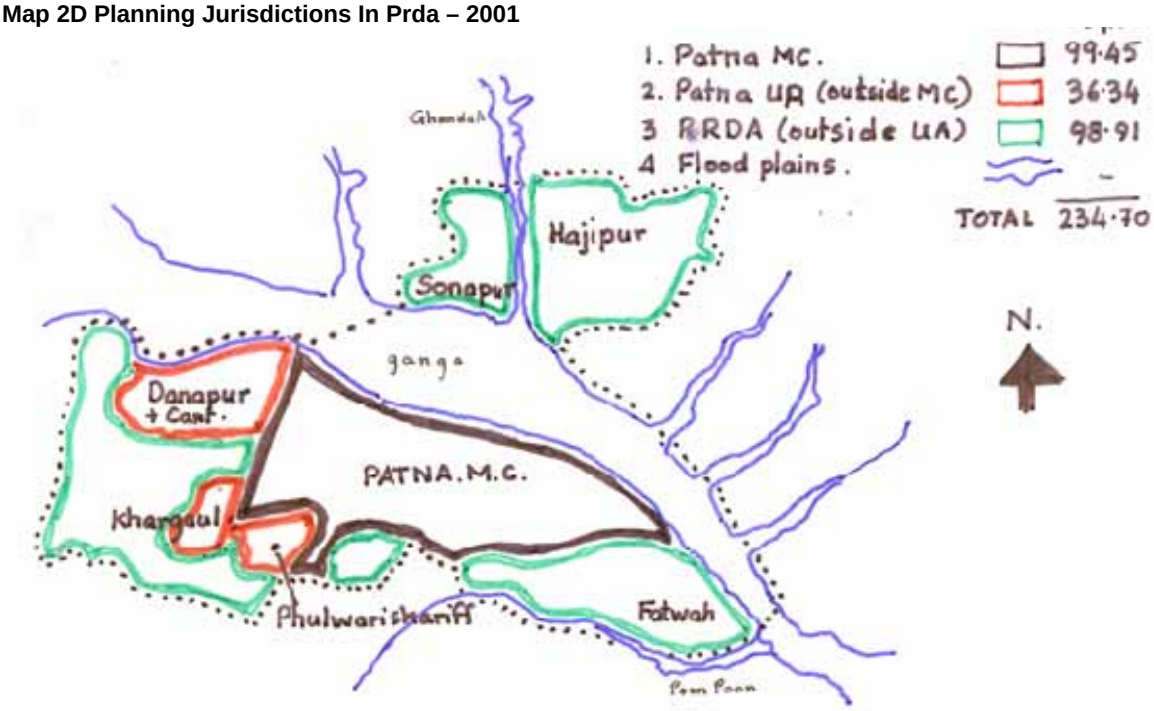
Map 2C: Patna Regional Development Authority Area/PMPC area

LEGEND
PRDA Boundary
PUAA Boundary
Urban Areas other than PUAA
Railway Stations
Airport

Government are committed to establish a Patna Metropolitan Planning Committee (PMPC) with 2/3rd of its members being elected from the local bodies, the assembly and parliament that constitutes the PRDA area. Officials would not be more than 1/3rd of the PMPC strength. The PRDA would be the secretariat to the PMPC.

The Patna Urban Agglomeration Area is within the PRDA area. Refer **Map 2C and map 2D.** Its constituents have been defined below.

Map 2D Planning Jurisdictions In Prda – 2001



2.4. CONSTITUENTS OF PATNA URBAN AGGLOMERATION AREA (PUAA)

The Patna Agglomeration Area as defined as per the 2001 Census constitutes the following within Patna District:

- Patna Municipal Corporation Area (PMC)
- Patliputra Housing Colony (Out Growth of PMC)
- Digha-Mainpura (Out Growth of PMC)
- Sabazpura (Out Growth of PMC)
- Khalilpura (Out Growth of PMC)
- Badalpura (Out Growth of PMC)
- Phulwarisharif (Nagar Panchayat)
- Danapur Nizamut (Nagar Parishad)
- Danapur Cantonment Area
- Khagaul (Nagar Parishad)
- Saidpura (Outgrowth of Khagaul)

Table 2.2 below, gives the area and population of the constituents of the PUAA in 2001.

Table 2.2: Constituents of PUAA

Name of Place	Area (in sqkm)	Population 2001 (In Lakhs)
Patna Municipal Corporation	99.45	13.66
Patliputra Housing Colony (out growth of PMC)	0.64	0.05
Digha-Mainpura (Out Growth of PMC)	6.99	0.53
Sabazpura (Out Growth of PMC)	0.39	0.02
Khalilpura (Out Growth of PMC)	0.80	0.05
Badalpura (Out Growth of PMC)	0.67	0.01
Phulwarisharif Nagar Palika Parishad	6.48	0.53

Name of Place	Area (in sqkm)	Population 2001 (In Lakhs)
Danapur Nagar Palika Parishad	11.63	1.31
Danapur Cantonment Area	3.42	0.28
Khagaul Nagar Palika Parishad	3.66	0.48
Saidpura (Outgrowth of Khagaul)	1.66	0.05
Total	**135.79**	**16.97**

Source: Census of India 2001; Respective ULBs

Therefore the three areas concerned with the CDP are the PRDA, PUAA and the PMC areas, the details of which have been summarized in **Table 2.3** below:

Table 2.3: Area and Population of development areas in PMPC 2021

Name of Place	Area (in sqkm)	Population 2001 (in lakhs)
Patna Regional Development Area	234.70	21.40
Patna Urban Agglomeration Area	135.79	16.97
Patna Municipal Corporation	99.45	13.66

Source: Census of India 2001; Respective ULBs and PRDA

The City Development Plan would be stating the vision for this agglomeration area (PUAA).

The proposals are for Patna UA comprising of PMC + OG's, Phulwarisharif NPP, Danapur NPP and Khagaul NPP + OG. Non-operational areas of Danapur Constonment (3.42 sq. km. Cat. A. Cant have also been incorporated for overall PUA services). In consultation with the state government, the 99.45 sq. km. PMC area + OGs is proposed to be expanded in stages to the 135.79 sq. km. PUA area for 28.00 lakh persons by 2021. This area is to be the core of the 234.70 sq. km PRDA area with the expanded PMC as the nodal implementation agency for the mission. Even so, the continuation of the NPP's of the PUA during the 7 year NURM has been recognized.

2.5. LANDUSE ASSESSMENT

The Patna Urban Agglomeration Area has been facing various problems in recent years due to rapid urbanization and other reasons. Some of the major problems identified are:

- The old city, which is in the eastern part of Patna Urban Area is congested, with narrow lanes, and has critical traffic congestion problems.
- Substantial parts of the city have grown spontaneously (unplanned);.
- Drainage is the most crucial problem of Patna and its surrounding areas. It is the root cause of many other physical and environmental problems.
- Incompatible land uses side by side, in some areas has lead to unplanned development.

2.6. EFFORTS FOR PLANNED DEVELOPMENT

2.6.1. *Master Plan (1962-81)*

The need for proper planning and development of Patna- the State Capital of Bihar was felt immediately after independence of India in the year 1947. A legislation was enacted in the form of Bihar Town Planning and Improvement Trust Act 1951 (Bihar Act XXXV of 1951) and the Patna Improvement Trust was set up there-under. In accordance to section 33 of the said Act the Trust prepared a master Plan for Patna for a 20 years period which was approved by the State Government vide Notification No. 4860 dated 20th June, 1967. The plan in reality was a rapid broad brush land use exercise. Furthermore, the Trust did not

have adequate infrastructure or legal support to implement the Plan. A new Act was then enacted in form of the Bihar Regional Development Authorities Act, 1982 transforming an are Ordinance of 1975 under which the Patna Regional Development Authority was set up.

2.6.2. *Plan Update (1982 – 2001)*

Developments in and around Patna during the broad brush Master Plan period 1962 to 1981 was largely unplanned in addition to existing organic growth. This prompted the authorities of Urban Development Department, Government of Bihar, to take up a new plan before the lapse of the period. The city and its suburbs were facing urgent problems related to traffic and transportation, housing, drainage, water supply etc. due to population growth, putting pressures on all walks of life. A re-orientation of the whole land use system was badly needed. After a series of meetings of technical and administrative personnel of Government of Bihar during 1979-81 directives were issued in 1980 to the Patna Regional Development Authority for preparing a revised Master Plan for Patna. As per provisions of section 16, 17 and 18 of Bihar Regional Development Authorities Act, it is a statutory obligation to prepare Master Plans for all urban centers located within P.R.D.A's defined territorial jurisdictions i.e. Patna U.A, Fatwah, Maner, Hajipur and Sonepur. However priority for preparation of plan was given to Patna M.C. considering its primacy as the capital of the State, its rank, size and complexities of its problems. Draft of the Revised Master Plan of Patna M.C. for the period 1982 - 2001 was prepared for PRDA by a team of planners and other urban agglomerations experts of Patna in 1986.

This Master Plan was only partially successful mainly because of the various socio-economic forces. The directions of growth emerged from this plan but there were several problem with its implementation. Widening of existing roads was not possible due to both financial and legal constraints. The rapid population growth, inadequate infrastructure for controlling development and paucity of funds lead to unplanned organic growth, The zonning and sub division regulations were rarely applied and growth seemed to emerge despite the plan. Parking norms were basic. This situation was typical of many urban areas of eastern India.

2.6.3. *Master Plan 2001-21*

Some bold steps were taken by the Government of Bihar to plan for augmentation of Patna's infrastructure in terms of Sewerage, Drainage, Water Supply and Solid Waste Disposal. PRDA decided to prepare a Master Plan of Patna Urban Area for the year 2001-2021 and appointed Development Consultants Private Limited of Kolkata in association with Sen and Lall Consultants Private Limited of Patna for the purpose. Presently the plan is under preparation.

The Master Plan for 2021 as being developed has the following vision:

"Patna shall be a modern, vibrant, beautiful, efficient urban area, which will be physically socially, economically and environmentally sustainable, it will act as a catalyst for development of the entire state, especially its immediate hinterland, it will be a symbol of the heritage of Bihar."

This Master Plan has the following emerging objectives:

1. Ensure sustainable development of Patna Urban Area (comprising of Patna UA, Fatwah, Maner, Hajipur and Sonapur);
2. Preparation of an integrated Structure plan identifying the major activity nodes, educational institutions, residential and other zones;

3. Preservation of prime irrigated agricultural land;
4. Preservation of existing water bodies to facilitate rainwater harvesting and recharging of ground water;
5. Improvement of existing rivulets and natural drainage channels;
6. Protection of flood-prone areas;
7. Retention of natural vegetation, forests, orchards, etc.;
8. Conservation of historical buildings and existing landmarks;
9. Recycling of solid waste;
10. Disposal of non-recyclable wastes in an eco-friendly manner;
11. Ensuring of a uniform distribution of community facilities;
12. Ensuring that along with the population of PRDA region, its immediate influence zone is also served by higher order services;
13. Making provision for appropriate land allocation and infrastructure for achieving a healthy and sustainable economic growth in the urban area along with its hinterland comprising of rural clusters around Patna Urban Area;
14. Creating an efficient vehicular and pedestrian movement system;
15. Ensure planned growth through adoption of appropriate Development Control Regulations for Patna Urban Area;
16. Incorporate a reasonably detailed Regional Approach. Of particular concern will be to define those significant regional factors that may be crucial to support decision making for shaping the spatial organization of future Patna and its surrounding urban areas, both existing and proposed which will form the Capital Region.
17. Ensure formation of new activity nodes to take care of sub-urban growth and decentralization to relieve the pressure of mother city's urban core
18. Ensure proper urban management system.

The existing land use break up of Patna Urban Agglomeration Area in the Interim MPD 2021 has been shown in **Table 2.4** below:

Table 2.4 Existing Land Use within Patna Urban Agglomeration Area

S.No	Land Use	Area (in Ha)	Total Area (In Ha)	Percentage
1	Residential		**8230**	**60.88 %**
	Residential Planned	438		
	Apartments	202		
	Residential Organic/Unplanned	7548		
	Slums	42		
2	Commercial		**298**	**2.20%**
	Commercial	134		
	Commercial (Predominant Ribbon development)	155		
	Agricultural Marketing Yard	9		
3	Public-Semi Public		**651**	**4.82 %**
	Administrative	211		
	Educational	236		
	Medical	154		
	Religious	32		

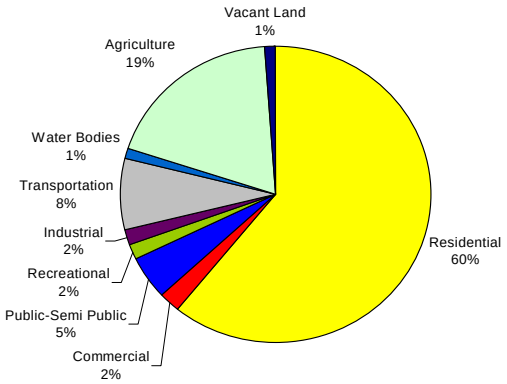
S.No	Land Use	Area (in Ha)	Total Area (In Ha)	Percentage
	Grave Yards and Cremation Grounds	18		
4.	Recreational		**212**	**1.56%**
	Clubs, Cinemas			
	Parks and Playground			
5.	Industrial		**238**	**1.76%**
6.	Transportation		**1050**	**7.77%**
7.	Water Bodies		**164**	**1.14%**
8.	Agriculture		**2591**	**18.88%**
9	Vacant Land		**145**	**0.99%**
	Total Land		***13,579***	***100%***

Source: Interim Report of Master Plan 2021, DCL, 2006

Land in use for transportation and recreation is low at Master Plan level. They are a little better at zonal and neighbourhood levels. Land in industries is also low as household industries are part of mixed uses and most organized industries are within the PRDA-outside the PUA. Industrial uses are nevertheless being infused in the PUA in addition to lungs spaces and quality institutional and commercial usage. Within the PMC several established industrial units do exist.

GRAPH

Land Use Distribution of Patna Urban Agglomeration Area



2.6.4. *Distribution of Various Land uses in Patna Urban Agglomeration Area (Refer Graph 2.a)*

The most densely populated wards are mainly along the banks of river Ganga. They vary from 301 to 900 persons per ha. The wards with lower density are along the southern and western side and their density varies from 100 to 300 persons per ha. The predominant land use in PUAA is residential which constitutes 60.88 % of the total area. Over and above that 91.7 % of the residential area is unplanned. About 52 % of the commercial land use is predominantly in the form of ribbon development along the major roads-typical organic growth in unplanned areas as we find in most of the India cities. Within the PMC area it has characteristic mixed land use along all the major arterial roads.

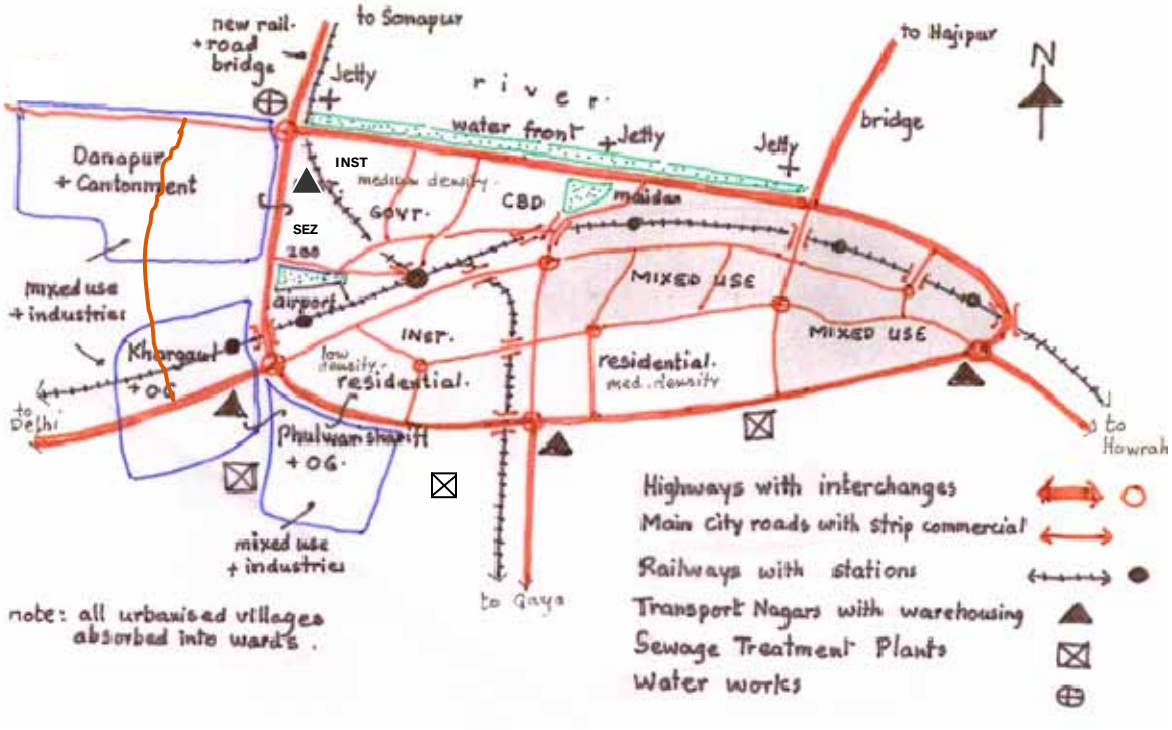
Mixed Landuse along the major arterial roads of the city

Most of the Government and other Public Sector Undertaking offices are located in the Western part of the city. There is a predominance of Educational sector and Social infrastructure facilities like hospitals, which clearly shows the increasing tertiary sector character of the city. The second major

land use is agriculture, which is 18.88 % of the total land, revealing the rural characteristic of the areas surrounding the urban areas in the PUAA.

A structure Plan of the PUA area (2001) is shown on **Map 2E**.

Map 2E: Structure Plan (Schematic) PUA Area - 2021



2.6.5. *Mapping Constraints:*

In Patna in particular and Bihar in general, mapped data has been weak. Despite legislative support, the Directorate of Town Planning is devoid of planners. This affects adversely land use planning and capacity building for planned intervention at ULB levels. The Patna Master Plans 1962-81 and 1982-2001 are not development integrative and the plan for 2001-21 is yet with consultants. Therefore the maps incorporated in this final report are generated as structure plans and offer directions to programmed development.

2.7. FUTURE GROWTH OF PATNA CITY

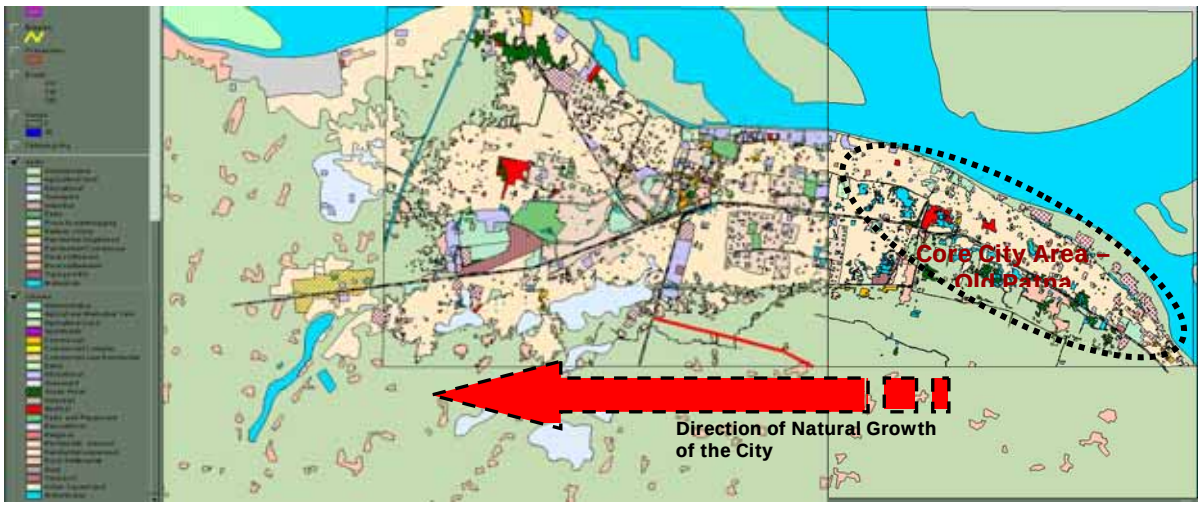
2.7.1. *Physical Constraints of Growth and Issues*

Map 2F shows the direction of growth of Patna City. Patna being surrounded by three rivers has a constraint of growth on the northern side due to river Ganga, southern side due to river Punpun and eastern side due to river Sone. Moreover the topography of Patna is like a saucer due to the surrounding three rivers. Thus drainage poses a major problem and pumping out of water seems to be the only solution at present. The city is also otherwise prone to flooding.

The natural growth of Patna City has been towards the west till date, with the older part of Patna being in the East side of the city. This core area of Patna faces problems of overcrowing, which has lead to enormous pressure on the physical infrastructure and traffic congestion. The newer development areas lying in the central and western part of Patna comprises of both plotted developments and apartment houses. The apartments in the newly developed area are again straining on the existing infrastructure, as the up gradation

of the physical infrastructure has not been done in proportion to the increase in population being accommodated in the apartments. This has lead to problems of water supply, sewerage, drainage, solid waste management, parking etc.

Map 2F: Direction of growth in the PUA area



In the southern part of Patna city there are low-lying areas lined along the bypass road, which again cause a constraint to the development of the area. These areas are being presently used for dumping of solid waste. In fact, almost the entire stretch of the bypass road is being used for dumping of city waste.

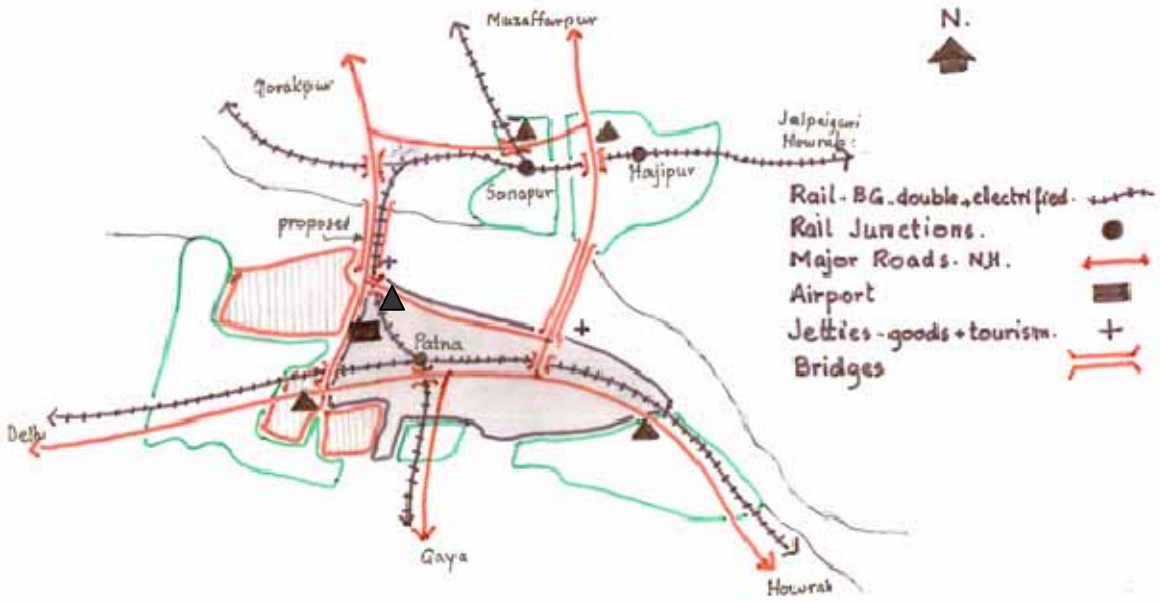
Solid Waste Being dumped along the bypass road

2.7.2. *Future Growth and Development Options*

As the city spreads in an organic manner, villages are engulfed, good farming land is sacrificed, open spaces disappear, and costly mains providing public utilities have to be enlarged and duplicated. A possible solution to this problem is to limit the spread of the city, as a homogenous mass, and to guide further growth into separated suburbs, divided from the main city by green wedges. Where land is suitable for farming it can be zoned as 'Rural'. The following options are being followed for the future growth of the city:

- **Renewal of the Core City Area – Inner City (pre-master plan interventions);**
- **Redensification of the intermediate city (largely due to master plan interventions) towards the west and south-west of the PMC area.**
- **Development of new/expanded centers in PUA to decongest rapid growth within the Current PMC area**

Map 2G below indicates the emerging primary Transport Links in the PRDA-2002



Primalarliy PRDA-21 aims at strenghtening Road, Rail, Air and River linkages to the Patna region so as to:-

a) **encourage industrial growth and the distributive trade at Hazipur and Sonapur;**

b) **have transport nagars and the wholesale trade on the fringe of the PUA;**

c) **encourage river transport for both-tourism and movement of goods and people;**

d) **exploit the advantage of an expanded airport for the location of special economic zones and quaity facilities in terms of health, education, recreation and tourism as major PUA generators of economic momentum along with small scale industries as spread across the PUA.**

2.7.3. *CDP Priorities*

The CDP is accordingly required for the PMC area (the current PUA) for employment based on:-

a) **quality health and educational facilities;**

b) **development of the I.T. sector and related facilities;**

c) **expansion of Patna's cultural heritage toursim through hotels, hotel infrastructure and intrenational conference centre;**

d) **renewing the core area of the city through compatible mixed uses, slum upgrading, organised conservation of heritage precints and sites, waterfront development and passive and active recreation facilities;**

e) **ensuring that the PMC's perennial drainage problems are adequately addressed along with organised solid waste management systems, adequate water supply and sewerage disposal. Transport planning and traffic management especially the idle parking of vehicles is a crucial issue along with governance through ULB's with a strong financial base.**

f) **There are key issues for the CDP addresed under the JN.NURM**

Chapter 3: DEMOGRAPHIC PROFILE AND ECONOMIC CHARACTERISTICS

3.1. DEMOGRAPHIC TRENDS AND PROJECTION

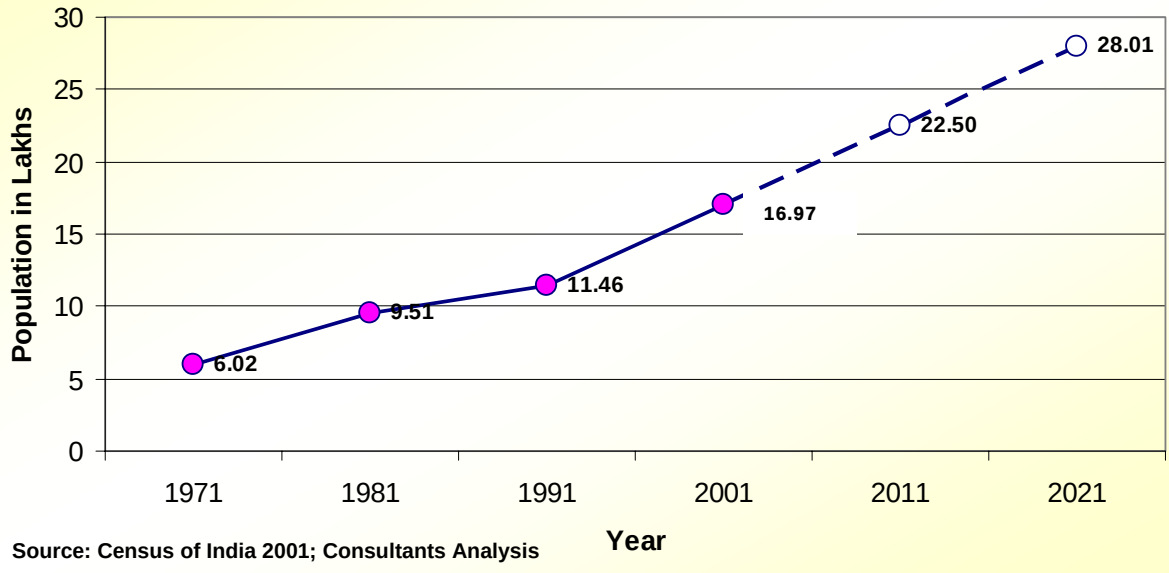
3.1.1. *The State Context:*

a) Patna is one of the few metropolitan areas outside the high capacity emerging national rail and road networks that are driving the linear urban regions of India. Therefore, the new 36 district state of Bihar is required to strengthen linkages to these primary networks and also to invest substantially in channalising water inflows from the north of the state to more predictable and harnessable levels. **Thus (i) Bihar as a food surplus state (ii) the PRDA as a state primate metropole and (iii) accelerated urbanisation in lesser settlements through DPC's is part of the state budgettery priorities.**

b) **It is in the above framework that the Patna Vision has to sit and (i) where Hajipur and Sonepur would be the prime industrial hubs of the PRDA through improved rail and road convergence and dispersal and distributive trade hubs (ii) where the expanded and better connected PMC would offer quality tertiary services and supportive secondary employment.** In this scenario, the accepted linear population graph for the PUA 2021 is projected within the envisaged accelerated population graph for the PRDA as being fleshed out by another consultancy for 2021. The employment participation rate emanates from this projection and which admittedly is not comparable to a majority of Indian settlements but is not necessarily unique to Patna. A preponderance of imformal and supplemental employment and a large day time floating population (to and from the PUA) is a manifestation of such regional primate cities.

3.1.2. *Population and Area*

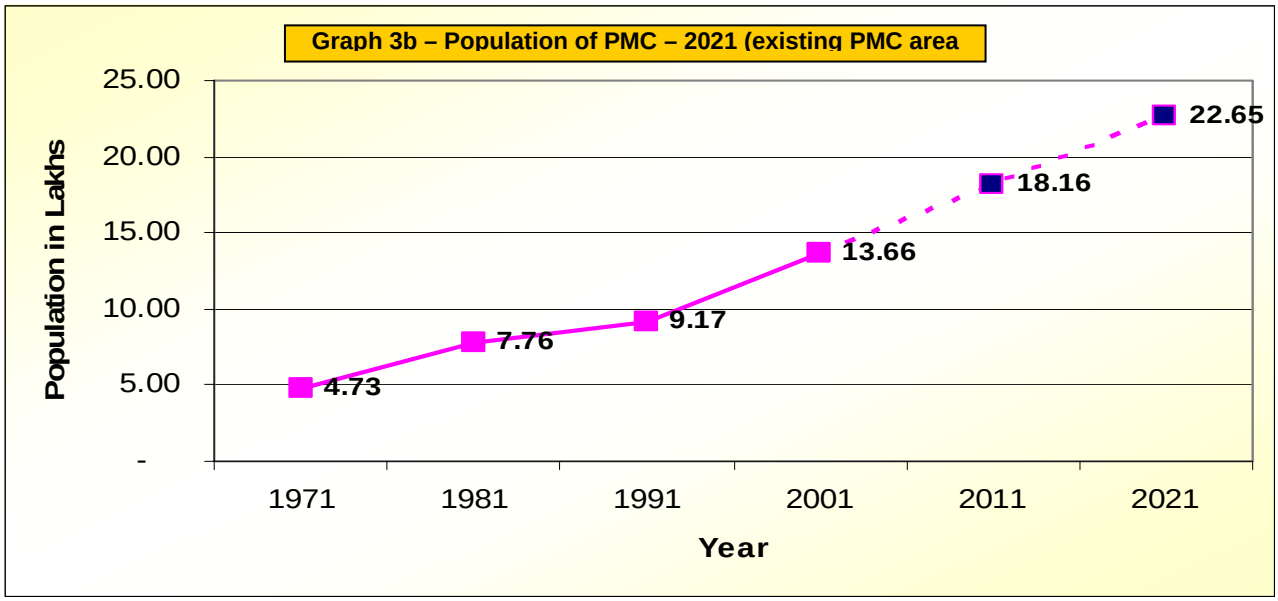
Graph 3a: Population in Patna UAA area – 2021 (expanded PMC)



Source: Census of India 2001; Consultants Analysis

The Patna UAA had a population of 16.97 lakhs as per the 2001 Census while the PMC area had a population of 13.66 lakh (2001 Census). The growth of population in the PUAA increased rapidly from 1991-2001. Thus using the 1991-2001 decadal growth rate as an indicator, a linear projection has been done for the consecutive decades upto 2021. Refer **Graph 3a** Thus the population of the PUAA is expected to be 22.50 lakhs in the year 2011 and 28.01 lakhs in the year 2021.

The population of the PMC Area constitutes around 80% of the population of the Patna UA area. The growth trend of the PMC Area is shown in **Graph 3b**. along with the projected



population for the PMC area. These projections show that the PMC could have around 18.16 lakh persons in 2011 and 22.65 lakh population by 2021 Also, as per discussions with planners and other officials in the state, the floating population who commute from districts to the PUAA each day is expected to be 3.00 lakhs by 2021 against around 2.00 lakhs at present. Of this at least 2.50 lakh would be to Patna Municipal Corporation area by 2021.

The area and population of the PUAA constituents has been elaborated in **Table 3.1** below:

Table 3.1 Area and population of the PUA area - 2001

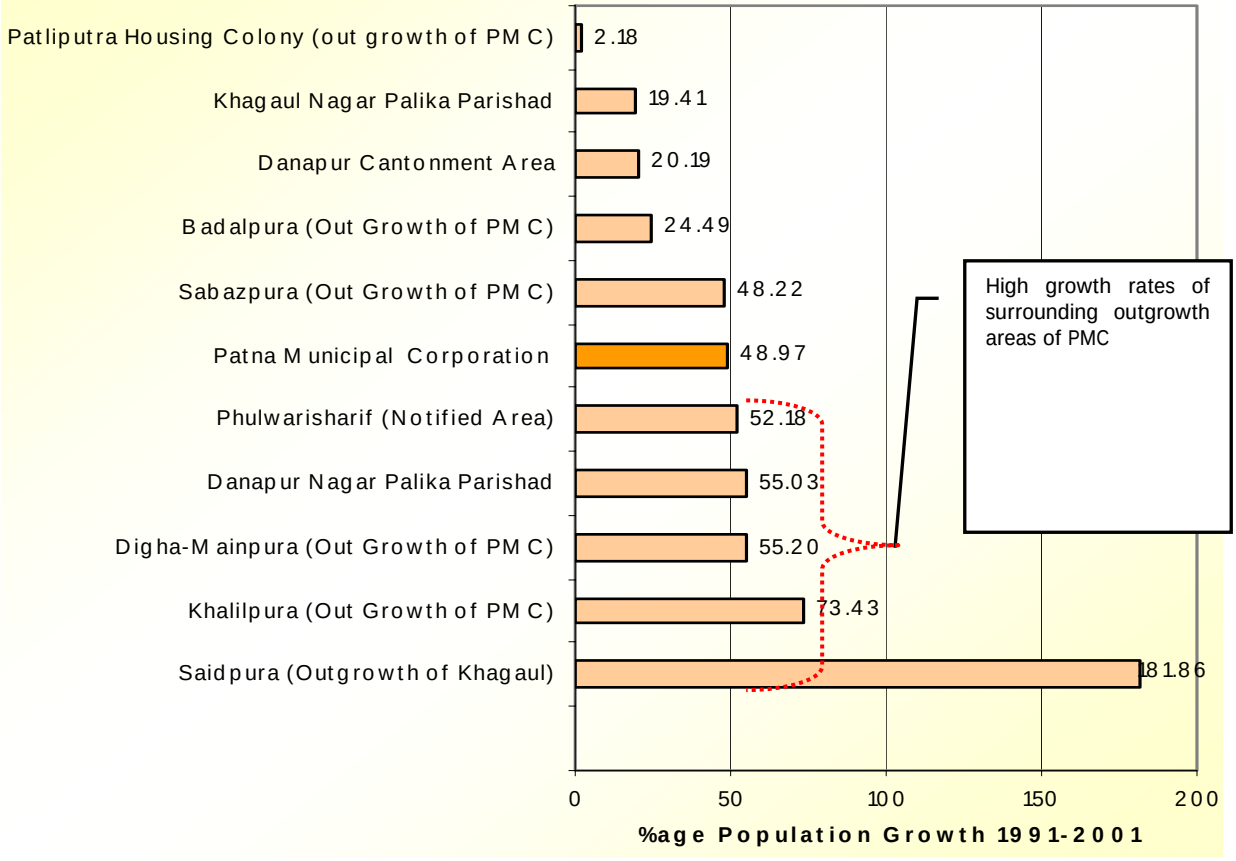
Name of Place	2001 Area (in SQKM)	1991 Population in Lakhs	2001 Population in Lakhs	Density of Population (PPHa.) 2001	Growth Rate of Population 1991-2001
Patna Municipal Corporation	99.45	9.17	13.66	137.40	48.97
Patliputra Housing Colony (out growth of PMC)	0.64	0.04	0.05	70.31	2.18
Digha-Mainpura (Out Growth of PMC)	6.99	0.35	0.53	77.20	55.20
Sabazpura (Out Growth of PMC)	0.39	0.01	0.02	44.65	48.22
Khalilpura (Out Growth of PMC)	0.80	0.03	0.05	60.53	73.43
Badalpura (Out Growth of PMC)	0.67	0.01	0.01	10.86	24.49

Name of Place	2001 Area (in SQKM)	1991 Population in Lakhs	2001 Population in Lakhs	Density of Population (PPHa.) 2001	Growth Rate of Population 1991-2001
Phulwarisharif Nagar Palika Parishad	6.48	0.35	0.53	82.49	52.18
Danapur Nagar Palika Parishad	11.63	0.85	1.31	112.79	55.03
Danapur Cantonment Area	3.42	0.23	0.28	82.56	20.19
Khagaul Nagar Palika Parishad	3.66	0.40	0.48	131.98	19.41
Saidpura (Outgrowth of Khagaul)	1.66	0.02	0.05	27.72	181.86
Total for PUAA (approx.)	**135.79**	**11**	**17**	**125**	**48.13**

Source: Census of India 2001; Interim Report of Master Plan 2021; ULBs

The density of population in Patna city was 137.40 persons per hectare (PPHa) in 2001 and the next highest density was that of Khagaul Nagar Palika Parishad, Phulwarisharif Nagar

Graph 3c: Growth Rate of Population 1991-2001 for PUA Constituent Areas

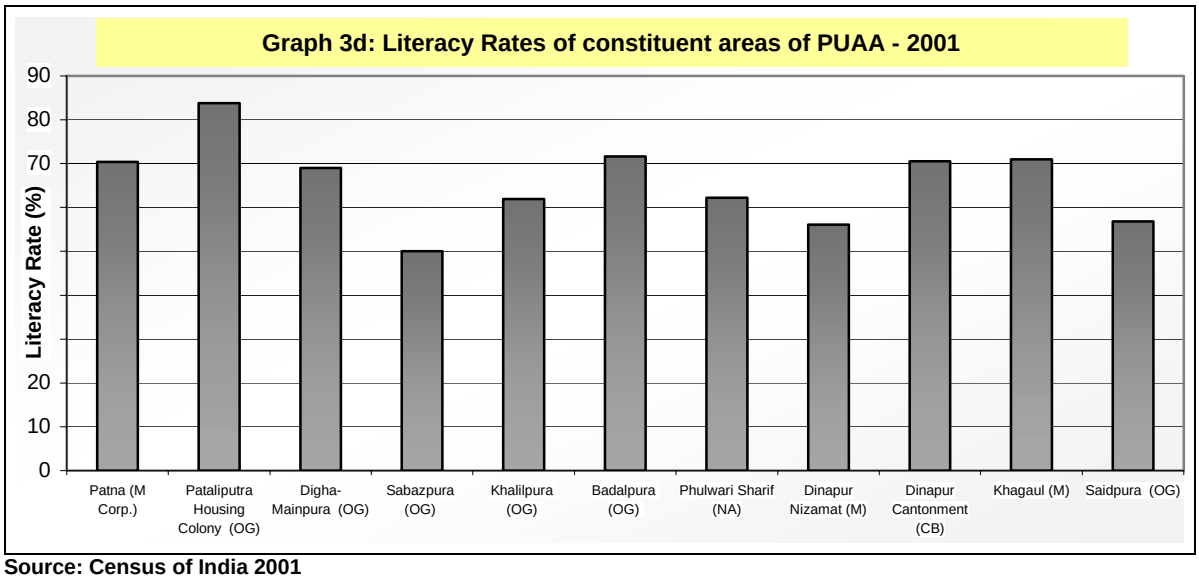


Palika Parishad, and Digha-Mainpura area. Refer **Graph 3c**. The areas with high growth rate, which varies from 48-73%, are Khalilpura, Digha-Mainpura, Danapur Nagar Palika Parishad, Phulwarisharif Nagar Palika Parishad, PMC, and Sabazpura. The extraordinary

growth rate of Saidpura is due to the change of the jurisdiction area. The growth rates of the outgrowth areas exceed that of the PMC area and even for the future development of the city such outgrowth areas may be developed to sustain the threshold of the city.

3.1.3. *Literacy Rate*

The literacy rate of Patna Urban Agglomeration area in 2001 is 68.9%, which is higher than the literacy rate of the State i.e. 47.53%. The literacy rates of the respective outgrowth areas have been depicted in **Graph 3d**. Literacy rates vary from 50-71% in all the constituent areas of the PUAA. 72.6% of the males and 62.2% of the females are literate.



Source: Census of India 2001

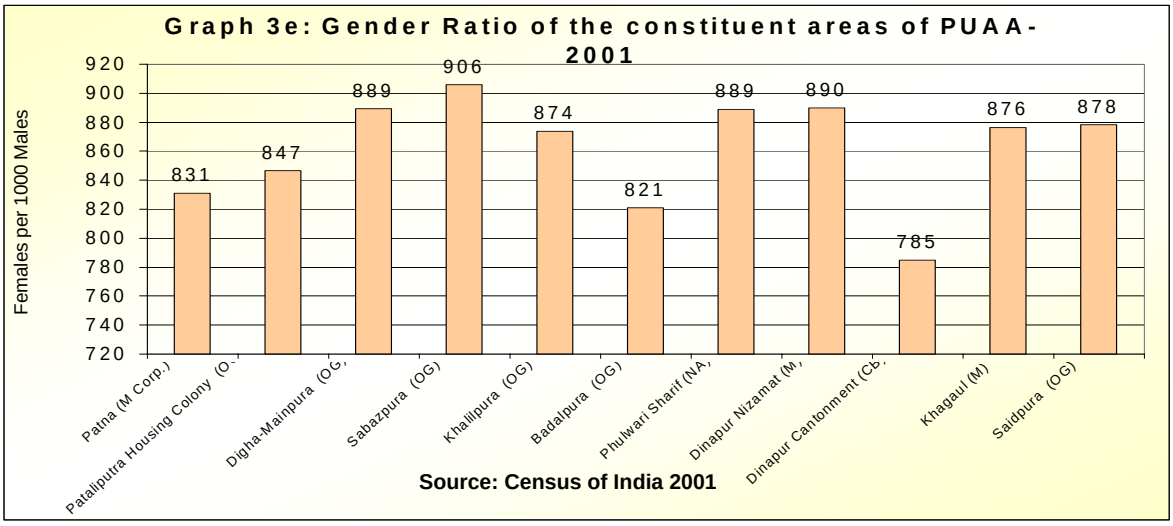
From discussions with officials, the target for 2011 is 60% overall in the PUAA and 90% by 2021 and the clasing of the gap between male and female literacy rates.

3.1.4. *Number of Households*

The average household size within the PUAA was 6.3 in 2001. There were therefore approximately 2.69 lakh households within the area. Refer **Table 3.2**.

Table 3.2 Number of households in PUAA-2001

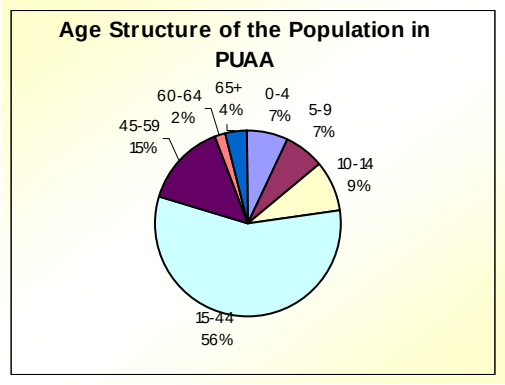
Name of Settlement	No. of Households	Population (Population in Lakhs)	HH Size
Patna Municipal Corporation	220,022	13.66	6.2
Patliputra Housing Colony (out growth of PMC)	862	0.05	5.2
Digha-Mainpura (Out Growth of PMC)	8,742	0.53	6.2
Sabazpura (Out Growth of PMC)	250	0.02	7.0
Khalilpura (Out Growth of PMC)	639	0.05	7.5
Badalpura (Out Growth of PMC)	103	0.01	7.1
Phulwarisharif Nagar Palika Parishad	7,725	0.53	6.9
Danapur Nagar Palika Parishad	18,809	1.31	7.0
Danapur Cantonment Area	4,174	0.28	6.8
Khagaul Nagar Palika Parishad	7,521	0.48	6.4
Saidpura (Outgrowth of Khagaul)	772	0.05	6.0
Total	**269,619**	**16.97**	**6.3**

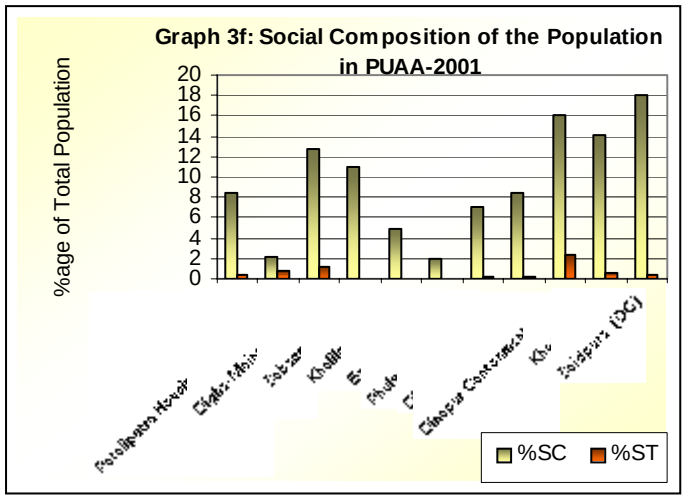


By 2021, the household size is expected to drop to 6.00 in the PUAA.

3.1.5. *Gender Ratio and Age Structure*

In 2001, the gender ratio in PUAA was 840 females per 1000 males, which is far lower than that of the state average of 921 females per 1000 males. The gender ratio in the PMC area was 831 females per 1000 males. The highest ratios were are in Sabazpura, Digha-Mainpura and Dinapur Nizamut Areas. Refer **Graph 3f**.





Source: Interim Report Master Plan for Patna 2021

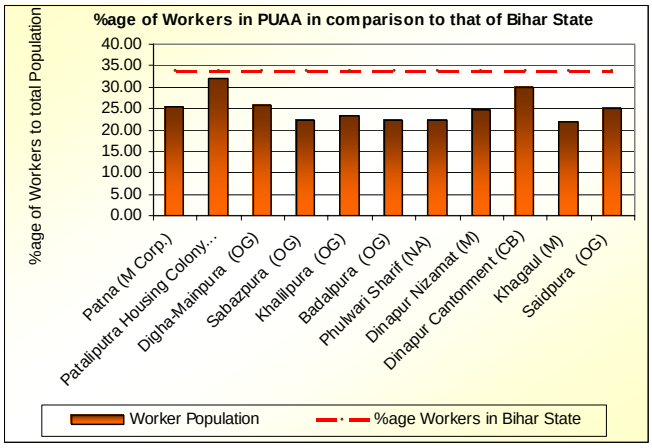
From discussions with state officials, it is expected that in the PUAA the male female ratio would improve to 900 and 930 females for 1000 males by 1991 and 2001 respectively, as distriess imigrations would reduce due to accelerated resources for implemention of the state rural policy.

The Age structure of the population in 2001 is shown in **Graph 3f**. It is evident that a significant proportion (56%) of the population is in the age group of 15-44 years of age i.e. this is the main population group of workers. The population of Patna UAA comprises of 8.8% and 0.4% S.C. and S.T. population, compared to 15.7% (S.C.) and 0.9% (S.T.) population in the State of Bihar.

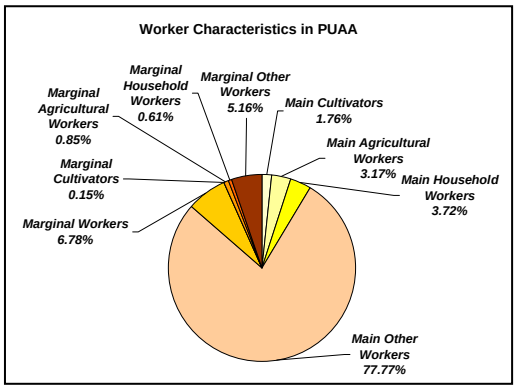
3.2. ECONOMIC CHARACTERISTICS

3.2.1. *Economic Profile*

The total workers population of PUAA was 25.2% of its total population in 2001. The male worker population was 3.8 lakhs (41.4%) and that of females it was 0.45 lakhs (5.8%). This is less than the percentage of workers population in the Bihar state which was 33% in 2001. This indicates that 74.8% of the population is dependent. It also indicates a high percentage of part time and supplemental jobs, common among those below the poverty line.



Among workers, 77% are in the other workers category which includes offices/institutional workers and business. Refer **Graph 3g**.



Source: Census of India 2001

The characteristics of employment of the main other workers include:

3.2.2. *Trade and Commerce*

Patna is an important commercial center and due to its central position at the junction of the three rivers it has the additional advantage of transport of goods by river. Other trade centers within the PUA are located in Dinapur, Khagaul, Phulwarisharif and its surrounding areas. The commercial establishments are lined along the major roads of the PUA area.

The most important commodities manufactured, imported and exported in PUAA are shown in the table below:

Name of Settlement	Most Important Commodity		
	Manufactured	Exported	Imported
Patna MC area	Electronic Goods	Vegetables	Food grains
Danapur NP area	Shoes	Shoes	Iron
Phulwarisharif NP area	-	Cotton Yarn	Cotton

Source: Urban Basic Services for the Poor: Patna District of Bihar, NIC, 2003

The municipal corporation area comprises of large business quarters namely, Marufganj, Masurganj, Mirchiyaganj, Maharajaganj, etc. Within the PMC there are several wholesale markets for vegetables and agricultural goods but none of them have been planned nor do they have any waste management systems. This leads to congestion of traffic, mismanagement of solid waste disposal system, and chaos within the city area. The agricultural market is also placed at the eastern tip of the town and this causes major congestion on the bypass road as the trucks are parked for delivery of goods

Disorganized wholesale Vegetable Market within PMC

which again leads to congestion on the bypass road. The commercial establishments within the city are maily lined along the arterial and major roads and there is extensive mixed land use of commercial and residential use throughout the city.

3.2.3. *Industries*

Patna had been famous in the past for its handicraft which has commanded respect of foreign markets on account of their finish, generally attributable to master craftsmen who have exhibited their skill from generation to generation. Besides, potters, carpenters, blacksmiths, coppersmiths and goldsmiths have been carrying on their traditional occupations both in rural as well as urban areas, to earn their living.

Parking of trucks along by-pass road for delivery of goods to agricultural market

Industries along the bypass road

Brick kilns lined along the bypass road

However, under the impact of modern economy, these activities are static. The large industrial establishments include:

Software Technology Park in Patna

- ShriLakshmi Cold Storage Ltd., Patna MC.
- Pradip Lamp Works, Patna UA.
- The Bihar Cotton Mills, Patna UA (Phulwarisharif NP).
- Shri Baidynath Ayurvedic Bhavan Ltd. (Patna UA).
- Hindusthan Manufacturing & Industrial Corporation Ltd., (Phulwarisharif NP).
- Ambuja Electocasting Ltd. Patna MC.
- Bata India Ltd. Bataganj, Patna MC.
- Modi Steels Ltd. Patna MC.

There are also several brick klins lined along the bypass road. The list of registered industries in the PUA area show a preponderance of household and cottage units interspersed over the core and intermediate locations of Patna.

The first Software Technology Park of Bihar has been developed at Patna by the Bihar State Electronics Development Corporation Limited (BSEDC), the nodal agency for development

of IT industry in the State. The Govt. of Bihar is formulating and implementing various policy initiatives and specialized infrastructure projects to place the State on the IT map of India. Setting up of an Information Technology Park (ITP) in the first phase in Patna, is one of them.

Patna has convenient road, rail and air connectivity with all parts of the country as well as the bordering countries. The ITP of Patna is located in the fifteen story Biscomaun Tower, adjacent to the historic Gandhi Maidan and the Ganges. It has all the ingredients to act at a catalyst for the growth of IT Industry in the State.

The salient features of the Software Technology Park of Patna includes:

- Development by credible developers and designed by reputed architects, employing quality driven construction practise.
- Location in the heart of the Central Business District.
- The positioning and configuration of this Park, has been done with the following key parameters.
    - Good road, rail and air connectivity;
    - Prominent location;
    - Good ambience next to Gandhi Maidan;
    - High rise fifteen storied building ensuring less pollution;
    - Uninterrupted, high quality 24 hrs. power supply;
    - Quality water and large overhead tank and captive tube well;
    - Fully air-conditioned modules;
    - Fully furnished modules with modular furniture, cabin, conference room and work stations.

The Biscomaun Tower is landmark of the City with excellent specialised IT and social infrastructure facilities, ensuring “ready to move” and “quick to operate” opportunities. However the new IT Park would be near the airport in about 50 hectares of land.

3.2.4. *Industrial Policy*

Bihar is endowed with natural resources such as surface and ground water, fertile land, and also improving power supply, skilled manpower etc. The changes taking place in the economic policies of the country, the vast internal market, being the state bordering Nepal, and a stablising Government are creating an attraction both for the Indian and foreign investors in the state.

The State Government is committed to maximizing capital investment for its accelerated economic development as also for generation of employment and incomes. Accordingly the Government is committed to create an environment conducive to growth of industries and quality secondary activities in the state. While not given to encouraging rank consumerism and production of luxury goods for conspicuous consumption, the Government is determined to encourage investment in industries based on the state's agro-climatic and mineral resources as also in development of infrastructure.

Currently the Industrial Incentive Policy 2003 is in vogue in the State. However in the context of changes taking place in the economic scenario at the international as also the national level in the country and the competition amongst various countries and the states in India for investments it has been considered essential to formulate a new Industrial Policy

for attracting private investment including foreign investment, in identified Thrust Areas as also for creation of essential infrastructure including power generation.

Under the State Reorganisation Act, the bifurcation of the State of Bihar became effective from the 15th of November, 2000. A large number of medium/ large industries, minerals as well as mineral based units and important forest produce have gone to the newly created Jharkhand State. Under the circumstances, it is imperative that truncated Bihar adopts a resurgent industrial policy. Based upon the raw materials and resources available in Bihar, a renewed effort has to be made to establish small/medium and large industries as well as to rehabilitate the sick and ailing industries of the State. The local and outside entrepreneurial talent has to be tapped to give a fillip to industrial development in order to create employment opportunities and to increase individual incomes coupled with State revenues. To achieve this, the State Govt. has decided to announce an industrial policy. The main features of the Policy are as follows:

- Provide encouragement to export oriented units based on Agro products, Medicinal Plants, and food processing;
- Simplified procedures for identification of sickness in industrial units and provision for remedial measures;
- Provide special incentives for Sugar, Tea and Jute Industries;
- Provide special incentives to knowledge based industries and those relating to information technology;
- Promote financial institutions and private sector for Industrial Growth Centres/ Industrial Areas/ Export Promotion Industrial Park/ Export Oriented Zones/ Special Economic Zones as well as infrastructure projects and invite their participation.

3.2.5. *Thrust Industries: in the PUA these relate to the following:-*

- Information Technology.
- Energy Generation, Transmission & Distribution.
- Bio Technology.
- Export oriented.
- Pollution Control Equipment.
- Non-Conventional Energy Equipment.
- Rice Mills and processing/packaging of tea and sugar.

Industries have been placed in two categories:

- Growth centres/industrial parks/export promotion Industrialpark/food park/software park/industrial areas and estates --- Category - A
- Industries located outside the above — Category - B

Growth Centres	:	With Modern Infrastructure
IP - Hajipur (in PRDA)	:	Land with infrastructure available for export oriented units
IT Parks (in PUA)	:	Software Technology Park at Patna in Biscomaun Bhawan already established
Food Park (in PRDA)	:	Proposed at Hajipur, Begusarai
Air Cargo Complex (in PUA)	:	Proposed near Patna Airport

Through discussions with the department of Industries and chambers of commerce as also

with the consultants for MPD 2001 – 21, the Patna UAA is expected to continue as a service centre with quality education and health facilities, infused with small scale and clean industries so as to give an employment participation rate of 30 percent by 2021. Apart from the existing industries in PMC, new industrial estates would be in the NPP's of Phulwarisharif, Danapur and Khagaul and adjoining outgrowths. Each of these would have an area of about 50 hectares, with convenient linkages to road, rail, air and even river connections. However major industrial growth would be at Hajipur and Sonepur within the PRDA area.

Secondary cities like Mujaffarpur, Dharbanga, Motihari, Siwan, Begusarai, Madhepura and Bihar Sharif, Ara, Gaya, Sarsaram, and Aurangabad in south Bihar are part of the state industrial expansion policy, as is the city of Patna.

For Patna, the regional plan ensures the industrial growth of Hazipur and Sonapur for agro based industries apart from heavy and extensive manufacturing industries. For the PUA, the stress is on IT and Bio technology activities, tourism and small-scale/household activities, several industries in the Patna MC one being spot zoned like Modi Steel, Bata Shoes, and Ambuja Electronics but with proper environmental protection safeguards. Small-scale and household activities abound and the tourism sector is growing with Patna as an entrepote. Dinapur within the PUA is ideally placed for air cargo activities around Patna airport and which also is ideal for quality hotels, medical and conference facilities.

In western Patna, higher level education facilities are being infused. Also, around the international airport an SEZ of 50 hectares is proposed. The Patna Institute of Technology is being substantially expanded. Allocation of 150 hectares in three locations is possible. Health facilities, conference centres, hotel facilities and quality recreation like golf courses are being infused, in this zone so as to upgrade the investment capacity of the PUA area.

The fact has also to be underlived that Patna has a large and viabrant CBD. The FAR of plots can be rationalized and increased based on parking and urban services provision. District centres in each of the 7 PUA zones can also be infused. Commerce however is largely linear as mixed land use plots along Master Plan roads and several zonal roads.

Chapter 4: URBAN ENVIRONMENT

4.1. URBAN ENVIRONMENT

4.1.1. *Physical Attributes*

Patna district can be divided into two natural areas comprising of:-

A narrow strip of somewhat high land about 8 kms. In width along the southern bank of the Ganges having very fertile soil. This is where the PMC lies. The remaining portions are Alluvial fertile plains.

The Site Of Ganga

4.1.2. *Vegetation*

The land in the district is too fertile to be left for wild growth. The district is devoid of any forest wealth of consequence. The alluvial contents of land yields rice, sugarcane and other food grains. The area under cultivation is studded with mango orchads and bamboo clumps. In the fields adjoining the Ganges, weeds such as ammannia, citriculari, hygrophile and sesbania grow. But palmyra and date palm and mango orchards are found near habitations. Dry shrub jungles are sometimes seen in the villages away from the rivers. Trees commonly seen are bel, siris, jackfruits and red cotton.

4.1.3. *Climate and Rainfall*

The climate of Patna varies from 43 °C – 30 °C during the summers and 21.4 °C – 5 °C during the winters. The precipitation in Patna is 1,100 mm during the months of June to September. It receives medium to heavy rainfall in the monsoon. Relative humidity can go up to 100% during summer.

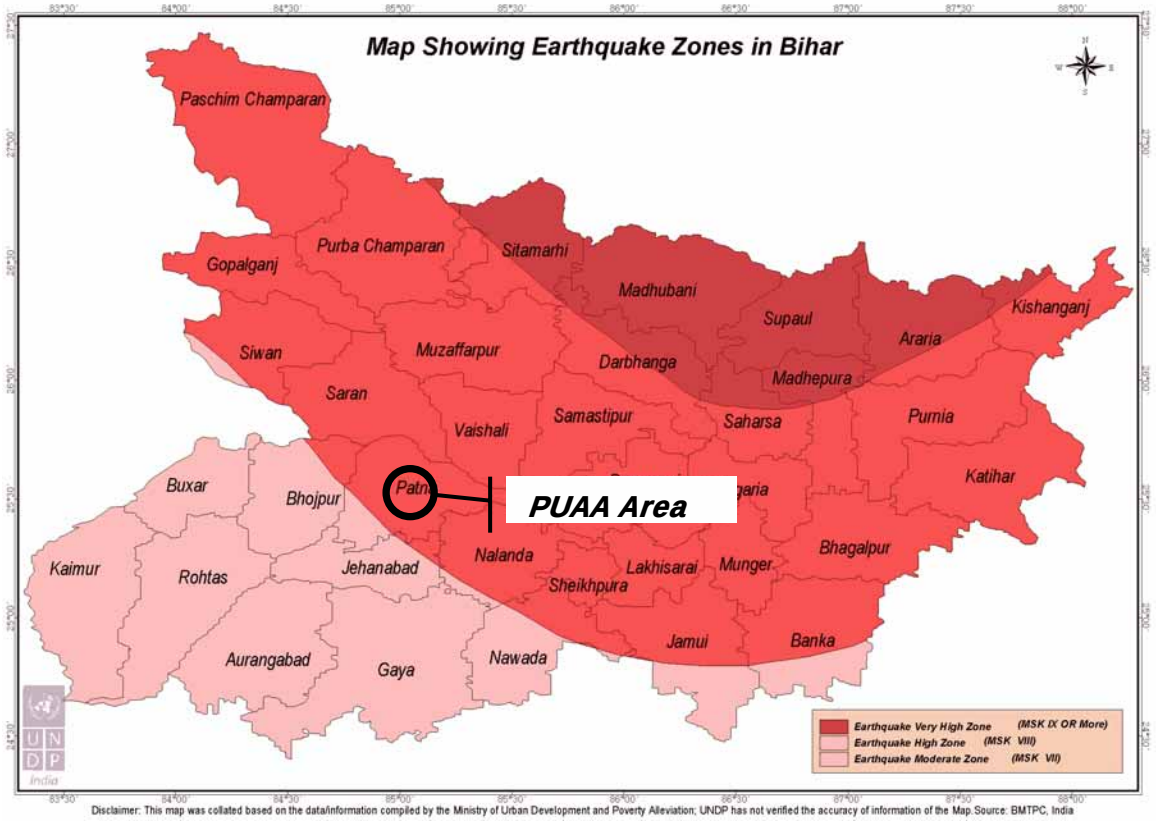
4.1.4. *Natural Hazards*

Patna lies in zone IV of the earthquake zones, which is a high-risk zone. Therefore the development controls in the area requires earthquake resistant buildings.

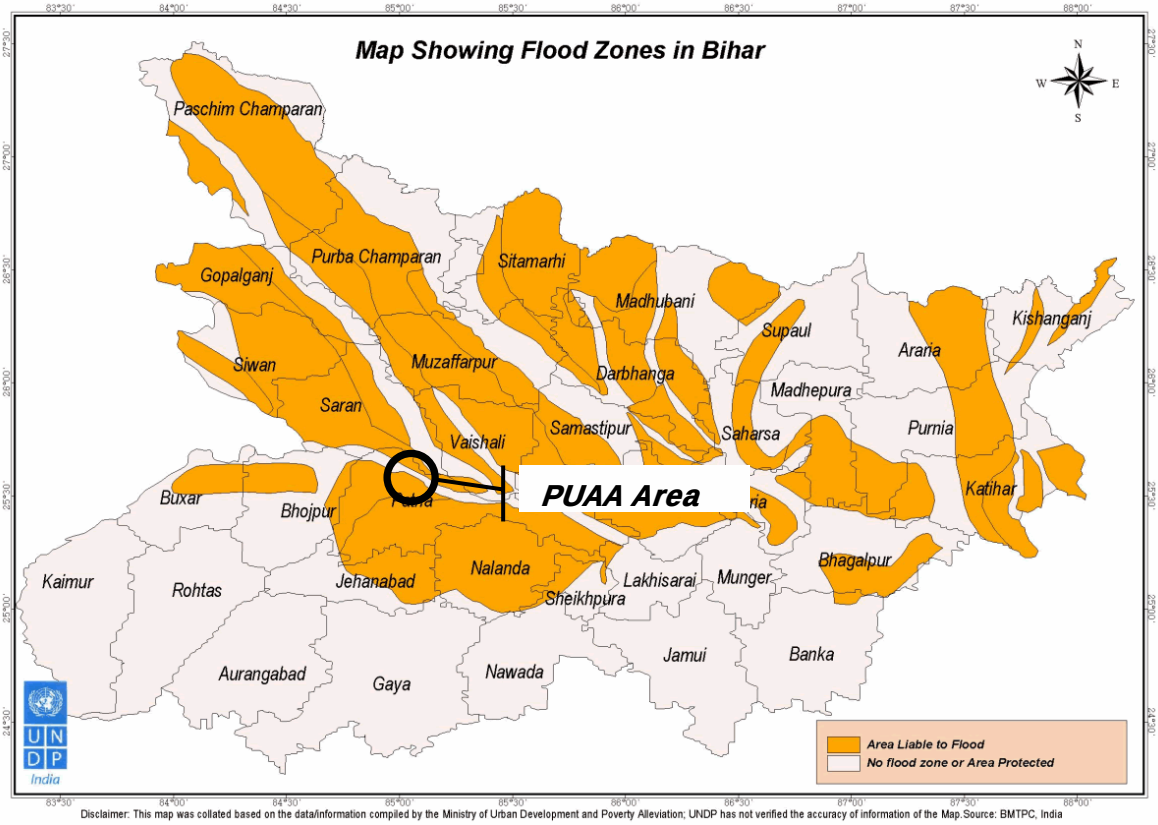
Patna also falls in the risk zone for floods. A series of bund/embankments have been constructed along River Punpun to control the floodwaters. During the monsoons the spillover from River Ganga tends to flood Patna and cause spread of disease. Therefore there is need to channelise the river and to devise and implement a proper disaster mitigation plan. Apart from being flood prone, Patna is also at risk due to cyclones as it lies in the wind high damage risk zone.

Map 4A, 4B and 4C indicate the natural hazards, which are at high risk in and around Patna.

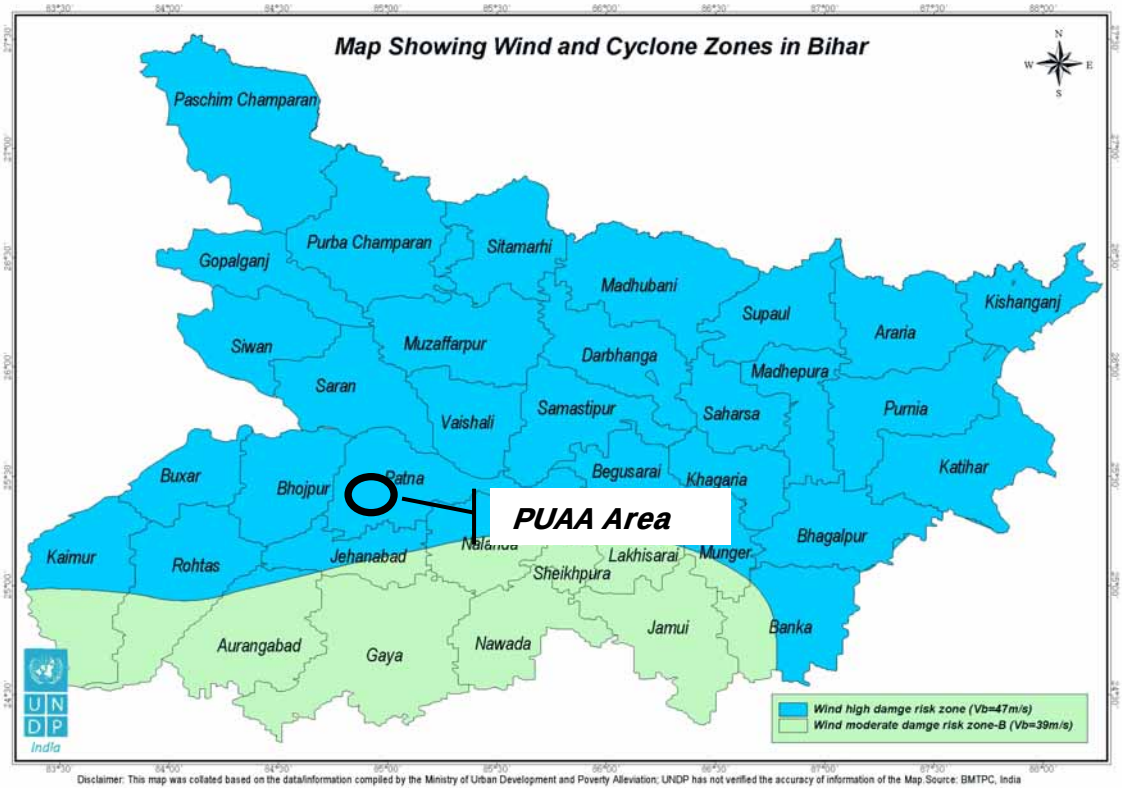
Map 4A: Map Showing Earthquake Zones in Bihar



Map 4B: Map Showing Flood Zones in Bihar



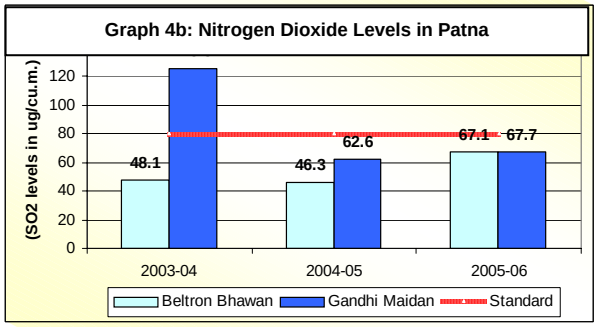
Map 4C: Map Showing Wind and Cyclone Zones in Bihar



Graph 4a: Sulphur Dioxide Levels in Patna

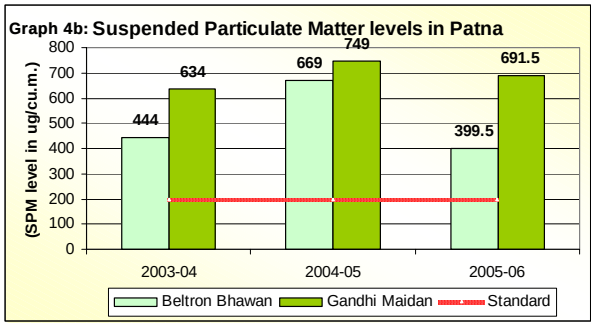
4.1.5. *Air Pollution Levels*

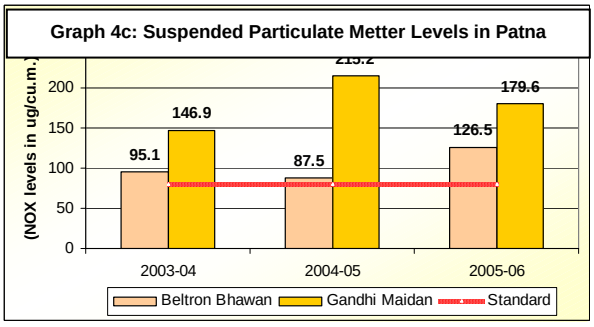
The Bihar State Pollution Control Board (BSPCB) has its monitoring stations at Gandhi Maidan and at Beltron Bhawan, where the pollution levels are monitored thoughout the year. The annual air pollution level has been compared to the national ambient air quality standard. It is observed that the levels of sulphur dioxide (SO2) has been within the permitted levels; however the levels of Nitrogen Oxides (NOx) has exceeded the limits due to vehicular traffic. Even the Suspended Particulate Matter (SPM) levels has exorbitantly exceeded the limit due to vehicular pollution and open areas which increase dust and SPM levels. Refer **Graph 4a, 4b and 4c.**



It may also be observed that the pollution levels of SO2, NOx, and SPM are more in Gandhi Maidan area, which has more vehicular traffic.

The BSPCB monitors the pollution levels of 50 industries in the PUAA area, however





the collection of ambient air pollution of industrial area is not possible here as all the industries are scattered along the major roads in the outskirts of the city and in the PUUA and PRDA areas. The air pollution levels of the individual industries show that the major air polluting industries are the brick kilns along the bypass road, Hindustan Coca-cola beverage and Bata India Ltd.; however all the industries emit excess of sulphur dioxide and not NOx. The brick kilns have been installed with devices to minimize the air pollution limits as prescribed by the BSPCB.

4.1.6. *Noise Pollution Levels*

The noise pollution levels have been annexed in Annex 2 and it may be concluded that the noise levels all over the city exceed the limits of the silence, residential and commercial marginally. However these level shoot up during the festival seasons of Durga pooja and Diwali.

4.1.7. *Water Quality*

The drinking water requirement for Patna is met by underground water. The water is extracted by induction motors under the surveillance of Patna Water Board and Public Health Engineering Department. The physicochemical characteristics of ground water showed that the water was colorless with average pH of 7.18, i.e. the water is alkaline in nature due to presence of bicarbonates. The pH ranged between 6.7 to 7.98 which is within the WHO prescribed limit of 6.5 to 8.5. The conductivity of the water samples showed higher values in the eastern part of Patna in comparison to the other parts of the city with the highest value of 1218µS/cm within the PMC area. This is due to the fact that the area has very old and ill maintained pumping sets. However this area is densely populated as this is the old Patna area and the exploitation of ground water is done extensively. The parameters of turbidity, total alkalinity, total hardness, Ca, Chloride, Na, K, Nitrate, sulphate, total Dissolved Solid (TDS) and fluorides were are within permissible limits but the iron content in water was found to be 0.5mg/L whereas the permissible limit as per CPCB water quality standards is 0.3mg/L. This has an adverse effect on domestic use and water supply structures; however since the limit has not been exorbitantly exceeded it is not a matter of major concern.

However as per Public Health Engineering Department (PHED), Patna district is an arsenic affected area with 1-10% of arsenic content of >50 ppt. It is not clear whether the arsenic content in water is there in the PUAA area and tests need to be carried out for confirmation. The following strategies have already been adopted by the PHED for addressing the water quality issues:

- Informed advocacy
- Water quality testing and mapping
- Strengthen capacity of laboratories
- Effective Communication Strategies and Plan
- Master Plan for operations for long-term mitigation efforts
- Provision of alternative sources in arsenic and fluoride effected areas
- Holistic approach for awareness and mitigation
- Knowledge management
- Establish communities based water surveillance system

The water quality of the effluents of the STPs and 3 industries namely Hindustan Cocacola Beverages, United Paper Board and Patna Dairy Project are monitored by the BSPCB. The effluents from the small scale industries also need to be carried out.

4.1.8. *Identification of Urban Environment Issues*

The issues of the infrastructure provision and their related issues and that of the urban environment of the slum areas have been discussed in the following chapters

- ***Natural Hazards:*** since Patna is at high risk of earthquakes, flood and cyclones a comprehensive and integrated disaster mitigation plan needs to be formulated.
- ***Air and Noise Pollution:*** for residential areas NOx levels need to be controlled by implementing pollution control measures strictly for vehicular pollution, random checking may be done on polluting vehicles and then penalized. The industries should be located in designated areas and not scattered around the outskirts of the city for a step towards planned development and also for ease of both air and water pollution control. Noise pollution is excessive during festivals and marginally exceeding the limits during normal days.

Excessive air pollution by vehicles

- ***Water Pollution:*** Testing for arsenic needs to be carried out for drinking water within PUAA in order to take measures to mitigate the problem if any. The effluents form the small-scale industries also need to be carried out.
- ***Depletion of Water Sources:*** The high surface water potentiality of River Ganga is unutilized leading to overexploitation of ground water. The utilization of ground water does not require high capital investment as well as recurring cost towards treatment, operation and maintenance.
- ***Solid Waste Management Problem:*** Indiscriminate disposal of waste by the residents: The spacing between the dustbins are more than 1.5km leading to litter of waste on the local and cluster level streets. Absence of Modern Waste Collection Technique and instruments.
- ***Water Logging:*** The encroachments; solid waste dumping and silt deposition cover the drainage channel and RCC drains in Central Zone. This lead to water logging in the central and eastern zone area.
- ***Poor living conditions within slums:*** presently the slum pockets are in poor habitable conditions and integrated development is required for all the physical infrastructure including water supply, drainage, sewerage, SWM and housing.
- ***Poor living conditions within old city:*** presently the core city area in the eastern side has lack of infrastructure provision including roads water supply, drainage, sewerage, SWM, open spaces and housing. This has lead to traffic congestion and poor living conditions for the core city area.

Consultation with board members and president of Bihar Industrial Association held on 25th May 2006

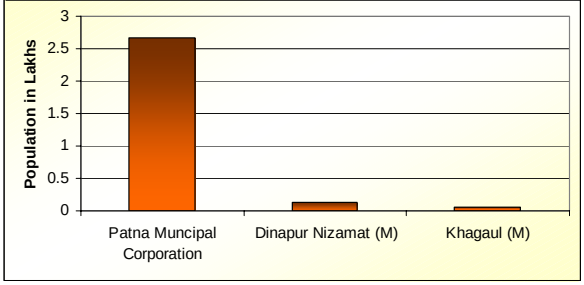
- Solid waste management should be on priority. There is a need to have better solid waste management system. There is a need to create public awareness on civic amenities and behaviour in public places.
- City Environment needs to be enhanced; city today is scare of open and green spaces. There is a need to have more open spaces, roadside plantation and river front development.

Chapter 5: URBAN POOR AND SLUMS

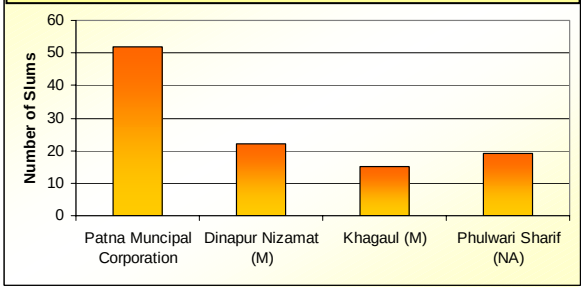
5.1. POVERTY PROFILE

In 2001, it was estimated that of 16.98 persons living in the PUAA, nearly 10.50 lakhs (63.50%) were within pockets identified for slum upgrading/ reconstruction/ resettlement. A majority of these pockets were in the PMC area and where nearly 9.80 lakhs (72.00%) of the PMC population of 13.66 lakhs lived. **Map 5A** shows the location of identified slums in 2001. These are almost entirely the urbanised villages of the PUA and which are now ripe for redevelopment as indentified slums. However, accordingly to PMC those below the poverty line (BPL), within these identified pockets were only 2.86 lakh in the PUA area (17.50% of the total population) and only 2.50 lakhs in the PMC area (19.00% of the total). **Therefore identified slum pockets in Patna (with less than one-fifth of the population in these pockets overall being of the BPL category) are really urbanised villages for upgrading in terms of sanitisation, access, quality of building stock and overall environment. In the PMC area apart from most of these identified slum pockets being urbanised villages, there were squatters near the railway station, the waterfront and in the congested inner city of Kankarbagh and its surroundings. Premarily, near the mandis and religious buildings. Refer Graph 5a and 5b for BPL population and number of slum pockets within the PUA area.**

Graph 5a: Below Poverty Line Population (fig. in lakhs)



Graph 5b: Number of Slums in the settlements in PUAA



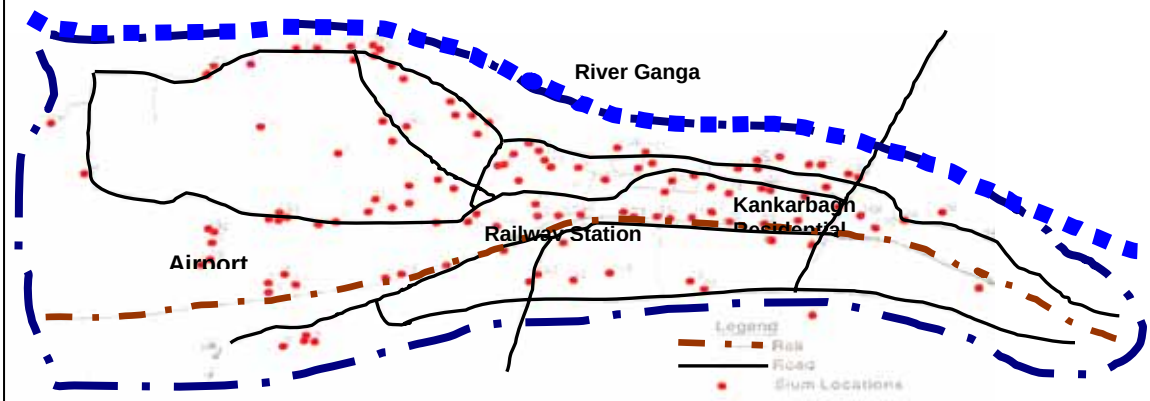
Source: Respective ULBs, 2001 population

However, the team working on PRDA 2021 were hopeful that the number of people in slum pockets in the PUA area would reduce from 63.50% in 2001 to around 40% by 2021 or 11.20 lakhs out of 28.00 lakhs. The BPL component would also correspondingly reduce. This is still a large number but in situ sanitisation or even some in-situ reconstruction would add to Patna's improving ambience. **Slum workers in wards subscribed to these views, especially as urbanised villages are in a constant stage of upgrading. Sanitisation and improved infrastructure are key issues in the PUA and social workers were hopeful that BPL components of identified slum pockets would benefit from upgraded ambiences.**

5.1.1. *Characteristics of the Poor*

The conditions of dwellers in the identified slum pockets is bad. The main constraints are cramped accommodation, choked sewage system, open defecation and open dumping of garbage. The human costs include alcohol abuse, gambling, child labor, domestic violence, poor socialization of children, and unhygienic living conditions. The population is of heterogeneous character composed of Hindus, Muslims and Christians. The main languages spoken are Hindi, Magahi, Bhojpuri, Maithili Bengali, and Oriya.

Map 5A: Slum in PMC Area – Source: Urban Basic Services for the Poor: Patna District of Bihar, NIC, 2003



Pavement dwellers in Patna are estimated at 20 per cent of this BPL category as most BPL goups reside in improvised shelter within the loosely defined Lal dora's of urbanised villages and ekk out a living through part time or sporadic employment as a family including rag picking. A fair amount of lower end household activities also take place is this improvised shelter but on land usurped or rented out over time. A negligible amount of doorstep squatting occurs outside the Lal dora's on rent or for services in terms of providing security for improvised or regular shops around the main railway station and around religious buildings especially along the water front. Primarily, the BPL in Patna's lal dora's comprise of squatter families with storage facilities for goods (perishable or otherwise) for petty trade. A sizable number are employed in transport industry (including rickshaw pulling), as semi-skilled workers in the building industry or the flourishing small eateries scattered across the city. Basically they all have an abode for the night with limited ablution facilities. A large number who sell perishble items notably comprise of the floating population from the PRDA and panchayat area all round. Several of such commuters have regular jobs or trades in Patna.

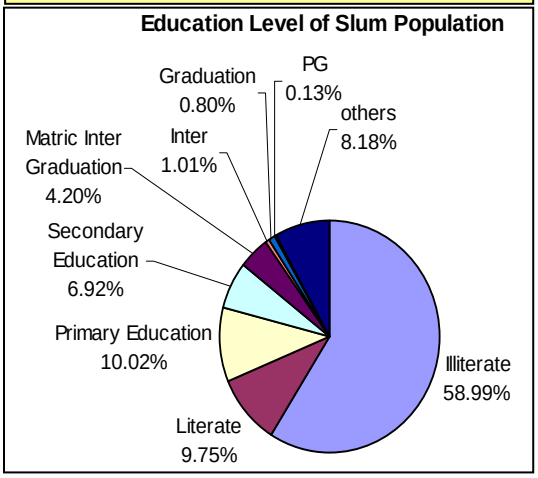
The pavement or doorstep dwellers are mainly single migrants who seek non-skilled daily wage employment. They need pay and use ablution facilities, access to free health and some night shelter.

Literacy and Occupation

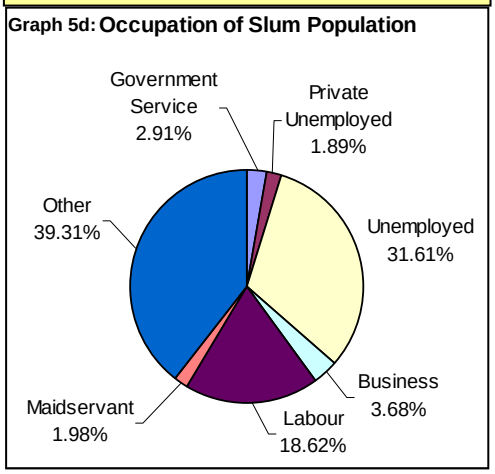
The literacy status of the population in slum pockets is shown in **Graph 5c** below. 60% of the population is illiterate and 31.6% is unemployed. The attendance in schools are very poor due to the non-congenial atmosphere in them (as stated by the residents). It is also interesting to note that some of the slum dwellers send their children to expensive private schools because of the very poor state of affairs of the government schools. It was also revealed during discussions with the residents that about 25% of the students enrolled in government schools drop out every year. About 50% of the children of school-going age are working as rag pickers in the city. There is a need to strengthen the educational facilities and conduct awareness programmes against child labor.

Occupation of slum population is shown in **Graph 5d**. As stated above, households in the slums rely on subsistence petty business such as vending of vegetable/fruit, groceries (fish, meat), bangles and bindis, milk and dairy products, book stores, salons (beauty), hotels, toys, and readymade garments. A large proportion of them ply rikshaws or thelas.

Graph 5c: Education Level of Slum Population



Graph 5d: Occupation of Slum Population

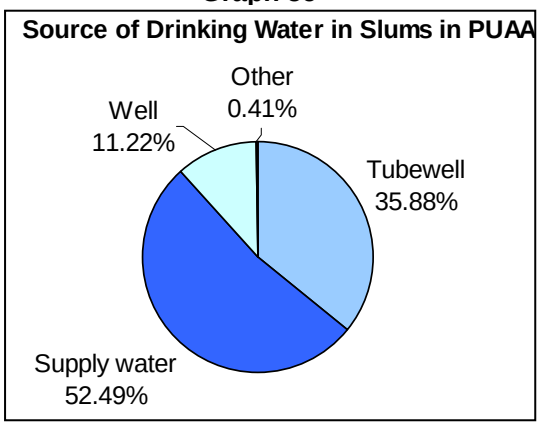


Source: Urban Basic Services for the Poor: Patna District of Bihar, NIC, 2003

5.1.2. *Status of Basic Infrastructure and Housing*[5]

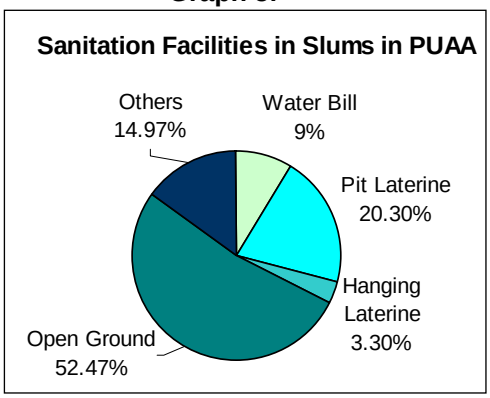
Water Supply: Refer **Graph 5e**. The source of drinking water in the slums is the municipal supply in 52% of the slums. Others are supplied through tube wells or any existing well. Only 2.6 percent of the wells have lids. Thus 11.2% of the people are at risk of consumption of polluted water. However the distance travelled for the water supply is less than 50 meters in 80% of the cases. The number of tube wells provided is 277 and out of this 75% are in working condition.

Graph 5e



Sanitation and Solid Waste Management: Refer **Graph 5f**. The sanitation facilities are very poor in the slum pockets in PUAA as 52% of the slum dwellers use open ground for defecation. Even the drainage system in the slums is very poor and in most areas there are open drains choked with solid waste. There is at present no system of solid waste disposal and the wastes are dumped on the streets.

Graph 5f

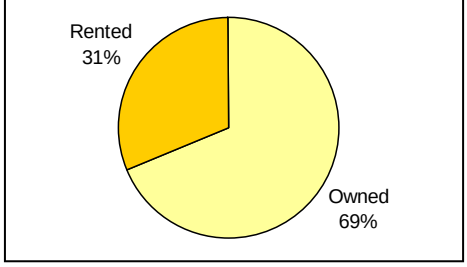


Poor Drainage Facilities in Slum Areas in Patna

[5] Data Source: Urban Basic Services for the Poor: Patna District of Bihar, NIC, 2003

Housing in Slum Areas: The number of households residing in the slum pocket (Refer **Graph 5g**) in PUAA in 2001 was 41,000 approx. (as per Report on Urban Basic Services for the Poor: Patna District of Bihar, NIC, 2003). 69% of the shelters are owner occupied. The materials for construction include brick, tin, thatches or tiles for the roof, and brick or clay for the walls.
46% slum is on government land and 54% on private land.

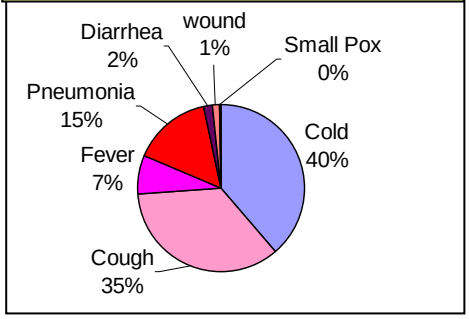
Graph 5g: Housing Ownership Status in Slums



5.1.3. *Environmental Condition and Health Status*

The environmental condition in the slums is deplorable due to lack of provision of basic infrastructure. Refer **Graph 5h**. All the slums face problems of poor sanitation facilities, poor drainage system and disposal of solid waste on the roads/open areas. The community toilets provided in the slums are in dilapidated conditions and therefore are not used by the communities; there is also no community awareness in the slums for self-upgradation. The common diseases prevalent in the slums are cold, cough, fever, pneumonia, diarrhea, and small pox. There are very few government dispensaries and after consultations with the slum dwellers it was found that most residents go to private clinics due to lack of facilities and also distant locations of the clinics. There is a need to strengthen the health and sanitation infrastructure.

Graph 5h: Prevalent Diseases in Slums of Patna



Source: Urban Basic Services for the Poor: *Patna District of Bihar, NIC, 2003*

5.1.4. *Unorganized and Informal Sector*

Patna has a significant proportion of informal trade located along the major commercial areas and the road network of the city and around mandi's tourist and religious areas, the railway station and the maidan. The PMC has designated footpaths and surounding for the informal trade and which attracts both-the resident and the floating population. The contribution of the informal sector, with more than 30% of the workforce, to the city's overall economy is considerable, even if the income per employed person in the organized sector varies from 3 to 6 times the income per employed in the informal sector. Studies conducted by Ministry of Urban Development and Poverty Alleviation in 2001 indicate that the informal sector accounts for 50-60% in a majority of the cities of the country and their share in the urban employment is increasing. In Patna the proportion is higher.

5.2. POVERTY ALLEVIATION SCHEMES

Slum upgradation in Patna is done under mainly the ***National Slum Development Programme*** and the ***Swarna Jayanti Sahari Rozagar Yojana*** both centrally sponsored schemes.

NSDP: This is a Central Level plan with the objective of up-gradation and improvement of urban slums through development of infrastructure and housing activities like development or roads, drains, street light, drinking water community latrine and bath etc. This includes the following components:

- Provision of physical amenities like water supply, storm water drains, community bath, widening and paying of existing lanes, sewers community latrines, street light etc.

- Community infrastructure, provision of community centers to be used for pre-School Education, non-formal education, adult education, recreational activities etc.
- Community Primary Health Care Centre building for infrastructure facilities, and for which the concerned Municipalities seek the support of Regd. Medical Practitioners / Govt. Doctors in the State / NGOs / CBOs / Philanthropic Association to those centres.
- Social Amenities like pre-School education, formal education, adult education, maternity, child health and primary health care including immunization etc.

The Scheme also has a component for shelter up-gradation, or construction of new houses for the urban poor.

Table 5.1 shows the status of NSDP schemes in Patna district in 2003

Table 5.1: Status of NSDP Scheme in Patna District (Housing) (2003)

S. No.	Location	No. of Schemes Proposed	Total Amount (Lakh Rs.) in 2001	No. of Schemes Completed	Total Disbursement 2001(Lakh Rs.)
1.	Baad	15	13.22	15	36.36
2.	Khagaul	14	13.50	14	33.75
3.	Danapur	20	40.7	18	71.22
4.	Fatuha	9	22.63	9	39.61
5.	Kushrupur	8	10.26	4	17.95
6.	Phulwari	34	11.9	33	38.24
7.	Maner	12	24.3	12	42.53
8.	Mokamah	25	44.64	25	133.92
9.	Bhaktiyarpur	8	26.79	8	53.58
10.	Masudi	18	32.08	18	32.08
Total no. of Schemes		164		157	

In Patna, 9 slums have developmental projects conducted under the NSDP, for which initiatives were taken as shown in **Table 5.2**.

Table 5.2: Slum development projects under NSDP, Patna

S.No.	Name of Slum	Units Proposed	Units Completed	Total Expenditure (lakh Rs.)
1.	Majhuatola	24	24	8.22
2.	Yarpur	75	40	16.95
3.	Kamla Nehru Nagar	88	72	25.25
4.	Kumharan	40	40	12.07
5.	Satichura Begampur	56	44	19.81
6.	Kamla Nehru Nagar	278	41	4.95
7.	Yarpur	260	12	23.59
8.	Patna City Ward 27	37	30	8.23
9.	Radhopur, Ward 1	260	258	92.15
	Total	1118	561	211.22

50% of the initiatives have been completed under the NSDP.

SJSRY: This Central Level policy has the following objectives:

- Gainful Employment of Unemployed/Under employed urban poor through Self Employment Ventures/Waste Employment.
- Creation of community structures on the UBSP pattern.
- Delivery of inputs through community structure.

The component of the scheme includes:

- Urban Self Employment Programme (USEP)
  - → Self Employment through setting up Micro Enterprises relating to servicing manufacturing and small business.
  - → To encourage local skill and crafts.
  - → To facilitate group enterprise.
  - → Maximum Unit Cost Rs.50,000/-.
  - → Loan is 80%.
  - → Subsidy 15%.
  - → Beneficiary Contribution 5%.
  - → Repayment 3 to 7 years.
- Training
  - → Skill training to urban poor in servicing and manufacturing trades as well as in local skills and local crafts.
  - → Per capita Expenditure is Rs.2,000/-.
- Development of Women & Children in Urban Areas (DWCUA)
  - → Assistance to urban poor women in groups for economic activity suited to their skill, training, attitude and local condition.
  - → Subsidy upto Rs.1,25,000/- to 50% of the unit cost which ever is less Lump sum grant of Rs.25,000/- as revolving fund at the rate of Rs.1,000/- per member, if the group set itself as a thrift & credit society.
- Urban Wage Employment (UWEP)
  - → To provide wage employment to urban poor through creation of public assets.
  - → Material labour ratio shall be 60:40.
- Social Sector Activities
  - → Provision of social sector activities including health, welfare and education.
  - → Maximum expenditure @ Rs.100/- per member for the first year and Rs.75/- per member for each subsequent year is allowed.

Table 5.3: Status of SJSRY Schemes (2002-03), Patna District

S.No.	Location	No. of Schemes Proposed	No. of Schemes Completed
1.	Mokamah	3	2
2.	Baad	10	3
3.	Danapur	2	1
4.	Khagaul	4	-
5.	Varityarpur	1	-
6.	Kushrupur	2	-
7.	Fatuha	-	-
8.	Masudi	11	8
9.	Phulwari	1	-
10.	Maner	3	-
Total no. of Schemes		37	14

37% of the Schemes have been completed under the SJSRY programme.

A consultative approach is necessary for slum development, a brief consultation with slum dwellers was

Table 5.4: Status of other Schemes for Slums, Patna

S.No.	Name of Scheme	Objective	Funding
1.	**Indira Aawas Yojna**	The objective of IAY is primarily to help construction of new dwelling units as well as conversion of unserviceable kutcha houses into pucca/semi-pucca by members of SC/STs, freed bonded labourers and also non-SC/ST rural poor below the poverty line by extending them grant-in-aid.	Centrally Sponsored Scheme
2.	**Community Development**	The objective of this scheme is to facilitate immediate execution of locally important schemes, whose execution may otherwise span over a large period	State Plan Scheme
3.	**MP Local Area Development Programme**	The basic objective of this programme is to facilitate immediate execution of small but locally important schemes, whose execution may otherwise span over a huge period. The works which can be carried out under this scheme are - construction of buildings for schools, hostels, libraries and shelter for old/handicapped, construction of link/approach roads, culverts/bridges, public irrigation and public drainage facilities etc. as indicated in the guidelines.	Centrally Sponsored Scheme

5.3. KEY ISSUES

The major issues to be addressed for slum development include:

- **Need for a state slum policy for integrated development of slums:** The infrastructure created in slums to be linked to the citywide networks.
- **Lack of Dependable Data: O**n various aspects of poverty including number of slums, slum population, access to services like water and sanitation, livelihood, etc.
- **Lack of Infrastructure**: presently the slums are in poor habitable conditions and integrated development is required for the entire physical infrastructure including water supply, drainage, sewerage, SWM and housing.
- **Absence of Integrated Response:** There is a need for an integrated response and the dwellers participation to deal with the problems of the urban poor. There is a need to focus on particularly vulnerable groups among them, like women and children, disabled and destitute, the aged and children in difficult circumstances.
- **Neglect of Informal Settlement: Programs** are targeted mostly for notified and developed Slums. Lack of awareness of non-notified slums and de-notification policy for developed slums.

- **Weak Municipal Resource Base:** Poor resource base for creating and constantly maintaining infrastructure is a critical issue. There is a requirement for capacity building of the PMC for handling continuous upgradation of slums and maintenance of database.

Consultation with Director, Nidan (NGO), Chakachak Patna:

- *Patna lacks the provision of basic amenities for slum dwellers. There are no provisions for increasing the housing stock for the urban poor and the no notifications for the slum areas. Self Financing Schemes need to be introduced for proper development of the slum dwellers.*
- *There is a requirement of a survey to be carried out for the assessment of the BPL population in Patna and the surrounding agglomeration areas and also for the slum population. The database for the slum areas is very poor and varies drastically within various departments.*

5.4. CITIZEN PRIORITIES AND COURSE OF ACTION

(i) In PUA each of the urbanized villages have to be redeveloped through a local area plan/project. The original settlers reside there, generally in run down walk-ups or single/double storeyed buildings. They are not BPL, however new settlers have come on the edges of these settlements and have elbowed out illegally. Accordingly, the urban villages are to be dealt under the Bihar Slums Act;

(ii) In discussions, it was noted that original settlers seek redevelopment/ reconstruction through subsidy/interest free loans, whereas the BPL seek tenural rights;

(iii) As a group, they collectively seek environmental upgradation through adequate water, sewerage, drainage and SWAM. They also seek related health and educational facilities apart from street lights, paved paths and recreation areas for children adolescents and adults;

(iv) The original residents seek house reconstruction whereas for the squatters this is not a priority;

(v) More importantly, a majority of them are willing to pay user charges for piped water, electricity and even house tax.

The magnitude of the problem and programmes however point towards in-situ upgradation in an incremental manner. In-situ reconstruction would also occur with environmental and services improvement. Rehabilitation/ relocation does not appear to be on the anvil except if within the pocket itself. However, implementation of other projects may lead to some dislocation. In such cases, relocation within 2 to 3 kms, of the original location would be possible in several cases due to Patna's linear profile. The ULB's would undoubtedly avail of NGO/CBO expertise and goodwill in this priority programme.

For a start 20 urbanised village redevelopment projects are recommended under JN-NURM in carefully selected Municipal Wards so as to get different typologies. Individual ablution facilities and appropriate level of services would go a long way in improving the environs of slums in Patna.

Chapter 6: THE HOUSING SECTOR

6.1. EXTENDING THE PMC TO THE CURRENT PUA BOUNDARIES

The State of Bihar as reconstituted in 2000 has only one primate city which is the metropolitan area of Patna UA. Within this area, even the Patna MC area had over a million people in 2001. Gaya, the next largest settlement of the state had just around 4.00 lakh persons in 2001, whereas Arrah, Patna Sahib and Darbanga had just between 1.00 and 2.00 lakh population each in 2001. Thus in India's second most populous state, the urbanization vision is one where the rural sector dominates with Patna metropolis as the dominant or primate multi sectoral settlement.

The metropolis comprises of PRDA area (234.70 sq. km. in 3 districts). Within this is the Patna UA area of 135.79 sq. km.), the major component of which is Patna MC (99.45 sq. km). The Interim Report of the Patna Master Plan 2021 has recommended a promotional population of 46.97 lakhs for the Patna UA by 2021 (37.88 lakh urban and 9.09 Lakh rural). In 2001, the PUA population was 16.97 lakhs. This gave a high overall settlement density of 125 PPHa. If 37.88 lakhs are to be accommodated in this area, either the overall density would be an unachievable 280 ppha or the PUAA land would have to increase substantially.

However, our assessment and consultation with officials and the citizen forums do not point towards a runaway growth of the PUA area. Even assuming a high degree of promotional investments, a maximum density of 200 to 210 PPHa as at Delhi should be aimed at. For this a linear projection based on the high decennial growth between 1991 and 2001 is proposed. This would give a maximum population of 28.00 lakhs by 2021 for the PUAA. The consultancy accordingly proposes that the jurisdiction of the PMC be extended and be made co-terminus with that of the PUA area i.e. from 99.45 sq. km to 135.79 sq. km; absorbing in the process the NPP's of Phulwarisharif, Danapur, Khagaul and all the outgrowths. This is explained in tabular form below. This is taking into account Patna's historicity, its several benchmarks and a vision as one of Indias favored destination through a sustainable environment.

Planning Area	Area (sq. km.)	Urban Population 2001 (in Lakhs)	Overall Density (PPHa) 2001	Urban Projected Population 2021 (in Lakhs)	Overall Density (PPHa)
Patna UA Area (extended PMC area)	135.79	16.97	124.8	28	207

6.2. HOUSING PROFILE

Patna MC is saturated and growth should take place in the PUA area (extended PMC), so that the present PMC area concentrates on urban renewal in the fullest sense and through a participatory process.

The linear city of Patna has a core at near its eastern extremity and a denser mixed use core near Patna Railway Junction. Expansion eastwards and southwards has been limited due to water logging. Therefore new developments have formed westwards between the Ganges and on either side of the Delhi Howrah trunk rail line. Expansion would still be in these directions in the UA and in the south-west upto Patna-Gaya rail line. With improved links across the Ganges, Hajipur and Sonepur would also be comprehensively enmeshed into metropolitan Patna so as just not to be the dormitories of Patna MC Area but self contained urban centers ripe for accelerated industrial growth. Currently daytime floating population to Patna MC is primarily from within the PRD area and where market gardens and orchards flourish in lieu of grains and pulses. Also for low paid wages, rentals are beyond the paying capacities compared to the two agglomeration settlements. The highest density of population is around Patna Railway station though mixed uses. It is equally high

along the river front near the eastern core of the city and from the central core towards the water front. These density patterns would not appreciably change and densification would primarily be in the southern and south western wards and along the water front wards, where city level recreation has to be enhanced.

6.3. URBAN HOUSING

Urban housing is classified into four broad typologies:

- Residential (organic/unplanned)
- Residential – Planned – Plotted
- Residential – Planned – Apartments
- Identified Slums

Quite naturally in the core Patna MC area, the bulk of the residential land use is organic/unplanned. In reality it is pre-master plan and is therefore organic. It is estimated that of around 5,390 Ha. (53% of MC area) of residential land use, barely 390 Ha. is in plotted residential landuse and 180 Ha. in the form of apartments.

The Bihar Housing Board has developed 10 housing colonies in the MC area (like Shashtri Nagar and Patliputra Colony). Notable private housing/apartments are Ashiana, Rajeev Nagar, IAS colony, MLA flats. Government housing includes P.T. Colony, PBI Colony, Police housing etc. 72 slum pockets are separately identified. New housing has come up in the western part of the city amidst vintage British India institutions and benchmarks of governance. New institutions have been added ever since. Yet it is in Patna's organic mixed use areas that the bulk of Patna's residents reside. This includes pockets identified as slums. The fact has also to be underlined that urbanized villages have been absorbed into the urban fabric and are part of municipal wards.

The overall household size in Patna UA area is around 6. In 2001 there were 2.83 lakh households and 2.70 lakh houses in the PUA area. Within Patna MC area, in 2001, there were 2.03 lakh houses. Of these, 1.37 lakh houses were in good condition, 0.55 lakh were of average condition and only 0.11 lakh were dilapidated. 1.32 lakh houses were owner occupied and 0.71 lakh were rented. About half the houses had 2 room or less and nearly half the areas had covered drains but which were hardly maintained. Nearly 1.75 lakh houses had in house bathroom facilities and 1.31 lakh house had in house piped water supply. The rest relied on handpumps and tube wells. Around 78% of the houses had septic tanks and only 18% were sewered. 85% of the households used gas for cooking and 96% had access to electricity.

In these PMC areas, 50% of dwellings are single storied, 35% are 2 storied, 8% are 4 or even more storied and 7% are huts. 30% of the dwellings had floor area between 251 to 500 sq.ft. and 20% had floor area between 500 to 750 sq.ft. In a rapid survey of people's perception, for the PRDA plan 2021, the residents of Patna in their first requirement indicated the following problems in order of priority:

- Poor drinking water supply
- Poor drainage and sanitation
- Excessive water logging
- Lack of employment opportunities
- Excessive traffic congestion

There were complaints on quality and access to housing and also on access to transportation, health and education. Thus environmental issues and infrastructure shortfall are major areas of concern in the PMC and PUA area.

The PMC would not be undertaking housing in Patna other than BPL programmes.

Chapter 7: HERITAGE AND TOURISM

7.1. HERITAGE AND CONSERVATION

7.1.1. *Introduction*

Patna has an abundance of heritage sites scattered over and around the city. Currently the archaeological sites, remains or buildings of 100 years of age or above are protected by the ASI and the State Directorate of Archaeology and Museums. INTACH has also developed an exhaustive list of sites, remains, ruins, monuments, and buildings of archaeological, historical, architectural, cultural and ecological significance. This list is with the State Government for processing.

In the year 1961, the Directorate of Archaeology and Museums was constituted on the recommendation of the Government of India. In the year 1987, however, the Directorate of Archaeology was separated from that of Museums. The two separate Directorates were formed in order to pursue more skilled and professional operations. The Directorate of Archaeology has the onus of discovering, preserving and developing the antiquarian remains, including monuments and potential sites of regional importance. Moreover, it conducts excavations of the important sites. Through exploration, it also identifies the potential archaeological remains. It, moreover, takes up the publication works on the related subjects.

The Directorate has protected as many as 28 archaeological sites in Bihar out of which 6 are in Patna. All these are protected under the provisions of the Bihar Ancient Monuments and Archaeological Site Remains and Art Treasure Act 1976. Over a dozen of archaeological sites have been excavated by the Directorate, of which Balirajgarh, Kataragarh (early historic cities), Chirand and Taradih (Neolithic sites) and Apasadh (a later Gupta temple complex) have revealed significant relics.

As per the survey conducted by INTACH, a list of 185 heritage entries in Patna Urban Agglomeration Area alone has been provided. This list comprises of 45 Mosques, 48 Temples, 4 Idgahs, 3 Churches, 1 Gurdwara, 44 tombs, 5 Educational Buildings, and 35 Civic Buildings **(Annex 3).** The database of these sites has been developed by INTACH, however due to shortage of funds the data processing and mapping of these sites has not been done. Nevertheless the entries could be part of the Patna Master Plan 2021. This would enable the identification of heritage precincts apart from individual building and sites. The gurdwara is significant as it is constructed at Guru Govind Singhs Birth Place and from the point of view of tourism it is an important bench mark of Patna.

7.1.2. *Major Archaeological Sites in Patna as identified by the Directorate of Archaeology:*

The sites identified by the various institutions have been listed below and in the **Annex 3**. An integrated conservation strategy for these sites along with the urban renewal of the core city area is required for sustainable planning of the Patna Municipal Corporation Area.

1. Agam Kuan, Patna

Agam Kuan, is famous for its two important relics – first is Agam Kuan (the unfathomable well), the fabled huge well fed with the Ashokan legends. The other is the famous temple of Shitala Devi, the goddess of smallpox cure and associated with several miracles. The site is situated at a short distance south-west of Gulzarbagh Station. Agam Kuan is a huge well, circular in plan, with a diameter extending over 20'2".

The adjacent temple housing the image of Shitala Devi, and the pindas of the 'Saptamatrikas' (the seven mother forms), is widely revered and worshipped not only for containing small-pox, but other oilments. The site also feeds the Jain legends. People, at

large, believe the well's water to be endowed with miraculous power.

2. Durakhi Devi Temple, Patna

This is a detached member of a carved railing of a stupa. The piece of the stone shows the semi-nude female figures on both of its faces, hence earned the name of 'Durukhi' or 'Durukhiya' (double faced) Devi. This is a fine specimen of the Shunga art of the 2nd-1st Century B.C.

3. Choti Patandevi, Patna

This temple is situated in the core (chowk) area of Patna City and once was considered as the main presiding deity of Patna. It was this very temple (Choti Patendevi) which held the primary position as the city's presiding deity during 18th and early 19th century.

The temple, however, houses a host of intact and severed Brahmanical images, including, Ganesh, Vishnu and Surya. Beyond the temple, but within its precincts, lie in open fragments of door jumbs/lintels and yet other set of images, Of these, an impressive, but broken sun-image is the most conspicuous.

4. Begu Hajjam's Mosque, Patna

This is the oldest mosque in Patna, which pre-dates the reigns of Mughals. Interestingly, the mosque is named after its renovator and not the builder. It is situated in the Khawaja Kalan Ghat Road of Patna City. The mosque was built by one Khan Muazzam Nazir Khan during the reign of Alauddin Shah Sultan of Gaur (Bengal) in the year 1509-10 A.D. (A.H. 916). The distinctive features of the mosque are its glazed tiles as was popular in Gaur those days.

5. Kamaldah Jain Temple, Patna

This is an 18th century Jain temple situated close to Gulzarbagh railway station in Patna, a little further east of Agam Kuan/Shitala Devi temple. There is, however, another temple, much later in construction, situated close to it. This place has traditionally been associated with the birth of the renowned Jain teacher, Sthulabhadra. The high mound of the brick ruins, that this temple overlies, might suggest some greater antiquity of the site than this late medieval temple. Significantly, this has the only historical inscription that confirms the identity of Patliputra with Patna.

6. Golghar, Patna

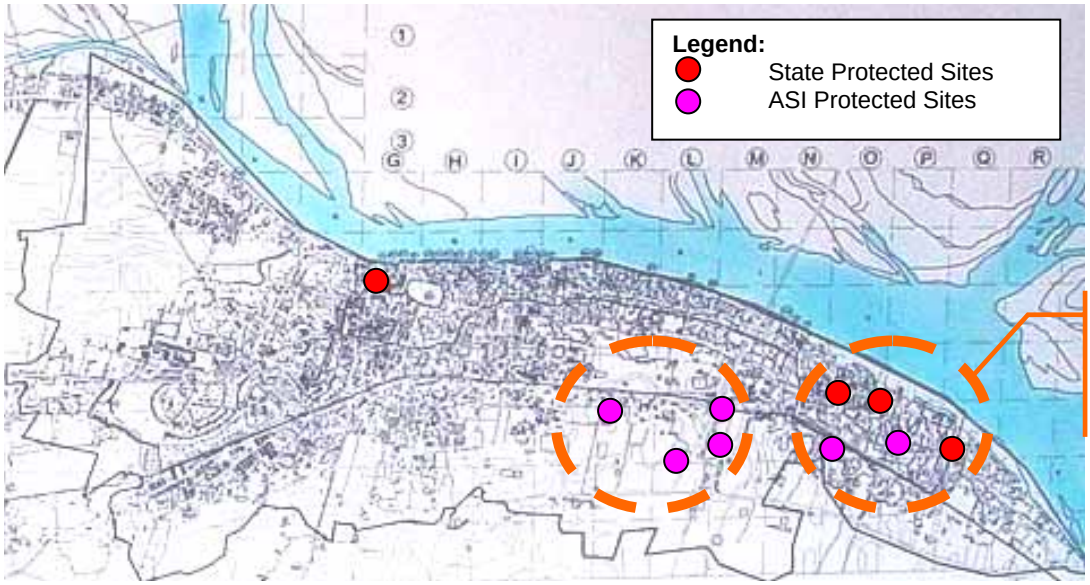
Golghar is one of the most outstanding architectural members of British India. It, in a way, symbolizes the identity of Patna. It is build close to the Ganga in Bankipur locality of Patna. Captain John Garstin, an engineer employed by the East India Company, has the credit of its conception and construction. It was built in the year 1886. The purpose of this huge circular structure with an imposing dome was to store grains in huge quantity. The impetus of its construction was the famine of 1770. But perhaps it was never fully put to this purpose.

7.1.3. *List of ASI Protected Sites*

The list of ASI protected sites includes:

a) Kumhrar Site
b) Buland Bagh
c) Chooti Pahari ka Tilla
d) Cluster of Five Mounts
e) Cluster of Five Statues
f) Remains of Wooden Wall of Mauryan Era
g) Juma Masjid of Mir Ashraf
h) Ancient Pond – Agam Kuan

The location of the heritage sites within Patna shows that there is a concentration of heritage areas within the core city area. However a detailed survey of all the heritage sites



Map 7A: Location of Major Heritage Sites within Patna

should be carried out and such precinct areas should be identified through out the city. Development Controls for these precinct areas are to be formulated and these sites may be developed into places of tourist interest.

7.1.4. *The Core City Area and Kankarbagh Residential Area*

Both the inner city lying in the east and the Kankarbagh Residential area of Patna stands out as an area with the following: overcrowding, decaying building stock, mixed uses, small scale incompatible manufacture, run-down walk-ups, pavement/ door-step dwellers, unorganized street vending, unusable/ overworked service networks, heterogeneous traffic, lack of idle parking spaces, incongruous city level uses, etc. Side by side it has heritage buildings and sites and historic footprints of various eras, underutilized plots, established cultural centers and social infrastructure. It often needs some orderliness or even organized chaos for phased correctives, proper solid waste management, water, ground, air and noise pollution control, hoarding and street furniture control. **Easing out of incompatible inner city uses to the periphery is a central ingredient of the vision plan.**

7.2. TOURISM

7.2.1. *Tourism Circuits*

Patna presently falls within the following types of ***religious tourism circuits*** which attract both national and international tourists:

1. Buddhist Circuit

From the point of entry into India at one of the four metros, Delhi, Calcutta, Chennai, or Mumbai it is best for the visitor to travel to either Patna in Bihar or Varanasi in Uttar Pradesh, before proceeding to the 4 sacred Buddhist sites.

They are both well connected by air and rail to all the metros and make ideal gateways for visiting the sacred sites. Patna and Varanasi, the ancient Indian towns of Pataliputra and Kashi were also thriving townships during the Buddha's lifetime.

The Buddhist circuit which covers the national level as well as at the international level tourists.

There are also interstate tourist sites which include the following locations:

- Bodhgaya
- Rajgir
- Nalanda
- Patna
- Vaishali

2. Tirtrhankar Circuit

This circuit has a combination of Buddhist and jain religious places including:

- Vaishali: Vaishali was one of the earliest republics in the world (6th century BC).It was here that Buddha preached his last sermon. Vaishali, birthplace of Lord Mahavira is also Sacred to Jains.
- Patna: Patna once called Patliputra the capital of Bihar, is among the world's oldest capital cities with unbroken history of many centuries as imperial metropolis.
- Rajgir: Rajgir,19 kms from Nalanda, the ancient capital of Magadh Empire. Lord Buddha often visited the monastery here to meditate and to preach. Rajgir is also a place sacred to the Jains, Since Lord Mahavira spent many years here.
- Pawapuri: In Pawapuri, or Apapuri, 38 kilometers from Rajgir and 90 kilometers from Patna, all sins end for a devout Jain. Lord Mahavira, the final tirthankar and founder of Jainism, breathed his last at this place.
- Deoghar(Baidyanath Dham): Deoghar, the House of Gods, is a popular health resort and an important center of Hindu pilgrimage, having the ancient temple of Baba Baidyanath - one of the twelve Jyotilingas in India.
- Parasnath: It is the place where several Jain Temple Exist.

3. Nirvana Circuit

- Rajgir: Rajgir,19 kms from Nalanda, the ancient capital of Magadh Empire. Lord Buddha often visited the monastery here to meditate and to preach. Rajgir is also a place sacred to the Jains, Since Lord Mahavira spent many years here.
- Bodhgaya: Near the holy city of Gaya, the Buddha attained enlightenment. The tree that had sheltered him came to be known as the Bodhi tree and the place Bodhgaya. Today Bodhgaya, an important place of pilgrimage, has a number of monasteries.
- Kushinagar: 53 km west of Gorakhpur. Kushinagar is where the Lord Buddha breathed his last and achieved mahaparinirvana. The ruins of many stupas as well as the chaityas and viharas that were built in latter times.
- Muzaffarpur: 35 km from Vaishali. Muzaffarpur the "Lychee Kingdom", is one of the major towns of North Bihar, a short distance from other popular tourist spots Hazipur and Sonepur. Today Muzaffarpur is famous for its exotic fruit "LYCHEE".
- Vaishali: One of the earliest republics in the world (6th century BC).It was here that Buddha preached his last sermon. Vaishali, birthplace of Lord Mahavira is also Sacred to Jains.
- Patna: Patna once called Patliputra the capital of Bihar, is among the world's oldest capital cities with unbroken history of many centuries as imperial metropolis.
- Nalanda: A great centre of Buddhist learning, Nalanda came into around the 5th century

BC and was a flourishing university town with over ten thousand scholars and an extensive library.

There ***Buddhist Heritage Tour*** which includes the following:

Delhi, Sarawasti, Lumbini, Kushinagar, Patna, Bodhgaya, Varanasi, Delhi

7.2.2. *Tourist Locations within Patna*

Pataliputra has been among the world's oldest capital cities with an unbroken history of many centuries as imperial metropolis. The history and heritage of modern day Patna thus goes back well over two millennia. Like Delhi, Patna too had been the regal seat of governance for successive kingdoms since ancient times. And to this day, it is the capital city of the state. As each ruler ascended in power and established dynastic glory, he gave his capital a new name. Thus, the ancient Kusumpura metamorphosed through Pushpapura, Pataliputra, Azeemabad and now into Patna, a continuous history ranging from 6th century BC to present times - a record claimed by few cities in the world. It was Ajatshatru the Magadha king who first built a small fort in Pataligram on the bank of the Ganga in 6th century BC, which later blossomed into the ancient glory still to be seen in the neighboring archaeological sites at Kumrahar. Bhiknapahari, Agamkuan, Bulandi Bagh and Kankar Bagh. Pataliputra dominated the political fortunes of the whole of north India between 6th century BC and 5th century AD, a fact established by archaeological excavations. After a temporary eclipse, in 16th century, Sher Shah Suri returned the city to its former glory and established the present Patna. After the decline of the Mughals, the British too found Patna a convenient regional capital and built a modern extension to this ancient city and called it Bankipore. It was in Gandhi Maidan in this area, that Mahatma Gandhi held his prayer meetings.

The other major bench marks of Patna include:

Golghar: Alarmed by the famine of 1770, captain John Garstin built this huge granary for the British army in 1786. The massive structure is 29 m high and the walls are 3.6 m wide at the base. The winding stairway around this monument offers a brilliant panoramic view of the city and the Ganga flowing by.

Martyr's Memorial: A memorial to seven freedom fighters who sacrificed their lives in the Quit India Movement of August 1942, the Martyr's Memorial is a modern sculpture facing the Secretariat, where they were shot in their attempt to hoist the national flag.

Har Mandir Takht: The second-most important gurudwara in India, the Takht Harmandir was built by Guru Gobind Singh, the 10th guru of the Sikhs. The gurudwara built in white marble with kiosks on the terraces consecrates the birthplace of Guru Gobind Singh. is an important Gurudwara for the Sikhs. The Gurdwara is situated in the Chowk area of Patna City (the older part the city). The gurudwara is situated in the Chowk are of Patna city and has a museum on it's third floor.

Patna Museum: The Patna Museum houses a First World War cannon, metal and stone sculptures of the Mauryan and Gupta periods, Buddhist sculptures and quaint terracotta figures. A 16 m long fossilized tree is one of its special features.

Pathar ki Masjid: Adjacent to Har Mandir Sahib, on the bank of the Ganga, is this beautiful mosque built by Parwez Shah, son of Jehangir, when he was the governor of Bihar. It is also called Saif Khan's mosque, Chimmi Ghat mosque and Sangi Masjid.

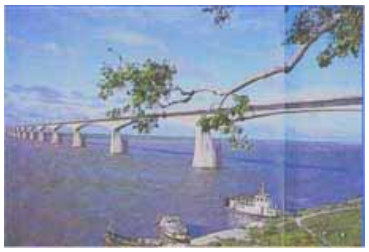
Sher Shah Suri Masjid: Sher Shah Suri built this mosque in 1545 to commemorate his reign. Built in the Afghan architectural style, it is one of the many beautiful mosques in Bihar, and one of the impressive landmarks of Patna.

Khuda Baksh Oriental Library: Founded in 1900, a magnificent one man collection of rare Arabic and Persian manuscripts, Rajput and Mughal paintings, oddities like the Koran inscribed in a book only 25mm wide and an assortment of old and new books from the University of Cordoba, Spain. It is one of the national libraries in India. The library also contains the only books to survive the sacking of the Moorish University of Cordoba in Spain.

Jalan Museum: Built on the foundations of Sher Shah's fort, Qila House contains an impressive private collection of antiques, including a dinner service that once belonged to George III, Marie Antoinette's Sevres porcelain, Napoleon's four-poster bed, Chinese jade and Mughal silver filigree. It is a private collection, and prior permission is required for a visit.

Sadaqat Ashram: The Ashram is the headquarters of Bihar Vidyapeeth, a national university. India's first president, Dr. Rajendra Prasad lived here after his retirement and there is a small museum here showcasing his personal belongings.

Agam Kuan: Agam Kuan (Unfathomable well) is one of the most important early historic archeological remains in Patna. It is situated just close to Gulzarbagh railway Station, which is proposed to be associated with the Mauryan Emperor Ashok.



Gandhi Setu: Asia's longest roadway bridge

Padri Ki Haveli: The Place was Mother Teresa got her training.

Biological Park: Also known as Sanjay Gandhi Biological Park

Kumhrar: Kumhrar, site of the ancient city of Patliputra, lays 5 kms from Patna railway station. Archaeological findings in this area establish Patna's claim to over a thousand years of political glory - 600 BC to 600 AD. Very little of this grandeur remains though, except for the remains of a huge Mauryan hall supported by 80 sandstone pillars dating back to 300 BC.

7.3. ISSUES IN HERITAGE AND TOURISM

1. There is a need for consolidation of the heritage and tourism sites in Patna Urban Agglomeration area.
2. The Archaeology preservation laws have to be dovetailed into the conservation instruments and which incorporate preservation. Conservation enables adaptive re-use and encompass sites and buildings upto the present times.

3. A concentration of listed sites or buildings leads to a heritage precinct or area. A heritage conservation ward plan would be ideal in such a situation. Even important single monuments could lead to such a heritage conservation ward plan. Even otherwise, individual buildings, sites or ecological areas can be listed legally for conservation prescriptions.
4. Surrounding infrastructure (roads, drainage etc.) of the tourist attraction sites have not been maintained properly and need upgradation; No planned leisure activities
5. There is very little tourism and heritage awareness in Patna. This aspect has also to be strengthened.

Meeting with Ex-INTACH Convener of Patna Chapter and Ex-Chief Conservator Forest for Patna held on 20th June 2006

- A legal framework for the heritage site protection should be formulated, which is non-existent presently.
- A committee in PMC should be setup for control of developments around the heritage site areas.

7.4. COURSE OF ACTION

Based on the recent toolkit under JN-NURM for heritage conservation it is recommended that:-

1. **The PMC be made the nodal agency for listing and processing actions for heritage sites. To start with, the INTACH list could be processed through statutory mapping;**
2. **Heritage precinct projects should initially be prepared for the Kankarbagh heritage area and around the six ASI projecated sites of Agam Kuon, Durokhi Devi temple, Chhoti Pantondevi, Begam Hajjam mosque, Kamaldah Jain temple and Golghar;**
3. **Bihar Tourism Development Corporation are to play the a greater role in this field particularly in promoting the religious circuits;**
4. **All stages of listed sites are to taken up, for conservation, preservation, restoration, upgrading as the case be.**

Chapter 8: REVIEW OF LEVEL OF URBAN SERVICES

8.1. INTRODUCTION

The status of the existing service levels in the PUA comprising of the Municipal Corporation, Nagar Parishads and outgrowths has been reviewed from point of view of adequacy for the current population. The facility wherever applicable for the core civic sector namely (i) Water Supply; (ii) Sewerage and Sanitation; (iii) Solid Waste Management; (iv) Roads and Storm Water Drains, (v) Street Lighting and (vi) Other Community Facilities and Amenities are analyzed.

For each core service sectors, specific indicators were classified under three categories, namely (i) Service Levels; (ii) Service coverage and (iii) Service Efficiency.

The specific indicators generated basically present the current situation/status of civic amenities in Patna Urban Area. The service level and coverage indicators have been used for estimating the gaps in services vis-à-vis set norms as prescribed by UDPFI and CPEHHO Manual. Based on the norms, requirements by the year 2011 and 2021 have also been estimated. Further, future requirements have been converted into monetary terms, assuming appropriate unit costs.

8.2. WATER SUPPLY

Piped water supply system was introduced in Patna in 1916 for limited area only i.e government quarters, under supervision of the state government. In those days people of Patna were totally depending either on Ganga Water or Open wells in riverbed. In the 1934 earthquake most of the wells were destroyed. Therefore, to meet the city water demand and extend the water network to other part of the city “Patna Bankipur Joint Water Works Committee” was entrusted with task to supply water to Patna city and Bankipur Municipal Area. Further, after enactment of Patna Municipal Corporation Act 1951, Patna Municipal Corporation was formed in 1952 by merging Patna and Bankipur Municipal areas. The water supply of city is done through a battery of tubewells on the Ganga River Basin.

The situation with regard to water supply in Patna Municipal Corporation and Nagar Parishads has been analyzed in terms of ‘Source *Sustainability’, apart from ‘Service Levels’, ‘Service Coverage’ and ‘Service Efficiency’*. The indicators analyzed for assessing the existing service levels, coverage and efficiency in delivery are presented in Box 8-1.

Box 8-1: Key Indicators for Assessment of Water Supply

SERVICE LEVELS: (i) % of Treatment capacity available (w.r.t. 2001 Population); (ii) % age Storage Capacity (w.r.t Supply); (iii) Daily Per Capita Water Supply (w.r.t 2001 Population)

SERVICE COVERAGE: (i) % of Household Covered with House Service Connection; (ii) Proportion of roads covered by distribution network; (iii) Number of person per stand post (Slum Population)

SERVICE EFFICIENCY: (i) Average Revenue and Expenditure per Connection/Month; (ii) % cost recovered-by way of charges; (iii) % cost recovered by way of water tax; (iv) Growth in water connection; (v) % Non-Domestic Connections; (vi) Tariff Levels and Collection Performance of the Charges

8.2.1. *Source Sustainability*

Groundwater is the major sources of water supply in Patna city and its urban agglomerations. The average discharge of tube well varies from 70000 to 90000 litres per

hour(lph). In terms of sources of water, all the towns under study have reasonably assured sources. The ground water table is overexploited in the city region. River Ganga and river Sone are surface water sources, which are not utilized for drinking water purposes due to high investment costs. **Table 8.1** shows the Water Supply system in PUA.

At present there are 89 tube wells with water production of 324 million litres per day (mlpd) against total requirement of 225 mlpd. The lack in adequate supply to the city habitant can be attributed to high water loss (around 40% T&D loss due old distribution network)

Table 8.1: Details of Water Supply in Patna Urban Area

Components	PMC area + outgrowths	Danapur Nagar Parishad + Cantonment	Khagul Nagar Parishad + Saidpura	Phulwari Nagar Parishad
Area in km^2	108.94	15.05	5.32	6.48
Year of establishment of Network	1913	1955	1968	1980
Supply Source	Although River Ganga is in North and River Sone & Punpun in South. The Ground Water is utilized as only source of water supply for Patna Urban Area			
Number of TWs	89	6	2	4
Total Supply (MLD)	325	11.0	1.5	2.5
Supply to Consumer in MLD	175	7.0	0.8	1.4
Network Length (kms)	700	25	5	12
Number of OHSR	4	NA	NA	NA
Storage Capacity (ML)	1.8	NA	NA	NA
No. Of Public Stand posts	1500	100	65	53
No. of Hand pump	284	65	35	40
Note: PMC Area comprises of area under Patna City (99.45); Patliputra Housing Colony (0.64); Digha-Mainpura (6.99); Sabazpura(0.39); Khalilpura(0.80) and Badalpura(0.67). Danapur area comprises Danapur NP (22.00) and Danapur Cantonment Area (3.42). Khagaul area comprises of Khagaul Nagar Parishad (3.66) and Saidpura (1.66).				

Source: (i) Report on Patna Water Supply System; Patna Water Board, Patna Municipal Corporation, 2005; (ii) Augmentation of Urban Water Supply and Danapur Nizamat, PH Division, Patna West, Patna; (iii) Urban Local body and line department survey formats, Patna, Danapur, Khagul and Phulwari Nagar Parishad

8.2.2. *Service Level*

The service levels of the water supply system in Patna UA are assessed by per capita water supply; % storage capacity and % of treatment capacity.

- Per Capita Water Supply: The per capita water supply level gives an indication of the quantity of water supplied. This however does not indicate the actual coverage and reach of the water supply system with regards to the population served and geographical area catered to by the system. Moreover, it does not indicate issues such as seasonal variation in supply levels. This is quick and common indicator used to assess the quantitative aspect of water supply situation in the town.

Table 8.2 indicates that per capita water supply in PMC is 107 litres and in other Nagar Parishads it is 43 litres. The water is supplied 6 hours in a day, through 700km distribution network of various sizes ranging from 50mm to 350mm. The water supply zoning is not suitable, further reducing the per capita water supply.

- Percentage to Storage Capacity: The storage capacity available is expressed as a percentage of the total quantity of water supplied per day. This indicator helps to determine the number of times the tank/reservoir needs to be filled, to meet the water demand and to time staggered supply for maximum and equitable water supply to the entire town. This also indicates the standby capacity available in case of emergency and also helps in estimating pumping machinery and power requirement. As per CPEHHO norms normally storage capacity should be at least 1/3rd of the supply.

- The storage capacity is below standard for PMC area (0.6% of total supply). Although there are 18 overhead service reservoirs in city, only 4 are in use leading to skewed storage capacity. The low water storage capacity has lead to low pressure head at the tail end of the distribution network.

- The other towns in Patna urban area have no overhead tanks and need continuous pumping to supply water in the town. This increases the O&M cost and decreases the water pressure & area covered by the water supply system.

- % of treatment capacity available: The water supply in PUA Area is through battery of tube wells, therefore no treatment is required other than chlorination. The local bodies have proposed for online chlorinator for water chlorination at transmission and distribution level.

Table 8.2: Status of Service Level Indicators in Patna Urban Area

Components	Standard	PMC area	Danapur Nagar Parishad	Khagul Nagar Parishad	Phulwari Nagar Parishad
Supply per Capita (lpcd)	135 lpcd 90 lpcd	107	53	38	38
Storage Capacity to Total Supply (%)	1/3rd of supply	0.6	NA	NA	NA
% of Treatment Capacity available		As Water is supplied through ground water, no water treatment is required			

Source: (i) Urban Local Boday and Line Departments Survey Formats, Patna, Danapur, Khagul and Phulwari Nagar Parishad

8.2.3. *Service Coverage*

The water supply for Patna City has been through decentralized system with single or group of tubewells having definite command area. As regards to existing water supply system city has been divided into 5 zones namely; the eastern Zone; Guljarbag Zone, Central Zone, Western Zone and Southern Zone. At present 700km of CI pipes varying from 50mm to 350mm diameter are in existence. There are about 1500 stand posts in city discharging 18.2 MLD of water.

The existing distribution system is very old and suffers from heavy leakage and much incrustation reducing its carrying capacity and giving rise to severe water pollution.

As per the study conducted by National Institute of Urban Affairs (NIUA), 75% of population

had piped water connection but due to low water pressure & poor supply system, around 40% of population had access to both house connection & public stand post. 20% of population gets water from public stand post and remaining 40% population depends on private tube wells.

The service coverage is assessed by proportion of roads covered by distribution network; percentage of households covered by house service connections and number of persons per public stand posts.

- Proportion of Roads covered by Distribution Network: This is the ratio of the total distribution network available to the total road length within the corporation limits. This is an indication of the geographical spread and reach of the distribution facility. However it does not give any indication as to which part of the town is uncovered.
- The average percentage of roads covered with distribution network is above 40%, which is less than the national urban average of 65%. The average level of coverage in PUA area is presented in **Table 8.3**.
- % of household covered by house service connections: The general modes of water supply to a city are by way of individual house service connection (HSC), Public Stand Posts and Hand pumps. The most preferred mode of water supply would be through HSCs, and satisfactory supply level would call for 100 percent household coverage by HSCs.
- However due to low levels of supply and poor network coverage in PUA, supply of water through HSC is limited only to a extent of about 45% of HHs, while rests HHs either depends on public stand posts and hand pumps or own sources.
- Number of Persons per Public Stand Post: As mentioned above households not having individual house service connection either have to depend on public stand posts or hand pumps. The load on each PSP has been assessed based on the slum population. The average dependency is over 300. It needs mention that dependency figures would be even higher if non-slum population is also considered.

Table 8.3: Status of Service Level Indicators in Patna Urban Area

Components	Standard	PMC area	Danapur Nagar Parishad	Khagul Nagar Parishad	Phulwari Nagar Parishad
Proportion of Roads covered by distribution Network (%)	-	40	45	42	43
Number of Assessments	-	124341	15256	3500	6280
Number of HH with HSC	-	64657	6560	1540	2261
Supply Hours	24	12	6	4	4
People*/PSP	130	387	318	208	228
Number of HH/Connections	1	2	2	2	3
% Assessment covered by HSC	100%	52	43	44	36

Source: (i) Urban Local Boday and Line Departments Survey Formats, Patna, Danapur, Khagul and Phulwari Nagar Parishad

8.2.4. *Service Efficiency*

The water charges and tax collection is the responsibility of Municipal Corporation and Nagar Parishads in state of Bihar. The water tax form the part of property tax, which is collected annually or quarterly by the municipal government under the provisions of Patna Municipal Corporation Act 1952 and Bihar Municipalities Act 1948.

The total number of connection in PUA Area is about 90000, out of which 80% is domestic connection and 20% is non-domestic connections.

The one time water connection charge for domestic connection is Rs 940. The water tax is collected as part of property tax @ 2% of the annual rental value or 10% of the property tax. The water connection charge for non-domestic property is Rs. 1455 and user charge of Rs 3.5 per 1000 gallon per month. **Table 8.4** presents the service efficiency of Local bodies in PUA area.

Efficiency of services is analyzed on several dimensions. They include; average revenue and expenditure per connection/month; % cost recovered by way of charges; growth in water connections; % of Non Domestic Connection and Tariff Structure and Collection Performance of the Charges.

- Average Revenue Expenditure per Connection Per Month: Revenue from Water supply comprises of receipts in the form of water tax collected as part of property tax and excess water charges collected for providing new connections. As observed from previous section only 35% of houses are covered by way of HSCs.

- Cost of production and distribution of water is one of the important indicators in assessing the cost of service and tariff fixation. The analysis indicates that on an average the revenue collected per connection is Rs 5 per month against the expenditure of Rs 45, indicating cost recovery is in order of 12 per cent.

- Cost Recovery by way of Water Charges: Water Charges and taxes are main source of income in water account. The recoveries by way of water charges work out to about 12 per cent. The share of non-domestic connection is below 10 per cent, hence the scope for cross subsidisation is also poor.

Table 8.4: Status of Service Efficiency in Patna Urban Area

Components	PMC area	Danapur Nagar Parishad	Khagul Nagar Parishad	Phulwari Nagar Parishad
A. AVERAGE INCOME EXPENDITURE PATTERN				
Average Income Per Connection / month	40	5	3	1
Average Expenditure Per Connection / month	135	45	40	40
% of Cost recovered by way of Charges	30	12	8	3
B. WATER SUPPLY EFFICIENCY INDICATOR				
Annual Average Growth in Connection	1.2	0.5	0.7	0.5

Components	PMC area	Danapur Nagar Parishad	Khagul Nagar Parishad	Phulwari Nagar Parishad
% age of non-domestic connection	1.5	1	1	1
C. WATER TARIFF STRUCTURE				
Domestic Tariff Rate (Rs.)	New Connection-Rs 940, Water Tax- 10% of Property Tax and 6.25 % of Property Tax for house without connection			
Non-Domestic Tariff Rate (Rs)	New Connection-Rs 1455, Water Charges of Rs 3.50 per 1000 Gallon per month excluding the property tax			
D. COLLECTION PERFORMANCE OF WATER CHARGES				
Current	45	40	35	41
Arrears	32	55	55	91
Total	38	48	45	56
Amount collected as water charges in five years (Rs. Lakhs)	1396.1	35.2	5.7	3.1

Source: (i) Urban Local Body and Line Departments Survey Formats, Patna, Danapur, Khagul and Phulwari Nagar Parishad

- Water Charges and Collection Performance: As mentioned in
- Table 8.4 water taxes forms the part of property tax. Although Domestic tariff per connection per month works out to be Rs. 40 for PMC and up to Rs 5 for Nagar Parishads.
- The collection performance indicates that on an average 47 per cent is collected against the current demand. The average collection performance of Patna Municipal Corporation is 38 per cent.
- As discussed in previous section the one-time fees of Rs 940 is collected for domestic connections and Rs 1455 for non-domestic connections. The PMC and Nagar Parishads has collected an amount of Rs 1440 Lakhs as water charges and taxes in last four years

8.2.5. *Water Supply Issues*

The high surface water potentiality of River Ganga is unutilized leading to overexploitation of ground water. The utilization of ground water does not require high capital investment as well as recurring cost towards treatment, operation and maintenance. The BRIJP and PWB are making an effort towards conjunctive use of surface and ground water sources in order to reduce pressure on the ground water sources.

The main problem with the existing system is non-uniform supply in different area and contamination due to various leakages. The UFW loss is above 40% due to poor and old supply network.

The pipes are in the center of the road due to road widening and facing heavy traffic, resulting in loss of carrying capacity, contamination of water, repair and maintenance problems.

In many colonies the drinking water and sewerage pipelines are interceding each other, with sewer line on top of water line increasing the possibility of contamination.

A number of agencies are responsible for the production, supply and distribution of water in PUA area. Coordination mechanisms between these agencies are missing. The line departments have significant experience in the operation and maintenance of the service delivery systems. Nevertheless, strengthening of the planning, design, and O & M capabilities of the organizations would have to be undertaken.

Unviable tariff and inadequate cost recoveries are two critical problems that result in poor performance of water operations in Patna Urban Area. Under the Acts, urban bodies are empowered to levy a water tax as well as water charge**,** which are generally implemented but are not revised to meet the costs of delivery. Water supply metering is almost non-existent**.**

8.3. SEWERAGE AND SANITATION

In PUA, Patna MC Area and some part of Phulwari & Danapur NP are covered by Underground Sewerage System. The Sewerage System in Patna City was established in 1936. There are 3 sewage treatment plant of 35 MLD each located at Saidpur & Beur in South & South West and Pahari in North of the City. The total Sewage Generated is 170 MLD.

8.3.1. *Terrain and Topography of Patna UA area*

Patna is a linear city and is about 30km in length from east to west and 5-7km wide from north to south. The city is situated between the river Ganga in north, river Punpun in South and Sone in the west. The general level Urban Area except old city is lower than the flood level. The general slope of the city is north to south and from west to east. The main east-west road, the Ashok Raj Path running almost parallel to river Ganga forms ridge in the north.

8.3.2. *Service level and Coverage Indicators*

Households having access to either Under Ground Sewerage Facility or Septic Tank are considered to have access to a safe disposal facility. The indicator is represented as percentage of assessments having access to safe disposal facility. Refer **Table 8.5.**
In the absence of any sewerage facility, the major mode of disposal is through individual septic tanks and low cost sanitation. The one-third population is dependent on the Septic tanks and LCS for sanitation in Urban Agglomeration area. In 1986, city pioneered the concept of low cost sanitation in individual houses and row housing establishment. These tanks are cleared once in three to four years with the help of cesspool cleaners. Often, wastewater is let out in to the streams polluting the potable water. Sanitation Management is a major issue to be dealt with in the Patna Urban Area.

Table 8.5: Sanitation Service Level Indicators

Components	PMC area	Danapur Nagar Parishad	Khagul Nagar Parishad	Phulwari Nagar Parishad
Availability of UGD System	YES	NO	NO	YES
Quantity of Sewage in MLD	170	10	4	4
Treatment Capacity in MLD	109	NA	NA	NA
% age of Population	9.2	NA	NA	NA

Components	PMC area	Danapur Nagar Parishad	Khagul Nagar Parishad	Phulwari Nagar Parishad
with UGD				
Sewer Length in km	27.4	NA	NA	6.0
Number of Connections	21884	NA	NA	532
Number of Septic Tanks	58305	9566	2132	3686
Road Covered by UGD Network (%)	25	NA	NA	10
% age of Assessment with				
UGD Network	17.6	NA	NA	3.2
Individual Toilets	85.7	86.3	85.2	85.7
Public shared toilets	14.3	12.4	13.6	13.7
Open Defecation	2.5	1.3	1.2	1.4

Source: (i) Urban Local Body and Line Departments Survey Formats, Patna, Danapur, Khagul and Phulwari Nagar Parishad. NA-Not Available

- Service Coverage and Efficiency: The households not connected to UGD system or other sanitation facilities have to depend on the other modes of disposal like public conveniences, slum population is taken as a proxy for dependents on public convenience. Around 15% of population are dependent on the public shared toilets. The city has around 3lakh population as floating population that depends of public or community toilets. In Urban agglomeration area did not have pay and use category public convenience system.

8.3.3. *Sewerage System and Sanitation Issues*

The underground sewerage system is one of the best methods of waste conveyance and disposal. But, due to high capital & operation cost and topography, urban areas depend on other mode of waste disposals. The issues of sewerage system in PUA area are

- Only 20% of the total households in urban agglomeration areas are covered with under ground sewerage system, increasing the dependency on the septic tank and low cost sanitations.
- Septic tank and Low cost Sanitation are supporting around 80-85 per cent of households, which may pollute shallow ground water with microbial pollution.
- Public conveniences are not adequate in the city. No user charge on the public conveniences has deteriorated the condition of existing system.
- Infiltration of rainwater into sewerage line further aggravates the problem in monsoon months.
- The partly or wholly untreated effluent flows into open drains.

8.4. STORM WATER DRAINAGE

As discussed in earlier sections Patna City is situated on an up level strip of land along south bank of river Ganga between Danapur in the west and Fatuah in the east and having an average width of 1.5km in east and 3km in the west. The strip slopes towards south and also towards east. This sort of topography has given a saucer like shape to Patna. The railway line virtually divides the topographic conditions of the town. Area in the south of railway line is almost flat and rain water often remains accumulated on a vast span of urban land for the major part of the year. The problems of city become more acute when the water level of Ganga, Punpun and Sone rises, which in turn leads to flood. Therefore city drainage

system has to depend on (i) Storm Water Pumping Stations and (ii) City Zoning as per Natural Drainage Zones. The section below describes the existing drainage system of city and its surrounding area.

8.4.1. *Existing Drainage System in Patna UA Area*

The City has been divided into four zones (i) Western Zone, (ii) Central Zone, (iii) Southern Zone and (iv) Eastern Zone. The zone wise descriptions of drainage channel are presented in Table 8.6.

Table 8.6: Storm Water Drainage- Patna Urban Area

Drainage Zone	Length in KM	Area Covered	Pumping Station	Water Discharge
A. WESTERN ZONE: It extends from west of Fraser Road to Danapur-Khagul Road				
Serpentine Channel	7.0	The storm water of Jakanpur area North of Patna Gaya Rail Line and South of Patna Pulwari road.	Mandiri Pumping Station	River Ganga at Mandiri outfall
Boring Canal	3.0	It was excavated to intercept water of Serpentine Channel. Areas covered are Bailey road, Government houses and Offices in Civil Secretariat area.	Rajapur Pumping Station	River Ganga at Rajapur Outfall situated at Danapur Road
SK Puri Drain	4.6	Area of Patel Nagar, Punaichak, AN college area, Anandpuri, New Patliputra colony near AN college, Nehru Nagar etc are drained	Punaichak Pumping Station	
Kurjee Drain	6.9	Area covered by this drain are veterinary college area; SK nagar; Western Patel Nagar; CDA Colony; AG Colony; New Patliputra Colony; Kurjee and Rajiv Nagar	Kurjee Pumping Station	River Ganga at Kurjee outfall
No Drainage	-	Area south of Railway line upto Phulwari Sherif from Anishabad turning has no drainage system and remains water logged on roads and low lying area.	-	-
	-	Area near Patna Canal and Saguna turning has out growth of city with residential and institutional landuses.	Proposal for Provision of Drainage system upto SK Puri and Kurjee Drain	
	-	The Sadaquat Ashram, Brajkishore Memorial, Loyala School and other establishment has no drainage system causing storm water flowing from Kurjee to Polytechnic road.	-	-
B. CENTRAL ZONE: It extends from Patna Gaya road in west to Nalanda Medical College hospital road in east and Ganga Bridge approach road in North to Delhi- Howarh Railway Line in South				
Bakarganj Channel	15	Area of from Phirmuhai to Ashok Rajpath and Lohanipur area, Rajender Nagar Railway Station, Karbhgahia area etc. The area is having Storm water drainage and Natural Drainage System.	Saidpur Pumping Plant	Not functioning properly- Water logging

Drainage Zone	Length in KM	Area Covered	Pumping Station	Water Discharge
Kadamkuan/ Agamkuan Nala	18	Area covered is Junction of RK avenue to Station Road and from Kadamkaun to Premchand Round about near Aryakumar road covered by 48" diameter UGD (3-4ft deep). Area from Arya kumar road to Saidpur Road is covered by Brick drain (72" to 90" OD).	Pahari Pumping Station and R.K. Avenue Lift Pumps to Saidpur Pumping Station	Punpun River
		Area on East of Rajendra Nagar Stadium, Patna University Hostels with Own Drainage System developed by PHED but pumping Station not Operational.	Saidpur Pumping Station	Punpun River
C. EASTERN ZONE: It extends from north of new bypass road and east of Nalanda Medical College Hospital and Ganga Bridge and upto Didarganj.				
Agamkaun Nala	18	Area covered in north are NMCH area, Tulsi Mandi and road from Agamkaun to Gulzarbagh railway station	Pahari Pumping Station	River Ganga in North and Low lying area in south
No Drainage System	-	Area south of Main Line remain water logged for month due to no pumping station in between Pahari and Didarganj Pumping Station	-	-
D. SOUTHERN ZONE: It is bounded by old bye pass road in north, new by-pass road in south, Agamkaun road in east and Patna Gaya Railway line in the west.				
Joginagar Drainage system	-	Lohianagar housing colony is served by 670HP pumping station.	670HP pumping station	River Punpun
No Drainage System	-	Area west of Chiraiyatar and Karbigahia and unplanned development beyond housing board colony in Kankarbagh, Bahadurpur and Hanuman Nagar has no drainage system.	2600 HP pumping station required	-

Source: An Approach Paper on Patna Drainage Scheme by Committee of Chief Engineers constituted by Secretary, Urban Development Department, Government of Bihar, Bihar

8.4.2. *Service level of Storm Water Drainage Network*

Storm water drainage is expressed in terms of its coverage with respect to the total road length. Ideally, the length of the storm water drain should be twice that of the total road length. As presented in

Choking of drains with solid waste

Table 8.7, the average road length covered with drains is 127% in PMC area and 52% in outer areas. Of which 90% is pucca drains in PMC area and 60% in outer areas.

Table 8.7: Storm Water Drainage Network- Service Level Indicators

Components	PMC area	Danapur Nagar Parishad	Khagul Nagar Parishad	Phulwari Nagar Parishad
Total Storm Water Drain Length (km)	1800	25	10	8
Road Length covered with SWD (%)	127	71	48	53
Pucca Drains (open and Closed) (%)	92	60	62	63
Length of Water Channels (km)	75km			

Source: (i) Urban Local Body and Line Departments Survey Formats, Patna, Danapur, Khagul and Phulwari Nagar Parishad. NA-Not Available

8.4.3. *Issues of Storm Water Drainage System*

- Even though separate sewerage system has been adopted in Patna, the same does not function in reality. Storm water drains; open drains and storm outfall carry sullage, septic tank effluent and even untreated sewage.
- When Sewerage network get choked the household usually connects it to the storm drainage system. Therefore open drains get silted.
- The Agamkaun nala is heavily silted, therefore during rainy season the drain overflows and water partially accumulates in its catchments areas and partially finds its way back to the pump house at Saidpur.
- The existing drainage pumping plants at Pahari, Jogipur (Kankarbagh), Rajendra Nagar, Antaghat, Kishanghat, Mandiri, Mithapur, Rajapur, Punaichak, SP Verma Road and Kurjee are old and not working at the designed capacity. The construction of unplanned colonies further aggravating the water logging and is source off health hazards.
- The Siadpur Pumping station is catering to total central zone drainage system leading to breaching of Agamkaun Nala, which is heavily silted. The water circulates in the catchments of Saidpur pump house.
- The encroachments; solid waste dumping and silt deposition cover the drainage channel and RCC drains in Central Zone. This lead to water logging in the central zone area.
- The multilateral agencies involved in planning, implementation and operation & maintenance has lead to mismanagement.

8.5. ROADS, STREET LIGHTING AND TRAFFIC

An efficient communication system is a prerequisite for the proper growth and functioning of the city. Its efficient management is very much dependent on the circulation pattern and the transportation system.

The physical expansion of Patna city is linear from east to west for a length of 30km and an average width of 3-4km from river Ganga in north, Punpun in south and Sone in the west.

The overall road network in the city is not adequate as less than 10% of area is under circulation against the normal standard of 15-20%. The road network system is deficient in terms of geometrics and traffic management aspects.
The major corridors are, Ashok Raj Path, Patna Danapur road, Baily road, Harding road, and Kankarbagh road. The feeder roads to these corridors are not able to serve their purpose because of insufficient road width and poor traffic management at many places. From viewpoint of road network hierarchy, the medium capacity roads are absent. Connectivity of the road network is poor also due to haphazard development of residential / commercial localities.

The functional widths of the major roads are thus reduced to as low as 50% due to encroachments, and parking on the road shoulders. Water logging due to poor drainage adds to the woes. The reduced road width leads to increases in the volume-capacity ratio causing congestion, vehicular pollution and accidents. Mixed traffic on major roads further compounds the problem.

The location of wholesale market in north within Patna city and transport nagar on south in the outskirts, leads to heavy movement of the LCVs and other small good carriages for to and fro transportation of goods and commodities from wholesale areas namely Kankarbagh, Ashok Rajpath, and Meethapur.

8.5.1. *Growth of Vehicles*

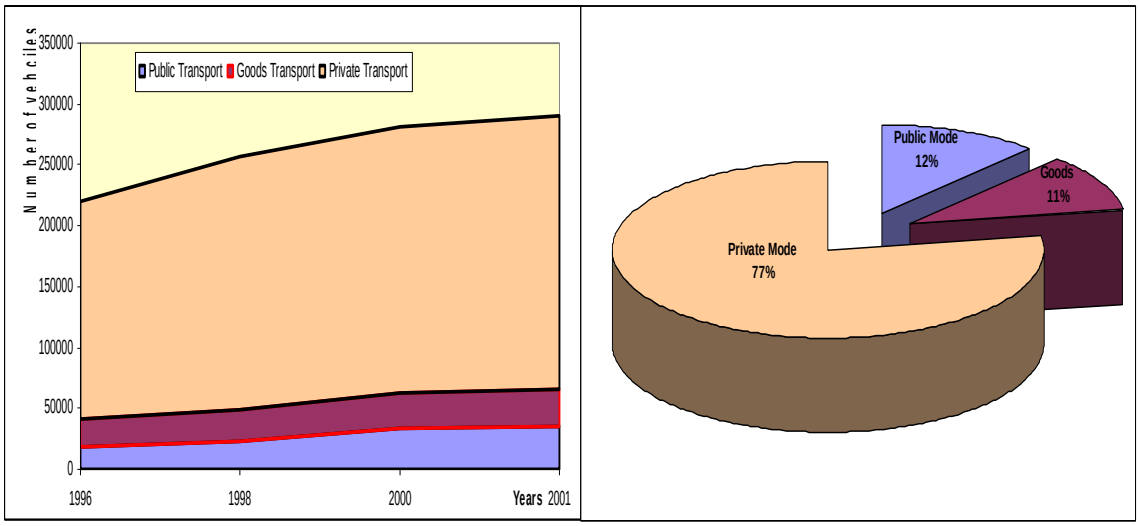
The traffic of the city has grown 67 folds in last two decades from 4384 in 1981 to 289844 in 2001. The poor public transportation system of the city has made increase in private vehicles by 4.7% in 1996-2001. **Table 8.8** below shows the growth & share of vehicular traffic of city from 1996-2001.

Table 8.8: Motor Vehicle Population in Patna City

Components	1996	1998	2000	2001	AAGR (96-01)	% age to Total
A. PUBLIC TRANSPORT						
Bus	2410	2668	2730	2938	4.0	1.0
Mini Bus	897	1045	1055	1077	3.7	0.4
Jeep	1051	2203	11777	12116	63.1	4.2
Taxi	2341	2468	2854	2945	4.7	1.0
Auto-Rickshaw	11782	13979	14466	15540	5.7	5.4
SUB-TOTAL	**18481**	**22363**	**32882**	**34616**	**13.4**	**11.9**
B. GOODS TRANSPORT						
Truck	11541	13373	14426	14733	5.0	5.1
Other Goods Vehicle	1275	1606	2065	2296	12.5	0.8
Tractor	5403	6419	6862	7235	6.0	2.5
Trailer	4691	5595	5968	6213	5.8	2.1
SUB-TOTAL	**22910**	**26993**	**29321**	**30477**	**5.9**	**10.5**
C. PRIVATE TRANSPORT						
Car	20818	25548	28670	31290	8.5	10.8

Components	1996	1998	2000	2001	AAGR (96-01)	% age to Total
Two-Wheeler	156982	180892	189440	192971	4.2	66.6
Others	715	495	475	490	-7.3	0.2
SUB-TOTAL	**178515**	**206935**	**218585**	**224751**	**4.7**	**77.5**
TOTAL	**219906**	**256291**	**280788**	**289844**	**5.7**	**100.0**

Source: (i) District Transport Office, Patna ; (ii) Traffic-SP, Patna City.



In order to assess the level of services of roads and streetlights, this forms the important infrastructure for movement of traffic and people. The following indicators have been generated to assess the level of services of roads and street lighting.

- Roads: (i) Total Length of Municipal Roads in km; (ii) Total Length of Other Roads (NH, SH, and MDR); (iii) % of Municipal Roads Surfaced; (iv) Surfaced Road Density in km/km2; (v) Per Capita Surfaced Road in m.
- Streetlight: (i) Average Street Light Spacing; (ii) % of High Power Fixtures

8.5.2. *Road and Road Network*

The total length of surfaced road in Patna Urban area is 1500km, out of which 90% is municipal road and 10% are state level roads. The average widths of the surface of roads right of ways are 5.5m, which is further reduced to 3.5m due to encroachments. The road density in PMC area is 13 km/km^2 whereas in Nagar Parishad area it is 3km/km^2. **Table 8.9** presents the road and traffic service level indicators in Patna Urban Area.

Table 8.9: Roads and Traffic- Service Level Indicators

Components	PMC area	Danapur Nagar Parishad	Khagul Nagar Parishad	Phulwari Nagar Parishad
A ROAD NETWORK				
Municipal Road Length in km	1315	25	20	12
Other Road Length in	53	10	1	3

Components	PMC area	Danapur Nagar Parishad	Khagul Nagar Parishad	Phulwari Nagar Parishad
km (NH, SH &MDR)				
Length of Surfaced Road (km)	1421	35	21	15
Length of Katccha Road (km)	346	NA	NA	NA
Average width of Road in m	5.5	4.0	3.5	3.5
Surfaced Road Density (km/km^2)	13.0	1.6	5.8	2.3
Per Capita Surfaced Road (m)	0.86	0.5	0.0	0.0
B. TRAFFIC SYSTEM				
Number of Registered Vehicle (2001)	289844	NA	NA	NA
Annual Growth Rate (%)	5.7	NA	NA	NA
Parking Area				
% of Land under Circulation to Total	4.6	3.2	4.0	4.5
Number of Signalized Intersection				
Number of Flyovers	10	0	0	0
Public Transport Mode	The city has IPT mode of transportation as Auto Rickshaw; Tempo and Cycle Rickshaw. Moreover City has non-functional city railways network. The minibuses mainly operates linearly between PMC and Nagar Parishads in Patna Urban Agglomeration Area			
Pedestrian Over bridges/Underpass	0	0	0	0

Source: (i) Urban Local Body and Line Departments Survey Formats, Patna, Danapur, Khagul and Phulwari Nagar Parishad. NA-Not Available

8.5.3. *Street Lighting*

- Average Street Light Spacing: Minimum Street light spacing required between successive lampposts is dependent on the road width, traffic volume and land use on a particular road. For normal two-lane road, preferred spacing is about 30m. The spacing between streetlights is 155m in PMC area and above 400 m in Nagar Parishads. The streetlights available are not working efficiently leading to accidents and other traffic hazards.

Table 8.10: Street Lights- Service Level Indicators

Components	PMC area	Danapur Nagar Parishad	Khagul Nagar Parishad	Phulwari Nagar Parishad
A. STREET LIGHTING				

Components	PMC area	Danapur Nagar Parishad	Khagul Nagar Parishad	Phulwari Nagar Parishad
Total Number of Streetlights	9167	65	NA	35
Total Number of High mast lights	23	0	0	0
Spacing between the Lampposts in m	155	540	NA	430

Source: (i) Urban Local Body and Line Departments Survey Formats, Patna, Danapur, Khagul and Phulwari Nagar Parishad. NA-Not Available

- % High Power Fixtures: The high power fixtures in terms of high mast lamps are installed at the intersections of major roads. There are 23 high mast lights in PMC area, whereas other Nagar Parishads has no high mast lights.

8.6. SOLID WASTE MANAGEMENT

It is important to note that certain initiatives in the form of door to door collection of solid waste in Patna appears to have been initiated under "Chaka Chak Patna Solid Waste Management Programme". Approximately 680 MT of garbage is being generated every day. Presently most of the city wastes are dumped without any treatment, in depressions, ditches or by the sides of the road in an unscientific manner. This practice may lead to air and water pollution, releases foul smell and this situation may cause major threat to public health. The waste collection and disposal system are undertaken through 3 zones in following manner.

- Segregation: Presently the waste is not segregated at the household level. The residents dump the waste in the nearby vacant land.
- Collection: At present there is an inefficient collection services in place. In PML Area, house-to-house collection of solid waste is not in practice. The solid waste is dumped by the individuals in the low lying areas which are then picked up by the local body who collects the garbage on trolley handcarts and dumps the waste in an unorganized manner into the roadside vats without any treatment. The waste is kept open at the collection points, which leads to subsequent foul smell, water, air pollution and unhygienic conditions. There are no specific disposal sites maintained by the PMC. The local body also does not have adequate and suitable vehicles for collection of waste or garbage.
- Transportation: Transportation of the garbage is in open truck, dumper and tractor. The local body does not have suitable vehicles for the collection of waste or garbage in terms of timely lifting and transportation. At the same time garbage is handled manually which leads to health hazards.
- Treatment and disposal: At present the waste does not undergo treatment and a crude method of dumping solid waste in low-lying areas is in practice.

The service level in case of solid waste management has been assessed by the collection performance of waste, availability of dustbins, vehicle fleets and conservancy staff. The indicators to assess the performance on the solid waste management in the Municipal Corporation and Nagar Parishad Area are presented in Box 8.2.

Box 8.2: Key Indicators for Assessment of Solid Waste Management

SERVICE LEVELS: (i) Waste Generated Per Capita (w.r.t. 2001 Population); (ii) Road Length per Conservancy Staff; (iii) Total Vehicle Capacity and % to waste generated; (iv) %age of Waste Collected as per LBs Estimate and as per available capacity
SERVICE COVERAGE: (i) Average spacing between dustbins; (ii) Number of Trips per vehicle per day

SERVICE EFFICIENCY: (i) Mode of Disposal

8.6.1. *Service level Indicators*

The service level indicators mainly emphasizes on the waste generation, collection and transportation mechanism and practices of the Municipal Corporation and Nagar Parishads. Refer **Table 8.11.**

- Waste Generated per capita: The sources of solid waste generation in Patna Urban Area are the household kitchen, hotels, markets, education institutions and offices. The quantity of waste generated ranges from 650MT-800MT, out of which 40% is domestic wastes and 60%, is industrial & commercial waste. The solid waste comprises[6] of vegetable and putrescible fractions (49%); combustible fractions (12.5%) and non-combustible fraction (38.5%). The analysis reveals that at the aggregate level, the average per capita waste generated is 331 grams.
- The collection performance is also key indicator for assessing the level of services in terms of management of solid waste. Based on the available capacity of conservancy vehicles, the total waste collected as percentage of waste generated per day is about 55% for PMC and 35% for Nagar Parishads.
- Road length per conservancy staff: Street cleaning is a primary activity in solid waste management. This indicator is measure of the load on the sweepers/conservancy staff deployed. The figures indicate that on an average about 600m of road length in PMC & about 300m in Nagar Parishads needs to be cleaned by one conservancy worker, which below the normative standard of about 800-1500 metre.
- Vehicle Capacity Ratio: Collection performance is dependent on the availability of vehicles and the number of trips made by them daily from collection point to disposal point. The vehicle capacity ratio is expressed as percentage of total vehicle capacity available to the total waste generated per day. The ratio helps to work out the minimum number of trips to be performed with available capacity, or additional number of vehicles to be acquired to achieve 100 percent collection performance.
- The average number of trips performed by vehicles ranges from 1 to 3 per vehicle per day and the average collection performance of 40 per cent for PMC and 20 per cent for Nagar Parishads.

Table 8.11: Solid Waste Management- Service Level Indicators

Components	PMC area	Danapur Nagar Parishad	Khagul Nagar Parishad	Phulwari Nagar Parishad
Total Waste Generated in MT/day	646.34	33.75	10.40	10.60
Number of Conservancy Staff	2462	150	66	15
Periodicity of Solid Waste Collected per week	In PMC daily Waste Collection on major road network and areas and alternate days on sub-arterial and local roads. In Nagar Parishads daily Waste Collection on main road and bi-weekly on the other roads.			
Total Number	867	20	NA	NA

[6] The physical analysis of Solid Waste has following characteristics (a) Vegetable and Putrescible fractions comprises of leaves-15%; straw-5%; garbage-21%; fruit and vegetable-8%; (b) Combustible Fractions-Paper-6%; Polythene & Plastic Bag-3%; Textile-3%; Bones-0.5%; (c) Ash & Silt-29%; Earthen ware-7%; Stone-0.5%; Ignited Coal-0.25%; Glass and mould-0.75; Leather and Rubber-1%

Components	PMC area	Danapur Nagar Parishad	Khagul Nagar Parishad	Phulwari Nagar Parishad
Community Dustbins				
Total Number of handcarts and trolley	386	NA	NA	NA
Total Number of Truck available per day	27	NA	NA	NA
Total Number of dumpers available per day	7	NA	NA	NA
Total Number of Tractors available per day	121	3	1	1
Trip Length in km	5-10	5-6	3-4	2-3
A. SERVICE LEVEL INDICATORS				
Waste Generated Per Capita (Grams)-2001	331	225	200	200
Road Length per Conservancy Staff (m)	577	233	318	1000
Waste Collected as per LBs estimate (%)	65	50	40	60
Total Vehicle Capacity (MT)	The waste carried in one Trolley is 1.25MT and in one Truck of Tipper is 3MT			
Vehicle Rated Capacity as % of Waste Generated	62.6	44.4	60.1	47.2
Waste Collectable as per available Capacity (%)	42	22	20	24
B. SERVICE COVERAGE INDICATORS				
Average Spacing between Dustbins (m)	1639	1750	NA	NA
Number of Trips per Vehicle per day	2	4	5	4
C. SERVICE EFFICIENCY INDICATORS				
Mode of Disposal	No designated waste disposal site is available. Therefore waste is disposed along the by-pass road and low lying areas in the south of Patna City			

Source: (i) Urban Local Body and Line Departments Survey Formats, Patna, Danapur, Khagul and Phulwari Nagar Parishad. NA-Not Available

8.6.2. *Service Coverage Indicators*

- Dustbins Spacing: Dustbins are primary collection points of garbage in hierarchy of the garbage collection system. Table 8.11 shows the average spacing between dustbins is above 1500m in PMC and Danapur Nagar Parishad, which is very high. There are no dustbins available in Nagar Parishads.

8.6.3. *Service Efficiency Indicators*

- Disposal Facility: The local bodies are dumping the waste collected in open yards in the outskirts of the city. The wastes are disposed in the low-lying area in the outskirts without following any scientific method. Only Danapur Nagar Parishad has designated

landfill site and that too of just 1 acre.

8.6.4. *Solid Waste Management Issues*

As any other ULB, in PMC and Nagar Parishads the state of solid waste collection is unorganized and unscientific. The local bodies are only able to collect part of the total quantum of waste generated in the city. Around 60% of total wastes generated per day are left on streets lead to drain blockages, soil and ground water pollution and results in acute unhygienic conditions. Major issues of MSW sector includes:

- Indiscriminate disposal of waste by the residents: The spacing between the dustbins is more than 1.5km, leading to litter of waste on the local and cluster level streets.
- Absence of Modern Waste Collection Technique and instruments: The Waste collection and transportation is handled using the age-old technique of broom and wheel borrowers due narrow streets and lack of suitable infrastructure. It is worth mentioning that piecemeal approach on modernisation of waste management techniques collapses with change in administrative set up (eg: Surat Municipal Corporation).
- Non-Segregation and Recycling/Reuse of Solid Waste: The intermixing of waste during collection and transportation lead to the increase in quantum of waste to be disposed.
- In availability of landfill site for waste disposal has lead to the dumping of waste along the major roads and low-lying drainage channels in south of the city.

Collection of Solid Waste from the streets by PMC and NGOs

Dumping of Solid Waste Along Bypass Road

Burning of Solid Waste in lowlying areas

8.7. COMMUNITY FACILITIES AND AMENITIES

Community facilities, revenue earning as well as service oriented, are essential requirements of a well functioning town. Often these are provided for by the urban local

governments. However, the private sector plays a major role these days. A brief status of the same has been presented in **Table 18.12** below.

Table 8.12: Community Facilities and Other Assets of Local Bodies

Components	PMC area	Danapur Nagar Parishad	Khagul Nagar Parishad	Phulwari Nagar Parishad
A. REMURERATIVE MUNICIPAL ASSETS				
Wholesale Markets	7	1	0	0
Retail Shops	2756	75	35	0
Weekly/Daily Markets	The roadside spaces are tendered out on annual fees for establishing roadside markets in Urban area.			
B. INFRASTRUCTURE RELATED ASSETS				
Schools	35	10	1	2
Colleges	1	NA	NA	NA
Hospitals and Dispensary	32	NA	NA	NA
Parks and Playgrounds	42	NA	NA	0
Rickshaw Stands	23	NA	NA	NA
Community halls	10	NA	NA	2
Recreation (Cinema/stadium)	1	NA	NA	NA
Other Facilities (Library/Dhobi Ghats Cremation/Burial Grounds)	10	2	1	1

Source: (i) Urban Local Body and Line Departments Survey Formats, Patna, Danapur, Khagul and Phulwari Nagar Parishad. NA-Not Available

While many of the above form critical assets, from the initial assessment it appears that commercial exploitation of the same has been done in a limited manner. Identifying the potential for generating revenue would be an important task. Since all of the above except parks and playgrounds and to some extent, schools and health facilities, would be classified as a 'private good' and are functioning as such in many instances, demand supply situation has not been worked out.

Chapter 9: REVIEW OF FINANCIAL RESOURCES

9.1. INTRODUCTION

The financial aspects of the City Development Plan (CDP) of Patna is anchored onto the primarily goal of the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), namely, creating economically productive, efficient, equitable and responsive cities.

This chapter details the municipal finances of the municipal corporation and outlines the receipts and expenditure over the last five years. This would form the base for the preparation of Financial & Operating Plan (FOP). The financial statuses of PMC and PRDA have been reviewed for the last four years, commencing from the financial year 2001-02. The category wise items of accounts are presented in Box 9.1.

Box 9.1: Category wise Items of Accounts

For the purpose of analysis, the items of account have been categorised under the following major heads:
Revenue Account: All recurring items of income and expenditure are included under this head. These include taxes, charges, salaries, maintenance expenditure, etc.
Capital Account: Income and expenditure items under this account are primarily non-recurring in nature. Income items include loans, contributions by GoB, other agencies and capital grants under various State and Central Government programmes. Expenditure items include expenses booked under developmental works and purchase of capital assets.
Deposits and Advances: Under the cash system of accounting, certain items are compiled under advances and deposits. These items are temporary in nature and are essentially adjustments for the purpose of recoveries and payments. Items under this head include library cess, income tax deductions, pension payments, provident fund, payment and recoveries of advances to employees and contractors, etc.

9.2. EXISTING FINANCIAL SITUATION-A REVIEW

The purpose of this stage is to review and analyze the existing financial situation in terms of trends in the revenues and expenditures of the authorities concerned with the development of the city.

The study area can be classified as -(i) Patna Municipal Corporation Area-99.45km^2; (ii) Patna Urban Area (PMC, Phulwari Sherif Nagar Parishad, Khagul Nagar Parishad and Dhanapur Nagar Parishad)-135.70 km^2; (iii) Patna Regional Development Authority Area)-234.70km^2. The urban services within various areas are managed by BRJP; PMC; PHED; PWD; and Nagar Parishads. **Table 9.1** shows department wise primary and secondary responsibility in managing urban services.

Table 9.1: Department wise Urban Services Management

Urban Services	PMC Area	Phulwari NP	Khagul NP	Danapur NP	PRDA
A. Water Supply					
Supply of Water	PMC	PHED	PHED	PHED	PHED
Maintenance of network	PMC, BRJP	PHED	PHED	PHED	PHED
Up gradation and laying of Network	BRJP, PHED	BRJP, PHED	BRJP, PHED	BRJP, PHED	BRJP, PHED
Collection of Water Charges	PMC	PHED	KNP	DNP	PHED
B. Sewerage System					
Construction of STP	Bihar Rajya Jal Parishad has constructed 3 Sewage Treatment Plant in PMC. There is no STP for Nagar Parishads in PUA.				
Laying of Network	BRIJP	BRIJP	BRIJP	BRIJP	BRIJP
Construction of Community	DUDA,	DUDA, UDD,	DUDA,	DUDA, UDD,	DUDA,

Urban Services	PMC Area	Phulwari NP	Khagul NP	Danapur NP	PRDA
Toilets	UDD, PMC	PNP	UDD, KNP	DNP	UDD
Maintenance on System	PMC	PNP	KNP	DNP	PHED
Collection of User Charges	PMC	PNP	KNP	DNP	PHED
C. Solid Waste Management					
Collection of Waste	PMC	PNP	KNP	DNP	NA
Collection of User Charges	PMC	PNP	KNP	DNP	NA
D. Storm Water Drainage					
Construction of Drains	PWD, PMC, BRJP	PWD, PNP, BRJP	PWD, KNP, BRJP	PWD, DNP, BRJP	PWD, NHAI
Cleaning of Drains	PMC	PNP	KNP	DNP	PWD, NHAI
E. Roads					
Construction of Main Road	NHAI, PWD, PMC	NHAI, PWD	NHAI, PWD	NHAI, PWD	NHAI, PWD
Construction of Streets	PMC	PNP	KNP	DNP	PWD
Collection of Road Tax	RTO, DTO	RTO, DTO	RTO, DTO	RTO, DTO	RTO, DTO
F. Building Plan Approval	**PRDA**	**PRDA**	**PRDA**	**PRDA**	**PRDA**
G. Street Lighting					
Installation of Lights	BSEB, PMC	BSEB, PNP	BSEB, KNP	BSEB, DNP	NA
Maintenance	PMC	PNP	KNP	DNP	NA

Note: PMC-Patna Municipal Corporation; PNP-Phulwari Sherif Nagar Parishad; KNP-Khagul Nagar Parishad; DNP-Danapur Nagar Parishad; PRDA-Patna Regional Development Authority; PWD-Public Works Department; PHED-Public Health and Engineering Department; BRJP-Bihar Rajya Jal Parishad; RTO-Regional Transport Office; DTO-District Transport Office; BSEB-Bihar State Electricity Board; NHAI-National Highways Authority of India

9.3. FINANCIAL STATUS AT A GLANCE - PMC

Revenue income of Municipal Corporation of Patna has declined to a level of INR 2061.10 lakhs in the FY 2004-05 from INR 2377.13 lakhs in FY 2001-02; the revenue income has declined at annual rate of 3.5 percent whereas the revenue expenditure increased at an average annual rate of 11.9 percent. Thus indicating a deficit position, during this period.

Capital income of PMC comprises of loans and grants in the form of loan for infrastructure development and grants for improvement of basic services in slums. A major share of capital income is in the form of grants. As observed in **Table 9.2** the capital account has witnessed a surplus-implying utilisation of capital income to fund revenue expenditure. It is observed that capital expenditure has been inconsistent during the review period. During FY 2004-05, capital expenditure had declined to INR 358 lakhs from INR 602.51 lakhs in the FY 2000-01. Around 90% of expenditure made for Construction of Public Conveniences and Ward wise civil works.

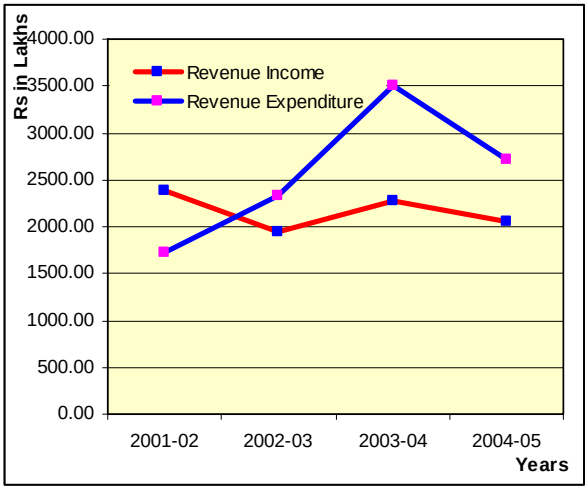
Table 9.2: Financial Status of PMC (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
A. REVENUE ACCOUNT				
Income	2377.13	1940.09	2277.66	2061.10
Expenditure	1731.30	2323.60	3505.38	2715.31

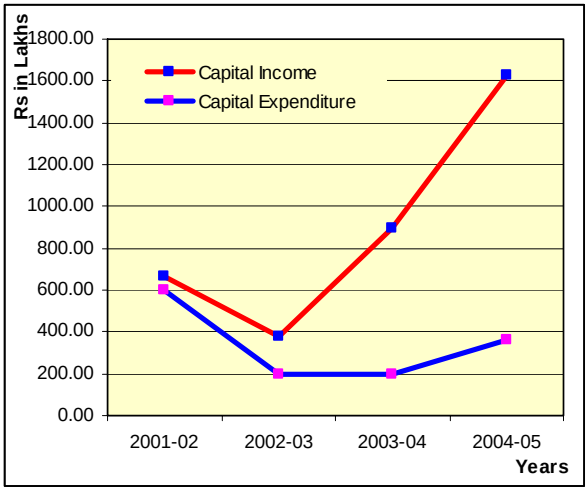
A Surplus/Deficit	*645.84*	*(383.51)*	*(1227.71)*	*(654.21)*
B. CAPITAL ACCOUNT				
Income	666.44	375.12	898.80	1624.32
Expenditure	602.51	194.24	198.54	358.00
B Surplus/Deficit	*63.93*	*180.89*	*700.26*	*1266.32*
C. ADVANCES AND DEPOSITS				
Income	0.00	0.00	0.00	0.00
Expenditure	188.98	360.92	698.69	74.07
C Surplus/Deficit	(188.98)	(360.92)	(698.69)	(74.07)
Overall Status	**520.79**	**-563.55**	**-1226.15**	**538.03**

Source: Annual Accounts, Patna Municipal Corporation, 2001-02 to 2004-05
Figures in parenthesis indicates negative

Graph 9a



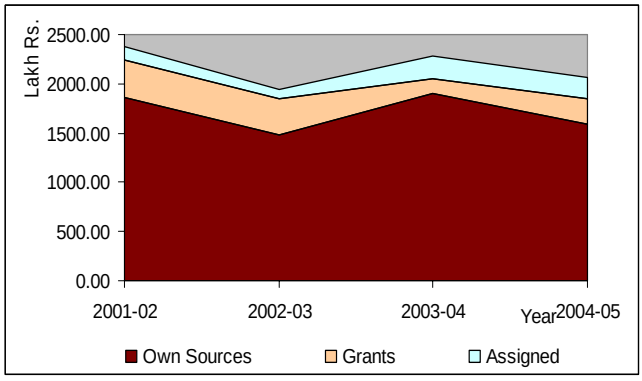
Graph 9b



Further review of the revenue and capital accounts indicates that deficit has increased over period of 2001-02 to 2004-05. The surplus in 2004-05 has been attributed to high surplus in capital account.

9.4. REVENUE ACCOUNT

GRAPH-9C (I)



The revenue account comprises of two components, revenue income and revenue expenditure. Revenue income comprises of internal resources in the form of tax and non-tax items. External resources are in the form of shared taxes/transfers and revenue grants from the State Government. Revenue expenditure comprises of expenditure incurred on salaries, operation & maintenance expenditure and debt servicing (Table 9.3)

Table 9.3: Source wise Revenue Income (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05	Average
A Own Sources	1864.30	1478.14	1898.88	1596.11	1709.99
B. Grants	375.51	370.64	155.49	249.40	287.76
C. Assigned Revenue	137.32	91.31	223.29	215.58	166.88
Revenue Account	**2377.13**	**1940.09**	**2277.66**	**2061.10**	**2164.63**

Source: Annual Accounts, Patna Municipal Corporation, 2001-02 to 2004-05
Figures in parenthesis indicates negative

9.4.1. *Own Sources*

Own-source income includes income from resource mobilisation activities of PMC in the form of taxes, user fees, fines, trade licences, etc. Own revenue sources are further classified as tax and non-tax sources that are generated by various sections of the PMC.

Tax Sources: The revenue income by taxes, fines and fees are categorised as General Administration; Communication & Engineering; Remunerative Enterprises. About 70% of the revenue is contributed by Tax Sources, which includes Property tax, Professionals and Trade Tax and Animal & Carriage Tax respectively.

Graph9c (ii)

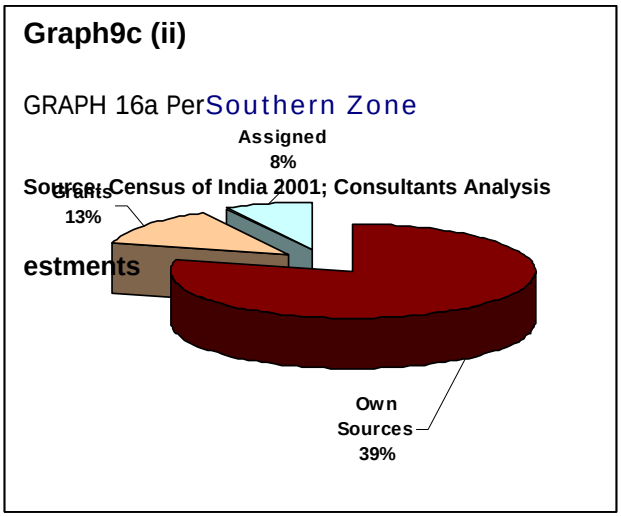


Table 9.4: Revenue Income from Own Sources-Tax and Non-Tax (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
Tax Revenue				
Property Tax	1750.34	1397.92	1810.80	1387.01
Other Taxes	3.01	5.02	7.24	6.64
Sub-Total	**1753.35**	**1402.94**	**1818.05**	**1393.65**
Non-Tax Revenue				
Communications	8.39	7.60	9.57	6.99
Remunerative Enterprises	97.00	62.80	69.74	196.91
Water Supply	5.58	4.82	1.57	1.02
Sub-Total	**110.97**	**75.22**	**80.88**	**204.91**
TOTAL	**1864.32**	**1478.16**	**1898.92**	**1598.56**
Share to Revenue Income (%)	**78.0**	**62.0**	**80.0**	**67.0**

Source: Annual Accounts, Patna Municipal Corporation, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

The essential features of this head of revenue income are listed below:

- Income from own sources accounts to about 70 percent of revenue income, and has declined at an average rate of 5.5 percent per annum. Major items of own-source income, contributing towards revenue income, include property tax (75%) and Sale of produce of land (4%). Own sources of income are inconsistent during 2001-02 to 2004-

05 due to low collection of current and arrears.

- The property tax is collected based on the assessment of 1993. The government is in the process of revising the property tax assessment, which is to be implemented by December 2006.

Income through own-source heads that contribute substantially towards revenue income include:

- **Property Tax**: Income through property tax is based on the Annual Rental Value (ARV) of property and is the single largest and most elastic source of revenue, contributing about 75% of the corporation's income.
- As per section 134 (2) of the PMC Act the tax rate shall ranges from 7 to 9 percent of the ARV. The components of the Property Tax and tax rate for different ARV slabs are presented in Table 9.5.

Table 9.5: Annual Rental Value in Rs per Ft^2

Location of Property		RCC/PCC/Pucca Ceiling	Asbestos/ Corrugated Ceiling	Others
Main Road	Commercial and Industrial	54	36	18
	Residential	18	12	6
	Others	36	24	12
Arterial Road	Commercial and Industrial	36	24	12
	Residential	12	8	4
	Others	24	16	8
Other Roads	Commercial and Industrial	18	12	6
	Residential	12	4	2
	Others	6	8	4

Note: Annual Rental Value is 1% of Annual Rent of Property (Holding Tax-2.5%; Water Tax-2%; Sanitation Tax: 2%, Health Cess: 1.25%, Education Cess: 1.25%)

Source: Annual Accounts, Patna Municipal Corporation, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

Non-Tax Sources: Non-tax sources include all non-tax revenues such as fees and charges levied as per the Patna Municipal Act 1952. Such revenue sources include income from special services, etc. The major sections contributing non-tax income include General Administration, Births and Death Certificate and Income from Remunerative Enterprises.

The income from non-tax revenue receipts has increased from Rs 110.97 Lakhs in FY 2001–02 to Rs. 204.91 in FY 2004–05 (Table 9.6) indicating the increasing collection efficiency.

Table 9.6: Composition of Non-Tax Revenue of PMC (Rs Lakhs)

Items	2001-02	2002-03	2003-04	2004-05
Communications				
Road Cutting Charges	5.84	5.00	5.32	4.32
Parking Fees	0.10	0.10	0.12	0.00
Charges for Use of Public Vehicles	2.21	2.25	1.53	2.14
Miscellaneous	0.25	0.25	2.60	0.53
Sub-Total	**8.39**	**7.60**	**9.57**	**6.99**
Remunerative Enterprises				
Sale of Produce of Lands	60.10	25.00	33.80	154.55
D & O Trade License Fee	0.09	0.10	0.06	0.08
Market and Abhotoir Fees	0.50	0.50	7.62	26.87
Rent of Land, Tourist Banglow and Others	14.71	15.00	16.48	3.95
Mutation Fees	2.60	1.50	1.15	0.40
Stamp Fees	0.00	0.00	0.74	0.46
Income from vendors and Stalls	0.10	0.10	0.08	0.00
Lorry & Cycle Stand Fees	2.15	2.50	1.47	1.04
Electric Cremation Fees	16.66	18.00	8.31	9.56
Water Supply	5.58	4.82	1.57	1.02
Miscellaneous	0.10	0.10	0.02	0.00
Sub-Total	**102.57**	**67.62**	**71.31**	**197.92**
TOTAL	**110.96**	**75.22**	**80.88**	**204.91**
Share to Revenue Income (%)	**4.67**	**3.88**	**3.55**	**9.93**

Source: Annual Accounts, Patna Municipal Corporation, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

Stamp Duty: Surcharge on stamp duty is a major assigned revenue source, accounting for 10 percent of revenue income. It is levied in the form of a surcharge on stamp duty applicable on all properties registered or transferred within PMC limits. The Revenue Department has been collecting this tax since 1980 and 2% of the total s collections of stamp fees are transferred to PMC. The proceeds from this source have registered an average annual growth of about 16 percent.

Grants and Contributions: The Corporation receives revenue grants and compensations from the State Government under various heads. The regular revenue grants are listed in Table 9.7. Planned grants from the state government have substantially declined from Rs 375.51 Lakhs in FY 2001-02 to Rs 249.40 Lakhs in FY 2004-05.

Table 9.7: Grant and Compensations (In Lakh Rs)

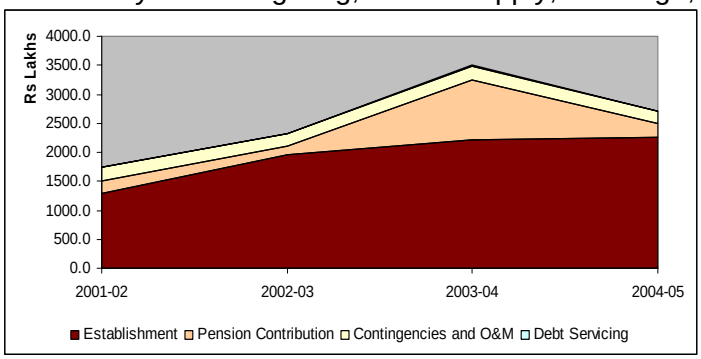
Items	2001-02	2002-03	2003-04	2004-05
GRANTS AND CONTRIBUTION				
Grants for Salary of Staffs	375.5	331.6	155.5	249.4
Grants for Election and Census	0.0	39.1	0.0	0.0
Others	0.0	0.0	0.0	0.0

Items	2001-02	2002-03	2003-04	2004-05
TOTAL	375.51	370.64	155.49	249.40
Share to Revenue Income (%)	16.0	9.0	7.0	12.0

Source: Annual Accounts, Patna Municipal Corporation, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

9.4.2. *Revenue Expenditure*

Revenue expenditure has been analysed based on expenditure heads broadly classified under the following sections of PMC - General Administration, Collection Establishment, Office of elected representatives, Pensionary Contribution, Communication-Engineering Section; Health & medical Services; Public safety-Street Lighting, Water Supply, Drainage, Public Health, Remunerative enterprises and Debt Servicing.



Graph 9d (i)

Revenue expenditure is further classified under establishment and contingencies (O&M). Besides the above items of expenditure, pension contributions constitute a substantial proportion of revenue expenditure. Application of funds by each sector is presented in Table 9.8.

Table 9.8: Sector wise application of Revenue Expenditure (In Lakh Rs)

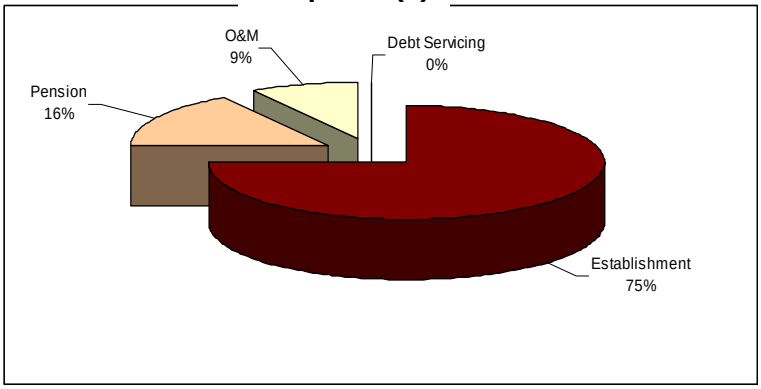
Items	2001-02	2002-03	2003-04	2004-05	Average	%age
Establishment	1299.99	1954.69	2216.44	2250.05	1930.3	75.1
Pension Contribution	211.98	153.78	1024.59	243.58	408.5	15.9
Contingencies and O&M	219.33	215.13	253.20	219.13	226.7	8.8
Debt Servicing	0.00	0.00	11.14	2.55	3.4	0.1
TOTAL	**1731.30**	**2323.60**	**3505.38**	**2715.31**	**2568.9**	**100.0**

Source: Annual Accounts, Patna Municipal Corporation, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

Establishment expenditure alone accounts for over 75 percent of revenue expenditure. In comparison with revenue income, over 120 percent is utilized for payment of salaries and pensions. Debt Servicing is about 0.1 percent of revenue expenditure.

For the assessment period, revenue expenditure grew at an average rate of 12.0 percent, while the corresponding decline in revenue income was 3.5 percent. This growth indicates that PMC expenditure is not in commensurate with its income.

Graph 9d (ii)



Further, while expenditure on establishment increased at annual average rate of 12 per cent, expenditure on O&M grew at an average rate of 10 percent per annum.

Analysis of heads under revenue expenditure has been carried out with regard to establishment, operation & maintenance, and debt servicing. The following sections detail the same.

Establishment Expenditure: Establishment expenditure of all sections accounts are over 75 per cent of total revenue expenditure. The salary bill alone of PMC, during FY 2004-05, was Rs 2493 lakh and constituted 92% of total revenue expenditure for the corresponding year. Details of establishment expenditure have been indicated in Table 9.9.

Table 9.9: Section wise Establishment Expenditure (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
General Administration	117.61	249.11	319.41	388.48
Collection Establishment	85.15	90.20	130.00	132.01
Office of Elected Member	128.20	130.25	170.50	180.85
Pension	211.98	153.78	1024.59	243.58
Communication	30.35	35.25	35.40	38.20
Health & Medical Services	18.15	20.50	28.15	30.16
Public Safety-Street Lighting	15.36	18.25	18.25	20.15
Water Supply	250.61	118.63	198.44	132.02
Drainage	32.15	460.00	475.00	510.00
Public Health	622.41	832.50	841.29	818.20
TOTAL	**1511.97**	**2108.47**	**3241.03**	**2493.63**
Share in RE (%)	*87.3*	*90.8*	*92.5*	*91.8*
Annual Growth Rate	*-*	*50.4*	*13.4*	*1.5*

Source: Annual Accounts, Patna Municipal Corporation, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

It is observed from the Table 9.9 that

- Expenditure on establishment, incurred by the Conservancy Section accounts for over 30 per cent of total establishment expenditure. Being a core service driven by a huge workforce/manpower, the high expenditure cost is expected.
- The next major establishment expenditure incurring sections are water supply, pension and general administration.
- The establishment expenditure has declined in 2004-05. This can be attributed high rate of retirement and increase in pension account.

Operation and Maintenance Expenditure: Operation and maintenance expenditure of all section together accounts for 9 percent (excluding revenue investments in short-term deposits) of revenue expenditure. The total O&M expenditure during FY 2004-05 was Rs 219.0 lakh (Table 9.10).

Table 9.10: Section wise O&M Expenditure (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
Collection Establishment	32.16	35.30	45.25	46.05
Communication	3.70	0.00	0.00	0.00
Health & Medical Services	7.25	7.50	8.20	10.10
Public Safety-Street Lighting	1.07	15.00	0.00	5.78

Items	2001-02	2002-03	2003-04	2004-05
Water Supply	44.23	20.93	35.02	23.30
Drainage	42.83	45.00	59.25	20.15
Public Health	60.78	70.60	72.25	75.15
Remunerative Enterprises	7.11	0.00	10.98	12.08
TOTAL	**219.33**	**215.13**	**253.20**	**219.13**
Share in RE (%)	*12.7*	*9.3*	*7.2*	*8.1*
Annual Growth Rate	-	-1.9	17.7	-13.5

Source: Annual Accounts, Patna Municipal Corporation, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

Debt Servicing: A review of the outstanding loan statement of PMC, reveals that the net outstanding debt liabilities of PMC are Rs 1496.17 lakh in the assessment year. It needs mention that PMC has done debt servicing of Rs 13.69 lakh in the assessment year.

9.5. CAPITAL ACCOUNT

9.5.1. *Capital Income*

Capital income comprises loans, grants and contributions. The detailed components of capital income are enumerated in Table 9.11. An analysis of this account indicates that 65 percent of capital income is in the form loans and 35 percent by way of grants. It also reveals that during the review period capital income was inconsistent due to irregular flow of scheme specific grants.

Table 9.11: Capital Income (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
A LOANS				
General Accounts	279.75	331.58	505.49	250.84
Remunerative Enterprise	27.51	0.00	0.00	0.00
Water Supply	101.01	0.00	0.00	0.00
Sub-Total	**408.26**	**331.58**	**505.49**	**250.84**
B. GRANTS				
NRY and SJSRY	97.02	14.18	0.00	0.00
Grants from ODA	129.75	0.00	0.00	0.00
NSDP and PVP	30.51	0.00	0.00	0.00
Grants for Drain Works	0.91	29.37	393.31	237.11
Other Grants	0.00	0.00	0.00	1136.38
Sub-Total	**258.18**	**43.55**	**393.31**	**1373.49**
TOTAL	**666.44**	**375.12**	**898.80**	**1624.32**
Share of Capital Receipts to Total Income	**21.90**	**16.20**	**28.30**	**44.05**

Source: Annual Accounts, Patna Municipal Corporation, 2001-02 to 2004-05;*Figures in parenthesis indicates negative*

9.5.2. *Capital Expenditure*

Capital expenditure has been directed towards new parks, water supply, sewerage and ODA grant works for improvement of slums. The overall status of the capital account

indicates a net surplus. The net surplus in capital accounts reveals that the funds from capital accounts are diverted for meeting the revenue expenditure **(Table 9.12).**

Table 9.12: Capital Expenditure (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
CAPITAL WORKS				
Construction of Public Conveniences	375.25	20.00	37.33	85.00
Construction of Markets	5.25	4.00	5.35	6.40
Construction of Schools	0.96	1.00	1.20	1.15
Development of New Parks	42.35	45.50	38.35	28.05
Health and Medical Services	3.51	3.75	4.25	4.10
Ward wise Community Works	159.45	53.64	101.37	222.80
Others	15.75	66.35	10.70	10.51
TOTAL	**602.51**	**194.24**	**198.54**	**358.00**
Share of Total Expenditure	*23.88*	*7.70*	*7.87*	*14.19*

Source: Annual Accounts, Patna Municipal Corporation, 2001-02 to 2004-05;*Figures in parenthesis indicates negative*

9.6. KEY ISSUES

The following issues emerge from the above analyses carried out on the municipal finances of PMC:

Revenue account status: The revenue account of PMC shows a deficit every year, with an operating ratio above unity throughout the review period.

Revenue Income: PMC has generated over 40 percent of revenue income through its own sources. Dependency on grants is to the extent of 15 percent.

Though property tax is the single largest own-source revenue income, in comparison with other major cities, there is scope for improvement by expanding the base by way of covering unassessed properties. It is also observed that the current average ARV per property is about INR 1200, indicating very low rentals values, thus providing scope to widen the base itself by way of identifying under assessed properties.

Revenue expenditure: Expenditure towards debt servicing has been about 0.1 percent of revenue income during the review period, which is well below the accepted threshold level of 20-25 percent. This figure might require review in light of overdue and/or unaccounted figures due to deduction at source by GoB.

It is observed that about 90 percent of revenue income is spent on salaries, which is well above the average when compared to other local bodies-the range being 30-40 percent of revenue income.

Capital account status: While the capital account has consistently indicated a deficit, indicating revenue surplus has been utilised to fund the capital works. However, the available revenue surplus would be under strain if debt servicing is done as per schedule under the current resource mobilisation pattern.

Table 9.13: Key Indicators of Finance Status Assessment of PMC

Items	2001-02	2002-03	2003-04	2004-05	AVERAGE
A. RESOURCE MOBILISATION					
Share of Own Sources in Revenue Income (%)	78.0	62.0	80.0	67.0	71.8
Growth in Revenue Income (%)	-	-18.39	17.40	-9.40	*-6.82*
Growth in Own Sources of Revenue Income (%)	-	-20.5	29.0	-16.3	-2.6
Share of Non-Tax to Revenue Income (%)	4.67	3.88	3.55	9.93	73.4
Share of Property Tax in Revenue Income (%)	73.8	72.3	79.8	67.5	73.2
B. EXPENDITURE MANAGEMENT					
Share of Establishment Expenditure to Revenue Expenditure (%)	100	97	122	101	105
Share of Establishment Expenditure to Revenue Income (%)	100.4	102.7	82.2	99.2	96.1
C. PERFORMANCE ASSESSMENT					
Revenue Account Balance	645.86	(383.49)	(1227.67)	(651.77)	19.62
Capital Account Balance	63.93	180.89	700.26	1266.32	552.85
Operating Ratio(RE/RI)	0.73	1.20	1.54	1.32	1.20
Debt Servicing Ratio	0.0	0.0	0.5	0.1	0.2
Capital Utilization Ratio	0.90	0.52	0.22	0.22	0.47
% of Revenue Income on Establishment	73	117	187	133	127

Source: Annual Accounts, Patna Municipal Corporation, 2001-02 to 2004-05;*Figures in parenthesis indicates negative*

9.7. FINANCIAL STATUS- DANAPUR NAGAR PARISHAD (DNP)

Revenue income of Danapur Nagar Parishad has increased to INR 179.72 lakhs in the FY 2004-05 from INR 65.27 lakhs in FY 2001-02; the revenue income has increased at annual rate of 28.5 per cent whereas the revenue expenditure increased at an average annual rate of 21.0 per cent.

Capital income of DNP comprises of loans and grants in the form of loan for infrastructure development and Grants for improvement of basic services in slums. A major share of capital income is in the form of grants. As observed in **Table 9.14**, the capital account has witnessed a surplus-implying utilisation of capital income to fund revenue expenditure. It is observed that capital expenditure has been inconsistent during the review period. During FY 2004-05, capital expenditure had increased to INR 7 lakhs from INR 5.0 lakhs in the FY 2001-02.

Table 9.14: Financial Status of DNP (In Lakh Rs)

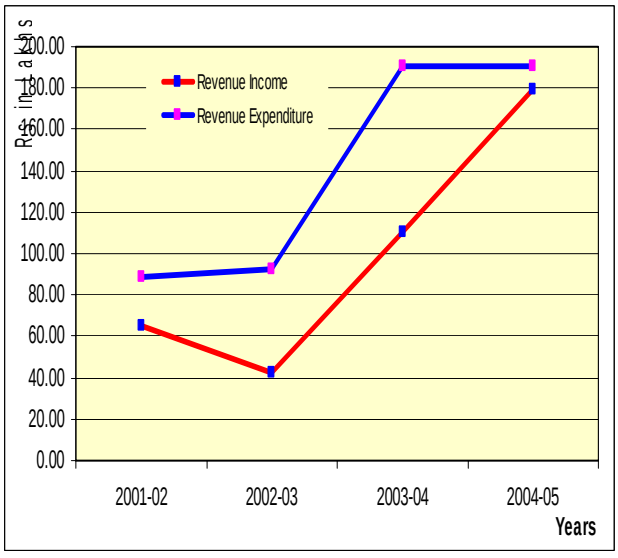
Items	2001-02	2002-03	2003-04	2004-05
A. REVENUE ACCOUNT				
Income	65.27	42.41	110.77	179.72
Expenditure	88.78	92.79	190.29	190.32
A Surplus/Deficit	*(23.50)*	*(50.37)*	*(79.51)*	*(10.60)*

Items	2001-02	2002-03	2003-04	2004-05
B. CAPITAL ACCOUNT				
Income	15.40	21.10	47.76	58.53
Expenditure	4.51	0.47	1.76	6.85
B Surplus/Deficit	*10.89*	*20.63*	*46.00*	*51.68*
C. ADVANCES AND DEPOSITS				
Income	0.00	0.00	0.00	0.00
Expenditure	3.26	0.77	1.90	2.55
C Surplus/Deficit	*(3.26)*	*(0.77)*	*(1.90)*	*(2.55)*
Overall Status	**(15.88)**	**(30.52)**	**(35.42)**	**38.54**

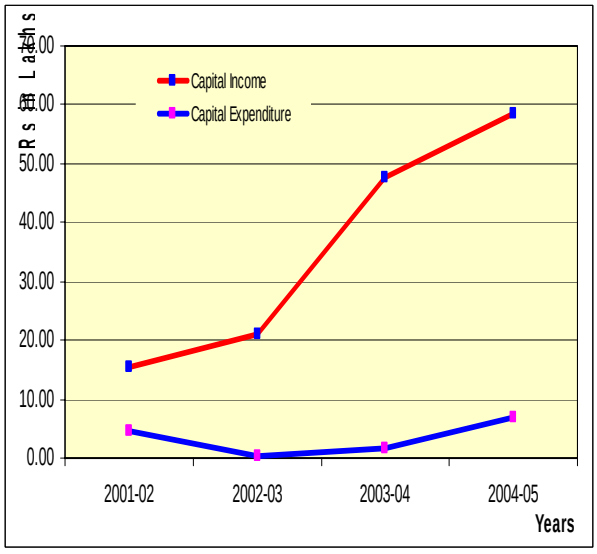
Source: Annual Accounts, Danapur Nagar Parishad, 2001-02 to 2004-05, *Figures in parenthesis indicates negative*

Further review of the revenue and capital accounts indicates that deficit has increased over period of 2001-02 to 2003-04. The surplus in 2004-05 has been attributed to high surplus in capital account and increase in revenue income. The gap in income and expenditure is clear from figure below.

Graph 9e



Graph9f



9.8. REVENUE ACCOUNT- DNP

The revenue account comprises of two components, revenue income and revenue expenditure. Revenue income comprises of internal resources in the form of tax and non-tax items. External resources are in the form of shared taxes/transfers and revenue grants from the State Government. Revenue expenditure comprises of expenditure incurred on salaries, operation & maintenance expenditure and debt servicing (Table 9.15).

Graph 9g (i)

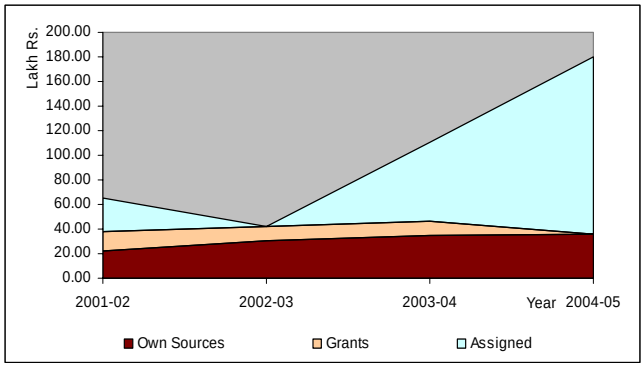


Table 9.15: Source wise Revenue Income (In Lakh Rs)

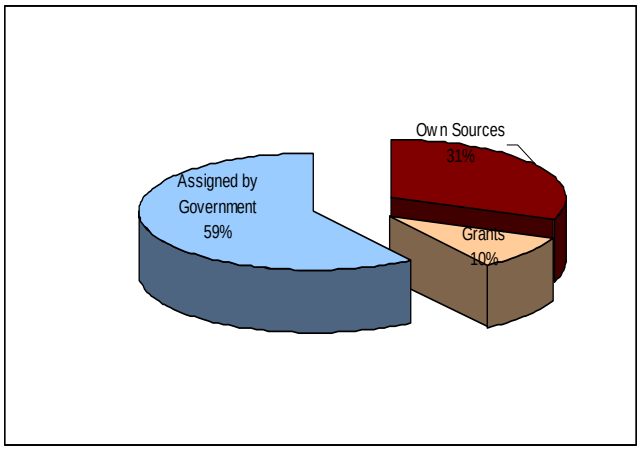
Items	2001-02	2002-03	2003-04	2004-05	Average
A Own Sources	22.21	30.22	35.11	35.39	30.73
B. Grants	15.48	12.19	11.23	0.09	9.75
C. Assigned Revenue	27.59	0.00	64.43	144.24	59.06
Revenue Account	65.27	42.41	110.77	179.72	99.54

Source: Annual Accounts, Danapur Nagar Parishad, 2001-02 to 2004-05, *Figures in parenthesis indicates negative*

9.8.1. *Own Sources*

Own-source income includes income from resource mobilisation activities of DNP in the form of taxes, user fees, fines, trade licences, etc. Own revenue sources are further classified as tax and non-tax sources that are generated by various sections of the DNP.

Tax Sources: The revenue income by taxes, fines and fees are categorised as General Administration; Communication & Engineering; Remunerative Enterprises. About 30% of the revenue is contributed by Tax Sources, which includes Property tax and Professionals and Trade Tax respectively.



Graph9g (ii)

Table 9.16: Revenue Income from Own Sources-Tax and Non-Tax (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
Tax Revenue				
Property Tax	18.53	20.48	20.22	23.21
Other Taxes	0.73	0.29	0.65	0.39
Sub-Total	**19.26**	**20.77**	**20.86**	**23.60**
Non-Tax Revenue				
Communications	0.85	0.54	0.66	0.60
Remunerative Enterprises	2.10	8.91	13.58	11.19
Sub-Total	2.95	9.45	14.25	11.79
TOTAL	**22.21**	**30.22**	**35.11**	**35.39**
Share to Revenue Income (%)	**34.02**	**71.25**	**31.70**	**19.69**

Source: Annual Accounts, Danapur Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

The essential features of this head of revenue income are listed below:

- Income from own sources accounts to about 40 percent of revenue income, and has increased at an average rate of 5.0 percent per annum. Major items of own-source income, contributing towards revenue income, include property tax (37%). Own sources of income are consistent during 2001-02 to 2004-05.
- The property tax is collected based on the assessment of 1996. The government is in the process of revising the property tax assessment and include Danapur Nagar Parishad in PMC area. The annual rental value for the DNP is presented in Table 9.17.

Non-Tax Sources: Non-tax sources include all non-tax revenues such as fees and charges levied as per the Bihar Municipalities Act 1963. Such revenue sources include income from special services, etc. The major sections contributing non-tax income include General Administration, Births and Death Certificate and Income from Remunerative Enterprises.

The income from non-tax revenue receipts has increased from Rs 3.0 Lakhs in FY 2001–02 to Rs. 12.0 in FY 2004–05 (Table 9.17). There is no collection from sale of land and parking fees which can be exploited for enhancing the revenue sources.

Table 9.17: Composition of Non-Tax Revenue of DNP (Rs Lakhs)

Items	2001-02	2002-03	2003-04	2004-05
Communications				
Road Cutting Charges	0.10	0.23	0.27	0.07
Parking Fees	0.00	0.00	0.00	0.00
Charges for Use of Public Vehicles	0.75	0.31	0.39	0.53
Miscellaneous	0.00	0.00	0.00	0.00
Sub-Total	**0.85**	**0.54**	**0.66**	**0.60**
Remunerative Enterprises				
Sale of Produce of Lands	0.0	0.0	0.0	0.0
D & O Trade License Fee	0.00	0.02	0.06	0.06
Market and Abhotoir Fees	0.00	0.00	0.00	0.00
Rent of Land, Tourist Banglow and Others	0.49	0.00	0.54	1.28
Mutation Fees	0.07	0.11	0.11	0.06
Stamp Fees	0.62	0.03	0.01	5.88
Income from vendors and Stalls	0.32	8.45	12.36	3.68
Lorry & Cycle Stand Fees	0.52	0.17	0.36	0.00
Electric Cremation Fees	0.00	0.00	0.00	0.00
Water Supply	0.00	0.00	0.00	0.00
Miscellaneous	0.07	0.13	0.13	0.24
Sub-Total	**2.1**	**8.9**	**13.6**	**11.2**
TOTAL	**2.95**	**9.45**	**14.25**	**11.79**
Share to Revenue Income (%)	**4.51**	**22.28**	**12.86**	**6.56**

Source: Annual Accounts, Danapur Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

Stamp Duty: Surcharge on stamp duty is a major assigned revenue source, accounting for 38 percent of revenue income. It is levied in the form of a surcharge on stamp duty applicable on all properties registered or transferred within DNP limits. The Revenue Department has been collecting this tax since 1980 and 2% of the total collections of stamp fees are transferred to DNP. The proceeds from this source have registered an average annual growth of about 2.2 per cent.

Grants and Contributions: The Nagar Parishad receives revenue grants and compensations from the State Government under various heads. The regular revenue grants are listed in Table 9.18. Planned grants from the state government have substantially declined from Rs 15.5 Lakhs in FY 2001-02 to Rs 0.1 Lakhs in FY 2004-05.

Graph 9h(i)

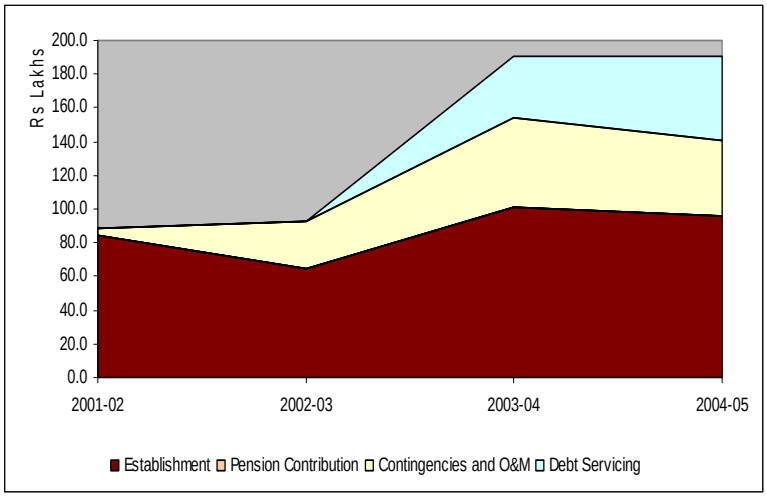


Table 9.18: Grant and Compensations (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
GRANTS AND CONTRIBUTION				
Grants for Salary of Staffs	12.4	11.9	11.2	0.0
Grants for Election and Census	3.1	0.3	0.0	0.1
TOTAL	15.48	12.19	11.23	0.09
Share to Revenue Income (%)	**23.71**	**28.75**	**10.14**	**0.05**

Source: Annual Accounts, Danapur Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

9.8.2. *Revenue Expenditure*

Revenue expenditure has been analysed based on expenditure heads broadly classified under the following sections of DNP - General Administration, Collection Establishment, Office of elected representatives, Pensionary Contribution, Health & medical Services; Public safety-Street Lighting, Drainage, Public Health, Remunerative enterprises and Debt Servicing.

Revenue expenditure is further classified under establishment and contingencies (O&M). Besides the above items of expenditure, pension contributions constitute a substantial proportion of revenue expenditure. Application of funds by each sector is presented in Table 9.19.

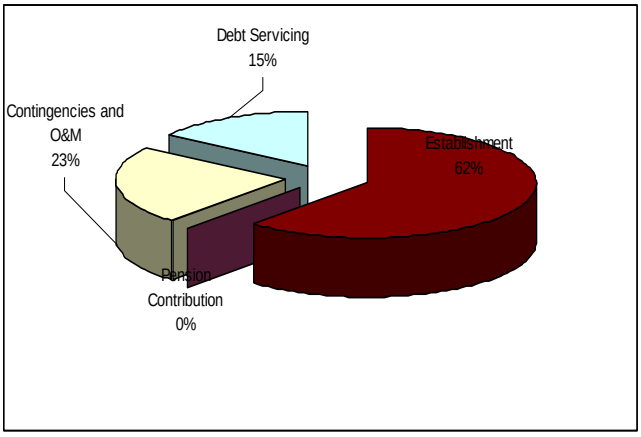
Table 9.19: Sector wise application of Revenue Expenditure (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05	Average	%age
Establishment	84.5	64.5	101.2	95.8	86.5	61.5
Pension Contribution	0.0	0.0	0.0	0.0	0.0	0.0
Contingencies and O&M	4.3	28.3	52.7	44.4	32.4	23.1
Debt Servicing	0.0	0.0	36.4	50.1	21.6	15.4
TOTAL	**88.8**	**92.8**	**190.3**	**190.3**	**140.5**	**100.0**

Source: Annual Accounts, Danapur Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

Establishment expenditure alone accounts for over 60 per cent of revenue expenditure. In comparison with revenue income, over 85 per cent is utilized for payment of salaries and pensions. Debt Servicing is about 15 per cent of revenue expenditure.

Graph 9h(ii)



For the assessment period, revenue expenditure grew at an average rate of 11.0 percent, while the corresponding increase in revenue income was 29 percent. This growth indicates that DNP expenditure is commensurate with its income.

Further, while expenditure on establishment increased at annual average rate of 5 per cent, expenditure on O&M grew at an average rate of 79 percent per annum.

Analysis of heads under revenue expenditure has been carried out with regard to establishment, operation & maintenance, and debt servicing. The following sections detail the same.

Establishment Expenditure: Establishment expenditure of all sections accounts are over 60 per cent of total revenue expenditure. The salary bill alone of DNP, during FY 2004-05, was Rs 95.8 lakh and constituted 50% of total revenue expenditure for the corresponding year. Details of establishment expenditure have been indicated in Table 9.20.

Table 9.20: Section wise Establishment Expenditure (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
General Administration	4.19	2.11	4.08	3.72
Collection Establishment	10.67	5.86	10.75	9.77
Office of Elected Member	5.65	2.73	1.11	1.66
Communication	0.00	0.06	0.00	0.26
Health & Medical Services	37.11	39.23	61.29	58.74
Public Health	26.85	14.52	24.00	21.63
TOTAL	**84.47**	**64.51**	**101.23**	**95.78**

Source: Annual Accounts, Danapur Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

It is observed from the Table 9-10 that

- Expenditure on establishment, incurred by health and medical services accounts is over 60 per cent of total establishment expenditure. Being a core service driven by a huge workforce/manpower, the high expenditure cost is expected.
- The next major establishment expenditure incurring sections are public health and collection establishment.

Operation and Maintenance Expenditure: Operation and maintenance expenditure of all section together accounts for 23 per cent (excluding revenue investments in short-term deposits) of revenue expenditure. The total O&M expenditure during FY 2004-05 was Rs 44.4 lakh (Table 9.1021).

Table 9.21: Section wise O&M Expenditure (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
Collection Establishment	0.00	0.00	6.33	6.61
Health & Medical Services	0.00	27.50	29.95	35.57
Public Health	2.87	0.64	16.22	2.00
Remunerative Enterprises	0.73	0.14	0.21	0.26
TOTAL	**3.6**	**28.28**	**52.71**	**44.44**

Source: Annual Accounts, Danapur Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

Debt Servicing: A review of the outstanding loan statement of DNP reveals that the net outstanding debt liabilities of DNP are Rs 196.17 lakh in the assessment year. It needs mention that DNP has done debt servicing of Rs 86.45 lakh in the assessment year.

9.9. CAPITAL ACCOUNT- DNP

9.9.1. *Capital Income*

Capital income comprises loans, grants and contributions. The detailed components of capital income are enumerated in Table 9.1122. An analysis of this account indicates that percentage share of capital income is in the form loans has declined from 80 to Zero per cent and percentage share by way of grants has increased from 20 to 100 percent. It also reveals that during the review period capital income was inconsistent due to irregular flow of scheme specific grants.

Table 9.22: Capital Income (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
A LOANS				
General Accounts	12.40	11.88	11.23	0.00
Sub-Total	**12.40**	**11.88**	**11.23**	**0.00**
B. GRANTS				
Grants from ODA	0.00	0.00	0.00	1.31
Grants for Drain Works	3.00	0.00	0.00	0.00
Other Grants	0.00	9.22	36.53	57.22
Sub-Total	**3.00**	**9.22**	**36.53**	**58.53**
TOTAL	**15.40**	**18.10**	**47.76**	**58.53**
Share of Capital Receipts to Total Income	**19.1**	**33.2**	**30.1**	**24.6**

Source: Annual Accounts, Danapur Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

9.9.2. *Capital Expenditure*

Capital expenditure has been directed towards ward wise community works and other works. The overall status of the capital account indicates a net surplus. The net surplus in capital accounts reveals that the funds from capital accounts are diverted for meeting the revenue expenditure (Table 9.23).

Table 9.23: Capital Expenditure (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
CAPITAL WORKS				
Ward wise Community Works	0.43	0.34	1.76	6.76
Others	4.08	0.13	0.00	0.09
TOTAL	**4.51**	**0.47**	**1.76**	**6.85**

Source: Annual Accounts, Danapur Nagar Parishad, 2001-02 to 2004-05;*Figures in parenthesis indicates negative*

9.10. SUMMARY OF PERFORMANCE INDICATORS- DNP

DNP has generated over 25 percent of revenue income through its own sources. Dependency on grants is to the extent of 10 percent. Though property tax is the single largest own-source revenue income, in comparison with other major cities, there is scope for improvement by expanding the base by way of covering unassessed properties. The performance indicators of the DNP are presented in Table 9.24 below.

Table 9.24: Key Indicators of Finance Status Assessment of DNP

Items	2001-02	2002-03	2003-04	2004-05	AVERAGE
A. RESOURCE MOBILISATION					
Share of Own Sources in Revenue Income (%)	29.51	48.97	18.83	13.13	27.61
Growth in Revenue Income (%)	-	-35.02	161.18	62.24	62.8
Growth in Own Sources of Revenue Income (%)	-	7.84	0.45	13.11	7.13
Share of Non-Tax to Revenue Income (%)	70.49	51.03	81.17	86.87	72.39
Share of Property Tax in Revenue Income (%)	28.40	48.28	18.25	12.91	37.60
B. EXPENDITURE MANAGEMENT					
Share of Establishment Expenditure to Revenue Expenditure (%)	95.14	69.52	53.20	50.32	67.05
Share of Establishment Expenditure to Revenue Income (%)	129.4	152.1	91.4	53.3	106.55
C. PERFORMANCE ASSESSMENT					
Revenue Account Balance					
Capital Account Balance	10.89	20.63	46.00	51.68	32.30
Operating Ratio(RE/RI)	1.36	2.19	1.72	1.06	1.58
Debt Servicing Ratio (%)	0.0	0.0	32.8	27.9	15.18
Capital Utilization Ratio (%)	0.29	0.02	0.04	0.12	0.12
% of Revenue Income on Establishment	129	152	91	53	106.25

Source: Annual Accounts, Danapur Nagar Parishad, 2001-02 to 2004-05;Figures in parenthesis indicates negative

9.11. FINANCIAL STATUS - KHAGUL NAGAR PARISHAD (KNP)

Revenue income of Khagul Nagar Parishad shows a varying trend over an assessment year. It has been observed that income has increased marginally to INR 4.57 lakhs in the FY 2004-05 from INR 3.32 lakhs in FY 2001-02.

Capital incomes of KNP are mainly in the form of grants for infrastructure development and improvement of basic services in slums. As observed in **Table 9.25**, the capital account has witnessed a surplus-implying utilisation of capital income to fund revenue expenditure. It is observed that capital expenditure has been inconsistent during the review period. During FY

2004-05, capital expenditure had increased to about Rs.7.00 lakhs from about Rs.4.00 lakhs in the FY 2001-02.

Table 9.25: Financial Status of KNP (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
A. REVENUE ACCOUNT				
Income	3.32	7.78	20.96	4.57
Expenditure	11.39	12.12	14.83	15.26
A Surplus/Deficit	(8.07)	(4.35)	6.12	(10.70)
B. CAPITAL ACCOUNT				
Income	3.25	3.49	21.45	15.78
Expenditure	3.90	3.57	4.09	7.03
B Surplus/Deficit	*(0.65)*	*(0.08)*	*17.35*	*8.75*
C. ADVANCES AND DEPOSITS				
Income	0.00	0.00	0.00	0.00
Expenditure	0.06	0.06	0.20	0.06
C Surplus/Deficit	*(0.06)*	*(0.06)*	*(0.20)*	*(0.06)*
Overall Status	(6.34)	(0.36)	28.13	7.97

Source: Annual Accounts, Khagul Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

9.12. REVENUE ACCOUNT- KNP

The revenue account comprises of two components, revenue income and revenue expenditure. The detailes of revenue from own sources-Tax & Non-Tax; Grants and assigned revenue are presented in Table 9.26.

Table 9.26: Source wise Revenue Income (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05	Average
A Own Sources	3.32	7.78	20.96	4.57	9.15
B. Grants	0.00	3.65	4.29	0.00	1.99
C. Assigned Revenue	0.00	0.00	0.00	0.00	0.00
Revenue Account	**3.32**	**11.43**	**25.24**	**4.57**	**11.14**

Source: Annual Accounts, Khagul Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

9.12.1. *Own Sources*

Own-source income includes income from resource mobilisation activities of KNP in the form of taxes, user fees, fines, trade licences, etc. Own revenue sources are further classified as tax and non-tax sources that are generated by various sections of the KNP.

Tax Sources: The revenue income by taxes, fines and fees are categorised as General Administration; Communication & Engineering; Remunerative Enterprises. About 60% of the revenue is contributed by Tax Sources, includes only Property tax (Table 9.27).

Table 9.27: Revenue Income from Own Sources-Tax and Non-Tax (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
Tax Revenue				
Property Tax	1.12	1.55	1.95	2.40

Other Taxes	0.00	0.00	0.00	0.00
Sub-Total	**1.12**	**1.55**	**1.95**	**2.41**
Non-Tax Revenue				
Communications	0.00	0.00	0.00	0.00
Remunerative Enterprises	2.20	2.58	14.72	2.16
Sub-Total	**2.20**	**2.58**	**14.72**	**2.16**
TOTAL	**3.32**	**4.12**	**16.67**	**4.57**
Share to Revenue Income (%)	**100**	**53**	**80**	**100**

Source: Annual Accounts, Khagul Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

Non-Tax Sources: Non-tax sources include all non-tax revenues such as fees and charges levied as per the Bihar Municipalities Act 1963. Such revenue sources include income from special services, etc. The major sections contributing non-tax income include General Administration, Births and Death Certificate and Income from Remunerative Enterprises.

The income from non-tax revenue receipts has remained constant through out the assessment year but has increased to Rs 15 Lakh in 2003-04 (Table 9.28). There is no collection from sale of land and parking fees which can be exploited for enhancing the revenue sources.

Table 9.28: Composition of Non-Tax Revenue of KNP (Rs Lakhs)

Items	2001-02	2002-03	2003-04	2004-05
Remunerative Enterprises				
Sale of Produce of Lands	0.01	0.01	0.01	0.03
D & O Trade Licence Fee	0.00	0.32	0.36	0.00
Market and Abhotoir Fees	0.24	0.26	0.30	0.33
Rent of Land, Tourist Banglow and Others	0.63	0.66	0.73	1.64
Stamp Fees	0.32	0.25	0.79	0.00
Miscellaneous	1.00	1.09	12.53	0.16
TOTAL	**2.20**	**2.58**	**14.72**	**2.16**
Share to Revenue Income (%)	*66.15*	*33.14*	*70.23*	*47.29*

Source: Annual Accounts, Khagul Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

Grants and Contributions: The Nagar Parishad receives revenue grants and compensations from the State Government under various heads. The regular revenue grants are listed in Table 9.29. Planned grants from the state government have substantially declined from Rs 15.5 Lakhs in FY 2001-02 to Rs 0.1 Lakhs in FY 2004-05.

Table 9.29: Grant and Compensations (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
GRANTS AND CONTRIBUTION				
Grants for Salary of Staffs	0.0	3.7	4.3	0.0
TOTAL	0.0	3.7	4.3	0.0
Share to Revenue Income (%)	**0.00**	**46.98**	**20.47**	**0.00**

Source: Annual Accounts, Khagul Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

9.12.2. *Revenue Expenditure*

Revenue expenditure has been analysed based on expenditure heads broadly classified under the following sections of KNP - General Administration, Collection Establishment,

Health & medical Services; Public safety-Street Lighting, Drainage, Public Health, Remunerative enterprises and Debt Servicing.

Revenue expenditure is further classified under establishment and contingencies (O&M). Besides the above items of expenditure, pension contributions constitute a substantial proportion of revenue expenditure. Application of funds by each sector is presented in **Table 9.30.**

Table 9.30: Sector wise application of Revenue Expenditure (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05	Average	%age
Establishment	2.0	1.1	2.4	3.1	2.1	15.9
Pension Contribution	0.0	0.0	0.0	0.0	0.0	0.0
Contingencies and O&M	8.4	10.0	12.5	10.9	10.4	77.8
Debt Servicing	1.0	1.1	0.0	1.3	0.8	6.3
TOTAL	**11.4**	**12.1**	**14.8**	**15.3**	**13.4**	**100.0**

Source: Annual Accounts, Khagul Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

Establishment expenditure alone accounts for 15 per cent of revenue expenditure. Debt Servicing is 6 per cent of revenue expenditure.

For the assessment period, revenue expenditure grew at an average rate of 7.6 per cent, while the corresponding increase in revenue income was 8.3 per cent.

Analysis of heads under revenue expenditure has been carried out with regard to establishment, operation & maintenance, and debt servicing. The following sections detail the same.

Establishment Expenditure: Establishment expenditure of all sections accounts are over 15 per cent of total revenue expenditure. The salary bill alone of KNP, during FY 2004-05, was Rs 3.1 lakh and constituted 20% of total revenue expenditure for the corresponding year. Details of establishment expenditure have been indicated in Table 9.31.

Table 9.31: Section wise Establishment Expenditure (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
General Administration	0.00	0.00	0.13	0.00
Collection Establishment	1.13	0.12	1.18	1.05
Office of Elected Member	0.00	0.00	0.00	0.14
Health & Medical Services	0.76	0.86	0.92	1.31
Drainage	0.14	0.10	0.13	0.42
Public Health	0.00	0.00	0.00	0.15
TOTAL	**2.0**	**1.1**	**2.4**	**3.1**

Source: Annual Accounts, Khagul Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

Operation and Maintenance Expenditure: Operation and maintenance expenditure of all section together accounts for 23 per cent (excluding revenue investments in short-term deposits) of revenue expenditure. The total O&M expenditure during FY 2004-05 was Rs 44.4 lakh (Table 9.32).

Table 9.32: Section wise O&M Expenditure (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
Collection Establishment	1.66	1.76	1.87	2.48
Public Safety and Street Lighting	0.00	0.00	0.02	0.00
Drainage	6.28	7.63	9.97	8.04
Public Health	0.44	0.57	0.59	0.40
Remunerative Enterprises	0.00	0.00	0.01	0.02
TOTAL	**8.4**	**10.0**	**12.5**	**10.9**

Source: Annual Accounts, Khagul Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

9.13. CAPITAL ACCOUNT- KNP

9.13.1. *Capital Income*

Capital income comprises loans, grants and contributions. The detailed components of capital income are enumerated in Table 9.33. An analysis of this account indicates that loans of Rs. 4.29 lakh has been received in 2003-04 and share by way of grants has increased from Rs 3.25 lakh to Rs 15.7 lakh.

Table 9.33: Capital Income (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
A LOANS				
General Accounts	0.00	0.00	4.29	0.00
Sub-Total	0.00	0.00	4.29	0.00
B. GRANTS				
NSDP and PVP	3.25	3.49	3.81	7.43
Other Grants	0.00	0.00	13.34	8.35
Sub-Total	3.25	3.49	17.16	15.78
TOTAL	**3.25**	**3.49**	**21.45**	**15.78**
Share of Capital Receipts to Total Incom e (% age)	***49***	***31***	***51***	***78***

Source: Annual Accounts, Khagul Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

9.13.2. *Capital Expenditure*

Capital expenditure has been directed towards ward wise community works and other works. The overall status of the capital account indicates a net surplus. The net surplus in capital accounts reveals that the funds from capital accounts are diverted for meeting the revenue expenditure (Table 9.34)

Table 9.34: Capital Expenditure (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
CAPITAL WORKS				
Ward wise Community Works	3.90	3.57	4.09	6.99
Others	0.00	0.00	0.00	0.04
TOTAL	**3.90**	**3.57**	**4.09**	**7.03**

Source: Annual Accounts, Khagul Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

9.14. SUMMARY OF PERFORMANCE INDICATORS - KNP

KNP has generated over 40 percent of revenue income through its own sources. Dependency on grants is to the extent of 14 percent. Though property tax is the single largest own-source revenue income, in comparison with other major cities, there is scope for improvement by expanding the base by way of covering unassessed properties. The performance indicators of the KNP are presented in Table below.

Table 9.35: Key Indicators of Finance Status Assessment of KNP

Items	2001-02	2002-03	2003-04	2004-05	AVERAGE
A. RESOURCE MOBILISATION					
Share of Tax Sources in Revenue Income (%)	33.85	19.87	9.31	52.71	39.32
Growth in Revenue Income (%)	134.30	169.42	(78.21)	134.30	75.17
Growth in Tax Sources of Revenue Income (%)	-	37.55	26.16	23.40	29.03
Share of Non-Tax to Revenue Income (%)	66.15	33.14	70.23	47.29	45.41
B. EXPENDITURE MANAGEMENT					
Share of Establishment Expenditure to Revenue Expenditure (%)	18	9	16	20	16
Share of Establishment Expenditure to Revenue Income (%)	61	14	11	67	38
C. PERFORMANCE ASSESSMENT					
Revenue Account Balance	(8.1)	(4.3)	6.13	(10.7)	(4.3)
Capital Account Balance	(0.6)	(0.08)	17.35	8.75	6.4
Operating Ratio(RE/RI)	3.43	1.56	0.71	3.34	2.3
Debt Servicing Ratio (%)	30.1	14.1	0.0	27.7	18.0
Capital Utilization Ratio (%)	1.20	1.02	0.19	0.45	0.72
% of Revenue Income on Establishment	61	14	11	67	38.3

Source: Annual Accounts, Khagul Nagar Parishad, 2001-02 to 2004-05; Figures in parenthesis indicates negative

9.15. FINANCIAL STATUS - PHULWARI SHERIF NAGAR PARISHAD (PSNP)

Revenue income of Phulwari Sherif Nagar Parishad shows a varying trend over an assessment year. It has been observed that income has increased to Rs. 23.19 lakhs in the FY 2004-05 from Rs. 6.97 lakhs in FY 2001-02. The enhanced collection of property tax during 2004-05.

Capital incomes of PSNP are mainly in the form of grants for infrastructure development and improvement of basic services in slums. As observed in **Table 9.36**, the capital account has witnessed a surplus-implying utilisation of capital income to fund revenue expenditure. It is observed that capital expenditure has been inconsistent during the review period. During FY 2004-05, capital expenditure had increased to about Rs. 10.00 lakhs from about Rs. 9.00 lakhs in the FY 2001-02.

Table 9.36: Financial Status of PSNP (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
A. REVENUE ACCOUNT				
Income	6.97	9.06	20.57	23.19
Expenditure	11.71	16.21	19.82	22.57
A Surplus/Deficit	*(4.73)*	*(7.15)*	*0.75*	*0.62*
B. CAPITAL ACCOUNT				
Income	27.82	13.97	13.77	41.31
Expenditure	8.76	5.37	7.56	9.73
B Surplus/Deficit	*19.06*	*8.60*	*6.21*	*31.58*
C. ADVANCES AND DEPOSITS				
Income	0.00	0.00	0.00	0.00
Expenditure	0.06	0.16	0.19	0.09
C Surplus/Deficit	-0.06	-0.16	-0.19	-0.09
Overall Status	**14.27**	**1.29**	**6.77**	**32.11**

Source: Annual Accounts, Phulwari Sherif Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

9.16. REVENUE ACCOUNT – PSNP

The revenue account comprises of two components, revenue income and revenue expenditure. The detailes of revenue from own sources-Tax & Non-Tax; Grants and assigned revenue are presented in Table 9.37.

Table 9.37: Source wise Revenue Income (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05	Average
A Own Sources	5.95	7.82	18.72	21.81	13.57
B. Grants	1.02	1.24	1.85	1.39	1.37
C. Assigned Revenue	0.00	0.00	0.00	0.00	0.00
Revenue Account	**6.97**	**9.06**	**20.57**	**23.19**	**14.95**

Source: Annual Accounts, Phulwari Sherif Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

9.16.1. *Own Sources*

Own-source income includes income from resource mobilisation activities of PSNP in the form of taxes, user fees, fines, trade licences, etc. Own revenue sources are further classified as tax and non-tax sources that are generated by various sections of the PSNP.

Tax Sources: The revenue income by taxes, fines and fees are categorised as General Administration; Communication & Engineering; Remunerative Enterprises. About 70% of the revenue is contributed by Tax Sources, includes only Property tax (Table 9.38).

Table 9.38: Revenue Income from Own Sources-Tax and Non-Tax (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
Tax Revenue				
Property Tax	4.62	5.99	8.96	19.99
Other Taxes	0.01	0.02	0.00	0.00

Sub-Total	**4.62**	**6.01**	**8.96**	**19.99**
Non-Tax Revenue				
Communications	0.00	0.00	0.00	0.00
Remunerative Enterprises	1.33	1.82	9.76	1.81
Sub-Total	**1.33**	**1.82**	**9.76**	**1.81**
TOTAL	**5.95**	**7.83**	**18.62**	**21.80**

Source: Annual Accounts, Phulwari Sherif Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

Non-Tax Sources: Non-tax sources include all non-tax revenues such as fees and charges levied as per the Bihar Municipalities Act 1963. Such revenue sources include income from special services, etc. The major sections contributing non-tax income include General Administration, Births and Death Certificate and Income from Remunerative Enterprises.

The income from non-tax revenue receipts has remained constant through out the assessment year but has increased to Rs 10 Lakh in 2003-04 (Table 9.39). There is least collection from sale of land and parking fees which can be exploited for enhancing the revenue sources.

Table 9.39: Composition of Non-Tax Revenue of PSNP (Rs Lakhs)

Items	2001-02	2002-03	2003-04	2004-05
Remunerative Enterprises				
Sale of Produce of Lands	0.02	0.01	0.01	0.05
D & O Trade Licence Fee	0.72	0.82	0.93	0.83
Rent of Land, Tourist Banglow and Others	0.46	0.53	8.34	0.94
Stamp Fees	0.13	0.46	0.48	0.00
TOTAL	**1.33**	**1.82**	**9.76**	**1.82**

Source: Annual Accounts, Phulwari Sherif Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

Grants and Contributions: The Nagar Parishad receives revenue grants and compensations from the State Government under various heads. The regular revenue grants are listed in **Table 9.40**. The grants for state government are for meeting the expenses for employee salaries.

Table 9.40: Grant and Compensations (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
GRANTS AND CONTRIBUTION				
Grants for Salary of Staffs	1.0	1.2	1.9	1.4
TOTAL	**1.0**	**1.2**	**1.9**	**1.4**

Source: Annual Accounts, Phulwari Sherif Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

9.16.2. *Revenue Expenditure*

Revenue expenditure has been analysed based on expenditure heads broadly classified under the following sections of PSNP - General Administration, Collection Establishment, Health & medical Services; Public safety-Street Lighting, Drainage, Public Health, Remunerative enterprises and Debt Servicing.

Revenue expenditure is further classified under establishment and contingencies (O&M). Besides the above items of expenditure, pension contributions constitute a substantial proportion of revenue expenditure. Application of funds by each sector is presented in **Table 9.41.**

Table 9.41: Sector wise application of Revenue Expenditure (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05	Average	%age
Establishment	2.3	4.2	5.3	6.1	4.5	25.4
Pension Contribution	0.0	0.0	0.0	0.0	0.0	0.0
Contingencies and O&M	8.4	11.0	14.5	15.2	12.3	69.8
Debt Servicing	1.0	1.1	0.0	1.3	0.8	4.8
TOTAL	**11.7**	**16.2**	**19.8**	**22.6**	**17.6**	**100.0**

Source: Annual Accounts, Phulwari Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

Establishment expenditure alone accounts for 25 per cent of revenue expenditure. Debt Servicing is 5 per cent of revenue expenditure.

Analysis of heads under revenue expenditure has been carried out with regard to establishment, operation & maintenance, and debt servicing. The following sections detail the same.

Establishment Expenditure: Establishment expenditure of all sections accounts are over 25 per cent of total revenue expenditure. The salary bill alone of PSNP, during FY 2004-05, was Rs 6.1 lakh and constituted 17% of total revenue expenditure for the corresponding year. Details of establishment expenditure have been indicated in Table 9.42.

Table 9.42: Section wise Establishment Expenditure (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
Collection Establishment	1.35	1.68	2.25	2.85
Office of Elected Member	0.00	1.25	1.52	1.35
Health & Medical Services	0.76	0.96	1.22	1.51
Drainage	0.22	0.26	0.33	0.35
TOTAL	**2.33**	**4.15**	**5.32**	**6.06**

Source: Annual Accounts, Phulwari Sherif Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

Operation and Maintenance Expenditure: Operation and maintenance expenditure of all section together accounts for 60 per cent (excluding revenue investments in short-term deposits) of revenue expenditure. The total O&M expenditure during FY 2004-05 was Rs 15.5 lakh (Table 9.43).

Table 9.43: Section wise O&M Expenditure (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
Collection Establishment	1.66	1.76	2.86	2.95
Public Safety and Street Lighting	0.00	0.00	0.06	0.06
Drainage	6.28	8.63	10.97	11.80
Public Health	0.46	0.58	0.60	0.40
Remunerative Enterprises	0.00	0.00	0.01	0.02
TOTAL	**8.4**	**10.97**	**14.5**	**15.23**

Source: Annual Accounts, Phulwari Sherif Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

9.17. CAPITAL ACCOUNT - PSNP

9.17.1. *Capital Income*

Capital income comprises loans, grants and contributions. The detailed components of capital income are enumerated in Table 9.44. An analysis of this account indicates that loans of Rs. 31.17 lakh has been received in 2004-05 and share by way of grants varies from Rs 5 to Rs 10 lakhs.

Table 9.44: Capital Income (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
A LOANS				
General Accounts	11.00	7.00	5.00	10.00
Sub-Total	**11.00**	**7.00**	**5.00**	**10.00**
B. GRANTS				
NSDP and PVP	3.48	3.51	3.43	3.45
Other Grants	13.34	3.46	5.34	27.72
Sub-Total	**16.82**	**6.97**	**8.77**	**31.17**
TOTAL	**27.82**	**13.97**	**13.77**	**41.31**

Source: Annual Accounts, Phulwari Sherif Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

9.17.2. *Capital Expenditure*

Capital expenditure has been directed towards ward wise community works and other works. The overall status of the capital account indicates a net surplus. The net surplus in capital accounts reveals that the funds from capital accounts are diverted for meeting the revenue expenditure (Table 9.45).

Table 9.45: Capital Expenditure (In Lakh Rs)

Items	2001-02	2002-03	2003-04	2004-05
CAPITAL WORKS				
Ward wise Community Works	8.76	5.37	7.56	9.69
Others	0.00	0.11	0.10	0.08
TOTAL	**8.76**	**5.48**	**7.66**	**9.77**

Source: Annual Accounts, Phulwari Sherif Nagar Parishad, 2001-02 to 2004-05; *Figures in parenthesis indicates negative*

9.18. SUMMARY OF PERFORMANCE INDICATORS – PSNP

PSNP has generated over 90 percent of revenue income through its own sources.

Dependency on grants is to the extent of 6 percent. Though property tax is the single largest own-source revenue income, in comparison with other major cities, there is scope for improvement by expanding the base by way of covering unassessed properties. The performance indicators of the PSNP are presented in Table below.

Table 9.46: Key Indicators of Finance Status Assessment of PSNP

Items	2001-02	2002-03	2003-04	2004-05	AVERAGE
A. RESOURCE MOBILISATION					
Share of Tax Sources in Revenue Income (%)	66.27	66.30	43.54	86.19	68.63
Growth in Revenue Income (%)	-	29.95	127.03	12.75	35.1
Growth in Tax Sources of Revenue Income (%)	-	30.02	49.08	123.21	44.2
Share of Non-Tax to Revenue Income (%)	19.05	20.05	47.46	7.82	23.60
B. EXPENDITURE MANAGEMENT					
Share of Establishment Expenditure to Revenue Expenditure (%)	20	26	27	27	25
Share of Establishment Expenditure to Revenue Income (%)	33.24	45.84	25.88	26.15	26.63
C. PERFORMANCE ASSESSMENT					
Revenue Account Balance	(4.73)	(7.15)	0.75	0.62	(2.63)
Capital Account Balance	19.06	8.49	6.11	31.54	16.30
Operating Ratio(RE/RI)	1.68	1.79	0.96	0.97	1.35
Debt Servicing Ratio (%)	14.3	12.1	0.0	5.5	7.98
Capital Utilization Ratio (%)	0.3	0.4	0.6	0.2	0.38
% of Revenue Income on Establishment	33	46	26	26	32.75

Source: Annual Accounts, Phulwari Sherif Nagar Parishad, 2001-02 to 2004-05; Figures in parenthesis indicates negative

9.19. OVERVIEW OF PRDA FINANCES

This section covers the details of financial performance of Patna Regional Development Authority (PRDA) during the last five years. The PRDA generates its revenue through development charges/fees, rental income through the properties in its possession, stamp duty, maintenance charges, interest income etc.

During the last five years the grant reduced in first three years but after Year2003 there is substantial increase in the grant. The rental income reduced significantly from Rs 13.30 lakhs in 2001-02 to Rs 7.23 lakhs in 2004-05.

9.20. REVENUE ACCOUNT - PRDA

9.20.1. *Revenue Income*

The trend of revenue income in last five years is not very consistent as in the first three years there is substantial increase in income while in subsequent years there is sharp decline. The graph also shows the same as the revenue income reduced sharply in 2004 and in 2005 it shows a minimal increase.

The sharp decrease in revenue income in the initial years is because of sharp reduction in collection of stamp duty charges i.e around 97.69%, reduction of maintenance charges to 58.98% and also as there is no grant being received towards repairing of roads in the 2004 and 2005.

9.20.2. *Revenue Expenditure*

The revenue expenditure shows a reducing trend in initial three years because of reduction in repairs and maintenance charges. There is 86.72% reduction in repairs and maintenance charges in the Year 2002. The major expenditure item is salary & wages, which contributes around 38.31% and other administrative expenditure and repairs & maintenance contributes around 12.18% and 1.24% respectively.

9.21. CAPITAL ACCOUNT - PRDA

9.21.1. *Capital Income*

The capital income comprises of the grant received towards development of the State. The amount of grant varies between Rs.58.7 lakhs in 2001 to Rs.379.88 lakhs in 2005.

9.21.2. *Capital Expenditure*

The capital expenditure directed towards expenditure on development of fixed assets. The analysis of last five years shows no particular trend, as there is increase and decrease in the amount in each subsequent year.
The capitalization ratio is also calculated as the ratio of capital expenditure to capital income. In the first two years it's more than 1 which explains that the expenditure is more than the incomes while in the 2005 its 0.5 which explains that the capital income is twice more than the capital expenditure.

9.22. KEY ISSUES OF PRDA FINANCES

The revenue and capital account balances indicate that the PRDA is not quite able to meet its recurrent expenditure out of its own resources. The establishment costs seem on a higher side and exceed the revenue receipts because both the average capitals as well as revenue account balance are negative.

As explained above under the capital receipts generate maximum revenues. The share of sale of plots under the same is more which is 70% on an average and is growing at a faster rate than the capital receipts itself.

The operating ratio has been more than unity indicating a trend of going beyond means. Debt Servicing Ratio (DSR) helps in assessing the implication of debt on the department finances. But it has been observed that the department did not service their debt on regular basis.

Chapter 10: REVIEW OF INSTITUTIONAL FRAMEWORK

10.1. INTRODUCTION

This chapter presents the existing institutional framework in Patna region responsible for provision of urban infrastructure. In particular, it assesses the framework in the PMC and which is to be co-terminus with the PUA area through expansion of its jurisdiction. It presents institutional issues and the institutional development strategy. The first section of the chapter describes the reform action taken till now by government of Bihar, second section briefly describes about the agencies involved, while last section brings out the issues and recommendations.

10.2. KEY DEPARTMENTS AND LINKAGES IN PUA

The civic infrastructures Planning & Design, Construction & Execution, Operation & Maintenance are responsibility of about 15 departments in PUA and PRA. These departments and authorities are categorized as state level and city level. The state level departments are (i) Public Works Department (Road Construction Department and Building Department), Public Health Engineering Department, Bihar State Transport Corporation, Bihar Housing Board, District Urban Development Authority, and Urban Development Department. The department and authorities responsible for city level functions are Bihar Rajya Jal Parishad, Patna Regional Development Authority, Patna Municipal Corporation, Danapur Nagar Parishad, Khagul Nagar Parishad, Phulwari sherif Nagar Parishad. **Table 10.1** shows the department wise urban services management in the city region.

Table 10.1: Department wise Urban Services Management

Urban Services	PMC Area	Phulwari NP	Khagul NP	Danapur NP	PRDA
A. Water Supply					
Supply of Water	PMC	PHED	PHED	PHED	PHED
Maintenance of network	PMC, BRJP	PHED	PHED	PHED	PHED
Up gradation and laying of Network	BRJP, PHED	BRJP, PHED	BRJP, PHED	BRJP, PHED	BRJP, PHED
Collection of Water Charges	PMC and PWB	PHED	KNP	DNP	PHED
B. Sewerage System					
Construction of STP	Bihar Rajya Jal Parishad has constructed 3 Sewage Treatment Plant in PMC. There is no STP for Nagar Parishads in PUA.				
Laying of Network	BRJP	PHED	PHED	PHED	PHED
Construction of Community Toilets	DUDA, UDD, PMC	DUDA, UDD, PNP	DUDA, UDD, KNP	DUDA, UDD, DNP	DUDA, UDD
Maintenance on System	PMC	PNP	KNP	DNP	PHED
Collection of User Charges	PMC	PNP	KNP	DNP	PHED
C. Solid Waste Management					
Collection of Waste	PMC	PNP	KNP	DNP	NA

Urban Services	PMC Area	Phulwari NP	Khagul NP	Danapur NP	PRDA
Collection of User Charges	PMC	PNP	KNP	DNP	NA
D. Storm Water Drainage					
Construction of Drains	PWD, PMC, BRJP	PWD, PNP, BRJP	PWD, KNP, BRJP	PWD, DNP, BRJP	PWD, NHAI
Cleaning of Drains	PMC	PNP	KNP	DNP	PWD, NHAI
E. Roads					
Construction of Main Road	NHAI, PWD, PMC	NHAI, PWD	NHAI, PWD	NHAI, PWD	NHAI, PWD
Construction of Streets	PMC	PNP	KNP	DNP	PWD
Collection of Road Tax	RTO, DTO	RTO, DTO	RTO, DTO	RTO, DTO	RTO, DTO
F. Building Plan Approval	**PRDA**	**PRDA**	**PRDA**	**PRDA**	**PRDA**
G. Street Lighting					
Installation of Lights	BSEB, PMC	BSEB, PNP	BSEB, KNP	BSEB, DNP	NA
Maintenance	PMC	PNP	KNP	DNP	NA

Note: PMC-Patna Municipal Corporation; PNP-Phulwari Sherif Nagar Parishad; KNP-Khagul Nagar Parishad; DNP- Danapur Nagar Parishad; PRDA-Patna Regional Development Authority; PWD-Public Works Department; PHED-Public Health and Engineering Department; BRJP-Bihar Rajya Jal Parishad; RTO-Regional Transport Office; DTO-District Transport Office; BSEB-Bihar State Electricity Board; NHAI-National Highways Authority of India

10.2.1 PRDA (Patna Regional Development Authority)

After disbanding Patna Improvement Trust in **21st May 1975**, the Patna Regional Development Authority was formed in 1979 under the provision of Patna Regional Development Authority act 1978 for preparation of Regional Plan, Master Plan and Zonal Plan.

Constitution of PRDA

The authority consists of following members namely (a) a Chairman, who shall be the Minister of Urban Development Department of the State of Bihar or any person nominated by the state government and his tenure shall be generally of three years; (b) Vice Chairman, to be appointed by the State Government; (c) a Planning Member who shall be Chief Town Planner, Bihar or his nominee not below the rank of Assistant Town Planner; (d) 3 ex-officio member (Urban Local Bodies within Region) nominated by State Government; (e) Two other person to be nominated by the State Government of whom one shall be a person of administrative or technical experience and other shall be a social scientist; (f) Administrator/ Chief Executive Officer of the Municipal Corporation or Executive Officer/ Special Officer of the Municipality situated at Patna; (g) Chairman; Bihar State Housing Board or his nominee who should not be below the rank of Executive Engineer (Ex-Officio); (h) not more than three members of the Bihar Legislature of the Regional Development Area nominated by State Government; (i) Collector or Deputy Development Commissioner-cum-Chief Executive Officer of District, to be nominated by the State Government (Ex-Officio); (j) Chief Engineer, Public Health Engineering Department or his nominee not below the rank of Executive Engineer (Ex-Officio); (k) Chief Engineer, Public Works Department or his nominee not below the rank of Executive Engineer (Ex-Officio) and (l) Secretary, Urban Development Department or his nominee not below the rank of deputy secretary (Ex-Officio). The flow

chart showing organisational structure of PRDA is presented below.

Function and Power of PRDA

The function of PRDA as per provisions of "**Patna Regional Development Authority Act, 1978"** are presented in **Table 10.2.**

Table 10.2: Functions and Power of PRDA

Functions and Power as per Act	Functions Performed by PRDA	Overlapping Functions with Other Departments
Planning and Execution of schemes relating to the Development Areas	PRDA is undertaking redevelopment schemes in the old city area and in the periphery of the municipal corporation area.	The development schemes are also undertaken by Bihar Housing Board
To specify development projects for the implementation of fund received for the development works	PRDA is responsible for development of new areas in the City	Bihar Housing Board
To provide for the setting up of planning information and storage retrieval systems	The official website for providing planning information is under construction	-
Establishment of Regional and Development Area and alteration of their limits	The PRDA area has been delineated on 12th June 1975 covering area of Revenue Thana Danapur; Phulwari, Patna City and Futwah and Anchal of Raghopur; Sonepur; Dighwara, Phulwari, Patna Rural and Fatwa	-
Preparation of Regional Plan, Master Plan and Zonal Development Plan	The Master Plan for Patna 2021 is under preparation and final plan has been submitted in July	-
Acquisition and Disposal of Land	The land acquisition is done for the planning purpose in the PRDA area	Land acquisition is also done by Land Revenue department headed by the District collector
Development of Land and Building Control	The building control regulations are prepared as part of Master plan for regulating development in the MP area	-
Preparation of Layout Plan	The layout for new areas are prepared by PRDA	The state government also prepare layout plan for government colonies
Sanction of Building Plan	The building plans are sanctioned by PRDA	

The PRDA has a 19 member authority: They can conveniently be upgraded to a 40 member MPC – with not more than 13 members being ex-officio by designation. The remaining 27 members have to be from the elected PRDA constitutions i.e. councillors / Panchayats, MLA's and MP's with the Minister UD of the state as chairman. At least 18 of the 27 members should be from the local body with PMC in the majority. The PMPC would prepare the regional prespective perfective plan (20 years with 5 year programmes) so that PMC and other local bodies could prepare plans for their jurisdictives. Such plans are to be disaggregated with zones, wards and area/ grama sabhas.

10.2.2 PMC (Patna Municipal Corporation)

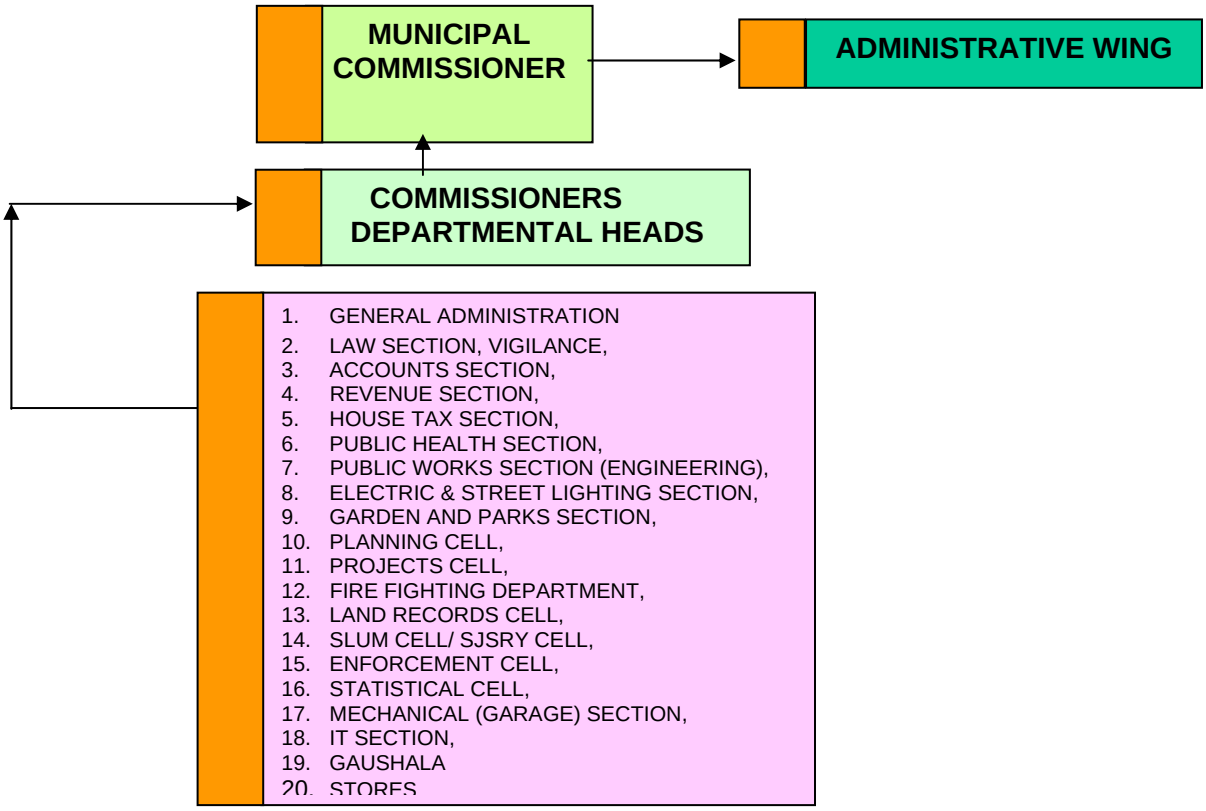
Constitutional Framework

The PMC functions under the "the Patna Municipal Corporation Municipalities Act, 1956" and further amendments to it. The act fall short to fulfill the spirit of 74th CAA, as PMC still has to seek approval from Directorate of Local Bodies.

Organizational Structure

The governance structure of PMC is divided into two wings viz., elected wing and administrative wing. Patna has Mayor-in-Council system. Mayor in Council comprises 57 elected members from 57 wards, 3-co-opted members, 1 MLAs and 1MPs. Mayor is Chairperson of the Council. Also, there are functional committees on various subjects, namely executive committee, finance committee, health committee, building and works committee, rules and byelaws committee, garage committee, license committee, house tax committee, electric and public lighting committee.

FUNCTIONS OF MUNICIPAL COMMISSIONER



The Municipal Commissioner oversees the functioning of administrative wing. The commissioners and departmental heads assist him. Departments includes, General Administration, Law Section, Vigilance, Accounts Section, Revenue Section, House Tax Section, Public Health Section, Public Works Section (Engineering), Electric & Street Lighting Section, Garden and Parks Section, Planning Cell, Projects Cell, Fire Fighting Department, Land Records Cell, Slum Cell/ SJSRY Cell, Enforcement Cell, Statistical Cell, Mechanical (Garage) Section, IT Section, Gaushala and Stores.

For administrative purposes The Nagar Nigam area is divided into 4 zones with zonal. Commissioners to head each zonal office. After the zonal offices there are 57 ward offices at lower level. (The Administrative Reform Commission have now recommended that the wards be composed of 'area sabhas' centering round a polling booth (1700 persons or 1000 voters per booth). This would help in the PPP process.

Functions

The functions of PMC are listed in Patna Municipal Corporation Act 1951. It provides for mandatory functions and provides for discretionary functions of PMC. The major function of PMC are: city cleanliness, solid waste management, maintenance of gardens/dividers/circles, street light, bio-medical waste, slaughter house, fire fighting, flood control, encroachment removal, stray cattle management, community toilets, community halls, sewer maintenance, parking lots, development works, advertisement, sale of land, house tax, and licensing.

Taxation power: As mentioned earlier, PMC requires approval from Directorate of Local Bodies on number of aspects, similar is the case with levy of taxes. PMC do not have powers to levy any tax or charges prior the approval of state government. Although the Bihar Municipal Act provides for power to levy of taxes, in actual terms they have not been delegated to PMC. At present PMC follows the tax rules and guidelines framed by government.

Billing and Collection: Billing of taxes and other charges are updated frequently. Collection system of revenues is inefficient; resulting in increases of arrears (amount not realized by PMC), and is increasing year by year.

Project Financing and Implementation: PMC is partly dependent on its own funds and partly on the funds received as grants. Most of the capital works done are through grants. PMC involves

Asset Management: PMC maintains it assets records.

Budgets and Audit: PMC at present maintains it accounts in registers. The PMC follows single entry accounting system. For every financial year balance sheet for accounts is prepared. Financial statements are prepared by chartered accountant. There is no provision for periodical review of municipal finances by comptroller auditor general.

Use of Technology

The PMC should implement e-governance programme. Under this programme (over the project period) Integrated computerized system can be developed and implemented for efficient service delivery. The project would develop and commission four modules for each of municipal function. The project can offer services like deposit of electric, telephone, water bills, Birth – Death certificate, payment of house tax, etc, through its ward wise kiosks installed through out the Patna city.

PMC should also start implementing computer based double entry accounting system. PMC should establish a Help-line phone number for resolution of Public Grievances regarding sanitation, sewer, streetlights etc.

Information management

In PMC information and data is maintained in the form of registers. The data base maintenance is very poor. There is no infrastructure information management system in place.

Issues

Summary of issues is given in **Table 10.3**.

Table 10.3: Institutional Issues: PMC

Sector	Issues
Legal	o PMC functions under an act that is applicable to municipal councils and falls short to meet challenges of urban development and municipal management. o Devolution of more powers and functions to PMC, in the spirit of 74th CAA. o High dependency on state government (LSG) for resources and approvals that is against the spirit of the 74th CAA. o Pending establishment of Metropolitan Planning Committee. o Too many subject Committees within PMC. o Need to have business allocation regulation for clear demarcation of function to be performed by cells/ department and sections of PMC. o No transfer of Infrastructure assets / services created by Line department / PRDA or private developers o Overlapping of functions; PRDA exercises number of function assigned to PMC. o Implementation of Byelaws.
Organization and functioning	o Lack of clarity for exercise of powers by committees, elected functionaries and nominated functionaries. o Lack of clarity about the role to be performed by the officers and elected members of PMC. o Scattered structure of PMC. No defined business rules for departments and sections. Need to reorganize the organizational structure. o Lack of accountability and transparency in functioning of PMC. o Lack of experience in handling big infrastructure project.
Finance	o Improper Financial Organizational Structure. o Lack of financial and taxation powers. o Law does not permit borrowing from market. o No proper budgeting system in place. o Revenue collection system inefficient. o Poor record maintenance and asset management. o High dependency on grants and loans.
Human resource management	o PMC does not have the required technical and skilled staff. o Need to redefine recruitment polices and guidelines. o Need to prepare office manual. o No accountability. o PMC does not have technical capacity for heritage conservation
Data base and information management	o Very Poor Data Base and Information Management o No asset management o Traditional land record and registration system o Use of Technology in infrastructure monitoring and database management system

10.2.3 BRJP (Bihar Rajya Jal Parishad)

The Bihar Rajya Jal Parishad was established in 1981 under the framework of Bihar State Water and Sewage Board Act 1979. The purpose of establishing the BRJP is to provide for the establishment of Water and Sewage Board for the development, maintenance and regulation of the water supply, sewerage and sewage disposal works within the territory of Bihar state.

Constitution of BRJP

The BRJP consists of (i) A Chairman -Chief minister (Ex-Officio Member); (ii) Vice Chairman- (a) Minister, Public Health Engineering Department (Ex-Officio Member); (b) Minister Urban Development Department (Ex-Officio Member) and (c) Minister Rural Development (Ex-Officio Member); (iii) One Managing Director-The Managing Director is Chief Executive Officer appointed by the State Government. The BRJP also have nine Ex-officio Directors are; (i) Principal Secretary, Public Health Engineering Department; (ii) Principal Secretary, Urban Development Department; (iii) Principal Secretary, Finance Department; (iv) Principal Secretary, Health Department; (v) Principal Secretary, Rural Development; (vi) Principal Special Social Secretary, Planning Department, (vii) Chief Engineer, Public Health Engineering Department and (viii) Two Members are nominated by the Government one from amongst the chairman of Municipalities and other from amongst the adhyakshas of Zila Parishad, for period not exceeding three years.

Function and Power of BRJP

The function of the BRJP as per Section-10 of **"THE BIHAR STATE WATER AND SEWAGE BOARD SECOND ORDINANCE, 1979"** are presented in tabular form below:

Chart 10(2): STRUCTURE OF THE BRJP

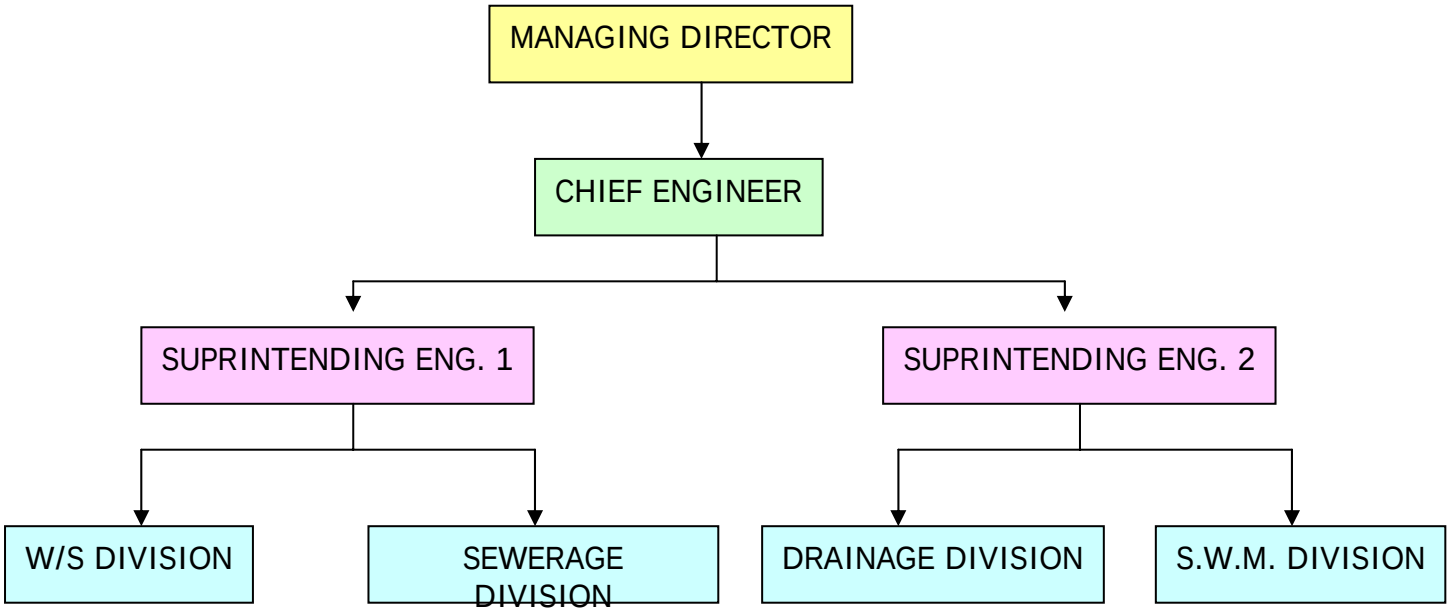


Table 10.4 : Functions and Power of BRJP

Functions and Power as per Act	Functions Performed by BRJP	Overlapping Functions
The promotion and operation of schemes for (i) Supply of Water; (ii) Sewerage; (iii) Sewage Treatment and its Disposal and (iv) Storm Water Drainage.	Designing of Water Supply and Sewerage system in terms of various schemes for Patna City area	This function is overlapping with functions of PHED. PHED is entrusted with responsibility of provision of Water and Sanitation in Rural Areas and Small Towns
Functions connected with or incidental to the promotion and operation of the schemes.	Bihar Rajya Jal Parishad has prepared DPR for Water Supply Schemes for Integrated Development Project for Patna Urban Area[7].	The Schemes for restructuring urban piped water supply in Dhanapur, Khagul, Digha East and Phulwari sheriff are prepared by PHED
To take over all the existing responsibilities, powers, control, facilities and services from local bodies to area relating water supply, sewerage and sewage disposal and to manage them so as to provide the people of those areas wholesome water and efficient sewerage services	This function is not performed by BRJP. But, It has constructed water works, drainage pumping stations and STP within Patna City.	In Patna Municipal Corporation the water supply is the responsibility of PWB and in other urban area the responsibility is of PHED but the act gives BRJP the power to undertake these functions.
To extend, expand and develop the existing facilities and to provide, maintain and operate facilities for supply of water and for providing sewerage services in areas not covered by existing facilities in consultation with local bodies	The BRJP has proposal for extension water supply network and drainage network in south of Patna City and in the newly developed area.	The extension water supply network is responsibility of PHED for small towns.
To establish, Maintain and operate laboratories and experimental and research station	Not Performed by BRJP	-
To establish Service Training Courses and provide other training for its personnel	Not Performed by BRJP	-
To regulate the drilling of Tube wells, public or private and to control the drawl of underground water in notified urban and rural areas	Not Performed by BRJP	-
To determine, levy and collect fees & charges	This function is not performed by BRJP	This function is performed by PMC, Nagar Parishad and PHED. The water charges are collected by PWB in Patna City
To borrow money issue debentures and manage its own funds	Not Performed by BRJP	-
To incur expenditure and to grant loans and advances to Urban Local Bodies and	The BRJP is undertaking construction and repair of	In rural areas and Nagar Parishads in PUA the

[7] Patna Urban Area comprises of Patna City, Danapur Nizamat, Khagul and Phuwari Sherif .

Functions and Power as per Act	Functions Performed by BRJP	Overlapping Functions
Authorities	water supply line in Patna City	construction and laying of water line is done by PHED.
To entrust execution and maintenance of works to local authority	The maintenance and execution of works are done by PWB in the Patna City area	The maintenance and execution of works are done by PHED in the Nagar Parishad and rural areas.
To undertake physical infrastructure schemes on behalf of local body, central or state or statutory bodies et.al	The BRJP is undertaking Integrated Development Project of Patna Urban Area on behalf of PMC.	The PHED is undertaking this function in the Nagar Parishad and rural areas.

Institutional Arrangement for Project Implementation

Institutional arrangement for project implementation comprises of structure mentioned in figure xx and three level project implementation committee namely (i) A high level committee headed by development Commissioner and comprising of secretary urban development department, Secretary, PHED, Secretary, Finance Department, Managing Director, Bihar Rajya Jal Board, Divisional Commissioner & District Magistrate, Patna

10.2.4 PHED (Public Health Engineering Department)

Constitutional Framework and Organizational Structure

The PHED is the line department of the State Government of Bihar. It is a functional arm of the government for provision of water supply through out the state including urban water supply. The Minister-In-charge is the head of PHED. Secretary PHED oversees the functioning of Bihar Rajya Jal Parishad and PHED. BRJB is the advisory board to secretary for policy planning, project planning and project financing. To perform its functions board has policy planning committee, empowered committee, finance committee and Technical committee. The Technical, financial and accounts specialists assist these committees.

Chief Engineer (head office), Chief Engineer (rural), Chief Engineer (Special projects), and Chief accounts officer assists Secretary PHED in performing its functions. CEs are assisted by Addl. Chief engineer (region). There are 15 regions. Patna falls under Patna Region and Patna Divisions. SE Patna oversees the water supply system to Patna city. Patna division has 10 sections, Production and Distribution and Revenue.

FUNCTIONS:

The PHED is responsible for provision of safe drinking water supply to city. This includes securing water sources, treatment of water, transmission and distribution of water, providing water connections, billing of water charges, disconnections of water charges, repair of damages etc.

Implementation of urban and rural water supply projects, Operation and maintenance of urban and rural water supply projects, and water quality testing and monitoring. The Department is also responsible for management of Dam's marked for drinking water purpose and rainwater harvesting and creating water awareness.

Jurisdiction and coverage

PHED is responsible for water supply production distribution to Patna city (PMC area). In these area also PHED role is limited to transmission of water though main lines. Rest area is covered by PRDA or BHB. With respect to total number of house holds and connected households the PHED covers 40% of PMC area.

Database and Information

The PHED manages data relating water supply and treatment. Information regarding the improvements or projects implemented through special project generally is not promptly transferred to the department creating the information gap. Also the water supply infrastructure created by PRDA and BHB are not transferred frequently to the PHED. PHED does not uses GIS and MIS for overall management of Water supply systems of Patna region.

Issues

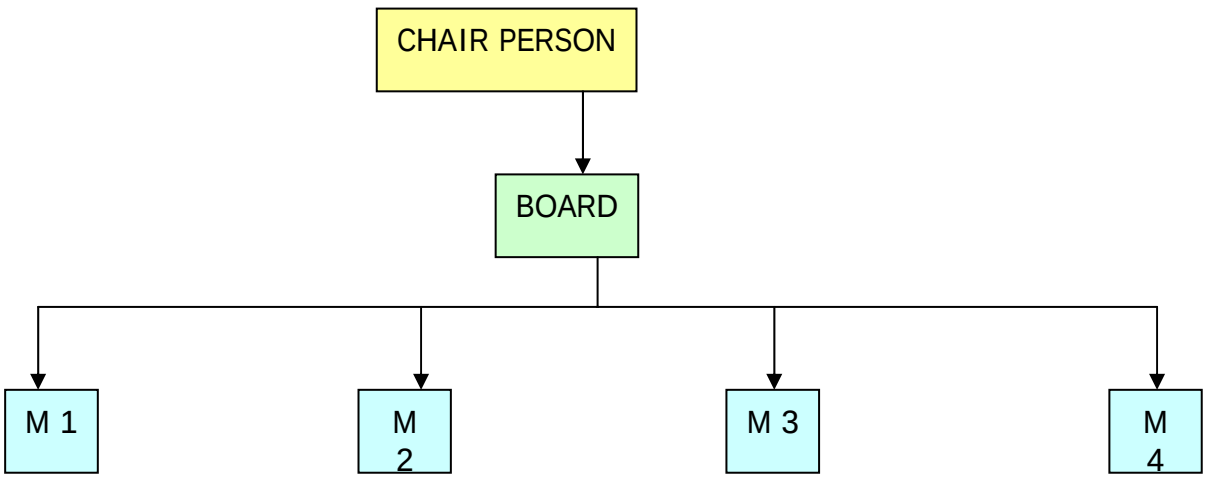
Revenue 0.5 times the expenditure cost, indicating high operation and maintenance cost and highly subsidized water supply. Need to deign water traffic policy to minimize revenue gap and use of water. There is a need to expand PHED jurisdiction. The single entity of PHED shall be responsible for water supply systems in PRDA region. This shall include the transfer of all assets to PHED created by PRDA and BHB. There is revenue loss due to less coverage / jurisdiction area and high rate of water loss (45%). The implementation of GIS and MIS based water supply information management system.

10.2.5 PWD (Public Works Department)

Constitutional Framework and Functions

The PWD is the line department of the State Government of Bihar. It is a functional arm of the government for providing road infrastructure (roads, bridges, flyover, underpass, pathways road over bridge etc), departmental building works, conservation of historical monuments and buildings. PWD (Patna) is responsible for maintenance and construction of State Highways, District Roads, other district roads and village roads within PRDA region.

Chart 10(3): ORGANISATIONALSTRUCTURE - PWD



Issues:

The PWD jurisdiction is limited to some major roads; adding one more agency responsible for maintenance of roads in PMC and PRDA are

10.3. ORGANOGRAMS OF ULB'S IN PUA

PUA Consists of:

- Patna Municipal Corporation and its outgrowth
- Khagaul Nagar Palika Parishad and its outgrowth
- Phulwari Sharif Nagar Palika Parishad
- Danapur Nagar Palika Parishad **(including Danapur Contonment).**

Their organisation structures are in **Charts 10(4), 10(5), 10(6) and 10(7)** respectively. The consultancy recommends that the local bodies constituting the PUA area be merged into an expanded PMC.

Map 10(A) explains schematically the recommended jurisdiction of the expanded PMC and its disaggregation into Municipal Zones and Wards.

At the ULB level, the PMC is disaggregated into 4 zones and 57 wards. For the PUA as the PMC for 28.00 lakh persons by 2021, an ideal disaggregation would be 7 zones, 70 wards of 40,000 persons each and area sabhas around polling booths of 1000 votes (or 1700 persons). Planned development and environmental upgrading could thus be participatory – a model which the consultancy found acceptable in their interactions especially at ward and slum upgrading level.

Basically, the organograms show that the NP's in particular need an enormous amount of capacity building. These issues are best addressed through capacity building of the expanded PMC in all its major wings like Adminitration, HRD, Finance/Revenue/Expenditure, Health/PHE, Buildings, and Maintanane, Horticulture Planning/Design/Development Control.

Chart 10(4): ORGANISATION STRUCTURE OF PMC

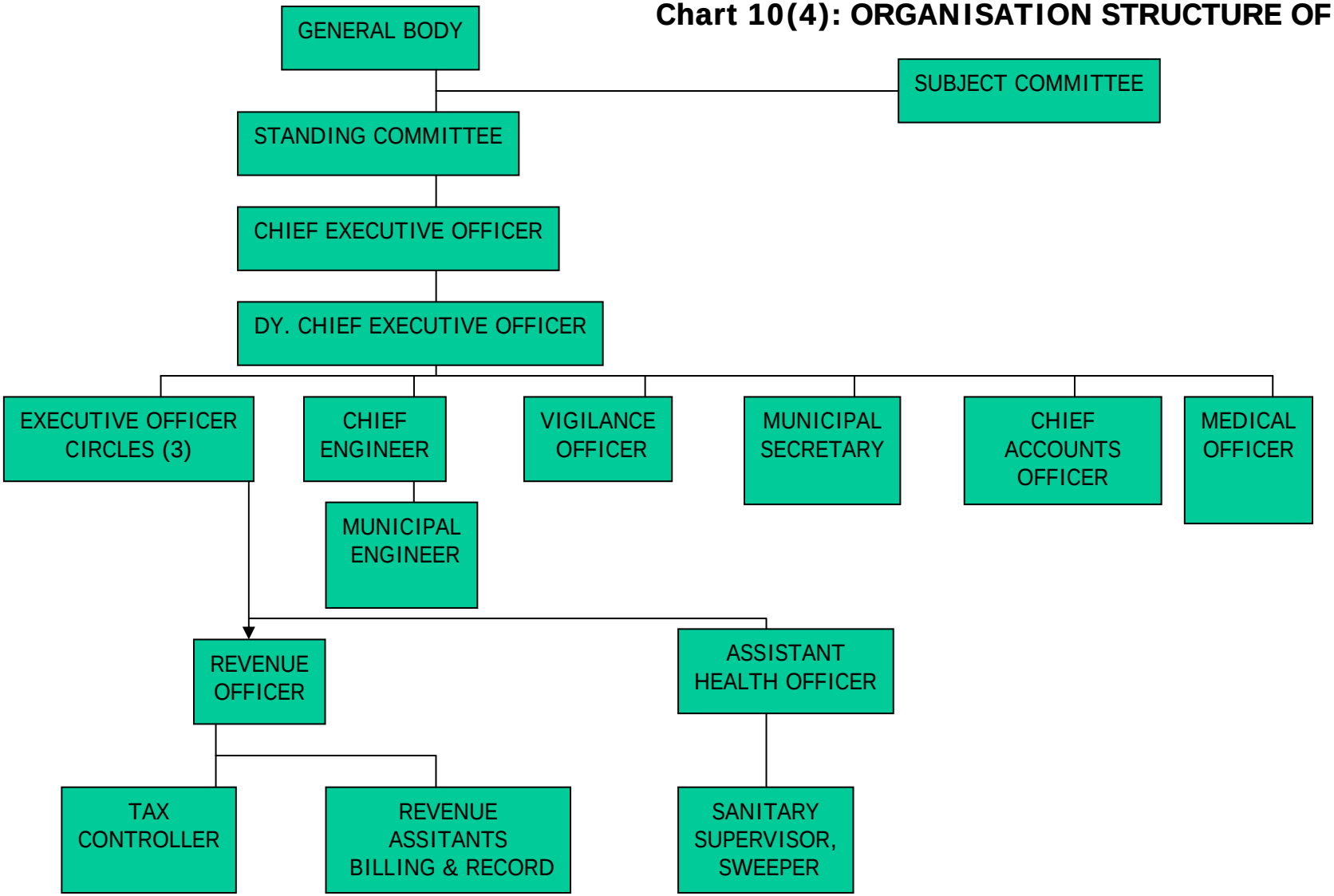
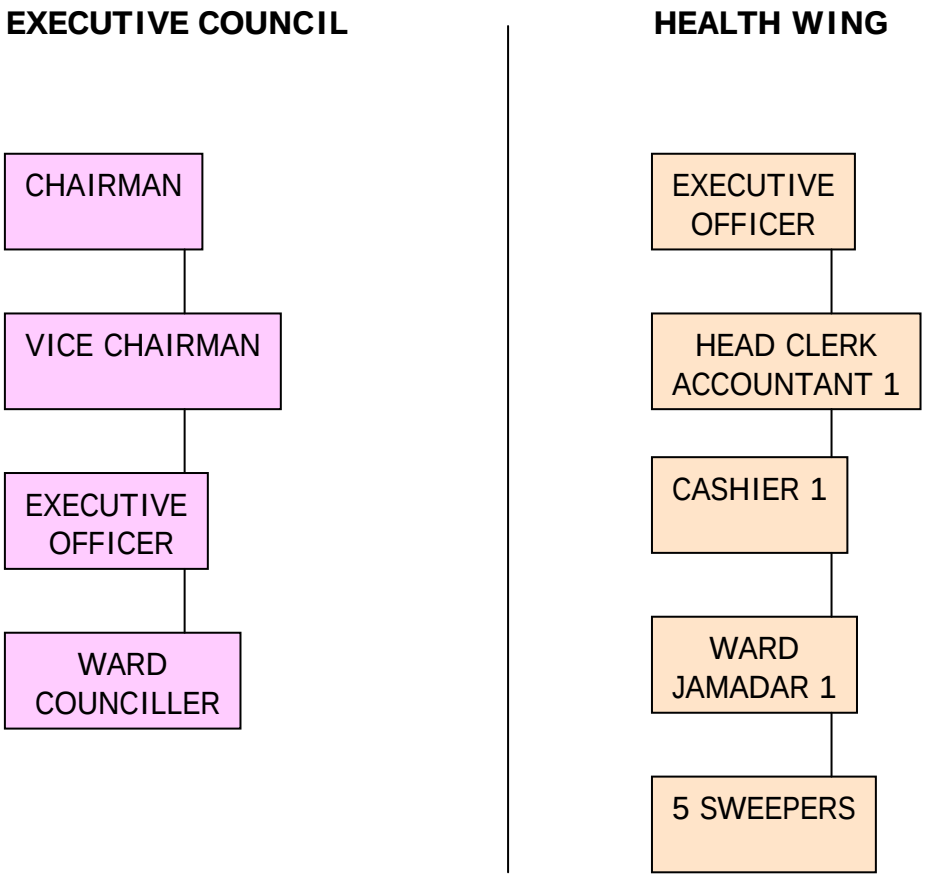


Chart 10(5): ORGANISATIONAL STRUCTURE OF PHULWARI SHARIFF NPP



Dhampur Cant. Is a 'A' category cantonment A. Board caters to its non-operational areas in consultation with PMC and DNNP.

Chart 10(6): ORGANISATIONAL STRUCTURE
DANAPUR NPP

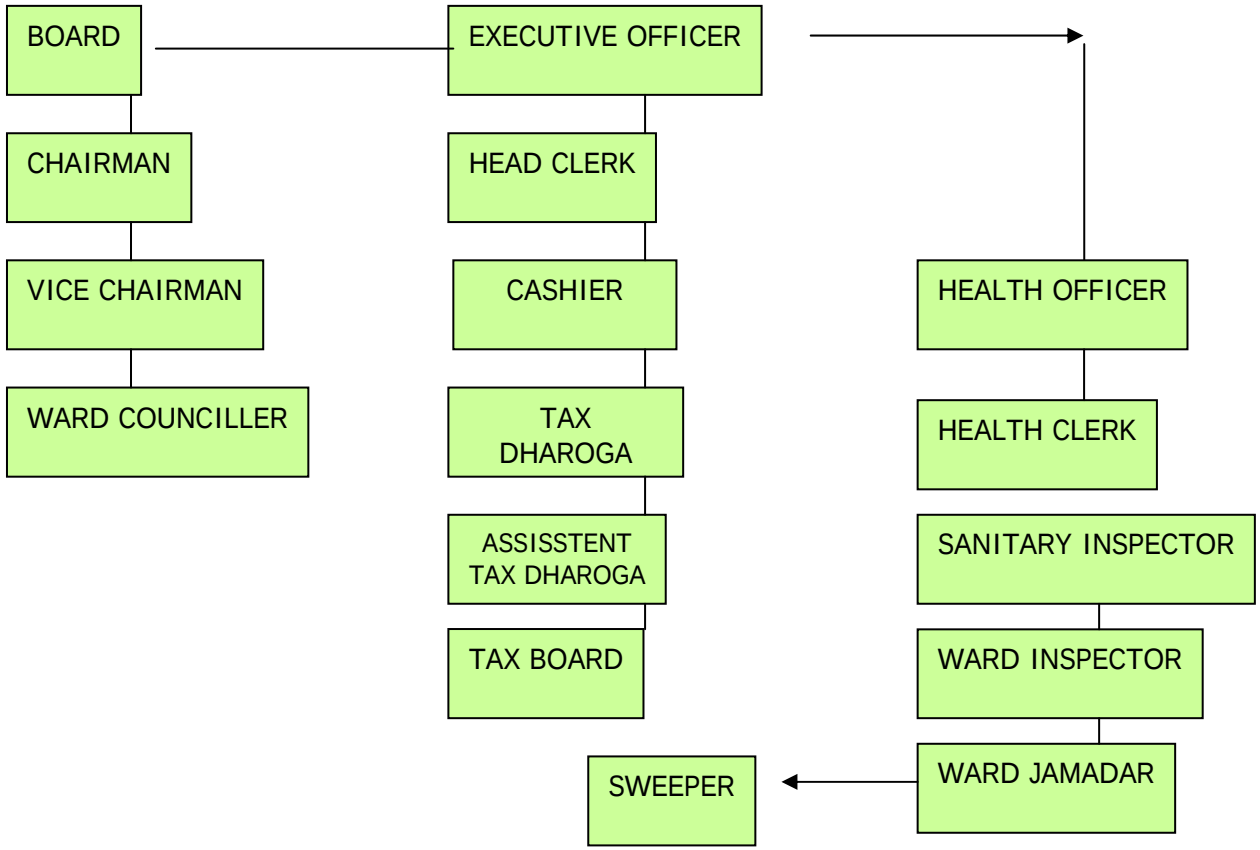
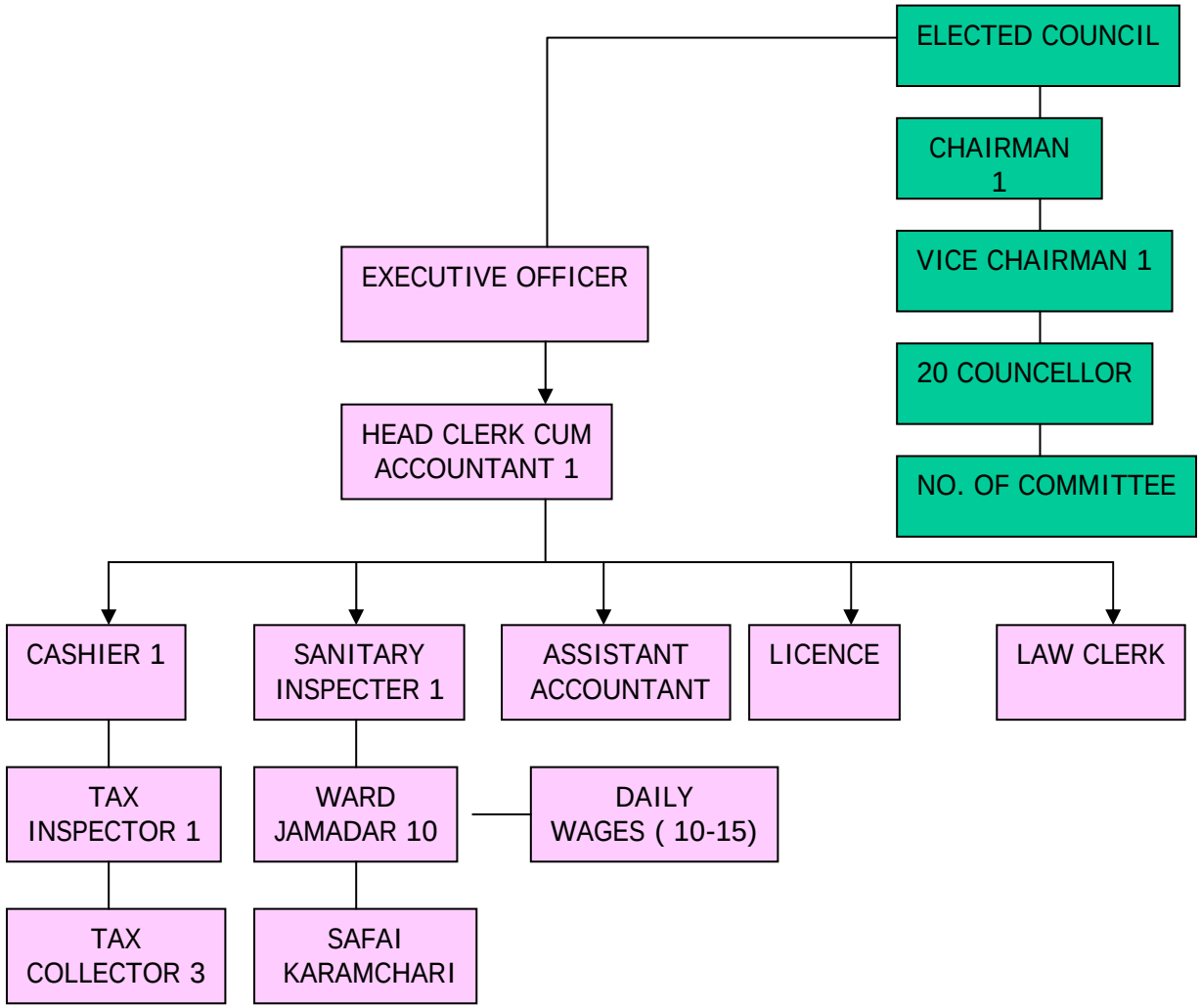
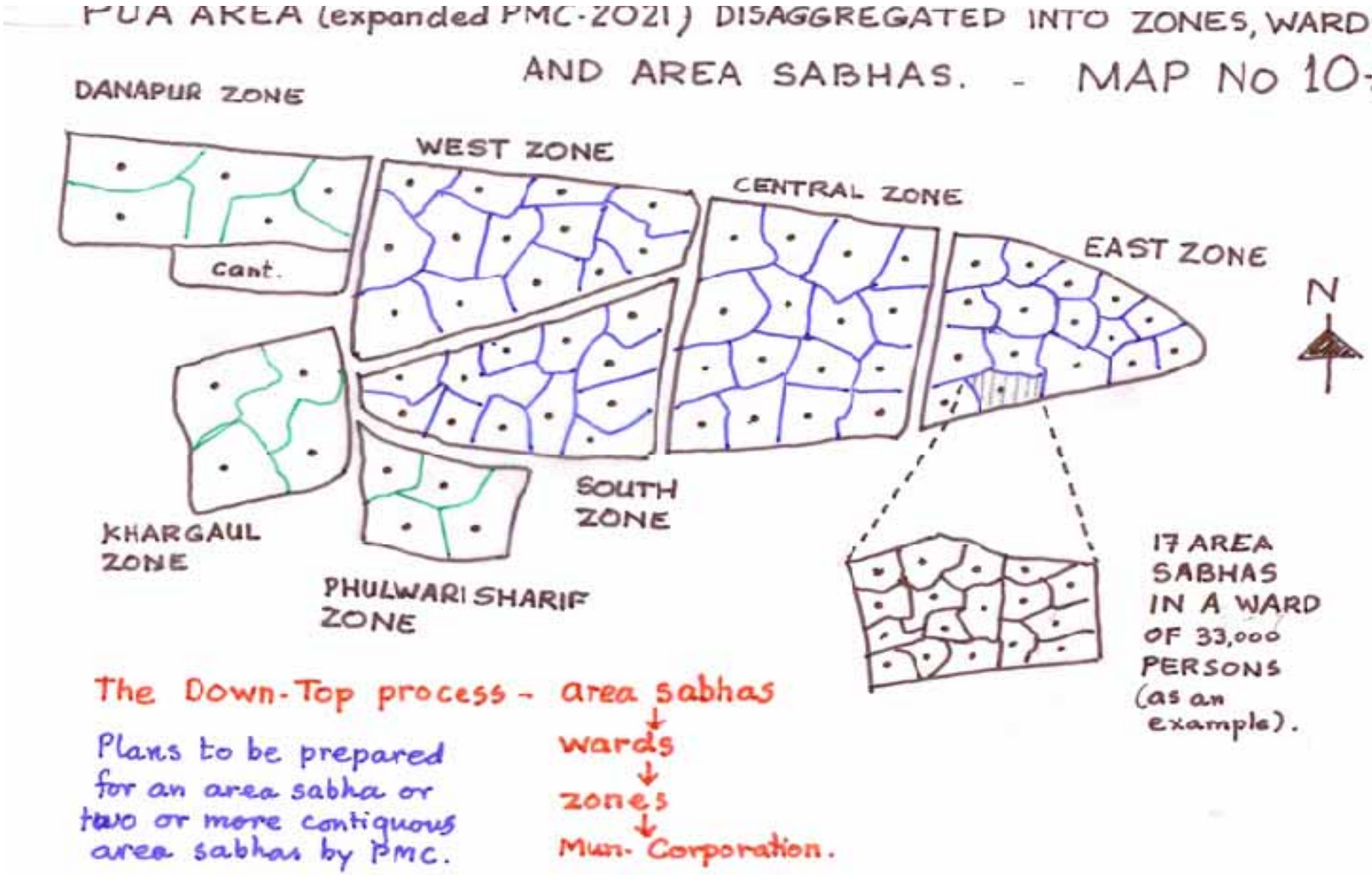


Chart 10(7): KHAGAUL NPP - ORGANISATIONAL STRUCTURE



Map 10A: The PUA Area Disaggregated into Zones, Wards and Area Sabhas



Chapter 11: THE CONSULTATIVE PROCESS

11.1. CONSULTATION STRATEGY

Consultations were held with the Patna Municipal Corporation, the PUA Nagar Parishads, the Urban Development Departments and line agencies. This was on a regular basis throughout the study duration to seek inputs on urban infrastructure issues, related information, data etc. The key urban administrative and line departments consulted included:

- Patna Municipal Corporation (PMC)
- Danapur Nagar Parishad (DNP)
- Khagul Nagar Parishad (KNP)
- Phulwari Sherif Nagar Parishad (PNP)
- City Traffic Police, Patna
- Urban Development Department (UDD)
- Transport Department
- Public Works Department (PWD)
- Bihar Rajya Jal Parishad (BRIJP)
- Patna Regional Development Authority (PRDA)
- In adddition, ward councillors, citizen groups and key citizen associations were consulted. These included:-
- Bihar Industrial Association (BIA)
- Automobile Association of East India (AAEI)
- Professional bodies represnted Engineers, Planners and Architects and
- Random citizen inteviews

As part of the consultations, a stakeholder workshop was organized to arrive at a consensus on the key issues identified with regards various elements presented below and to firm up the optional strategies to address the service delivery and financial issues identified.

The highlights of the key meetings and the issues identified have been elaborated below.

11.1.1 Meetings with various representatives of departments including the Commissioner and Secretary of the Urban Development Department and the Municipal Commissioner of PMC held from 25th May 2006 onward

Issues Identified:

Road Transport

- Presently there is traffic congestion in certain parts of the city and there is a need for provision of fly-overs to relieve the congestion points.

Environmental Concern

- Solid waste management shall be on priority. There is a need to have better solid waste management system. There is a need to create public awareness on civic amenities and behaviour in public places.
- The participants highlighted the problem of fault line parallel to Kankarbagh in east west direction. Therefore the construction in this area is to be regulated.

- The power cables be converted to underground systems. This would get rid of the ugly look of old city structure on which they hang. City would look more original than today.
- Development of Old Jail area as parking lot and open spaces.

Water Supply

- Participants emphasized on the low pressure in municipal water supply have lead people to drill rivate tube wells and extract water from ground water sources.

Growth Management

- The Master Plan has not regulated the conversion of plots to multi-storeyed building leading to congestion and parking problem on the roads. Enforcement of the Zoming Regulation and Building Bye-Laws is weak.

11.1.2 Meetings with Bihar Industrial Association and Professiona bodies held on 25th May 2006

Sector-wise Issues during Consultations and Prioritization

The consultation with the Bihar Industrial Associations highlighted the following issues and suggested measures.

Road Transport

- The stakeholders in BIA suggested the shifting of wholesale commercial market from the core area of the city to the south near the Transport Nagar. They also emphasised the problem in movement of commodity to the city wholesale market from the truck terminal.
- They felt that developing rural areas and smaller urban centres would reduce migration to cities, which in turn would reduce the pressure on the transportation system.
- They emphasised on the development of the circular road parallel to river Ganga in North and connecting it to new by-pass road in the south, which will help in the growth of the city, redcing congestion and increasing the road density.
- Participant's emphasised on the construction of light metro rail to reduce the traffic congestion.

Meeting With Stakeholders in Bihar Industrial Association

Storm Water Drainage

- The participants were of the opinion that Patna city is like a saucer and development in the low lying areas are restricting the natural flow of water leading to water logging on the roads and low lying areas.

Environmental Concern

- Solid waste management shall be on priority. There is a need to have better solid waste management system. There is a need to create public awareness on civic amenities and behaviour in public places.

- City Environment needs to be enhanced; city today is scare of open and green spaces. There is a need to have more open spaces, roadside plantation and river front development.

Water Supply

- Participants emphasized on the low pressure in municipal water supply have lead people to drill the private tube wells and extract water from ground water sources.

Master Plan and Growth Management

- The association members said that land was being developed in Patna without any consideration for environment and heritage. They called for proper enforcement of master plan and other rules.
- The Master Plan has not regulated the conversion of plots to multi-storeyed building leading to congestion and parking problem on the roads.

Project Implementation

- To implement the project there is a need to realize and address the ground realities, i.e. problem related to institutional capacity to implement the project, legal issues (for eg. PIL court cases etc.), Engineering and technical aspects of the project. Most important is the capacity of the PMC to implement the project.

City Development Vision

The stakeholders put forward a vision for Patna City as:

- **"City as Nodal Centre of Development"**
- **"Patna – A Clean City"**
- **"Patna- A Modern City"**
- **"Patna- A Transport City"**
- **"Patna- A Health Tourism City"**

To achieve the above vision, stakeholders put forward an idea of assessing the holding capacity of the city and regulating development in the surrounding urban center such as Muzafarpur, Dharbanga, Bhagalpur etc. They further emphasizes on benchmarking the city horizon by comparing it with the other urban centers and proposing development modules to achieve the same benchmarks.

Consultation with stakeholders for formulation of strategies

Urban Infrastructure Development Proposals identified by Stakeholders

From the citywide stakeholder consultations and stakeholder workshop, the following proposals for development of infrastructure emerged**.** The sector wise proposals for the city have been outlined below:

Road and street lighting/Traffic management

- 100 percent coverage of PUA by public transport system
- Flyovers not to be indiscriminately built

- Intelligent transportation systems to be considered for PUA
- LRTS required for PUA
- Development of city circular road parallel to Ganga River

Economic activities

- Industrial development to be promoted in smaller cities.
- Convention centres and exhibition spaces along lines of Pragati Maidan to be developed.
- Management Schools and educational institutes.
- State of art medical facilities is to be developed in the city.

Solid waste management

- Patna to be garbage free city
- SWM plan for city.
- SWM infrastructure to be modernised
- Sanitary Landfill sites for city to be developed
- Night sweeping to be taken up in SWM

Urban Environment

- Need for more open spaces in city
- Need for city level stadium and parks
- Increase in green cover of city required.
- Urban forest needed for city
- Landscaping along the roads as part of avenue plantation
- River front development to increase the green spaces

Water Supply

- Re-zoning of water supply system to avoid problem of low pressure at the tail ends.
- Construction of Overhead Water Tanks to increase water storage system

Sewerage and Drainage

- Need for 100 % coverage of city by sewerage system.
- Drainage system of city to be improved so as to avoid water logging
- Need for community toilets in BPL areas and where there are substantial pavememt dwellers.

Other Proposals

- Satellite towns to be developed
- Disaster preparedness plan in case of fire needed for city.
- Fire fighting infrastructure required for city
- Modernization of fire fighting system for city
- Training of Government Officials
- Mass awareness of citizens on city planning and waste management

11.1.3 Meeting with Automobile Association of East India held on 24th May 2006

Issues identified:

The meeting between the consultants and senior officers was to identify broadly the need for reforms in the city and the areas of intervention suggested by the officers to give direction to the consultants and expert for the preparation of the city development plan for Patna. After a brief description of the scope of the CDP preparation the following problems in the transportation system in Patna were identified:

- Patna City Road, i.e. the road network within the old core city area where it is densely

populated needs to be focused on for improvement and regular maintenance.

- The stakeholders called for old city to be traffic free; introduction of vehicular mode restrictions, provision of identified tourist routes no entry zones, introduction of traffic management system etc.
- They suggested removal of encroachments along the footpaths and in the commercial areas to be removed for the smooth movement of traffic.
- Need of more parking spaces in the commercial areas such as Exhibition road, Ashok Rajpath, Meethapur area and wholesale market etc.
- Roads within the Kankarbagh area again where the population density is very high needs to be improved upon.
- The participants highlighted the problem of road accidents and lack of pedestrian crossing on the major road sections. They emphasises on the construction of pedestrian over bridges at major intersections and main roads.
- Wetlands/Low lying areas along the bypass road, south of Patna city, cause an obstruction to the development and expansion of the urban areas. Therefore it may be filled with malwa and expansion of the town may be done in the south of Patna.
- There is a requirement of expansion of the bypass road to 6 lanes for easier movement of through traffic.
- Patna requires water recharge areas, as there is lack of open areas in the city and there could be a possibility of introduction of social forestry and more recreational areas in and around the city.
- Road on the north of the railway line is presently occupied by displaced people and relocation for these squatter settlements is required.

11.1.4 Meeting with Ex-INTACH Convener of Patna Chapter and Ex-Chief Conservator Forest for Patna held on 20th June 2006

Issues identified:

The meeting between the consultants and the team was to identify broadly the need for reforms in the city and the areas of intervention to give direction to the consultants and expert for the preparation of the city development plan for Patna. After a brief description of the scope of the CDP preparation the following problems and issues in Patna were identified:

- A legal framework for the heritage site protection should be formulated, which is non existent presently.
- A committee in PRDA or ULB should be setup for control of developments around the heritage site areas.
- Recreational areas in Patna are sparse and these need to be developed in and around the city. Harding Park, which was previously adjacent to the bus stand, the use of the park was limited due to incompatible surrounding land use. Since the bus stand has been relocated recently, the park is still neglected and this may be developed into a city-level recreational area.
- Apartments and Multi-storied buildings developed in the Patna must have a regulation of compulsory provision of neighborhood parks and playgrounds. This may require reframing the building bye laws for apartment buildings by the PRDA/ULB's

11.1.5 Meetings with Khagaul Nagar Parishad held on 23rd May 2006 onwardas

Issues identified:

The meeting between the consultants and senior officers was to identify broadly the need for reforms in Khagaul and the areas of intervention suggested by the officers to give direction to the consultants and expert for the preparation of the city development plan for Patna Agglomeration Area. After a brief description of the scope of the CDP preparation the following problems in Khagaul were identified:

- Presently there is no solid waste management system in the town; the waste is presently being dumped into the low lying areas around the town.
- The solid waste management system within the town needs to be improved by provision of tractors, trolleys and dustbins.
- The water supply system in Khagaul town is partial and the network does not cover the entire town. The wards 6, 14, 15, and 18 lacks in the water supply network system.
- The water supply system in the town may be improved by provision of tube wells, main pipe lines in the above mentioned wards.
- The accounting system in the Nagar Parishad is single entry and there is a need for upgrading it to double entry accounting system.
- There is a need for training and capacity building of the municipal staff for better management of the ULB.
- The Nagar Parishad is facing problems in the property tax collection, and there is a need for reforms in the property tax collection system.

11.1.6 Meetings with Phulwarisharif Nagar Parishad held on 23rd May 2006 onwards

Issues identified:

The meeting between the consultants and senior officers was to identify broadly the need for reforms in Phulwarisharif and the areas of intervention suggested by the officers to give direction to the consultants and expert for the preparation of the city development plan for Patna Agglomeration Area. After a brief description of the scope of the CDP preparation the following problems in Phulwarisharif were identified:

- The condition of roads in Phulwarisharif area is very poor and the officials suggested construction and routine periodic repair of the road network.
- The drainage system in the town does not serve the entire population and there is a need for construction of new drains and repairing of drains in the smaller congested mohallas.
- The water supply system needs to be improved upon by provision of hand pumps and tube wells; only 50% of the wards are covered by the water supply network and there is a requirement for covering the entire town with the piped water supply network.
- Only 40% of the town is covered by the sewerage network and presently and there is no treatment and disposal system for the sewage. There is a need for development of a sewerage network for the entire town and provision for a treatment and disposal system for the sewage.
- The solid waste management system in the town needs to be improved upon by provision of dumpers, pay loader, dustbins, tractor, and additional labor.
- There is a need for community halls as presently there are no designated areas for

social gatherings.

- The slums in the town lack in the basic amenities of proper drainage system, lighting and water supply.

Proposals Envisaged:

- 5 boring tubewells and extension and expansion of water supply network.
- Drainage line for entire town to avoid water logging problems.
- Sewerage trunk line to be laid and along with network covering entire town
- Purchasing Landfill Site for solid waste disposal
- Street Lighting in 20 wards.
- Market complex to be developed within the town along with marriage complex, and community centers.
- Housing, community toilets, handpumps to be provided for slums.
- Yatri Sheds, Planned Parks and open spaces and Sulabh Sauchalyas to be provided in public places.

11.1.7 Meetings with Danapur Nagar Parishad held on 25th May 2006 onwards

Issues identified:

The meeting between the consultants and senior officers was to identify broadly the need for reforms in Danapur and the areas of intervention suggested by the officers to give direction to the consultants and expert for the preparation of the city development plan for Patna Agglomeration Area. After a brief description of the scope of the CDP preparation the following problems in Danapur were identified:

- The Nagar Parishad is facing problems in the property tax collection, and there is a need for reforms in the property tax collection system.
- Presently there is no proper solid waste management system in the town, only 50% of the solid waste is collected and waste is disposed off on the streets by the households; the waste is presently being dumped into the low lying areas around the town.
- The solid waste management system within the town needs to be improved by provision of tractors, trolleys and dustbins.
- There is a need for development of a sewerage network for the entire town and provision for a treatment and disposal system for the sewage.
- The drainage system in the town does not serve the entire population and there is a need for construction of new drains and repairing of drains in the congested areas.

11.1.8 Meeting with Director, Nidan (NGO), Chakachak Patna held on 1st July 2006

Issues identified:

The meeting between the consultants and officer was to identify broadly the need for reforms in Patna and the areas of intervention suggested by the officer was to give direction to the consultants and expert for the preparation of the city development plan for Patna Agglomeration Area. After a brief description of the scope of the CDP preparation the following problems in Patna were identified:

- Patna lacks the provision of basic amenities for B.P.L. There are no provisions for increasing the housing stock for the urban poor and the no notifications for the slum areas. Self Financing Schemes need to be introduced for proper development of the

slum dwellers.

- There is a requirement of a survey to be carried out for the assessment of the BPL population in Patna and the surrounding agglomeration areas and also for the slum population. The database for the slum areas is very poor and varies drastically within various departments.
- There is poor civil society participation and no proper implementation of the 74th Amendment.
- Public Private Partnership should be encouraged for service provision in Patna.
- The solid waste management system is poor within the city. Though the primary collection system involves the municipal corporation and NGO participation, the storage transportation, disposal and treatment system of solid waste is not organized and not planned. The solid waste is transported and dumped into low lying areas haphazardly along the bypass road and burned in regular time intervals. Thus there is a need for the designation of a landfill site and also implementation of proper collection, transportation, segregation, treatment, recycling and disposal system for the solid waste.
- Scarcity of open spaces has lead to the requirement of location of planned open spaces within and around the city.
- There are no guidelines and facilities provided for vendors; there is a need for planned commercial areas.
- Sulabh Sauchalyas are not maintained properly in the city, and regular maintenance is required for proper service provision.

A consultative approach is necessary for slum development, a brief consultation with slum dwellers was carried out development of this CDP

Apart from these consultations we have also consulted the citizen from various localities and settlements across Patna. The highlights of the citizen consultative process included the following issues:

- Poor physical infrastructure facilities in the slums areas for water supply, sanitation, drainage, solid waste management, medical and educational facilities etc.
- The most crucial problem was felt to be of the poor sanitation facilities and lack of solid waste management by the PMC.
- However, the slum dwellers also agreed to their negligence for taking any initiative on their own for the development of their area.
- There was also a problem of access to water supply in a few of the slums areas.
- Apart from the slum dwellers, the citizen interviews revealed the lack of recreational and open areas within the city.
- This also revealed the concern for increasing density of the residential areas with the

new apartment buildings, which is causing havoc on the present physical infrastructure; these apartments are built with over 50% FARs and do not have any provision for open spaces within their complexes.

- Lack of a proper public transportation system was also a concern for the citizen, as the city does not have this infrastructure in place. This is substituted by auto-rickshaws and rickshaws for inter city public transportation.
- Residential Areas in the core city area required a focus on the transportation network as there is congestion on the roads, and also upgradation of the physical infrastructure.

11.2. MEETINGS WITH URBAN POOR, NGO'S & OTHER CITIZEN GROUPS

One aspect that gets highlighted in all consultations is the dissatisfaction that people feel with the present quality of urban infrastructure and service delivery. In PUA area as in all other cities, people have put forth the need for improvement of urban infrastructure services especially drainage improvement and sewerage network.

11.2.1. *View on Water Supply*

Primary stakeholders[8] have expressed extreme resentment over the present service delivery. People of slums and other area of city informed that the frequency of water supply ranges from once in two days to once a week. To supplement the inadequate water supply people buy water from private water suppliers at a monthly rate of Rs 100-150 per 1000 litre per households or through private tube wells. The community has expressed more faith in the private water suppliers than in the PWB. The community has put forth suggestions such as construction of reservoirs, community water tanks to resolve water supply woes. People have expressed willingness to pay for improved and assured water supply. It is also clear from the consultation that people are paying for water from private supplier, which further supports the people's willingness to pay and privatization.

11.2.2. *View on Sewerage*

Presently 15-20 per cent of PUA area is covered by sewerage system. The common method of sewage disposal is through septic tanks and soaks pits in the city. The toilets are mainly connected with septic tanks and soak pits with outlets into the streams and drains. Even the sewage from the septic tanks is disposed directly into drains and streams in rainy season. People in all meetings have expressed desire to have a public sewerage system once they were explained about the system.

11.2.3. *View on Drainage*

It is evident from the maximum no of responses giving top priority to addressal of drainage issues that the drainage components in PUA area needs most intervention. People have linked occurrence of water logging to drainage. Drainage issues thus need to be addressed holistically. Participants in all the consultations have expressed concern about the drainage situation in the city. People are aware of the implications of improper drainage system. People have complained about choked drains and underground seepage from drainage channels.

11.2.4. *Slum and JJ clusters*

Slum areas (largely the urbanized village) are characterized by inadequate services such as poor approach roads, improper drainage, and lack of water supply and sewerage facilities.

[8] The beneficiaries of a development intervention or those directly affected (positively or negatively) by it. They include local populations (resource persons, community, students) in the project/program area, in particular, poor and marginalized groups who have traditionally been excluded from participating in development efforts

People from all the slums have asked specifically for provision of water supply, provision of individual toilets, improvement of drainage. Moreover people also emphasizes on the security of tenure and in-situ redevelopment to avoid loss of their livelihood.

11.2.5. *Views on Traffic and Transportation Sector*

Transportation sector has been accorded fourth ranking along with SWM in the priority ranking of issues and has received the third most no of responses after drainage & sewerage system. The generic suggestions for improvement of Traffic and Transportation sector include:

- Removal of encroachment in commercial and residential areas,
- Repair of road network damaged due to laying of underground infrastructure
- Improving connectivity of the urban fringes with core city area and
- Provision of street lighting

11.2.6. *Views on Solid Waste Management*

SWM has been accorded overall fourth priority ranking by the community and the NGOs consulted. Presently the waste collection service of the PUA is concentrated in few wards of in core city area with less emphasis on the peripheral area; slums and rural areas within city. The collection service is restricted to the main arterial roads, government colonies and planned areas with city territory. Moreover, there is a dearth of dustbins in almost all the areas of the city.

In areas covered by network private waste collection system, bins are placed on the shoulder of the road. It has been observed that due to low efficiency of collection of waste, waste gets accumulated in the dustbins itself and spills over to the surroundings attracting stray cattle's creating traffic congestion.

11.2.7. *Willingness to Pay for Services*

People have expressed willingness to pay for improved urban services like piped water with assured water supply, improved collection facility for SW and community toilets. However, the willingness to pay varies from across income groups and urban and rural areas. People were are to pay property tax in addition to holding tax of terrmural rights were accorded.

Chapter 12: CONSOLIDATION OF ISSUES AND SWOT ANALYSIS

The assessment of the status of the various sectors in the city has brought in a set of issues for city development. While all issues are important, it was considered important to prioritize them in order to address them more effectively. The prioritization of the issues has been done based on several criteria including stakeholder perception and technical assessment.

Further, assessment of the strengths, weaknesses, opportunities and threats of a city forms a basis for preparation of a relevant city development plan. A city level SWOT analysis has been done based on an assessment of the status of various sectors of the city. This chapter focuses on the consolidation of the issues and describing the strengths, weaknesses, opportunities, and threats respectively.

12.1. CONSOLIDATION OF ISSUES

The issues with respect to city development have been arrived at after extensive analysis of the status of each of sectors. The sectors include urban growth and land management, city economic development, environment, housing, slum development and poverty alleviation, urban services including water supply, sewerage, solid waste management and transportation, heritage and conservation, urban finance and governance and institutional development. **Table 12.1** presents the sector wise issues of Patna City.

Table 12.1: Sector wise Consolidated Issues

SECTORS	ISSUES
A. URBAN SERVICES	
Storm Water Drainage	• Storm water drains; open drains and storm outfall carry sullage, septic tank effluent and even untreated sewage. • When Sewerage network get choked the household usually connects it to the storm drainage system. Therefore open drains get silted. • 10 out 15 drainage pumping plants are not working to it is designed capacity due to poor maintenance and completion of life cycle • The encroachments; solid waste dumping and silt deposition cover the drainage channel and RCC drains in Central Zone. This lead to water logging in the central zone area. • No Drainage system in Old city area and newly developed colonies in the urban periphery
Water Supply	• The high surface water potentiality of River Ganga is unutilized leading to overexploitation of ground water. • Problem of arsenic content in water in surrounding areas second layer of geological strata. • Non-uniform supply in different area and contamination due to various leakages. The UFW loss is above 40% due to poor and old supply network. • The pipes are in the center of the road due to road widening and facing heavy traffic, resulting in loss of carrying capacity, contamination of water, problem in repair and maintenance. • In many colonies the drinking water and sewerage pipelines are interceding each other, with sewer line on top

SECTORS	ISSUES
	of water line increasing the possibility of contamination. • Multi-lateral institutional arrangement for management of water supply system. • Highly Subsidized water supply • High Operation and Maintenance cost
Sewerage System	• Only 20% of the total households in urban agglomeration areas are covered with under ground sewerage system. • Septic tank and Low cost Sanitation are supporting around 80-85 per cent of households, which may pollute shallow ground water with microbial pollution. • Infiltration of rainwater into sewerage line further aggravates the problem in monsoon months. • The partly or wholly untreated effluent flows into open drains.
Solid Waste Management	• The spacing between the dustbins is more than 1.5km leading to litter of waste on the local and cluster level streets. • Absence of Modern Waste Collection Technique and instruments • Storm Water Drainage are receptor of waste due to lack of collection system • Non-Segregation and Recycling/Reuse of Solid Waste • Non-availability of landfill site for waste disposal has lead to the dumping of waste along the major roads and low-lying drainage channels in south of the city.
Road Street Lighting and Traffic	• Encroachments by vehicles and commercial activities • Low operating speeds and environmental pollution • Heavy traffic in Ashok Rajpath, and old city area • On street parking due to inadequate parking space • Increase in incidence of road accidents • Improper traffic management • Poor public transportation system operated by private owners • Overcrowding and increased waiting time • Lack of pedestrian walkways making safety an issue • Inadequate capacity of roads due to encroachments
Urban Slums and Poor	• Need for a state slum policy for integrated development of slums: The infrastructure created in slums should be linked to the citywide networks. • Lack of Dependable Data: Lack of dependable data on various aspects of poverty including number of slums, slum population, access to services like water and sanitation, livelihood, etc. • Lack of Infrastructure: presently the slums are in poor habitable conditions and integrated development is required for the entire physical infrastructure including water supply, drainage, sewerage, SWM and housing. • Absence of Integrated Response: There is a need for an integrated response and the dwellers participation to deal with the problems of the urban poor. There is a need to focus on particularly vulnerable groups among them, like women and children, disabled and destitute, the aged and children in difficult circumstances. • Neglect of Informal Settlement: Programs are targeted mostly for notified and developed Slums. Lack of awareness of non-notified slums and de-notification policy for developed slums.

SECTORS	ISSUES
	• Weak Municipal Resource Base: Poor resource base for creating and constantly maintaining infrastructure is a critical issue. There is a requirement for capacity building of the PMC for handling continuous upgradation of slums and maintenance of data base.
B. URBAN ENVIRONMENT AND HOUSING	• Natural Hazards: since Patna is at high risk of earthquakes, flood and cyclones a comprehensive and integrated disaster mitigation plan needs to be formulated. • Air and Noise Pollution: for residential areas NOx levels need to be controlled by implementing pollution control measures strictly for vehicular pollution, random checking may be done on polluting vehicles and then penalized. The industries should be located in designated areas and not scattered around the outskirts of the city for a step towards planned development and also for ease of both air and water pollution control. Noise pollution is excessive during festivals and marginally exceeding the limits during normal days. • Water Pollution: Testing for arsenic needs to be carried out for drinking water within PUAA in order to take measures to mitigate the problem if any. The effluents form the small-scale industries also need to be carried out. • Depletion of Water Sources: The high surface water potentiality of River Ganga is unutilized leading to overexploitation of ground water. The utilization of ground water does not require high capital investment as well as recurring cost towards treatment, operation and maintenance. • Solid Waste Management Problem: Indiscriminate disposal of waste by the residents: The spacing between the dustbins is more than 1.5km leading to litter of waste on the local and cluster level streets. Absence of Modern Waste Collection Technique and instruments. • Water Logging: The encroachments; solid waste dumping and silt deposition cover the drainage channel and RCC drains in Central Zone. This lead to water logging in the central and eastern zone area. • Poor living conditions within slums: presently the slums are in poor habitable conditions and integrated development is required for the entire physical infrastructure including water supply, drainage, sewerage, SWM and housing. • Poor living conditions within old city: presently the core city area in the eastern side has lack of infrastructure provision including roads water supply, drainage, sewerage, SWM and housing. This has lead to traffic congestion and poor living conditions for the core city area.
C. URBAN FINANCE	• The revenue account of PMC shows a deficit every year, with an operating ratio above unity throughout the review period. • Though property tax is the single largest own-source revenue income, in comparison with other major cities, there is scope for improvement by expanding the base by way of covering unassessed properties. • Expenditure towards debt servicing has been about 0.1 percent of revenue income during the review period, which is well below the accepted threshold level of 20-25 percent. • No computerized account system • Single entry accounting system is still in practice, but it is to be revised by the end of this financial year
D. INSTITUTION AND URBAN GOVERNANCE	• Non implementation of 74th CAA in spirit-PMC does not have • Financial/taxation powers, budget is to be approved from Department of Local Self Government. • Infrastructure Development in PMC area is with PWD, PHED, and BRIJP and Maintenance and Tax collection is by PMC

SECTORS	ISSUES
	• PRDA entrusts functions to PMC against the spirit of 74th CAA • Overlapping of jurisdiction between PRDA and PMC • PRDA, PHED, exercise control over major parts of PMC Area • Overlapping functions
E. HERITAGE CONSERVATION	• There is a need for consolidation of the heritage and tourism sites in and around Patna City • The Archaeology preservation laws have to be dovetailed into the conservation instruments and which incorporate preservation. Conservation enables adaptive re-use and encompass sites and buildings upto the present times. • A concentration of listed sites or buildings leads to a heritage precinct or area. A heritage conservation ward plan would be ideal in such a situation. Even important single monuments could lead to such a heritage conservation ward plan. Even otherwise, individual buildings, sites or ecological areas can be listed legally for conservation prescriptions. • Surrounding infrastructure (roads, drainage etc.) of the tourist attraction sites have not been maintained properly and need upgradation; No planned leisure activities • Patna not present on the Bihar Tourism Map; no awareness

12.2. SWOT ANALYSIS

Patna is the capital city of Bihar. Being the seat of administrative power, it is the center of economic and political activities. The city has several strengths, Weakness Opportunity and Threats. These have been outlined in Error! Reference source not found.. The **Strengths** relate to the sectors include location and regional linkage, trade and commerce, heritage and state reforms. The major areas of **Weaknesses** for the city include infrastructure, urban growth, conservation, environment, slums, and institutional capacity. The potential **Opportunities** are derived from the strengths, which are utilized for the purpose of development of the City. The **Threats** are primarily the existing weakness, which if not addressed adequately might pose as threats for development of the city in the future.

Table 12.2: Sector wise SWOT Assessment-STRENGTH & WEAKNESS

SECTORS	STRENGTH	WEAKNESS	OPPORTUNITY	THREATS
City Profile details the location and socioeconomic status of the city. It also discusses the area of employment in the Patna city				
City Profile	• Potential for rapid economic growth of the city	• Weak Local Economy • Low Literacy Rate • Low Pace of industrial development • Poor Sanitation and Solid Waste Management • Poor Public Transportation	• Developed as agro-processing and Marketing Center • Nodal Center for Surrounding settlements	• Physical topographical constraints in development

Storm Water Drainage System is one of the important infrastructures for Patna City. The city growth and development is affected due to frequent floods. Therefore any infrastructure or asset developed as part of the project shall be supported by the drainage system.				
Storm Water Drainage	• Availability of Natural Drainage and Covered Drainage system. • 15 Pumping Station to pump water in rainy season • Zone wise Drainage flow system has been identified	• Area not Served by Drainage system • Old town have damaged drainage system • Pumps are failing to perform • Natural Drainage channels are choked due development in these areas	• The drainage channel clogged due waste disposal are to be cleaned and disilted • The interlinking of drains is possible. • The drainage systems in new areas are not working due to non-operational pumping station. These pumps are to be operationalised.	• Unorganized development in the low lying areas and natural drainage channels are not controlled even though development control regulation are enacted • Storm water drainage is to be pumped to bale out the water • 45% of natural drainage system of city has already been filled for the purpose of development. • High intensity development in areas destroyed by the earlier floods
Road Network and System is linear network with 4.5% area under circulation. The citizens are concern about the transport system of city. They raised the issues of poor transport network of city resulting in congestion, accidents and other transport problem.				
Road Network and System	• Linear layout of the city from east to west • Right of Way available for widening but encroached. • Road safety and development efforts by AAEI	• Road Network are developed in unplanned manner with non-hierarchy • Improper maintenance of road and parking • Roadside encroachment • No initiative for IPT development	-	• Most of the intersection of city has poor geometry. • Present parking scenario is constantly reducing the road width
Water Supply System is dependent on the ground water sources, which is now affected by the overexploitation and depletion. The citizens are not concern about water as it is easily extracted from the ground water sources but government departments are making an effort toward developing efficient water supply system to generate revenue collection and minimize maintenance of depleted water network.				

Water Supply System	• Highly fertile and productive water belt. • Availability of Surface water	• Depleting ground water level due to excess utilization. • Single Source water supply system-Ground Water • Damaged water supply network lead to intensification private tube wells • Ground water extraction clearance law not applied	• Low lying areas and drainage channels can be used for rainwater harvesting • Usage of Surface Water from River Ganga	• As per the studies Extensive utilization of ground water lead to problem of arsenic • High population growth can lead to create further pressure on the water supply system in the future. Provision of trunk services is crucial. • Poor water supply system in new colonies are threat to quality of life
Sewerage System	• Model of Low Cost Sanitation and Septic Tanks	• The length of sewerage network is only 25km and make people connect their sewage pipe to storm water system	• The success in implementation of Low cost sanitation system in 1986 is still the only source of sewage disposal • There are 4 STPs in the city to treat the sewage	• High population growth can lead to create further pressure on the sewerage system in the future. • Poor sanitation in new colonies are threat to quality of life
Solid Waste Management		• No landfill site earmarked for disposal of waste. • Poor Collection System • No system of waste segregation existing		• High population growth can lead to create further pressure on the solid waste collection and disposal.
Urban Heritage is not yet identified in the city except religious structures. There are around 100 structures that have got architectural and historic importance, need conservation.				
Heritage in City	• The city has around 200 build up heritages which need to be conservation	• Lack of proper database management in each sector especially in the Heritage and Infrastructure development. • Lack of awareness among the people towards heritage conservation. • No proper maintenance of the heritage sites	• The city historic heritage can be preserved and developing it as “Transit Tourist Destination”.	• Lack of repair and maintenance of the heritage buildings can lead to loss of the heritage property.

Urban Slums	-	• Increasing levels of poverty; • Coverage of poverty alleviation programmes inadequate; • Increasing number of slums; • Poor infrastructure facilities in both regularized and unregularised slums;	• The state is focused on provision of basic services to the poor that will help in development of the city.	• Infrastructure provision in the slums is inadequate that can lead to poor living conditions.
Institutional and Fiscal Aspects		• Lack of coordination among various departments like PMC, PRDA • Planning dept., PWD, PHED, etc. • Non implementation of 74th CAA in spirit-PMC does not have financial/taxation • Powers, budget to be approved from Department of Local Self Government. • PRDA entrusts functions to JNN against the spirit of 74th CAA. • Overlapping of jurisdiction between PRDA and PMC. • Overlapping of functions between line departments.	• Stat government is in process of undertaking institutional and legislative reforms which will support the development	• Capacity building of all the government organizations if inadequate would result in no implementation of several reforms. • Fiscal reforms are a key for carrying out projects and provision of infrastructure in a sustainable manner. • Efficient marketing of the city as well as state needs to be done with the proper placement of the same with its USPs.
City Environment		• Degraded air quality of city. • Depletion of ground water. • Degraded water quality. • Contamination of piped water with sewerage. • Silt deposition in Natural Drainage system • Extreme Climate especially summers.		

Chapter 13: THE EMERGING PATNA VISION 2021

13.1. STATE PERSPECTIVE

Bihar, the most populous state of India after U.P. has a well established Panchayati Raj system comprising of 38 Zila Parishads, 531 Panchayati Samitis and 8471 Grama Panchayats. It has an effective and growing District Training Institute at Saran and where capacity building is a prime focus. It is an agrarian state but with inefficient land holdings in need of long overdue reforms. Therefore updating Land Records is a major priority.

Successive state annual plans stress the following priorities:-

a. Improving rural infrastructure, district level machinery and the cooperative movement;
b. Accelerating agro- industries, animal husbandry and crop and cattle insurance ;
c. Restoring irrigation capacity and renovating ponds and tanks for supplemental fisheries to that from rivers and canals;
d. Rehabilitation of degraded forests, social forestry, canal bank and roadside plantation (Nahar Tal and Path Tal);
e. Balancing groundwater (open wells, tubewells, artesian wells) with surface water (tanks/reservoirs, irrigation channels, lift irrigation), apart from Ganga Basin anti-erosion works and embankments extension schemes;
f. Enhancing hydro power and non-conventional energy sources and reducing transmission and distribution losses;
g. Ensuring metalled roads to all settlements and improved rural housing and sanitation.

The above issues are addressed through the state annual budgets and 5 year plans.

13.2. REGIONAL PERSPECTIVE

Based on an extensive access to secondary data followed by intensive ground level consultations and beneficiary aspirations and a swot analysis all in the form of a rapid assessment, the Patna Vision emerges as herein. This necessarily provides the long-term basis for a 7-year investment programme plan as part of a City Development Plan which enables the statutory master plan for the PRDA to be upgraded every 5-years as a rolling plan. The emphasis of the CDP is on Urban renewal. Typically Patna Municipal Corporation (PMC) emerges as the JN-NURM nodal agency or the reference point as the bulk of its jurisdiction is ripe for urban renewal. In this process, the contiguous settlements within the Patna UA are ideally to be part of the expanded PMC. Also, the larger PRDA area for which a perspective plan update is on the anvil, are recipient centres to ensure that the core or inner city is not unduly cluttered and that integrated urban renewal and development takes place – over a wider Patna centric metropolitan region canvas.

Iteratively, this vision based on people's perceptions may require adjustments in the PRDA plan 2021. ***The more optimistic of Patna's citizens, aware of the settlements unbroken tryst with history as an apex capital, seek revival of Patna as a focus for global investments in quality activities, tourism, health and education through clean environments, inter and intra city accessibility and quality infrastructure and governance.*** This requires an intrinsic equation between the expanded Patna MC area (PUA) and the PRDA within the 3 districts of the State.

The fact has also to be underlined that Patna which latterly was the capital of a State with three distinct regions, has now to serve two agrarian regions – north and south of the

Ganges, having lost the rich mineral and forest based industrialized southern region since reconstituted as the separate state of Jharkhand. Thereby, except for its orchards, the state is not generating surplus produce due to debilitating land mutations and uncontrolled river flows. Patna sits along the Ganges in the middle of this belt/ state as a primate regional city and recipient of an accelerating rural push. Therefore, Patna metropolis is in need of quality investments to galvanise the state as implied in its 5-year plans. For this Patna has to be substantially upgraded on several fronts simultaneously and rapidly. JN-NURM funds offer the incentives for this broad-based vision to be fleshed out.

Accordingly, this **vision** projects that well before 2021, an expanding Patna metropolis would be developed through a participatory process and which process enables adjustments to the **vision** as and when required and facilitates implementation of projects and programmes as driven by the **vision**.

The draft Master Plan 2021 by the PRDA consultants have envisaged Vision 2021 as follows:-

"Patna shall be a modern, vibrant and efficient urban area, which will be physically, socially, economically and environmentally sustainable. It will act as a catalyst for development of the entire state, especially its immediate hinterland. It will be a symbol of the heritage of Bihar"

This appraisal enables the fleshing out of this generalized statement through appropriate adjustments, taking into account the following:-

a. It was only as late at 2000 AD that Jharkhand state was carved out of undivided Bihar, leaving the bifurcated state with 38 districts and a population of around 83.00 million in 2001. This gives a very high density of 880 persons per sq. km. with an almost all inclusive primary sector base with the Ganges more or less dividing the state into North and South.
b. With only 10 percent of the state being urban, the Patna UA has emerged as a **regional primate city** not directly on National Expressways or primary broad gauge double track electrified trunk rail routes. However, it is well connected to NH2 and Delhi-Howrah rail line to its south and the East West expressway to its north, by appropriately bridging the Ganges
c. With the taming of the rivers entering north Bihar delayed, water logging is rampant in vast expanses of North Bihar reducing this non-industrial state to also a deficit food production and distribution state. In the process, river bunds and their maintenance in north Bihar require constant funds. At Patna this is critical as the city is expanding in a bowl which compounds its already critical problem.

13.3. VISION PARAMETERS

a. A vision plan for the expanded Patna Region within 3 districts, (Patna, Saran and Vaishali), of which only Patna District is south of the Ganges. The consultancy hopes that these 3 districts would constitute a new revenue Division with the Ganges as a bond, especially for North and South Bihar.

b. The PUA at the hub of national water way No.1 (Allahabad to Haldia) an expanded airport with an Special Economic Zone (SEZ) nearby and easily accessed quality health, tourism and higher educational services and with dispersed service and household industries at a historic location is an

achieveable vision as endorsed through the participatory process. The consultancy has accordingly fleshed out the CDP and the CIP.

c. Within such a region, the national rail and road links for the movement of goods and people is through a proper dispersal of inter urban activities at well developed nodes in all directions. At such nodes inter and intra metropolitan activities would interchange through wholesale distribution centers, inter-state bus and truck terminals, areas for manufacture and the like.

d. It is envisaged that Patna airport would be upgraded for the movement of goods and people for the international and national circuit, cashing in on Patna as a base for tourist traffic to the great Buddhist, Jain, Vedic, Islamic and Sikh heritage areas in and around Patna. Also, near the airport an export promotion zone (EPZ) or SEZ linked with rapid transit to Hajipur can be provided. It is also envisaged that near the airport, an international conference center complete with quality hotels, golf courses and the like be set up.

e. The consultancy envisages a rapid bus transit system linking the airport to major key areas of Patna, and to recreation areas along the river bund, Hajipur and other important modes of manufacture and commerce, trade and governance.

f. With a rapid bus system, multi-modal intra-settlement transport systems by bus and other motorised public transport systems (4 and 3 wheelers) can be restructured, without discouraging cycle-rickshaws as neighbourhood / zonal modes of point-to-point transport.

g. With its history encompassing Patliputra, Buddhist, Jain, Mauryian, Islamic, Sikh and British periods, Patna has a continuous heritage and distinct footprints on the banks of the Ganges. Great centers of learning and health and culture are embedded within this heritage and which is to be enhanced in quality and improved environments. This would be done in consultation with people through the expanded PMC.

h. Patna's environment needs a face-lift with its penchant to service small scale informal activities by its growing modest to low-income population, a large percentage of whom commute each day from neighbouring villages and small towns. In this process, roadside greenery, street furniture and signage, development of public open spaces, quality recreation along the bund and bridging it with activities on the opposite banks of the Ganges are important components of this vision.

i. With its tradition in education, health and culture, institutions of higher learning need being established at Patna like I.I.T's, I.I.M's, A.I.I.M.S, etc, Also cultural centers and quality hospitals need being encouraged so as to attract not only local and regional clientele but national and international ones as well.

j. Patna's local government base needs being strengthened through well defined wards and ward committees for people's participation. Through wards and local area plans, it is expected that sane environments would emerge, where built space, on plot open spaces, adequate idle-parking within plots and around plots would be provided, and where local citizen groups would monitor developments from local levels upward.

k. Patna has more than its fair share of low income inhabitants. Through a

combination of in-situ upgrading, in-situ reconstruction and some rehabilitation they could be catered to so as to make Patna an inclusive city for all income groups. The globally popular sulabh system emanated at Patna and this now constitutes an important system of integrated sanitization and sewage disposal.

l. **Skill upgrading at local government level is an important component of this vision as is the improvement of the local government resource base; simplification of regulations, laws and procedures. The NURM aims to made Patna a prime public participatory city through which development, conservation and environmental improvements add to its attractiveness for investments.**

13.4. THE VISION AND THE PRDA PLAN 2021

Though this vision is primarily for the expanded PMC area incorporating the present PUA area, it supports strategies within the PRDA, so as to facilitate the development of the expanded PMC area. Therefore, the following statements from the draft master plan for Patna 2021 are also supported:-

a. **Projects for new activity nodes in the PRDA area to relieve the pressure of mother city's urban core and the PUA/ extended PMC;**
b. **The PRDA and extended PMC to have adequate potable water supply for all at least 145 lpcd ;**
c. **The PMRA to have an efficient drainage system, which will follow the natural drainage slopes as far as possible so as to reduce the energy consumption. They should have adequate protection from floods by extending the existing 'bunds' to protect the future growth areas ;**
d. **The extended PMC to have an efficient, eco-friendly and energy efficient sewerage system and adequate power supply, both for economic growth as well as residential and other uses ;**
e. **The extended PMC to have an efficient solid waste collection and disposal system where the solid waste will be converted to other products and thus generate revenue**

13.5. RELATED REGIONAL ACTIONS

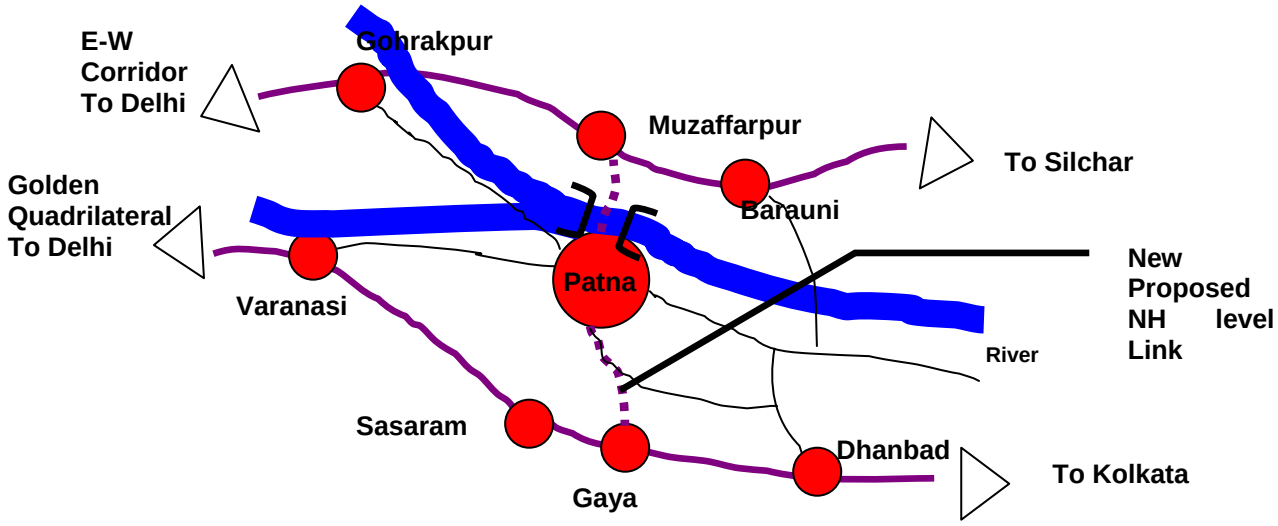
For Metropolis Patna to develop as a regional / state primate city and an identified international destination within the current buoyant national investments climate, several regional actions are necessary, primarily relating to accessibility. These are as highlighted below:-

A. Patna and National Expressways

Patna is nearly 100 Km. away from the National East-West expressway and over 100 Km from the Agra-Kolkata expressway (NH2). Therefore,

i) The Muzaffarpur – Patna and the Patna Bodhgaya links to the expressways need being upgraded to NE standards from SH Level as at present.
ii) Also, Patna needs a second link to Muzaffarpur across the Ganges – from western Patna. Over the Ganges, if could be a road-cum-rail bridge and as proposed in the PRDA Plan – 2021.

MAP 13A: Regional Road Connectors round PRDA



Patna and National railways

Patna is not yet fully on the Broad gauge double track electrified system of India. Also rail links across the Ganges is via Barauni over 100 Kms to its east. Therefore,

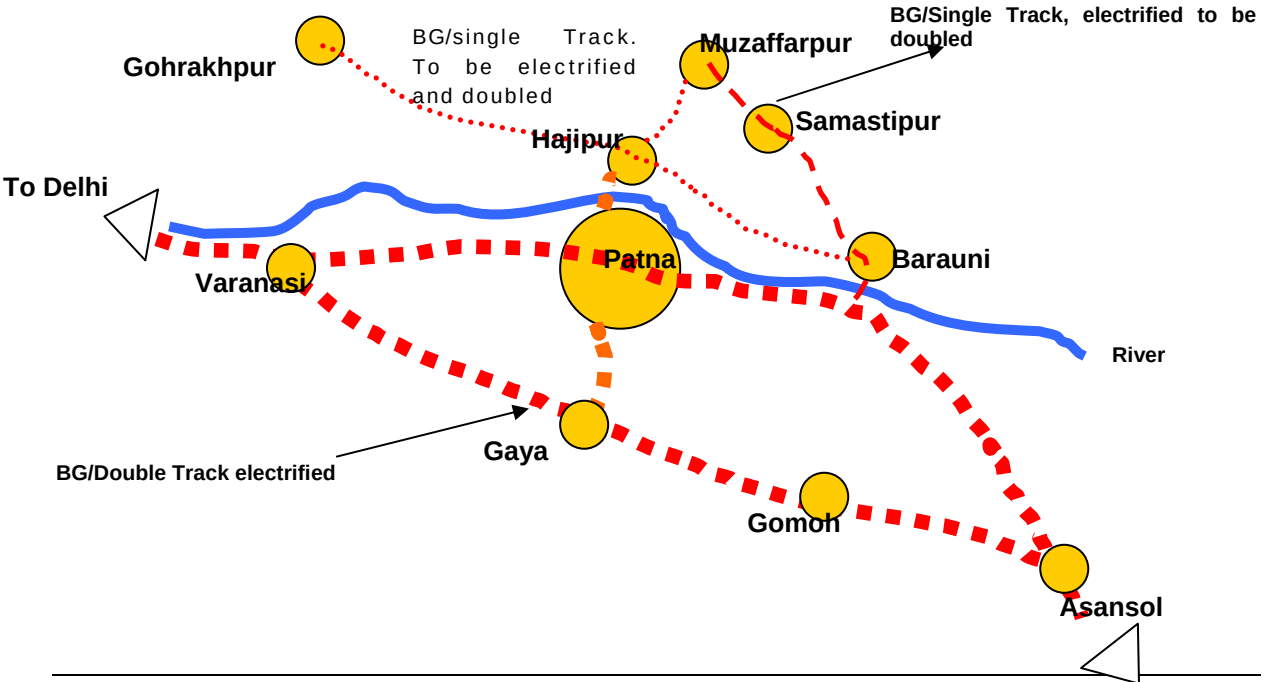
(i) The Patna-Muzaffarpur single track B.G. electrified link should be expedited as a double track.

(ii) The B.G. double-track rail link should be extended from Patna to Hajipur through a rail-cum-road bridge over the Ganges and as proposed in the PRDA plan 2021.

(iii) The Gorakhpur – Hajipur – Barauni and the Hajipur Muzafapur line be converted to double-track and be electrified.

(iv) This would complete the national level rail centrality of Patna for the rapid movement of goods and people.

MAP 13B: Regional Rail System round PRDA



B. Patna and River transport

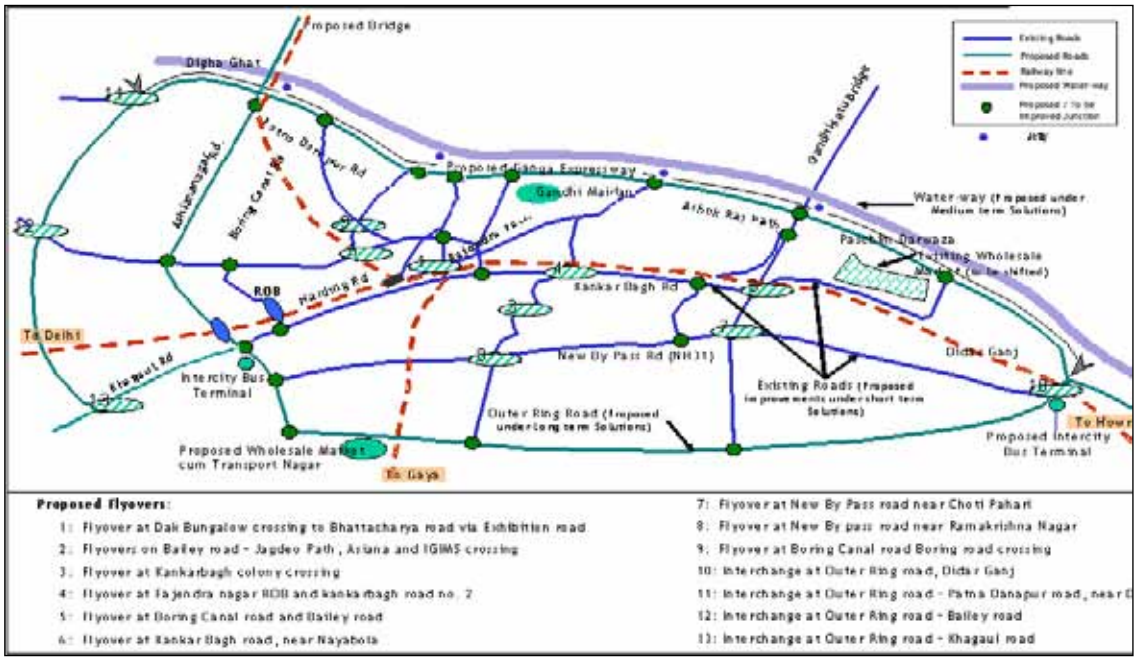
National waterway 1 (NW1) is the 1354 Km stretch from Allahabad to Haldia via Varanasi, Patna and Farrakka. The 236 Km stretch between Allahabad and Varanasi and the 356 Sq. Km. stretch between Varanasi and Patna have draughts of between 1.5 and 2.0 meters and are therefore navigable for most of the year. However from Patna to Farraka (411 Kms) and Farraka to Haldia (351 Km), the draughts are a minimum of 2.00 meters and are therefore navigable throughout the year. However, this cheap and environmentally friendly system of transport for goods and people has not been exploited to its potential. It also has tourism prospects with Patna as a hub. A rail spur from Patna rail junction to the jetty exists but is economically stagnant and has to be revived. More jetties are also required so as to vastly increase river movements for goods and people especially between Patna and Kolkata / Haldia.

C. Patna and air transport

With Lucknow, Jaipur, Amritsar and Chandigarh emerging as supportive International airports to Delhi, it is necessary for Patna, Gawahati and Bhubaneshwar to be developed as supportive international airports to Kolkatta. This requires a runway of around 9,000 to 10,000 m length and supportive infrastructure for the rapid clearance and movement of goods and people. In addition, precision all weather operations would facilitate related locations for export oriented manufacture and quality hotels, conferencing, business and related recreational and other facilities. The fact has to be underlined that of the four modes of inter settlement transport which Patna enjoys; air is the only one that links this region directly to international destinations. The other three are meant to link Patna to all the other major national nodes with quick international links. The present runway length is inadequate. It is being lengthened but there is doubt if there is sufficient land for airport upgrading to prime international standards. Also the air strip at Gaya is no substitute. Perhaps a new site may be necessary. These proposals however are based on expansion at the current location.

The 4 inter settlement transportation modes with upgrading as proposed above would enable the regional interchange nodes to develop between intra and inter settlement movements for Patna UA. These nodes are crucial for the restructuring of Patna's inner city in terms of transport and land use, especially as over 20 modes of transportation are used within the UA for the movement of goods and people. The non-motorised varieties like cycle-rickshaws slow down travel time but afford a clean and affordable service apart from livelihood. They however need being channelised as an appropriate point-to-point service. Thus the regional nodes emerging out of a vision is crucial for the urban renewal of Patna M.C. area. These nodes are explained in map form below:

MAP 13C: Proposed Improved Junctions PMA



As part of the Patna Vision – two other points are crucial from the regional angle i.e. regional governance and the taming of the rivers entering the state from the north.

Patna as stated earlier is now the capital of just North and South Bihar – separated by the Ganges. Patna is along the southern banks of the Ganges. However it needs a presence in both regions. This is partially catered to by the PRDA which is largely within Patna District and partially in the 2 northern districts of Vishali and Saran. Unfortunately, the Districts are grouped into Divisions of north and South Bihar. It is necessary that the three Districts within which the PRDA sits form a separate administration division on either banks of the Ganges. Thereby devolution of Plan funds and District revenues would be more Patna centric.

The rivers entering the state from the north have not been adequately regulated through dams. Thus floods are an annual feature over vast areas with adverse impacts on food production and regulated use of water. Such a regional regulated system could help in the generation and storage of food surplus and of Patna region serving as the main receipt and distribution centre for the state with other settlement and mandi towns. This regulated system would also encompass an achievable balance of water between ground and surface sources. This is particularly relevant for Patna UA with its rapidly decreasing per capita access to water.

Chapter 14: RIVER FRONT DEVELOPMENT

Patna being surrounded by rivers requires a river front development plan. It is also necessary to designate the type of development regulations along the river and also to relocate the slum areas along the riverfront. This project aims at river front development, water conservation, improving the ground water table, water recharging and rehabilitation of riverbank slum dwellers and informal sector.

14.1. RIVERFRONT DEVELOPMENT PRINCIPLES INCLUDE

14.1.1. *Insist on interconnected, linear waterfront development with broad public access by...*

- Encouraging the use of the riverfront greenway as a daily commuter path and recreational amenity.
- Demonstrating the connection between access, greenway development and market demand.
- Creating a coherent, visually pleasing order to the water's edge.

14.1.2. *Create synergy between office, retail, residential and recreational use of key waterfront sites by...*

- Selecting the most imaginative development concepts and architectural designs.
- Enhancing real value and competitive market advantages for private developers.

14.1.3. *Protect and enhance the natural riverfront environment by...*

- Documenting the ecological state of riverfronts in order to preserve this environmentally diverse natural habitat.
- Preventing and, where possible, eliminating inappropriate uses and practices from the rivers' edge.
- Relocation of the slums and informal activities along the river.
- Protecting existing natural areas from development.

14.1.4. *Involving Public Participation by…*

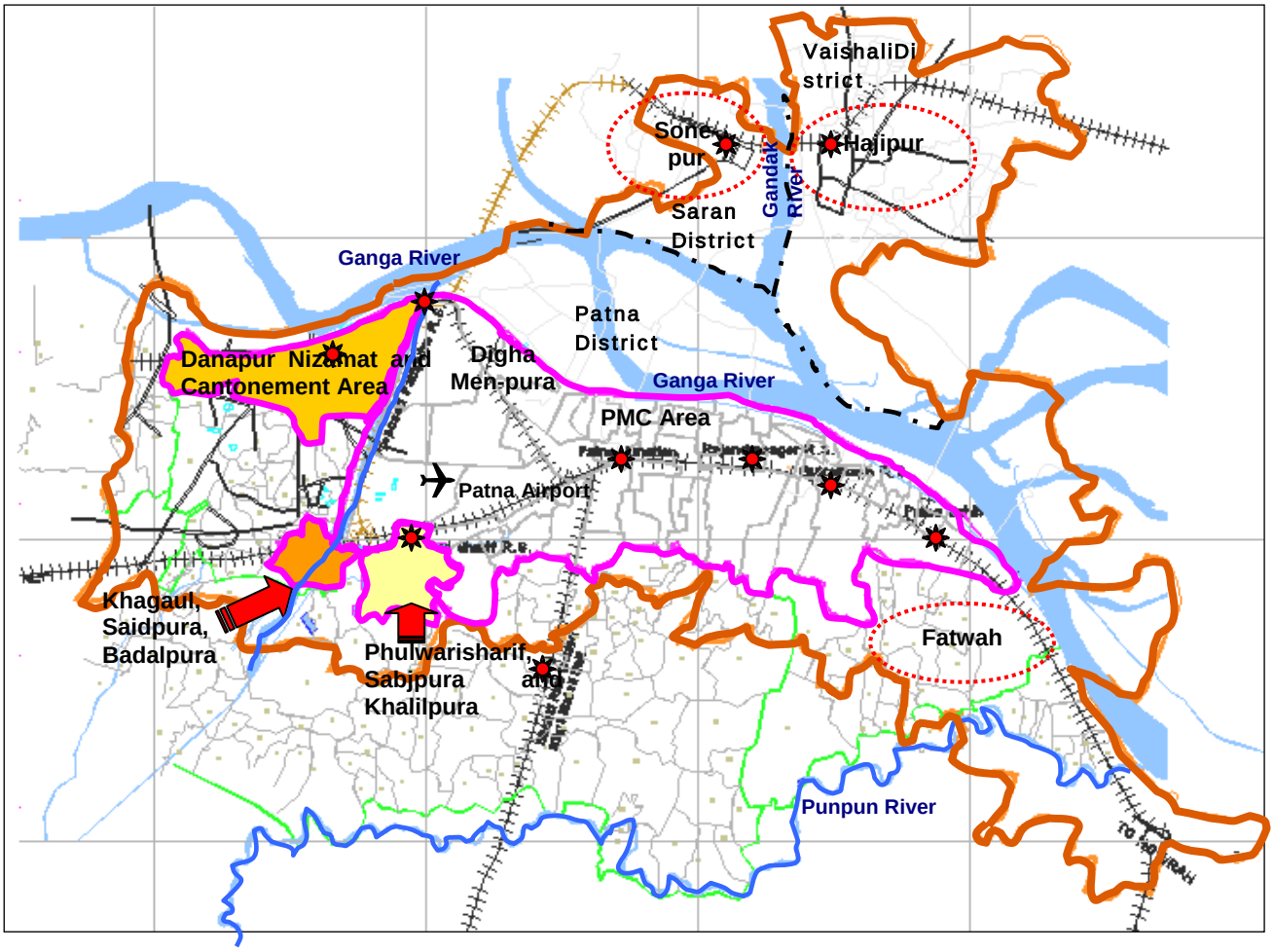
- Raising public expectations of what the city's riverfront offers.
- Attracting people, investment and the best aspects of urban living to the waterfront.

14.2. OPTIONS FOR RIVER FRONT DEVELOPMENT

The river front development would include the following stages:

- This would first involve insitu relocation of the slums areas within a kilometers distance and with focus of provision of integrated sewerage system to avoid open defecation and also discharge of sewerage in to the River. This may involve provision of septic tanks etc. for proper sewerage system.
- Open spaces and visual access to the riverfront would allow a connection between the riverfront and a large segment of the population whose only chance for contact may come while driving along one of the major arterial road along the river. The green areas along the river and the new silted areas would be protected from development for recreational uses such as parks, walkways, food plazas etc.
- Major arterial roads through these areas will become river boulevards with enhanced views of the water and natural landscape. A preservation ethic will encourage restoration of existing vegetation, stabilized slope areas, minimal retaining walls, scenic overlooks along river boulevards, and continuous nature promenades along river.

- Guidelines for development should be set up for the river front area, which may include:
    - **The river's edge will be maintained in as natural a state as possible.**
    - **Natural ecosystems should be restored where necessary.**
    - **Slope areas should be stabilized to prevent any erosion and maintain a green edge to the river.**
    - **Any infrastructure improvements, including roads, rail lines or highways, will be constructed to minimize impacts on slopes and vegetation.**
    - **Utility lines will be placed underground or away from the rivers.**
    - **Riverfront promenades will be designed to use soft materials which minimize impacts, and to discourage pedestrian intrusion into natural areas off the promenade.**
    - **Substantial construction, including building development, retaining walls, and infrastructure development, will be discouraged.**
- A detailed study is to be carried out for identification of the river front promenades with sitting arrangements and development of the recreational areas along the river front.
- The areas around the jetties may be developed with food courts and small commercial establishments to encourage recreational use, and also provision of boating facilities.



LEGEND

PRDA Boundary
PUAA Boundary
Urban Areas other than PUAA
Railway Stations
Airport

Map 14A: River Front Development Proposal

- Approximate Length of riverfront promenade to be developed: 10 sq.km. (width 0.5km) – The promanade would be developed along the entire length. These areas would include the jetties every two kilometers; around the jetties there would be kiosks and food stalls, street furniture and boating facilities The extreme east and west jetties would be used for shipment of goods etc. and not for recreational use.
- Area adjacent to Digha-Mainpura to be developed as recreational area: 10 sq. km. – this area may be used for development of a green recreational area and development controls are to be formed for restrcting non-recreation related developments.

Chapter 15: PROJECTS AND CAPITAL INVESTMENT PLAN

15.1. INTRODUCTION

Within the framework of long-term vision set out for urban development of Patna explained in the previous chapter, this chapter presents sectorwise goals and projects. The project identification and capital investment plan has been prepared for following urban sectors (i) Water Supply; (ii) Sewerage and Sanitation; (iii) Storm Water Drainage; (iv) Road Network and Transport Projects; (v) Solid Waste Management Projects; (vi) Slums and Poverty Alleviation; (vii) City Environment; (viii) Heritage Conservation and (viii) Urban Governance. The sector wise project identification is covered under following heads:

- **Project Summary:** The brief descrition of the identified projects is done under this head. The project identification is based on the assessed requirement through Norms from CPEHHO manual and UDPFI guidelines.
- **Cost Estimation of the Identified Projects:** The cost of identified project is assessed through building and road schedule of rates for Bihar and recently prepared DPRs and Feasibility Reports for the various projects.
- **Phasing Plan of Project implementation:** The Phasing Plan presents the project implementation schedule during the plan period from 2007-2012.
- **Institutional Arrangement:** It presents the institutions (ULB/Parastatal bodies) responsible for undertaking the projects for various sectors under JNNURM.

The implementing authorities for projects in Patna Urban Agglomeration area are Patna Municipal Corporation (including the Danapur Nagar Parishad; Khagul Nagar Parishad and Phulwari Sherif Nagar Parishad respectiviely); Public Health Engineering Department (PHED); Bihar Rajaya Jal Parishad (BRJP); Public Works Department (PWD); and Patna Regional Development Authority (PRDA). The sectorwise projects, investment and implementation plan are presented in the sections below.

15.2. SECTION 1: WATER SUPPLY

The projects to be undertaken in the city for improving the water supply situation are presented hereunder. Those water supply projects are taken on priority, which are low cost projects and resolve the present drawbacks of the system.

15.2.1. *Project Summary*

The projects identified are classified under: (i) Production System; (ii) Storage System; (iii) Distribution System; and (iv) Monitoring System. The locations of the projects are presented in **Map 15A.**

15.2.2. *Development of the Production System*

As discussed in the previous chapters the water supply system in PUA area is dependent on the ground water. The projects are planned to bring down the share of ground water to 75% and surface water utilization to 25% during the project implementation phase.

(i) Water Treatment Plant of 50 MLD: Two water treatment plants of 50 MLD capacities are to be constructed on the upstream of the River Ganga to meet the 25% water demand of the PUA area. The intake points and Water Treatment Plant will be located near New Rail Road Bridge in the North. It will cater to around 0.6 million population in PUA area.

(ii) Proposed Tube wells and Pumps: 30 tube wells are to be constructed and 40 pumps are to be installed with design period of 15 years. These tube wells are to be drilled at average distance 500m spread over the PUA area. The locations of 30 tube wells and their storage

tanks are presented on **Map 15A**. These tube wells are also utilized for online pumping of water in the rising mains.

15.2.3. *Development of Storage System*

As discussed in previous chapters the storage system in PUA area is 6%, which is below the norms of 35% of total supply. The storage system supports the continuous water supply for the city. The location of CWR/GLSR/OHSR will be on the highest point to provide requisite water head (4m) at the tail end of the distribution system.

(i) CWR of 100ML Capacity: In case of long power failure the city does not have adequate storage capacity to supply water. To counter this problem, two CWR of 50ML each will be constructed at AG office cooperative and near Patna Airport respectively (**Refer Map 15A**).

(ii) Overhead Reservoirs: 36 overheads reservoirs of 10 lakh litre will be constructed with at least 14-20m staging to improve the water head at the tail end of the supply network. The overhead reservoirs are to be connected to rising main for water intake (**Refer Map 15A**).

15.2.4. *Development of Distribution System*

The distribution system comprises of rising main; sub-main and primary distribution network. As discussed in previous chapters that the distribution system in Patna city and agglomeration area is damaged leading to high T&D losses (40-45%). The project is planned to rehabilitate the old network and laying of new network in the uncovered area.

(i) **Rising Main:** Rising Main have been provided for pumping water to service reservoir. Approximately 40km of rising main with sizes varying from 800mm to 1000mm of CI pipe are to be laid as shown in **Map 15A**.

(ii) **Distribution System:** Total length of 100km of CI pipe of 100mm diameter to 300mm diameter to be laid for meeting the water distribution demand in PUA area. The following schemes are covered under improvement of water supply system in Patna City; Danapur; Khagul and Phulwari Sherif.

- Reorganisation of Urban Piped Water Supply Scheme at Khagaul (Ward No-1, 5, 6, 7,8):
- Augmentation of Urban Water Supply Scheme of Dinapur Nizamat
- Reorganization of Rural Piped Water Supply Scheme at Digha Paschim

(iii) **Gross Improvement of Distribution pipeline:** In many areas of the city it is found that distribution system is quite old. The leaking pipelines are thus adding huge amount to non-revenue water. To address this problem of in different parts of the city collectively, around 400km of water pipeline will be replaced in the PUA area.

(iv) **Extension of Water Supply to New Colony Areas:** Patna city is growing in west and south; therefore it is proposed to cover the projected area with water supply network by laying around 50km distribution line of 75mm to 100mm diameter CI pipe.

15.2.5. *Development of Monitoring System*

The monitoring system of water supply involves *Quantity Monitoring and Quality Monitoring*. The Unaccounted Flow of Water (UFW) can be minimized to 15% from current loss of 45% by installing proper water monitoring system which includes Bulk Metering; Consumer Metering, CCTV etc.

The quality of water supplied to the consumers will be monitored through establishing/strengthening water testing laboratory at treatment plant; installing online chlorinator etc.

(i) Bulk Meter: For metering of water and to reduce the unaccounted for flow of water, thirty six bulk meters is proposed to be installed at storage reservoirs.

(ii) Establishing Customer Connections Meters: To increase revenue it is proposed to establish customer connections meters. The costs of meters are to be recovered from the consumers.

(iii) Leak Detection Study and Rehabilitation Program for Water Supply System: To reduce the quantity of non-revenue water and improve service delivery it is proposed to carry out leak detection study and rehabilitate the water supply system as per the findings.

(iv) Civil & Electromechanical Works: For the above-proposed reservoirs pumping machinery would be required to pump water. Electro mechanical works are proposed including pumping sets, underground electric cabling etc.

(v) Strengthening of Water Testing Laboratory: Keeping in view the requirement of regular water quality monitoring at user end it is proposed to strengthen the laboratory at filter plant to carry out bacteriological and physico-chemical tests.

(vi) Energy Efficiency Study: To optimize the efficiency of the electro-mechanical machinery it is being proposed to carry out the energy efficiency study.

(vii) Miscellaneous Work: Provision for miscellaneous works such as land acquisition, carriage of materials, hire charges of godown, site development, HT transmission and Transformers, boundary wall, T&P has also been made.

15.2.6. *Cost Estimates of Projects*

The cost estimates will be based on the unit rates derived from the Schedule of Rates (SoR) for each component. The details of the costs are presented in **(Table 15.1)**.

Table 15.1: Project wise Cost Estimation (in Rs Crore) - WATER

S.no	Projects	Quantity	Unit Rate * (Rs)	Cost in Rs Crore
1	**DEVELOPMENT OF PRODUCTION SYSTEM**			
i	Water Treatment Plant (50 MLD each)	2	Rs 20 Lakh/MLD	20.00
ii	Proposed Tube wells and Pumps	30	Rs 16.5 lakh/TW	4.29
iii	Additional Set of Motor and Pump	10	Rs 4.5 lakh/TW	0.45
A	**SUB-TOTAL OF PRODUCTION SYSTEM**			**24.74**
2	**DEVELOPMENT OF STORAGE SYSTEM**			
i	Construction of CWR (100ML)	2	Rs 25 Lakh/ML	25.00
ii	Overhead Reservoirs- 36 No with each of 1.0 ML Capacity	36	Rs 10 Lakh/ML	3.60
B	**SUB-TOTAL OF STORAGE SYSTEM**			**28.60**
3	**DEVELOPMENT OF DISTRIBUTION SYSTEM**			
i	Rising Main-40km CI or MS Pipe of 800m to 1000mm diameter	40	Rs 2000/RM	8.25
ii	Distribution System-100km length of water pipeline of 100m to 300mm diameter in PUA area	100	Rs 700/RM	7.00
iii	Repair and Maintenance of 400km water pipeline	400	Rs 375/RM	15.00

S.no	Projects	Quantity	Unit Rate * (Rs)	Cost in Rs Crore
iv	Extension of Water Supply line in New Colony- 50km length of CI pipe of 75mm to 100mm diameter	50	Rs 250/RM	1.25
C	**SUB-TOTAL OF DISTRIBUTION SYSTEM**			**31.50**
4	**DEVELOPMENT OF MONITORING SYSTEM**			
i	Bulk Meter 36 Nos at CWR and OHSR	36	Rs 7.5 Lakh/Meter	2.80
ii	Civil & Electromechanical Works including Underground electric cabling near pumping stations and OHSR	Lump sum		40.20
iii	Strengthening of Water Testing Laboratory at Filter Plant	Lump sum		0.70
iv	Establishing Customer Connections Meters	4.7 Lakh	Rs 150/ Meter	5.0
v	Leak Detection and Leak indicators	Lump sum		0.75
vi	Energy Efficiency Study	Lump sum		15.25
vii	Land Acquisition	Lump sum		8.5
viii	Public awareness	Lump sum		0.45
ix	Water Hydrant, Fire Hydrant, Water Tanker	Lump sum		0.72
x	Electric Substation	Lump sum		0.64
xi	Electric Chlorinator	Lump sum		0.15
xii	Leak Detection Study and Rehabilitation Program for Water Supply System	Lump sum		10.0
xiii	Miscellaneous	Lump sum		5.0
C	**SUB-TOTAL OF MONITORING SYSTEM**			**90.16**
TOTAL WATER SUPPLY SYSTEM (in Rs Crore)				**175.00**

** Unit Rates are derived from PWD Schedule of Rate, Bihar; Average cost of the projects already developed.*
NOTE: The costs include cost of construction, labour, land and contingencies.

15.2.7. *Phasing plan for project implementation*

The phasing plan for the project implementation are designed initially implementation of low investment projects (2007-09) followed by implementation of high revenue intensive projects (2009-2012). The phasing plan for project implementation is presented in **(Table 15.2).**

Table 15.2: Phasing Plan for Project Implementation - WATER

S.no	Projects	Implementation Plan (2007-12)- Investment in % AGE					Total in Crore	Department
		1	2	3	4	5		
1	**DEVELOPMENT OF PRODUCTION SYSTEM**							
I	Water Treatment Plant (25 MLD each)		15	15	20	50	20.00	BRJP
ii	Proposed Tube wells and Pumps	15	20	35	30		4.29	
iii	Additional Set of Motor and Pump	15	20	35	30		0.45	
2	**DEVELOPMENT OF STORAGE SYSTEM**							
i	Construction of CWR (100ML)			50	50		25.00	BRJP/PHED
ii	Overhead Reservoirs- 36 No with each of 1.0 ML Capacity	25	25	25	25		3.60	

S.no	Projects	Implementation Plan (2007-12)- Investment in % AGE					Total in Crore	Department
		1	2	3	4	5		
3	**DEVELOPMENT OF DISTRIBUTION SYSTEM**							
i	Rising Main-40km CI or MS Pipe of 800m to 1000mm diameter		15	25	25	35	8.25	BRJP
ii	Distribution System-100km length of water pipeline of 100m to 300mm diameter in PUA area		20	25	30	25	7.00	BRJP/PHED
iii	Repair and Maintenance of 400km water pipeline	30	35	25			15.00	PMC
iv	Extension of Water Supply line in New Colony-50km length of CI pipe of 75mm to 100mm diameter	15	15	25	35	10	1.25	PMC
4	**DEVELOPMENT OF MONITORING SYSTEM**							
i	Bulk Meter 36 Nos at CWR and OHSR	25	25	35	15		2.80	BRJP/PHED
ii	Civil & Electromechanical Works including Underground electric cabling near pumping stations and OHSR	25	25	30	20		40.20	BSEB
iii	Strengthening of Water Testing Laboratory at Filter Plant	35	50	15			0.70	PHED
iv	Establishing Customer Connections Meters	25	20	25	30		5.0	PMC
v	Leak Detection and Leak indicators	25	25	25	10	15	0.75	
vi	Energy Efficiency Study		25	25	30	20	15.25	BRJP
vii	Land Acquisition	50	50				8.5	PHED
viii	Public awareness	25	25	25	25		0.45	PMC
ix	Water Hydrant, Fire Hydrant, Water Tanker			35	35	30	0.72	
x	Electric Substation	25	25	35	15		0.64	BSEB
xi	Electric Chlorinator			30	40	30	0.15	PMC
xii	Leak Detection Study and Rehabilitation Program for Water Supply System	50	50				10.0	BRJP
xiii	Miscellaneous	10	10	20	30	30	5.0	PMC

15.2.8. *Institutional Arrangement*

As discussed in previous chapters the institutions responsible for design, implementation and operating water supply system in PUA area are PMC, NP's, PHED and BRJP. Presently local bodies are responsible only for operation and maintenance of water supply system.

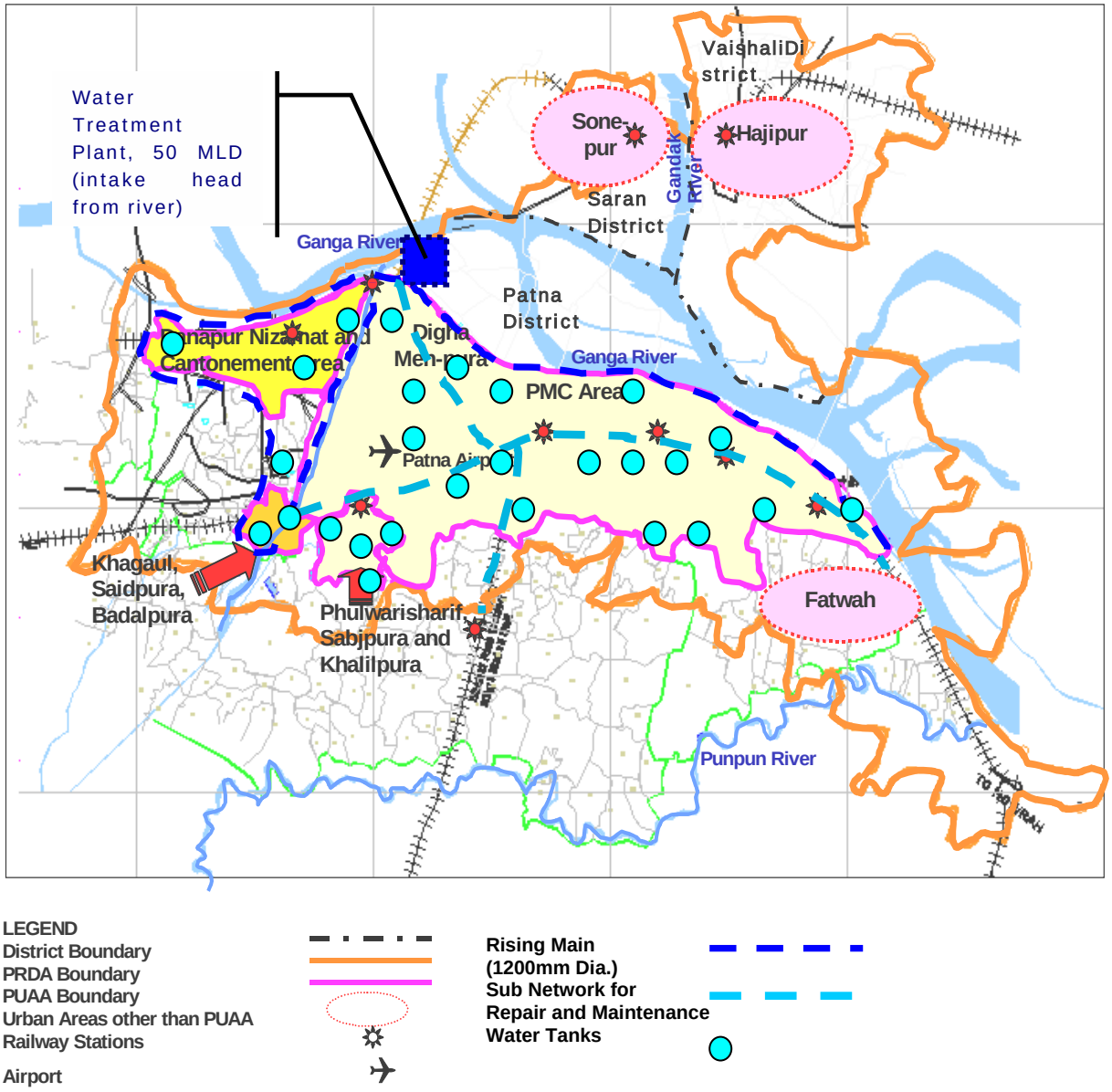
In order to improve water supply system in the PUA area the project implementations would be shared by the state departments. Therefore the project within the current jurisdiction of PMC area will be done by PMC & BRJP and in other areas its done by PHED (Refer **(Table 15.3).**

Table 15.3: Institutional Arrangement for Project Implementation - WATER

Projects	PMC & NP's		PHED		BRJP		BSEB		TOTAL Rs Crore
	Rs Crore	%	Rs Crore	%	Rs Crore	%	Rs Crore	%	
Development of Production System	0	0	0	0	24.74	100	0	0	24.74

Projects	PMC & NP's		PHED		BRJP		BSEB		TOTAL Rs Crore
	Rs Crore	%	Rs Crore	%	Rs Crore	%	Rs Crore	%	
Development of Storage System	0	0	8.60	30.0	20.00	70.0	0	0	28.60
Development of Distribution System	16.25	56.8	4.00	12.7	11.25	35.7	0	0	31.50
Development of Monitoring System	12.07	13.4	11.20	12.4	26.05	28.9	40.84	45.3	90.16
TOTAL COST in Rs Crore	**28.32**	**16.2**	**23.80**	**13.6**	**82.04**	**46.8**	**40.84**	**23.3**	**175.00**

MAP 15A: Proposed Water Supply Network PUA area



15.3. SECTION 2: SEWERAGE AND SANITATION

The projects to be undertaken in the city for improving the sanitation situation are presented below:

15.3.1. *Project Summary*

The sewage disposal system in PUA area is mainly dependent on septic tanks. For a metropolitan city to have efficient sanitation the UGD system is recommended. In order to have network of sewerage line and treatment plants, projects are identified to cover the whole city with efficient sanitation system. The projects identified are classified as **1. Underground Drainage System:** (a) Treatment System; (b) Collection and Disposal Network; **2. Individual Sanitation System**: (a) Operated by Network of Septic Tanks; (b) Low Cost Sanitation System (Refer Figure 14-2).

15.3.2. *Underground Drainage System*

(a) Development of Treatment System

(i) Three STP of 35 MLD: There are four STP in PUA area, which is not sufficient to cater the treatment demand in 2011. Therefore three STP of 35MLD will be constructed south of the city. Two STP will be located in west and Southwest for Phulwari Sherif, Khagul and Part of Danapur Nagar Parishads and one STP in Southeast direction for part of Patna City.

(b) Development of Disposal System

(ii) Laying of Trunk Network: The Trunk line has to be laid along Kanakar bagh road from west to east to cover partly south and north of the Patna City; East of Danapur & Khagul Nagar Parishads. The length of the trunk line will be 30km and diameter of 1500mm CI/RCC pipe. This trunk line will be connected to STP in North and East.

Another trunk line of 35km length is to be laid parallel to existing by-pass road from west to south upto Pupun River. This trunk line will be connected to Existing STP at Beur and proposed STP at Phulwari Sherif.

iii) Laying of Sub-Main Sewer Network: The sub-main sewerage networks will be laid perpendicular to trunk line. The sub-main network will be 115km in length of 600-800mm diameter. The network will be along the major roads such as Ashok Rajpath; Rajendrapath; Boring Canal Road; Road connecting Rajendrapath to Kanakarbagh road to Exisiting By-pass road, road connecting Gandhi Setu to Kankarbagh road to Existing By-pass road.

iv) Laying of Lateral Sewer: The lateral sewer of 200-450mm diameter of 150km length will be laid perpendicular to sub-main network mainly on the neighbourhood roads network.

v) HH Connections Sewer: Around 2.5 lakh households are to be provided the house service connection of 100-150mm diameter in PUA area by 2014. The total length of sewer line is estimated to be 2500km.

vi) Upgradation of old sewer Network: The old sewer of 30km length in PUA area are to be replaced to make it part of the total sewerage system.

vi) Construction of Public Toilet Complex: 105 public toilet complexes are to be connected to sewerage system in PUA area. The public toilet complex are constructed at major shopping areas such as Ashok Rajpath; Exhibition Road; Patna Danapur Road; Railway Stations; Bus stand and one public toilet complex in each wards of Patna city; Danapur Nagar Parishad (28 No); Khagul Nagar Parishad (22 No.) and Phulwari Sherif Nagar Parishad (20 No.).

15.3.3. *Development of Individual Sanitation System*

(i) Operated by Network of Septic Tanks: Around 20% of household in old city area and isolated residential and commercial areas are dependent on the septic tank for sewage disposal. Around 40000 septic tanks are to be provided till 2014.

(ii) Low Cost Sanitation System: The low cost sanitation will be phased out of PUA area with development of UGD system. The village abadi area and informal settlements due to lack of space has to depend on the LCS system of sewage disposal. Therefore around 25000 units of LCS system will be provided for waste disposal in unorganized and degenerated areas.

15.3.4. *Operation and Maintenance System*

(i) Procurement of sewer maintenance equipment: The sewerage maintenance equipment such as CCTV-10 No.; Sewer Jetting Machine-10 Nos., Sewage Lifting Stations- 8 No. and Flushing Sewer Machine-5 Nos. are to be procured for efficient functioning of system.

(ii) Miscellaneous works: The monitoring of total sewerage system and its functioning automation, computerization, networking of STPs & establishing central control rooms and Sewage Testing Labs are prerequisite. The other aspects to be covered are HRD/ training of Staff; Public Awareness and a-forestation of STPs.

15.3.5. *Cost Estimates of Projects*

The cost estimation of the projects is presented in **Table 15.4**. The cost for development of UGD system is Rs 341.1 Crores, whereas that of individual sanitation system is Rs 76.50 Crore. The O&M cost is Rs 26.3 crore, which is 7.7% of the system development cost.

Table 15.4: Project wise Cost Estimation (in Rs Crore) - Sewage

S.no	Projects	Quantity	Unit Rate * (Rs)	Cost in Rs Crore
1	**DEVELOPMENT OF UGD SYSTEM**			
a	**Development of Treatment System**			
i	Sewage Treatment Plant (35 MLD each)	3	Rs 175 Lakhs per MLD	183.75
A	**SUB-TOTAL OF TREATMENT SYSTEM**			**183.75**
b	**Development of Disposal System**			
i	Laying of Trunk Network (Length 65km, diameter 1500mm)	65km	Rs 4500 per RM	29.25
ii	Laying of Sub-Main Network (Length 115km, diameter 600-800mm)	115km	Rs 3000 per RM	34.50
iii	Laying of Lateral Network (Length 150km, diameter 200-450mm)	150km	Rs 850 per RM	12.75
iv	Laying of HH Connection Sewer (Length 2500km, diameter 200-450mm)	2500km	Rs 300 per RM	75.00
v	Upgradation of Old Sewer Network (Length 30km, diameter 200-450mm)	30km	Rs 200 per RM	0.60
vi	Construction of Public Toilet Complex (105)	105	Rs 5 Lakh each	5.25
A	**SUB-TOTAL OF DISPOSAL SYSTEM**			**157.35**
2	**DEVELOPMENT OF INDIVIDUAL SANITATION SYSTEM**			
i	Septic Tank Network (40000)	40000	Rs 15000 per unit	60.00
ii	Low Cost Sanitation (25000)	25000	Rs 6600 per unit	16.50
B	**SUB-TOTAL OF INDIVIDUAL SANITATION SYSTEM**			**76.50**
3	**DEVELOPMENT OF O&M SYSTEM**			

S.no	Projects	Quantity	Unit Rate * (Rs)	Cost in Rs Crore
i	Procurement of sewer maintenance equipment (CCTV, Sewer Jetting Machine et.al)	Lump sum		10.75
ii	Miscellaneous works	Lump sum		15.55
C	**SUB-TOTAL OF O&M SYSTEM**			**26.30**
TOTAL SEWERAGE SYSTEM (in Rs Crore)				**443.90**

NOTE: The costs include cost of construction, labour, land and contingencies.

15.3.6. *Phasing plan for project implementation*

The city and its agglomeration area have no planned sewage disposal system other than the individual sanitation infrastructure developed in early 90's. The phasing plan for sewerage system focuses on the development of treatment system followed by lying of trunk network. The implementation plan has been prepared to cover around 40% of the population through sewerage system up to 2014. The system will be further extended to cover 75% population in 2021. **Table 15.5** presents the phasing plan of project implementation in Patna Urban Area.

Table 15.5: Phasing Plan for Project Implementation - SEWAGE

S.no	Projects	Implementation Plan (2007-12)- Investment in % AGE					Total in Crore	Department
		1	2	3	4	5		
1	**DEVELOPMENT OF UGD SYSTEM**							
a	**Development of Treatment System**							
i	Sewage Treatment Plant (35 MLD each)	10	25	30	15	25	183.75	BRJP
b	**Development of Disposal System**							
i	Laying of Trunk Network (Length 65km, diameter 1500mm)	20	15	15	30	20	29.25	BRJP
ii	Laying of Sub-Main Network (Length 115km, diameter 600-800mm)		25	25	25	25	34.50	
iii	Laying of Lateral Network (Length 150km, diameter 200-450mm)	15	20	20	20	25	12.75	PMC
iv	Laying of HH Connection Sewer (Length 2500km, diameter 200-450mm)		25	25	30	20	75.00	BRJP /PMC
v	Upgradation of Old Sewer Network (Length 30km, diameter 200-450mm)	15	35	25	25		0.60	PMC
vi	Construction of Public Toilet Complex (105)	35	35	30			5.25	
2	**DEVELOPMENT OF INDIVIDUAL SANITATION SYSTEM**							
i	Septic Tank Network (40000)		25	25	30	20	60.00	PMC
ii	Low Cost Sanitation (25000)	15	15	20	30	20	16.50	
3	**DEVELOPMENT OF O&M SYSTEM**							
i	Procurement of sewer maintenance equipment (CCTV, Sewer Jetting Machine et.al)		25	20	30	25	10.75	PMC
ii	Miscellaneous works		25	25	30	15	15.55	

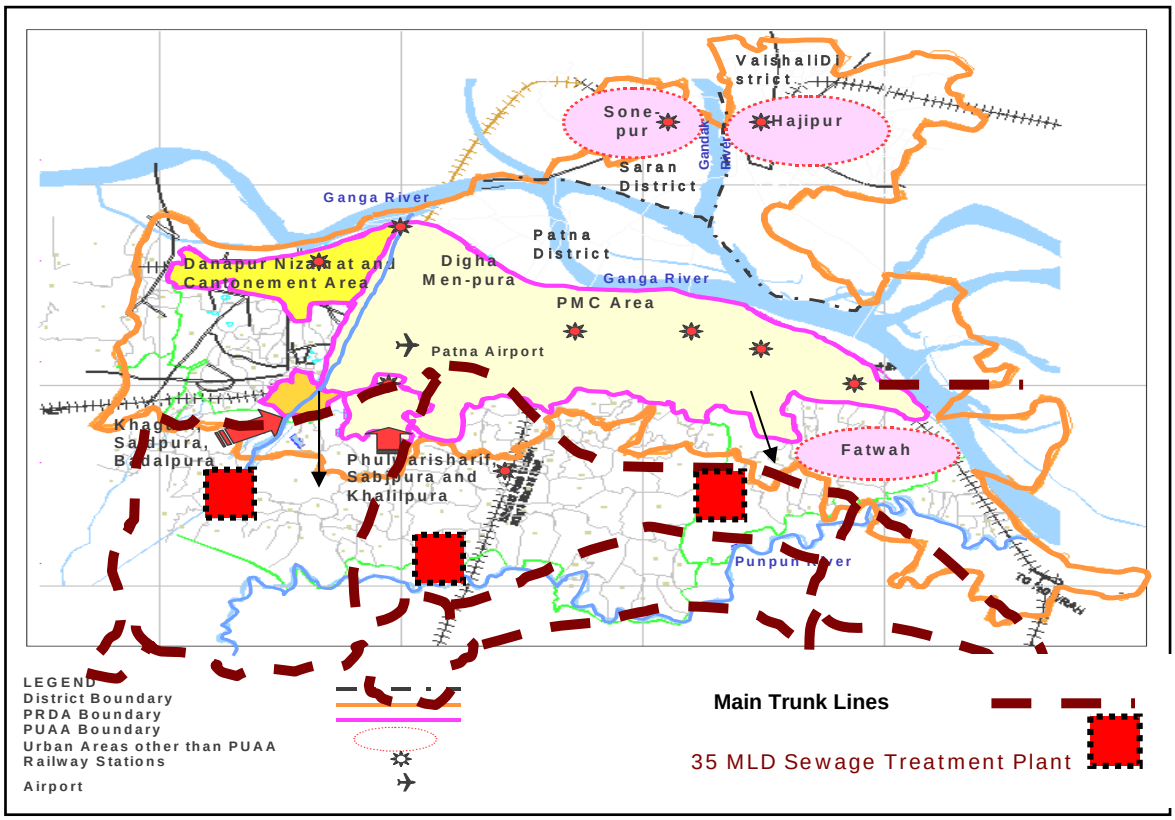
15.3.7. *Institutional Arrangement*

The institutions responsible for implementation of the sewerage system development are PMC; and BRJP. The development of treatment and disposal system is responsibility of BRJP, whereas individual sanitation system is developed mainly by PMC. **Table 15.6** presents the institutions responsible for project implementation.

Table 15.6: Institutional Arrangement for Project Implementation - SEWAGE

S. No	Projects	PMC + NP's		BRJP		TOTAL Rs Crore
		Rs Crore	%	Rs Crore	%	
1	Development of Treatment System	0	0	183.75	100	183.75
2	Development of Disposal System	56.10	35.6	101.25	64.4	157.35
3	Development of IS System	76.50	100.0	0	0	76.50
4	Development of O&M System	26.30	100.0	0	0	26.30
TOTAL INVESTMENT IN RS CRORE		**158.9**	**35.8**	**285.0**	**64.4**	**443.90**

Map 15B: Proposed Sewerage System PUA area



15.4. SECTION 3 SOLID WASTE MANAGEMENT

The projects are prioritized based on their low capital cost, feasibility of project implementation and ability to show desired results in short time. The projects are identified for (i) Primary Collection; (ii) Secondary Collection & Transportation; (iii) Disposal facilities; and (iv) Miscellaneous. The prioritized projects are as follows:

15.4.1. *Project summary*

The projects are identified in various sectors for solid waste management based on the criteria mentioned below.

- First priority shall be given to the implementation of those programmes for which master plans has already been prepared. This will reduce the time consumption for making another study.

- Identification of the dumping ground to a legal and scientific MSW disposal landfill to restrict any further damage to the ground and surface water.
- Procurement of mechanical equipments for cleaning, collection and transportation of wastes.
- Encourage various drives for keeping the city clean and encouraging segregation of wastes at source to the common mass.
- Involving private sector participation in collection, transportation and treatment of MSW facilities.

(i) Development of Collection System: The garbage collection system has been classified as primary collection system and secondary collection system.

(a) Primary Collection System: The total length of road network at neighborhood level is around 6000km. The garbage bins of $3m^3$ at distance of 200m on neighborhood road, therefore 30,000 bins are to be placed on the neighborhood road.
(b) Secondary Collection System: The total length of major road network in PUA area is 1500km. The dustbins of $10m^3$ on the sub-arterial roads (Zonal Plan) are placed at distance of 500-700m and bins of $25m^3$ at distance of 1500-2000m are placed on the arterial roads (Master Plan). Therefore 1700 bins of $10m^3$ and 150 bins of $25m^3$ are required to cover the road network of PUA area.
(c) Pilot Project on HH Collection: Pilot project for primary collection of waste will be undertaken covering 50,000 households in PUA area. One ward in Patna City and two wards in Danapur, Khagul and Phulwarisherif will be selected for the purpose of the pilot projects. The waste bins and other materials will be provided to households of these wards.

(ii) Development of Disposal System: As discussed in previous chapters the LBs in PUA area have no waste disposal site. Therefore it has been proposed to acquire landfill site of 50 acre each on west and east for scientific waste disposal.

(iii) Development of Transportation System: The waste transportation system involves wheel barrows for collecting waste from streets & tertiary network; Trucks/tractors for collecting waste from sub-arterial roads to zonal level disposal sites; Collection of waste from zonal level disposal sites and arterial roads to city level disposal sites is done through tippers and trucks.

(iv) Miscellaneous Works/Activities: For waste collection, transportation and disposal system to function systematically, public awareness at various levels is important. The public awareness will be carried out based on the land use; community and area level aspects.

15.4.2. *Cost estimates of projects*

The various projects for solid waste management include waste collection, transportation, disposal and monitoring facility. Refer **Table 15.7**. The total capital cost of the project is Rs 92.58 crore.

Table 15.7: Project wise Cost Estimation (in Rs Crore) - SWM

S.no	Projects	Quantity	Unit Rate * (Rs)	Cost in Rs Crore
1	**DEVELOPMENT OF COLLECTION SYSTEM**			
a	**Primary Collection System**			
i	Litre dustbin at Community Level-$3.0m^3$	30,000	20000	60.00
ii	Household Bins (Pilot Project Basis)-$1.0m^3$	50,000	300	1.50

S.no	Projects	Quantity	Unit Rate * (Rs)	Cost in Rs Crore
iii	HD PVC Bags (Pilot Basis)	50,000	50	0.25
iv	Tri-Cycle for 300 Households (Pilot Basis)	300	6000	0.18
	SUB-TOTAL OF PRIMARY COLLECTION SYSTEM			**61.93**
b	**Secondary Collection & Transportation System**			
i	10 cum Container (1700 bins)	1700	75000	12.75
ii	25 cum Container (150 bins)	150	100000	1.50
iii	7 Dumper placer vehicles	7	850000	0.60
iv	Civil Works of 10 Transfer Station	10	2500000	2.50
v	12 new large tipper truck for collecting waste from the transfer station to disposal site	12	1500000	1.80
vi	Small Vehicles to collect waste from congested areas	20	500000	1.00
	SUB-TOTAL OF SECONDARY & TRANSPORTATION SYSTEM			**20.15**
c	**Secondary Collection & Transportation System**			
i	Equipment cost of Garages	Lump sum		1.00
ii	Development of Garages	Lump sum		4.00
	SUB-TOTAL OF SECONDARY & TRANSPORTATION SYSTEM			**5.00**
2	**DEVELOPMENT OF DISPOSAL SYSTEM**			
i	Civil work for the electronic weigh bridges	2	150000	0.03
ii	Weigh Bridge Cost (2 No.)	Lump sum		0.03
iii	Bulldozer	2	6500000	1.30
iv	Tripper Truck	4	1500000	0.60
v	JCB	3	2300000	0.69
vi	Incinerator	3	1300000	0.40
vii	Septic tank Cleaner	3	550000	0.17
viii	Rear end loader compactor	2	1500000	0.30
	SUB-TOTAL OF DISPOSAL SYSTEM			**3.52**
3	**MISCELLANEOUS**			
i	Public Awareness Campaign and Training	Lump sum		0.52
ii	Detailed Project Report of Solid Waste Management	Lump sum		0.80
iii	Medical Benefits for Sanitary Workers	Lump sum		0.70
	SUB-TOTAL OF MISCELLANEOUS			**2.02**
	TOTAL COST OF SOLID WASTE MANAGEMENT (in Rs Crore)			**92.58**

NOTE: The costs include cost of construction, labour, land and contingencies.

15.4.3. *Phasing plan for project implementation*

The phasing plan for implementation of the waste management projects involve development of primary collection system; secondary collection system and transportation system over and above this the phasing plan emphasizes on the investment in awareness programmes. The awareness programme is initiated in the initial years along with the system development **(Refer Table 15.18).**

Table 15.8: Phasing Plan for Project Implementation - SWM

S.no	Projects	Implementation Plan (2007-12)- Investment in % AGE					Total in Crore
		1	2	3	4	5	
1	**DEVELOPMENT OF COLLECTION SYSTEM**						
a	**Primary Collection System**						
i	Litre dustbin at Community Level-3.0m^3		20	20	25	35	60.00
ii	Household Bins (Pilot Project Basis)-1.0m^3	15	25	35	25		1.50
iii	HD PVC Bags (Pilot Basis)	15	25	35	25		0.25
iv	Tri-Cycle for 300 Households (Pilot Basis)	15	25	35	25		0.18
b	**Secondary Collection & Transportation System**						
i	10 cum Container (1700 bins)		20	20	25	35	12.75
ii	25 cum Container (150 bins)		15	25	30	30	1.50
iii	7 Dumper placer vehicles			25	35	40	0.60
iv	Civil Works of 10 Transfer Station		25	35	40		2.50
v	12 new large tipper truck for collecting waste from the transfer station to disposal site			30	40	30	1.80
vi	Small Vehicles to collect waste from congested areas	25	25	35	15		1.00
c	**Secondary Collection & Transportation System**						
i	Equipment cost of Garages		25	25	25	25	1.00
ii	Development of Garages		20	35	45		4.00
2	**DEVELOPMENT OF DISPOSAL SYSTEM**						
i	Civil work for the electronic weigh bridges			50	50		0.03
ii	Weigh Bridge Cost (2 No.)			50	50		0.03
iii	Bulldozer			35	35	30	1.30
iv	Tripper Truck					100	0.60
v	JCB				50	50	0.69
vi	Incinerator		25	25	25	25	0.40
vii	Septic tank Cleaner	50	25	25			0.17
viii	Rear end loader compactor		35	30	25	10	0.30
3	**MISCELLANEOUS**						
i	Public Awareness Campaign and Training	45	15	15	15	10	0.52
ii	Detailed Project Report of Solid Waste Management	50	50				0.80
iii	Medical Benefits for Sanitary Workers	55	45				0.70

15.4.4. *Institutional arrangement*

The implementation of waste management project is the responsibility of local bodies in PUA area in coordination with private sector and citizen groups. The citizens groups are involved at the primary and secondary collection level. Moreover, the citizen groups and CBOs are also involved in monitoring the waste collection, disposal and awareness of the city population involved in pilot studies **(Refer Table 15.9 & 15.10).**

Table 15.9: Project wise Implementing Agencies – SWM

S.no	Projects	Cost in Rs Crore	Implementing Agency
1	**DEVELOPMENT OF COLLECTION SYSTEM**		
a	**Primary Collection System**		
I	Litre dustbin at Community Level-3.0m^3	60.00	PMC
ii	Household Bins (Pilot Project Basis)-1.0m^3	1.50	NGO/CBOs
iii	HD PVC Bags (Pilot Basis)	0.25	NGO/CBOs
iv	Tri-Cycle for 300 Households (Pilot Basis)	0.18	NGO/CBOs
b	**Secondary Collection & Transportation System**		
I	10 cum Container (1700 bins)	12.75	PMC
ii	25 cum Container (150 bins)	1.50	
iii	7 Dumper placer vehicles	0.60	
iv	Civil Works of 10 Transfer Station	2.50	
v	12 new large tipper truck for collecting waste from the transfer station to disposal site	1.80	
vi	Small Vehicles to collect waste from congested areas	1.00	
c	**Secondary Collection & Transportation System**		
i	Equipment cost of Garages	1.00	PMC
ii	Development of Garages	4.00	
2	**DEVELOPMENT OF DISPOSAL SYSTEM**		
i	Civil work for the electronic weigh bridges	0.03	PMC
ii	Weigh Bridge Cost (2 No.)	0.03	
iii	Bulldozer	1.30	
iv	Tripper Truck	0.60	
v	JCB	0.69	
vi	Incinerator	0.40	
vii	Septic tank Cleaner	0.17	
viii	Rear end loader compactor	0.30	
3	**MISCELLANEOUS**		
I	Public Awareness Campaign and Training	0.52	NGO/CBOs
ii	Detailed Project Report of Solid Waste Management	0.80	
iii	Medical Benefits for Sanitary Workers	0.70	

Table 15.10: Institutional Arrangement for Project Implementation - SWM

S. No	Projects	PMC + NP's		NGOs/CBOs		TOTAL Rs Crore
		Rs Crore	%	Rs Crore	%	
1	Development of Collection System	85.11	97.8	1.93	2.2	87.04
2	Development of Disposal System	3.52	100	0	0	3.52
3	Miscellaneous	0	0	2.02	100	2.02
TOTAL INVESTMENT IN RS CRORE		**88.63**	**95.7**	**3.95**	**4.3**	**92.58**

15.5. SECTION 4: ROAD NETWORK AND TRANSPORT PROJECTS

The improvement in transport system of Patna is not difficult. While the long-term solutions are with long gestation period and high cost, there are short-term improvement measures, which can make a significant difference in the situation. What is being recommended here are based on a few assumptions as follows: (i) The land acquisition should be minimum (ii) Optimum utilization of available network and road space, (iii) Providing better management of systems and services for urban travel and (iv) Create no-cost or low-cost solutions which needs only innovations and zero or little funds. The summary of the projects is presented below.

15.5.1. *Project Summary*

The short-term improvement measures are regulatory measures and immediate remedial measures on low investment cost. These include converting roads with two-way traffic to one-way traffic; restricting entry of goods vehicles in core area etc. The long-term measures involve construction of bridges, flyovers and new roads respectively.

15.5.2. *Short Term Measures*

All short-term measures will be attempted within a 1-3 year framework and they are likely to give results with immediate effect for a low investment proposed. Some of these will involve civil works, but of minor nature or simple rearrangements for better efficiency. These are:

(i) **Removal of Encroachments**: The encroachment, squatter and garbage dumps are common phenomenon in urban settlement in PUA area. These encroachments are extension of built-up properties; parking of vehicles of shopkeepers/ customers and informal vegetable and cloth market on major roads (Bailey road; Fraser Road & other lateral roads). Figure 14.4 shows the roads requiring clearing of the encroachments.

(ii) **Traffic Regulatory Measures:** In order to improve traffic condition on Ashok Rajpath, drain of around 15km from Gaighat to Mohinlahak stadium has to be covered. The vehicle coming from east on Ashok Rajpath can be diverted to west, to minimse the traffic of this spine of city. Therefore Ashok Rajpath can be made one way for vehicular movement from east to west.

Other regulatory measures involve (i) Restriction of goods traffic (even LCV and Tempo) in the city center during peak periods; (ii) Restrict entry of trucks within the city limits during daylight hours. However, certain routes may be permitted, if so required.

(iii) **Wide Road with Narrow Dividers:** The wide roads are to be provided with narrow medians for separating traffic of both directions. On following roads divider are to be constructed (i) Chitdiyatand Bridge to Danuka Turning-3km; (ii) Repair of Kampura divider on Boring road-5km; and (iii) Income Tax Junction on Baeily road to Humara intersection-5km.

(iv) **Road Widening within City:** To counter increasing traffic load and congestion on the major road networks the following roads are to be widened.

- Kankarbagh road, North of Exhibition Road Saidpur-Bai path road, Kunkun singh lane- 8km
- Prithvirajpath (Lohanipur) from Kadamkuan to the south of Graveyard on Rajendra Path between Bhattacharya road and Uma Cinema-4km
- Rajendra Path between Bhattacharya road to the junction of Budha Murthy road-2km

- The bottle neck of Bari path have to be widened-1km
- The station road between Hanuman Mandir and GPO Golumbar needs to be widened by relocating shops-2km
- Widening of Ashok Rajpath from 9m to 24m from Science College to engineering college and in its westward run it has to widened from 11m to 24m till west of Golghar-10km
- Up gradation of Arya Samaj Road from Junction of NH-30 to Naya Tola, Danapur: Much institutional and residential development along the Arya Samaj Road has led to congestion, therefore it is proposed to connect Nayatola Urban Village to NH-30 for length of 2km.
- Up gradation of Khagri Road from Junction of Patna-Danapur Main Road upto Bailey Road (NH- 30): The Patna-Danapur Main Road is only link existing between Patna City and Danapur. Up gradation of 5km of Khagri Road will serve as by-pass of two towns improving the traffic conditions.
- Improvement of Biscuit Factory Road from Junction of Patna-Danapur Road to Abandoned site of Trenching Ground: The single lane PCC road to be constructed for length of 1.5km connecting of Junction of Patna-Danapur Road to Abandoned site of Trenching Ground. Improvement of this road will lead to development of undeveloped area.
- Repair and Maintenance of 12km of road in Phulwari sheriff area.
- Repair and Maintenance of 20km of road in Khagul area.

(v) **Intersection Improvements:** Around 15 major intersections are to be redesigned and 40 minor ones to be examined for their efficiency. This would include signalization, if required and justified.

Ausangbad is a tri-junction of road from Patna City, By-Pass Road and NH-98 with movement of heavy and light vehicles. The Annual average Daily Traffic (AADT) at this intersection is around 800-1000 PCU from each leg. In order to improve this intersection the divider is to be constructed for 250-300m along the length. The construction of divider will reduce traffic accident at the intersection.

(vi) **On Street & Off Street Parking:** All unauthorized on-street parking to be banned and designated locations (identified by demand levels and feasibility) to be auctioned for private operation.

The off street parking is one of the important projecst for the city. Around 15% of the roads are encroached with the on street parking of private and commercial vehicles (Tempo, Taxi, Auto Rickshaw etc). The proposed locations for parking are as follows:

- Car Parking area in north of Bakipur Jail
- Tempo stand are to be made at (i) Behind Apna Bazar near Gandhi Bazar; (ii) Kargil Chowk behind Ashok Rajpath; (iii) Boring Canal Road; (iv) Rajapur Bridge near Petrol Pump; (v) Intersection of Ashiana Nagar, Bailey Road; (vi) Harding Park near old Bus stand; (vii) Near Boring road water tank
- Car parking at Boring road: (i) Near Shedev road marriage road; (ii) in front Laxmi Complex; (iii) In front Shahnaz Beauty Parlour; (iv) Krishna Apartment, Shivpuriroad; (v) Nageshwar Colony.

(vii) All parking needs generated by a plot would have to be within the plot itself. For unsatisfied demands, ULB to provide lift parking lot through full cost recovery for tand and building from errant plot holders.

(Viii) **Other Short Term Improvement Measures:** The other measure for traffic improvement involves Training of Traffic Police on Traffic Management; Public Awareness and Traffic Enforcement Drives; Establishment of a Traffic Engineering Cell within PMC headed by a Traffic Engineer and Registration of NMT vehicles.

15.5.3. *Medium Term Measures*

All medium term solutions are to be implemented in a 3-5 year time horizon. They will involve some investment, but not necessarily very high level of investment. These will require some redesigning, civil construction works, organizational changes, etc.

(i) **Construction of Flyover:** The intersections requiring Flyovers and ROBs have been depicted in the Map at the end of this section.

(ii) **Developing Feeder Road:** Already existing feeder roads are to be upgraded to ease the traffic pressure on the busy road intersections. Some additional north-south links between the four east-west corridors (including the proposed bypass) is to be created with right-of-way of 30 m. The roads to be improved are as follows:

- Upgrading Sinha Library road in North and Bandarbagicha road in South shall reduce traffic on Dak Banglow intersection.
- In case of Boring Road intersection, the subsidiary roads of Kavi Raman Path and behind Alankar Place in the east and the roads going in either direction in the west near the gasolene service center petrol pump could be used.
- In central Patna, Dwarika nath lane, covered nala between Uma Cinema and Bari Path link road No. 1C of rajendra nagar and Jagat narain Road must be developed as feeder road.

(iii) **Construction of Pedestrian over bridge:** The pedestrian overbridge to be constructed on 25 major intersections in Patna Urban Agglomeration area.

(iv) **Introduction of a Formal Public Transport (bus) System:** The proposed system covering the entire Patna UA area will include, development of a Bus Rapid Transit System (BRTS) along one of the major East-West corridors of Patna (Refer Figure 14-4).

In this process, a study may be instituted to design a most appropriate network of bus routes to serve the peak hour travel as well as the daylong travel demand in the city. This exercise will provide the frequency and capacity of buses required in each route. The routes demanding highest capacity during peak and off-peak hours may be selected for BRTS. Generally, a BRTS can have capacity from 6000 to 25,000 pass/hour/direction depending on operating condition. Patna will have maximum of 10,000 PHPD in any given route and BRTS is the most economic and most feasible option for a rapid transit.

(v) **Widening of Existing By-Pass Road:** The existing by-pass to be widened to four/six lane from Didarganj to Khagul Road to cater the city traffic.

(vi) **Utilization of Water Transport System**: Water transport facility will be created between Digha and Didarganj for commuter traffic to utilize the advantage of river Ganga running all along the city for 30 kilometer length. The Jetty terminals will be provided at distance of 2km with facility of ticketing; commercial hutments and open spaces.

(vii) **Other Medium Term Improvement Measures:** The other measure for traffic improvement involves Installation of CCTV, Speed Radar, and Video Camera for traffic management.

15.5.4. *Long Term Measures*

The long-term vision of the city must be to utilize the PRDA Area most efficiently and for that many more additional transport infrastructure projects will be required to be developed. These will require a normal time frame of 10-15 years.

(i) **Construction of New Road – From New Hazipur Bridge to Gandhi Setu in West:** Development of the proposed outer ring road connecting Kagaul Road (Beur Area) to the Didar Ganj parallel but 2-3 km south of the New Bypass Road (NH-31). This will further be connected to north from Khagaul Road to Bailey Road after crossing the main railway line by grade separation, and then cross the Patna-Danapur Road to meet the Ganga outer ringroad to be built all along the river front upto Didar Ganj to join the proposed bypass again. This ring will serve as a fast corridor all around Patna for providing fast access to all parts of the city. The total length of the circular road is 60km. The road laid parallel to Ganga river in north is 30km in length. The feasibility and financial viability of the road has to be done before implementing this project. The project has to be developed on BOOT by private developer.

(ii) **Development of Northern Patna Area:** To develop the northern bank of the river as part of the city (as already included in PRDA Area), at least one more bridge are required – one in Digha and another in Didar Ganj across Ganga river.

(iii) **Decentralization of Bus Terminals:** Two intercity bus terminals are to be developed at the two ends (east and west) of the city. The land required for the bus stand cum depot is 30-35 hectare.

(iv) **Shifting of Wholesale Market:** The wholesale market is proposed to be shifted from the core city area to the periphery in the south. It is proposed that the truck terminal on the existing by-pass will also be shifted along with wholesale market. The area required for wholesale market and truck terminal is 70-80 hectare.

15.5.5. *Cost estimates of projects*

The project cost for the short-term measures are mainly the lump sum cost and mainly the regulatory measures with investment of Rs 3.55 Crore. **Refer Table 15.11**. The project cost of medium term and long-term measures are based on PWD schedule of rates. The investment for medium term and long term measures are Rs 76.85 Crore and Rs 605 Crore respectively.

Table 15.11: Project wise Cost Estimation (in Rs Crore) T - T

S.no	Projects	Quantity	Unit Rate * (Rs)	Cost in Rs Crore
SHORT TERM SOLUTIONS				
1	Removal of Encroachments- 15 major road in PUA	Lump sum		0.20
2	**Traffic Regulatory Measures**			**0.80**
I	Covering 15km from Gaighat to Mohinlahak stadium	15	Rs 5 Lakh per km	0.75
Ii	Installing Traffic Signage- 50 Nos. (No Entry; One Way; No Parking et.al)	Lump sum		0.05
3	Wide Road with Narrow Dividers	15	Rs 0.5 lakh per km	0.08
4	Road Widening within PUA area	68	Rs 2 Lakh per km	1.36
5	Intersection Improvements-15 major intersections and 40 minor intersections	55	Rs 15.0 Lakh per Major Junction Rs 10.0 Lakh per Minor Junction	6.25
6	On Street & Off Street Parking	Lump sum		0.10

S.no	Projects	Quantity	Unit Rate * (Rs)	Cost in Rs Crore
7	Other Short Term Improvement Measures (STTIP and Public Awareness etc)	Lump sum		0.50
A	**SUB-TOTAL OF SHORT TERM MEASURES**			**10.09**
MEDIUM TERM SOLUTIONS				
1	Construction of Flyover-13 No.	13	Rs 12.0 Crore per Flyover	166.4
2	Construction of New Road in City-55km	55	Rs 1.1 Crore per km	60.5
3	Developing Feeder Road- 8 No.	8	Rs 10 Lakh per km	0.80
4	Construction of Pedestrian over bridge-25 No.	25	Rs 9 Lakh per POB	2.3
5	Introduction of a Formal Public Transport (bus) System-Kankarbagh road (40km)	40	Rs 15 Lakh per km	6.0
6	Widening of Existing By-Pass Road (30km)	30	Rs 200 lakh per km	60.0
7	Utilization of Water Transport System-15 jetties at distance of 2km	15	Rs 2 Lakh per Jetty	0.3
8	Other Medium Term Improvement Measures- CCTV, Speed Radar et.al	Lump sum		5.5
B	**SUB-TOTAL OF MEDIUM TERM MEASURES**			**301.8**
LONG TERM SOLUTIONS				
1	Construction of elevated corridor – From New Hazipur Bridge to Gandhi Setu in West-30km	30	Rs 8.0 Crore per km	240.0
2	Construction of New Road in City-45km	45	Rs 1.0 Crore per km	45.0
3	Decentralization of Bus Terminals- 2No.	2	Rs 100 Lakh per Bus Stand	2.0
4	Shifting of Wholesale Market and Transport Nagar- 1 No	1	Rs 300 Lakh per Market	3.0
B	**SUB-TOTAL OF LONG TERM MEASURES**			**290.0**
TOTAL COST OF ROAD NETWORK AND TRANSPORT MANAGEMENT (in Rs Crore)				**601.6**

NOTE: The costs include cost of construction, labour, land and contingencies.

15.5.6. *Phasing plan for project implementation*

The phasing plan focus major share of investment for Short-term solutions during 2007-2009, whereas medium term and long term solutions are implemented in 2009-12. **Table 15.2** presents detail-phasing plan for project implementation.

Table 15.12: Phasing Plan for Project Implementation – T - T

S.no	Projects	Implementation Plan (2007-12)- Investment in % AGE					Total in Crore	Department
		1	2	3	4	5		
SHORT TERM SOLUTIONS								
1	Removal of Encroachments- 15 major road in PUA	50	50				0.20	PMC

S.no	Projects	Implementation Plan (2007-12)- Investment in % AGE					Total in Crore	Department
		1	2	3	4	5		
2	Traffic Regulatory Measures						**0.80**	PWD
i	Covering 15km from Gaighat to Mohinlahak stadium	35	40	25			0.75	
ii	Installing Traffic Signage- 50 Nos. (No Entry; One Way; No Parking et.al)	50	50				0.05	
3	Wide Road with Narrow Dividers	75	25				0.08	
4	Road Widening within PUA area	35	65	10			1.36	
5	Intersection Improvements-15 major intersections and 40 minor intersections	40	50	10			6.25	
6	On Street & Off Street Parking	50	50				0.10	PMC
7	Other Short Term Improvement Measures (STTIP and Public Awareness etc)	40	30	30			0.50	
MEDIUM TERM SOLUTIONS								
1	Construction of Flyover-15 No.			30	50	20	166.40	PWD
2	Construction of New Road in City-55km			20	50	30	60.50	PWD
3	Developing Feeder Road- 8 No.			40	30	30	0.80	PMC
4	Construction of Pedestrian over bridge-25 No.			50	40	10	2.30	PWD
5	Introduction of a Formal Public Transport (bus) System-Kankarbagh road (40km)		15	40	30	15	6.00	PWD
6	Widening of Existing By-Pass Road (30km)		25	35	30	10	60.00	PWD
7	Utilization of Water Transport System-15 jetties at distance of 2km		35	30	25	10	0.30	IWAI
8	Other Medium Term Improvement Measures- CCTV, Speed Radar et.al			50	50		5.50	PMC
LONG TERM SOLUTIONS								
1	Construction of elevated corridor – From New Hazipur Bridge to Gandhi Setu in West-30km			25	35	40	240.00	Private Investor
2	Construction of New Road in City-45km			30	50	20	45.00	PWD
3	Decentralization of Bus Terminals-2No.			50	35	15	2.00	PWD
4	Shifting of Wholesale Market and Transport Nagar- 1 No			40	35	30	3.00	PMC

15.5.7. *Implementation arrangement*

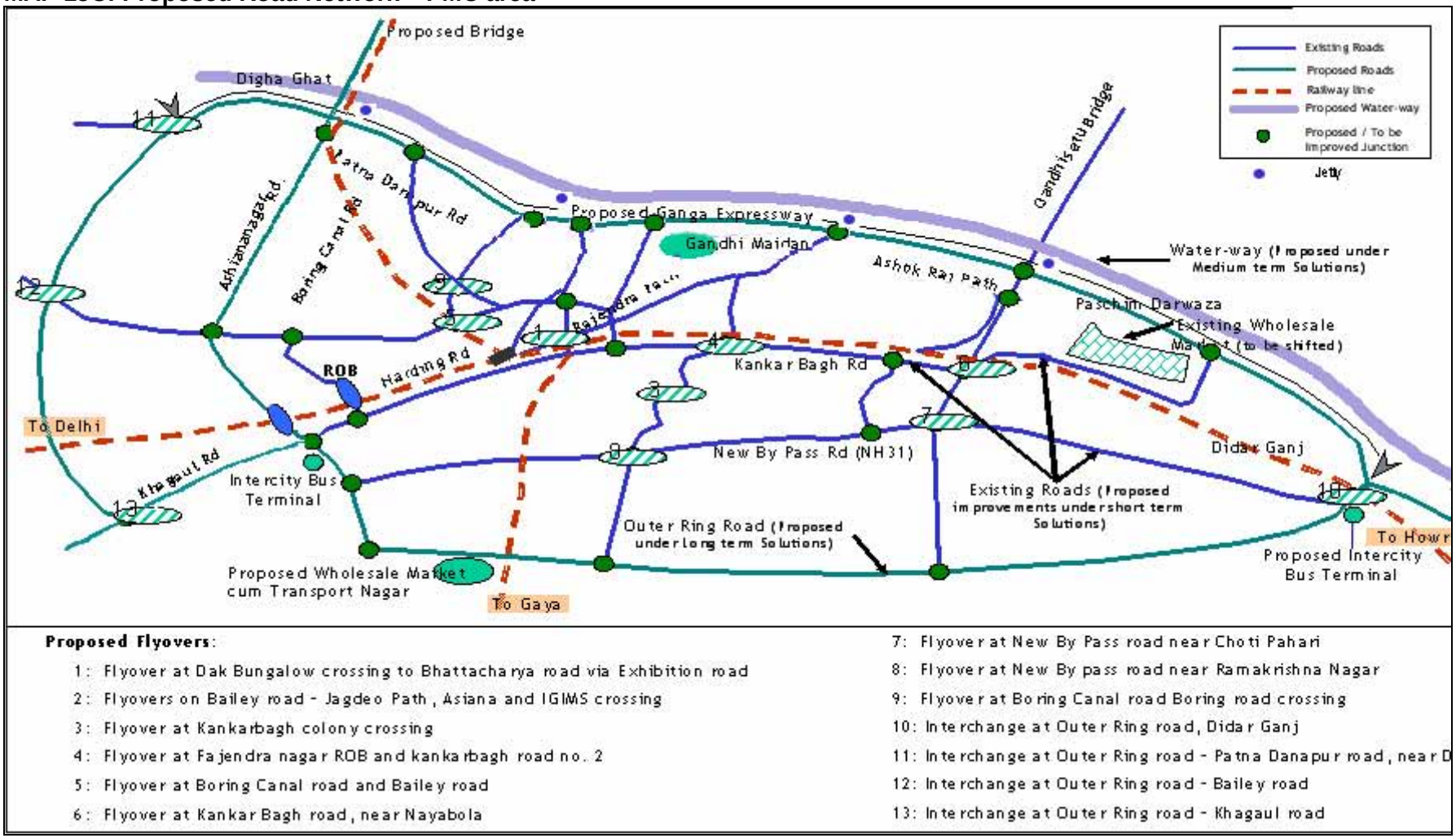
The institutions responsible for implementation of the road development projects within city are PWD and PMC, whereas the regional roads connecting the city to its periphery are responsibility of NHAI or MoRTH. **Refer Table 15.13**. Developments of Ganga waterways are responsibility of Inland Waterways Authority of India. The peripheral road with investment of Rs 300 crore is to be constructed by NHAI in the south of the city. The cost of the by-pass in

south of city is excluded from the project to be funded under JNNURM.

Table 15.13: Institutional Arrangement for Project Implementation T - T

S.No	Projects	PMC + NP's		PWD		IWAI/NHAI		Private Investors		Total (Rs Crore
		Rs Crore	%	Rs Crore	%	Rs Crore	%	Rs Crore	%	
1	Short Term Solutions	1.6	15.8	8.5	84.2	0.0	0.0	0.0	0.0	**10.1**
2	Medium Term Solutions	5.5	1.8	296.0	98.1	0.3	0.1	0.0	0.0	**301.8**
3	Long Term Solutions	3.0	1.0	47.0	16.2	0.0	0.0	240.0	82.8	**290.0**
TOTAL INVESTMENT IN RS CRORE		**10.1**	**1.7**	**351.5**	**58.3**	**0.3**	**0.0**	**240.0**	**39.9**	**601.9**

MAP 15C: Proposed Road Network – PMC area



Proposed Flyovers:

1: Flyover at Dak Bungalow crossing to Bhattacharya road via Exhibition road
2: Flyovers on Bailey road - Jagdeo Path, Asiana and IGIMS crossing
3: Flyover at Kankarbagh colony crossing
4: Flyover at Fajendra nagar ROB and kankarbagh road no. 2
5: Flyover at Boring Canal road and Bailey road
6: Flyover at Kankar Bagh road, near Nayabola
7: Flyover at New By Pass road near Choti Pahari
8: Flyover at New By pass road near Ramakrishna Nagar
9: Flyover at Boring Canal road Boring road crossing
10: Interchange at Outer Ring road, Didar Ganj
11: Interchange at Outer Ring road - Patna Danapur road, near D
12: Interchange at Outer Ring road - Bailey road
13: Interchange at Outer Ring road - Khagaul road

15.6. SECTION 5- STORM WATER DRAINAGE

The storm water drainage system is one of the important components of the city infrastructure. Prioritization has been made on the basis of cost of the project and need of the project.

15.6.1. *Project Summary*

As discussed in previous chapters the drainage system in Patna urban area is divided into four zones. The drainage system needs improvement in all zones with construction of new drains in all the zones. The projects are identified for drainage system improvements are classified as (i) Construction of New Drains; (ii) Upgradation of Open & Katchha drains to closed drainage system and (iii) De-silting of Drains. **- Refer Map 15D**

(i) Construction of New Drains: In all the four drainage zone and new areas drains are to be constructed to avoid water logging during rainy seasons. Total length of drains to be constructed in PUA area is 95km. The zone wise areas requiring construction of new drains ar as follows:

A. WESTERN ZONE: It extends from west of Fraser road to Khagul Danapur Road	
Area south of Railway line upto Phulwari Sherif from Anishabad turning has no drainage system and remains water logged on roads and low lying area.	Proposed Length of Drain is 54km
Area near Patna Canal and Saguna turning has out growth of city with residential and institutional landuses.	Proposed Length of Drain is 20km
The Sadaquat Ashram, Brajkishore Memorial, Loyala School and other establishment has no drainage system causing storm water flowing from Kurjee to Polytechnic road.	Proposed Length of Drain is35km
B. EASTERN ZONE: It extends from north of new bypass road and east of Nalanda Medical College Hospital and Ganga Bridge and upto Didarganj.	
Area south of Main Line remain water logged for month due to no drainage system and pumping station in between Pahari and Didarganj Pumping Station	Proposed Length of Drain is 45.7km
C. SOUTHERN ZONE: It is bounded by old bye pass road in north, new by-pass road in south, Agamkaun road in east and Patna Gaya Railway line in the west.	
Area west of Chiraiyatar and Karbigahia and unplanned development beyond housing board colony in Kankarbagh, Bahadurpur and Hanuman Nagar has no drainage system.	Proposed Length of Drain is 89.45km
D. CENTRAL ZONE: It extends from Patna Gaya road in west to Nalanda Medical College hospital road in east and Ganga Bridge approach road in North to Delhi- Howarh Railway Line in South.	
Construction of Alamkuan nala, SP Verma Storm pumping Plant Drain Maurya Hotel to Bakerganj and Internal Drainage System in Surrounding areas such as Saleempur Ahra, Lohanipur, Bazaar Samiti, Bahadurpur area and north of railwayline	Proposed Length of Drain is 39.45km
E. DANAPUR: It is part of the Patna Urban Area located in North west of PMC area. It has water logging on the main spine running north south direction of the urban area due to poor drainage.	
Providing and laying RCC pipe drain on Khagri Road	Proposed length of Drain is 10km

Providing and laying RCC pipe drain along Arya Samaj Road from Junction of NH-30 upto Bibiganj	Proposed length of Drain is 10km
Providing and laying pucca open drain along biscuit factory road	Proposed length of Drain is 8km
E. KHAGUL: It is part of the Patna Urban Area located in west of PMC area.	
Provision of drainage network along major road system of the urban area	Proposed length of Drain is 24 km
F. PHULWARI SHERIF: It is part of the Patna Urban Area located in South west of PMC area.	
Provision and laying RCC drain along the major road network of the Urban area	Proposed length of Drain is 16 km

(ii) **Provision of Pumping Station:** The PUA area has flat terrain therefore it is difficult to attain slope suitable for attaining drainage system without pumping. In order to have efficient drainage system four pumping station are required at following locations namely (a) 2600 HP pumping station required at Karbigahia in Southern Zone; (b) 670HP pumping station at Rajendra Nagar in Central Zone; (c) One Pumping Station in Danapur Nagar Parishad and (d) One Pumping Station for Khagul and Phulwari Sherif nagar parishad.

(iii) **Desilting of Drains in PUA area:** The drains to be desilted in Patna City area are as follows: (i) Desilting of Serpentine Channel, Boring Canal and Kurjee Drain of 16.9km in western zone; (ii) de-silting of Kadamkuan/ Agamkuan Nala of 18km in central zone; (iii) de-silting of Agamkaun Nala of 18km in eastern zone; (iv) Joginagar Drainage system of 10km length in Southern Zone to be de-silted. Around 35km of drainage network to be de-silting in the other LBs of Patna Urban Area.

(iv) **Up gradation of the Drains:** Around 50km of open and kutccha drain are to be converted covered drain in PUA area. Patna City has around 35km of open drains which are to be converted into covered drains. Around 15km open drains are to be converted to pucca covered drains in other LBs in PUA.

15.6.2. *Cost Estimates of Projects*

The cost estimated for construction of new drains, provision of pumping stations, Desilting of drains in PUA area and up gradation of drainage system are Rs 14.68 Crore; Rs 0.25 Crore; Rs 2.94 Crore and Rs 5.10 Crore respectively. Refer **(Table 15.14).**

Table 15.14: Project wise Cost Estimation (in Rs Crore) - Drainage

S.no	Projects	Quantity (km)	Unit Rate * (Rs)	Cost in Rs Crore
1	**CONSTRUCTION OF NEW DRAINS**			
i	Western Zone: Area south of Railway line upto Phulwari Sherif from Anishabad turning Area near Patna Canal and Saguna turning The Sadaquat Ashram, Brajkishore Memorial, Loyala School and other establishment	136.8	40000RM	547.2
ii	Eastern Zone: Area between Pahari and Didarganj Pumping Station and surrounding areas	45.4	40000RM	181.6
iii	Central Zone: Construction of Alamkuan nala, SP Verma Storm pumping Plant Drain Maurya Hotel to Bakerganj and Internal Drainage System in Surrounding areas such as Saleempur Ahra, Lohanipur , Bazaar Samiti, Bahadurpur area and north of railwayline	39.75	40000RM	159.0
iv	Southern Zone: Area west of Chiraiyatar and Karbigahia and unplanned development beyond housing board colony in Kankarbagh, Bahadurpur and Hanuman Nagar	89.7	40000RM	359.0
v	Danapur Nagar Parishad: Providing and laying RCC pipe drain on Khagri Road; Arya Samaj Road from Junction of NH-30 upto Bibiganj and along biscuit factory road	28.0	40000RM	112.0
Vi	Khagul Nagar Parishad: Provision of drainage network along major road system of the urban area	24.0	40000RM	96.0
vii	Phulwari Sherif Nagar Parishad: Provision and laying RCC drain along the major road network of the Urban area	16.0	40000RM	64.0
	SUB-TOTAL OF NEW DRAINS			**1518.8**
2	**PROVISION OF PUMPING STATION**			
i	Provision of Pumps (8 Nos.)	8	65000	0.05
ii	Construction of Pumping Stations (4 Nos)	4	500000	0.20
	SUB-TOTAL OF PUMPING STATIONS			**0.25**
3	**DISILTING OF DRAINS IN PUA AREA**			
i	Desilting of Serpentine Channel, Boring Canal and Kurjee Drain in western zone	16.9	300000	0.51
ii	Desilting of Kadamkuan/ Agamkuan Nala in central zone	18.0	300000	0.54
iii	Desilting of Agamkaun Nala in eastern zone	18.0	300000	0.54
iv	Joginagar Drainage system in Southern Zone	10.0	300000	0.30
v	Desilting of drainage in the other LBs of Patna Urban area	35.0	300000	1.05
	SUB-TOTAL OF DISILTING OF DRAINS			**2.94**
4	**UPGRADATIONS OF DRAINS**			
i	Up gradation of Drains in Patna City	35	1000000	3.50
ii	Up gradation of Drains in Other LBs in PUA area	15	1000000	1.50

S.no	Projects	Quantity (km)	Unit Rate * (Rs)	Cost in Rs Crore
	SUB-TOTAL OF UPGRADATION OF DRAINS			**5.10**
	TOTAL COST OF DRAINAGE SYSTEM IMPROVEMENT (Rs CRORE)			**1527.09**

NOTE: The costs include cost of construction, labour, land and contingencies.

15.6.3. *Phasing plan for project implementation*

The phasing plan emphasizes on the provision of pumping stations in initial phases to activate the existing non-operational drainage system. The cleaning of drainage system is also covered in initial phases. The construction of link drains and drainage system in uncovered area are also given priority. Refer (**Table 15.15**).

Table 15.15: Project wise Implementation Plan - Drainage

S. no	Projects	Implementation Plan (2007-12)- Investment in % AGE					Total in Crore	Department
		1	2	3	4	5		
1	**CONSTRUCTION OF NEW DRAINS**							
I	Western Zone: Area south of Railway line upto Phulwari Sherif from Anishabad turning Area near Patna Canal and Saguna turning The Sadaquat Ashram, Brajkishore Memorial, Loyala School and other establishment		25	25	20	30	547.20	BRJP/PWD
ii	Eastern Zone: Area between Pahari and Didarganj Pumping Station		15	15	35	35	181.60	
iii	Central Zone: Construction of Alamkuan nala, SP Verma Storm pumping Plant Drain Maurya Hotel to Bakerganj and Internal Drainage System in Surrounding areas such as Saleempur Ahra, Lohanipur , Bazaar Samiti, Bahadurpur area and north of railwayline						159.00	
iv	Southern Zone: Area west of Chiraiyatar and Karbigahia and unplanned development beyond housing board colony in Kankarbagh, Bahadurpur and Hanuman Nagar		30	35	25	10	359.00	
v	Danapur Area: Providing and laying RCC pipe drain on Khagri Road; Arya Samaj Road from Junction of NH-30 upto Bibiganj and along biscuit factory road		15	25	30	30	112.00	
vi	Khagul Area: Provision of drainage network along major road system of the urban area		20	25	25	30	96.00	
vii	Phulwari Sherif Area: Provision and laying RCC drain along the major road network of the Urban area		20	25	25	30	64.00	
2	**PROVISION OF PUMPING STATION**							

S. no	Projects	Implementation Plan (2007-12)- Investment in % AGE					Total in Crore	Department
		1	2	3	4	5		
i	Provision of Pumps (8 Nos.)	50	50				0.05	BRJP
ii	Construction of Pumping Stations (4 Nos)	50	50				0.20	
3	**DISILTING OF DRAINS IN PUA AREA**							
i	Desilting of Serpentine Channel, Boring Canal and Kurjee Drain in western zone	25	30	45			0.51	PMC
ii	Desilting of Kadamkuan/ Agamkuan Nala in central zone	35	30	35			0.54	
iii	Desilting of Agamkaun Nala in eastern zone	35	30	35			0.54	
iv	Joginagar Drainage system in Southern Zone	35	30	35			0.30	
v	Desilting of drainage in the other LBs of Patna Urban area	25	25	25	25		1.05	
4	**UPGRADATIONS OF DRAINS**							
i	Up gradation of Drains in Patna City			35	35	30	3.50	PMC
ii	Up gradation of Drains in Other LBs in PUA area			35	35	30	1.50	

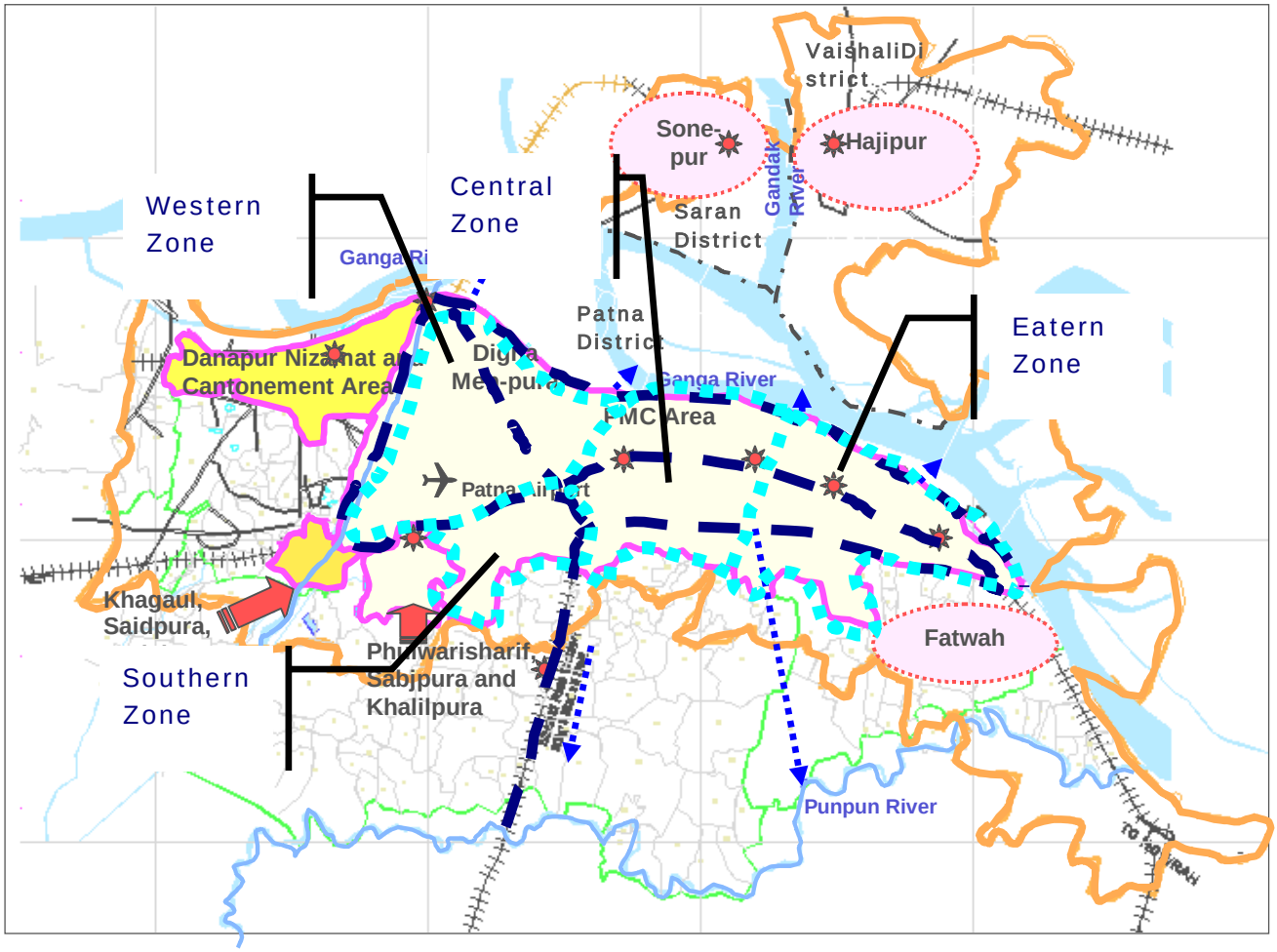
15.6.4. *Institutional arrangement*

The institutions responsible for construction, up gradation and cleaning of drainage system in PUA area are PWD; PMC; and BRJP respectively **(Refer Table 15.16)**.

Table 15.16: Institutional Arrangement for Project Implementation

S.no	Projects	PMC + NP's		PWD		BRJP		TOTAL
		Rs Crore	%	Rs Crore	%	Rs Crore	%	Rs Crore
1	Construction of New Drains	0	0	637.55	42.0	880.9	58.0	1518.80
2	Provision of Pumping Stations	0	0	0	0	0.25	100	0.25
3	Desilting of Drains	2.94	100	0	0	0	0	2.94
4	Up gradation of Drains	5.10	100	0	0	0	0	5.10
TOTAL INVESTMENT IN RS CRORE		**8.04**	**0.6**	**637.55**	**41.7**	**881.15**	**57.7**	**1527.09**

Map 15-D: Proposed Drainage Network PUA Area



15.7. SECTION 6 SLUMS & POVERTY ALLEVIATION

There are approximately 2.73 lakh households in the PMC area out of which 1.73 lakh households fall in the slum areas. The estimated condition of the slums has been divided into four categories, namely: (i) *run down walkups in the city comprising of third and fourth generation slum dwellers; (ii) second and third generation of slum dwellers in the inner city; (iii) squatters of first and second generation in marginal lands and (iv) new migrants in marginal lands along pavement etc.*

15.7.1. *Project Summary*

There are approximately 2.73 lakh household areas in the PMC area out of which 1.73 lakh households reside in the slum areas. The estimated condition of the slums has been divided into four categories, namely:

a. *It is estimated about 20% or 0.34 lakh households are run down walkups (3-4 storied) in the city comprising of third and fourth generation slum dwellers*
b. *Another 20% are estimated (0.34 lakh households) to comprise of second and third generation of slum dwellers in the inner city in one or two storied housing*
c. *A large 40% or 0.69 lakh HHs are squatters of first and second generation in marginal lands within the PMC area.*
d. *The balances of 20% are new migrants (0.34 lakhs) in marginal lands along pavements etc.*

The policy to deal with poverty is through the following strategies:

- In-situ upgradation (largely to apply to category 'c')
- In-situ reconstruction (largely to apply to category 'a' and 'b')
- In-situ rehabilitation (largely to apply to 'd' and to the other 3 above in case some land is required for road widening)

PMC has identified 52 pockets of slums, however the Urban Basic Services for the Poor Report prepared by NIC indicates 122 locations out of which at least 100 are in the PMC area. Therefore the action plan under this head is proposed in two phases; firstly up gradation of the 52 PMC identified slums, followed by the up gradation of the other approximately 50 odd slums.

Details surveys to consider the categories 'a' –'d' is yet to be taken. However per hectare costs are estimated as below:

- Estimated Cost for total in-situ upgradation inclusive of paved path, drainage, piped water supply, street lighting, ablution facility within the house and community toilets and proper medical facilities, primary and adult education centers etc. is estimated at Rs.1 crores per ha. Spread over 3 years.
- For 50% in-situ reconstruction combined with 50% in-situ up-gradation the costs are estimated at Rs.3 crores per ha over 3 years
- For rehabilitation and reconstruction in new areas the costs are estimated at Rs. 5 crores/ha over 3 years.
- Provision of six night shelters for pavement dwellers mainly near the economic nodes and employment centres.

15.7.2. *Cost Estimates of Projects*

The cost for up gradation of slums are calculated various category of slums existing in the PUA area. The total cost estimated for up gradation of slums is Rs 200 Crore.

Table 15.17: Project wise Cost Estimation (in Rs Crore) – Slum & Poverty Alleviation

Category of Slums	Area Under Slums (sqkm)	Type of Upgradation	Area (sqkm)	Estimate in Crore Rs.
Category A	12.63	In-situ Upgradation (5%)	3.16	3.2
		In-situ Reconstruction (14%)	8.84	26.5
		In-situ Rehabilitation (1%)	0.63	3.2
Category B	12.63	In-situ Upgradation (9%)	5.68	5.7
		In-situ Reconstruction (9%)	5.68	17.0
		In-situ Rehabilitation (2%)	1.26	6.3
Category C	25.26	In-situ Upgradation (25%)	15.79	15.8
		In-situ Reconstruction (10%)	6.32	19.0
		In-situ Rehabilitation (5%)	3.16	15.8
Category D	12.63	In-situ Upgradation (25%)	15.79	15.8
		In-situ Reconstruction (5%)	3.16	9.5
		In-situ Rehabilitation (15%)	9.47	47.4
Pavement Dwellers	6No.	Provision of Nightshelters	-	15.0

NOTE: The costs include cost of construction, labour, land and contingencies.

15.7.3. *Phasing plan for project implementation*

The project wise implementation plan emphasizes on the immediate investment of up gradation and reconstruction measures followed by rehabilitation of slums. The cost for up gradation; reconstruction and rehabilitation are Rs 24.24 Crore; Rs 43.19 Crore and Rs 43.57 respectively (Refer **Table 15.18**).

Table 15.18: Project wise Implementation Plan - Slum & Poverty Alleviation

Category of Slums	Type of Upgradation	Implementation Plan (2007-12)- Investment in % AGE					Cost in Rs Crore	Department
		1	2	3	4	5		
Category A	In-situ Upgradation (5%)	15	25	30	30		3.2	PMC
	In-situ Reconstruction (14%)		10	25	35	30	26.5	UDD
	In-situ Rehabilitation (1%)		25	25	30	20	3.2	PMC
Category B	In-situ Upgradation (9%)	15	25	30	30		5.7	PMC
	In-situ Reconstruction (9%)		10	25	35	30	17.0	UDD
	In-situ Rehabilitation (2%)		25	25	30	20	6.3	PMC
Category C	In-situ Upgradation (25%)	15	25	30	30		15.8	PMC
	In-situ Reconstruction (10%)		10	25	35	30	19.0	UDD
	In-situ Rehabilitation (5%)		25	25	30	20	15.8	PMC
Category D	In-situ Upgradation (25%)	15	25	30	30		15.8	PMC
	In-situ Reconstruction (5%)		10	25	35	30	9.5	UDD
	In-situ Rehabilitation (15%)		25	25	30	20	47.4	PMC
Pavement Dwellers	6 night shelters	20	30	25	25		15.0	PMC

15.7.4. *Institutional Arrangement*

The PMC is responsible for implementing slum improvement, up gradation and reconstruction schemes. The support from UDD shall be provided to PMC during the project implementation phase **(Refer Table 15.19)**.

Table 15.19: Institutional Arrangement for Project Implementation

S.no	Projects	PMC + NP's		UDD		Total
		Rs Crore	%	Rs Crore	%	Rs Crore
1	In-situ Upgradation	40.4	100	0	0	40.4
2	In-Situ Reconstruction	0	0	72.0	100	72.0
3	In-Situ Rehabilitation	72.6	100	0	0	72.6
4	Pavement Dwellers	15.0	100	0	0	15.0
TOTAL INVESTMENT IN RS CRORE		**128**	**100**	**72**	**100**	**200**

15.8. SECTION 7 CITY ENVIRONMENT

15.8.1. *Project Summary*

(i) **Landscaping and Improvement:** Provision of street furniture within the city along the master plan and zonal plan roads (including street furniture along the master plan and zonal plan roads including paving, lighting, signage, bus stand, dividers, round abouts etc.).

(ii) **River Front Development:** The river front development extends from Didarganj in east to Digha in west for a stretch of 30km. The attributes for river front development are

- Approximate Length of riverfront promenade to be developed: 10 sq.km. (width 0.5km) – The promanade would be developed along the These areas would include the jetties every two kilometers, and around the jetties there would be kiosks and food stalls, street furniture and boating facilties. The extreme east and west jetties would be used for shipment of goods etc. and not for recreational use.
- Area adjacent to Digha-Mainpura to be developed as recreational area: 10 sq. km. – this area may be used for development of a green recreational area and development controls are to be formed for forbidding developments.

15.8.2. *Cost Estimates of Projects*

S.no	Projects	Cost in Rs Crore
1	Street furniture within the city along the master plan and zonal plan roads (including street furniture along the master plan and zonal plan roads including paving, lighting, signage, bus stand, dividers, round abouts etc.)	17.00
2	River Front Development (20 sq.km @ Rs.1500lakhs/ sq.km.)	300.00
TOTAL COST FOR CITY ENVIRONMENTAL IMPROVEMENT (in Rs Crore)		**317.00**

NOTE: The costs include cost of construction, labour, land and contingencies.

15.8.3. *Phasing plan for project implementation*

Projects	Implementation Plan (2007-12)- Investment in % AGE					Cost in Rs Crore
	1	2	3	4	5	
Street furniture within the city along the master plan and zonal plan roads (including street furniture along the master plan and zonal plan roads including paving, lighting, signage, bus stand, dividers, round abouts etc.)	15	20	20	35	10	17.00
River Front Development		20	20	30	30	300.00

15.8.4. *Institutional Arrangement*

These projects are financially viable and can be given on BOOT basis to private financing institutions for period of 20 years.

15.9. SECTION 8 HERITAGE AND CONSERVATION

Priority would be given to listing of the heritage sites. Heritage is of two types – manmade and natural. Manmade heritage could be movable or immovable. In the renewal of inner cities we are primarily looking at immovable manmade heritage and often some immovable natural heritage.

15.9.1. *Project Summary*

Immovable heritage comprises of sites, remains, ruins, buildings or areas of archaeological, historical, architectural, cultural/ religious or ecological significance. This encompasses both- manmade and natural artifacts. The proposals would include:

- Listing of heritage sites (immovable heritage primarily in PUA area which comprises of the above mentioned categories). The list prepared by INTACH may be used by the corporation so as to ensure that the list gets a legal basis.
- Based on the listing, heritage precincts have to be identified in areas where there is a concentration of listed entries. The precincts to be immediately identified should be Agam Kuan, Durakhi Devi Temple, Choti Patandevi, Begu Hajjam's Mosque, Kamaldah Jain Temple, Golghar, and the Har Mandir Takht. The precinct could be within a radius of 100m from the monuments.
- Projects should involve partners from tourism promotion departments, archaeological and archaeological history institutions and planners who consider conservation as part of the development process
- The plans should be prepared in great detail at 1:1000 scale starting with generation of base maps, surveys, proposals for the built environment (including street and area scapes), circulation, parking and greenery etc.

15.9.2. *Cost Estimates of Projects*

S.no	Projects	Cost in Rs Crore
1	Detailing of plans for the listed buildings	1.00
2	Planning and Development of the seven precinct areas mentioned above	107.00
TOTAL COST OF HERITAGE CONSERVATION PROJECTS (in Rs Crore)		**108.00**

NOTE: The costs include cost of construction, labour, land and contingencies.

15.9.3. *Phasing plan for project implementation*

S.no	Projects	Implementation Plan (2007-14)- Investment in % AGE							Cost in Rs Crore
		1	2	3	4	5	6	7	
1	Detailing of plans for the listed buildings	25	25	25	25				1.00
2	Planning and Development of the seven precinct areas mentioned above			15	15	20	25	25	107.00

15.9.4. *Institutional Arrangement*

INTACH will prepare detail list of buildings of historical importance and architectural values in coordination with State Archeology Department (SAD). The planning and development of seven precinct areas are to be developed by ASI and SAD.

15.10. SECTION 9 OTHER DEVELOPMENT PROJECTS

Other Development Projects involve development of the vacant lands; park and open spaces; multiplexs; commercial complex; botanical gardens et.al.

15.10.1. *Project Summary*

Shifting of incompatible/non-conforming uses from core areas such as Bus Stand, Slaughter House, Dairies, Industries etc; City Level Fair Ground and Construction of Multi-Purpose Sports Complex.

15.10.2. *Cost Estimates of Projects*

S.no	Projects	Cost in Rs Crore
1	Shifting of incompatible/non-conforming uses from core areas such as Bus Stand, Slaughter House, Dairies, Industries etc	25
2	City level fair Ground	10
3	Construction of Multi-Purpose Sports Complex	15
TOTAL COST OF OTHER DEVELOPMENT PROJECTS (in Rs Crore)		**50**

15.10.3. *Phasing plan for project implementation*

Projects	Implementation Plan (2007-12)- Investment in % AGE					Cost in Rs Crore
	1	2	3	4	5	
Shifting of incompatible/non-conforming uses from core areas such as Bus Stand, Slaughter House, Dairies, Industries etc	35	35	30			25
City level fair Ground		25	25	30	20	10
Construction of Multi-Purpose Sports Complex		25	25	30	20	15

15.10.4. *Institutional Arrangement*

The institutions responsible for the implementation of other development projects are PMC; PWD and UDD respectively.

15.11. SECTION 9 URBAN GOVERNANCE

15.11.1. *Project Summary*

The projects to be undertaken in this category are (i) E-Governance-For efficient management of increasing administrative responsibilities and the welfare activities (ii) Preparation of Town planning and Information systems (maps); (iii) Development of Bihar Urban Management Institute and (iv) Capacity building for PMC and other line departments.

15.11.2. *Cost Estimates of Projects*

S.no	Projects	Cost in Rs Crore
1	E-Governance- For efficient management of increasing administrative responsibilities and the welfare activities	20.30
2	Preparation of Town planning and Information systems (maps)	15.00
3	Development of Bihar Urban Management Institute	57.00
4	Capacity building for PMC and other line departments	10.40
TOTAL COST OF OTHER DEVELOPMENT PROJECTS (in Rs Crore)		**102.70**

15.11.3. *Phasing plan for project implementation*

Projects	Implementation Plan (2007-12)- Investment in % AGE					Cost in Rs Crore
	1	2	3	4	5	
E-Governance- For efficient management of increasing administrative responsibilities and the welfare activities	35	35	30			20.30
Preparation of Town planning and Information systems (maps)		25	25	30	20	15.00
Development of Bihar Urban Management Institute		25	25	30	20	57.00
Capacity building for PMC and other line departments	25	25	25	15	10	10.40

15.11.4. *Institutional Arrangement*

The urban governance and management is undertaken for PMC and other line departments responsible for the urban development activities in the city.

15.12. SUMMARY OF CAPITAL INVESTMENT REQUIRED

The capital investment required by sectors and various departments are presented in **Table 15.20** below. The projects which are funded by financing institutions are classified under two categories: (i) **Category A projects (Financially Viable Projects-BOOT Projects)**: These projects are River front Development and street furniture development under City Environment- Rs 317 Crores; (ii) **Category B Projects (Annuity Projects)**: Solid Waste Management projects- Composting and Bio-Methanation Plant Development-Rs 92.58 Crore, which will involve initial contributions from government (65 per cent) and 35 per cent is contributed by financing institutions.

The projects under slum and poverty alleviation are social development projects which are mainly funded by government and 12 per cent is the contribution of the beneficiary. The cost recovery in infrastructure projects will be mainly in the form of user charges and pricing mechanism. The details of user charges are presented in chapter 16.

Table 15.20: Summary of Capital Investment – PUA Area

S.no	Components	Central Government	State Government	PMC	Contribution of Financial Institutions	Total (Rs Crore)
		50%	20%	30%		
I	SUB-MISSION-1: URBAN INFRASTRUCTURE AND GOVERNANCE					
A	Water Supply	87.5	35.0	52.5	0.0	175.0
B	Sewerage and Sanitation	222.0	88.8	133.2	0.0	443.9
C	Storm Water Drainage	763.6	305.4	458.1	0.0	1527.0
D	Road Network & Transportation	180.5	72.2	108.3	240.0	601.6
E	Solid Waste Management	30.1	12.0	0.0	32.4	92.6
G	City Environment	0.0	0.0	0.0	317.0	317.0
H	Heritage and Conservation	54.0	21.6	32.4	0.0	108.0
I	Other Development Projects	25.0	0.0	0.0	25.0	50.0
J	Urban Governance	51.4	20.5	30.8	0.0	102.7
SUB-TOTAL		**1430.2**	**562.1**	**815.3**	**609.8**	**3417.9**
S.no	**Components**	**Central Government**		**SG/PMC**	**Contribution of Financial Institutions**	**Total (Rs Crore)**
		50%		**50%**		
II	SUB-MISSION-2: URBAN POOR AND SLUMS					
F	Slum and Poverty Alleviation	100.0		76	24	200
GRAND TOTAL		**1530.2**	**562.1**	**891.3**	**633.8**	**3617.9**

Chapter 16: INVESTMENT SUSTENANCE PLAN

16.1. INTRODUCTION

The objective of this study is to assess the investment sustenance of the expanded PMC vis-à-vis the envisaged project and to recommend a road map for implementation. The preceding sections reviewed the progress of the project and the municipal fiscal situation, while this section determines the initiatives to be undertaken by PMC to successfully finance and implement the urban services projects.

From an overall development perspective, PMC area is the extended area to include Danapur Nagar Parishad; Khagul Nagar Parishad and Phulwari Sherif Nagar Parishad for comprehensive implementation of projects i.e the PUA area.

16.2. THE PHASING OF INVESTMENTS

The phasing of investment across the sectors is presented in **Table 16.1** and **Graph 16a** below. The CDP has given an investment requirement of Rs. 3618 crores. Out of the total capital investment plan, about 42% is for Storm water drainages, 18% for roads and transportation, 5% for water supply, 13% for Sewerage system, 9% for Urban environment and rest 13% is for Solid waste management, Slums and poverty alleviation, Heritage/ conservation, Urban governance etc.

GRAPH 16a Percentages of investments

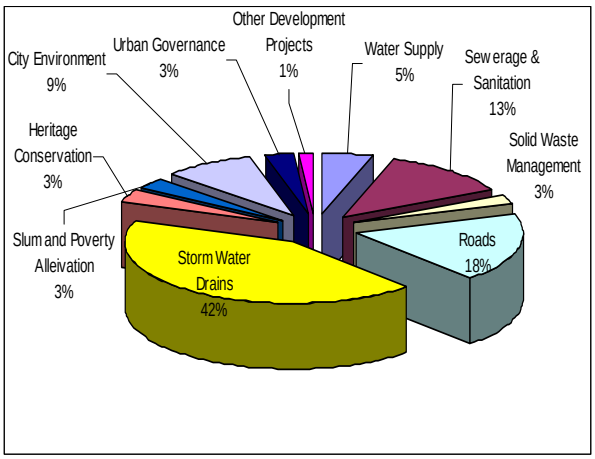


Table 16.1: Phasing of Investments

S.no	Projects	Implementation Plan- (2007-12)- in Rs Crore					Total in Crore
		2007-08	08-09	09-10	10-11	11-12	
1	Water Supply	28.8	39.0	46.0	26.7	34.5	**175.0**
2	Sewerage & Sanitation	30.5	106.3	115.5	101.0	90.6	**443.9**
3	Solid Waste Management	1.6	18.2	20.0	24.3	28.5	**92.6**
4	Roads and Transportation	4.0	21.0	166.6	245.3	165.0	**601.9**
5	Storm Water Drains	1.0	347.1	384.3	392.3	402.3	**1527.0**
6	Heritage Conservation	16.3	16.3	21.7	27.0	26.7	**108.0**
7	Slum and Poverty Alleivation	9.1	40.0	52.0	62.9	36.0	**200.0**
8	City Environment	2.6	63.4	63.4	96.0	91.6	**317.0**
9	Urban Governance	9.7	27.7	26.7	23.2	15.4	**102.7**
10	Other Development Projects	8.8	15.0	13.8	7.5	4.9	**50.0**

S.no	Projects	Implementation Plan- (2007-12)- in Rs Crore					Total in Crore
		2007-08	08-09	09-10	10-11	11-12	
	Total- Project Costs	**112.4**	**694.0**	**910.0**	**1006.2**	**895.3**	**3618.1**

16.3. OPERATION AND MAINTENANCE OF PROJECTS

The additional O&M cost on the PMC and state departments are Rs.148.7 crores. The O&M for new assets created under jnNURM are *(i) Water Supply- 5 per cent; (ii) Sewerage System-8 per cent;(iii) Solid Waste Management-5 per cent; (iv) Roads and Transport-5 per cent; (v) Storm Water Drainage-8 per cent; Heritage Conservation-3 per cent; Street Lighting-3 per cent; Slum and Poverty Alleviation- 5 per cent; City Environment-5 per cent; Urban Governance-8 per cent and Other Development Projects-5 per cent.* The details yearwise O&M cost are presented in **Table 16.2** below. The O&M expenditure is calculated as

O&M Expenditure of Current Year (2008-09) = [*(Investment of Current Year 2008-09* Percentage (say 5 per cent for Water Supply) of the investment of Current Year 2008-09) + O&M of the previous Year (2007-08)*]

Table 16.2: Phasing Of O & M of Projects

S.no	Projects	Implementation Plan- (2007-12)- in Rs Crore						Total in Crore
		2007-08	08-09	09-10	10-11	11-12	12-13	
1	Water Supply	28.8	39.0	46.0	26.7	34.5	0.0	**175.0**
a	*O&M Cost-PMC*		*1.4*	*3.4*	*5.7*	*7.1*	*8.8*	*8.8*[9]
2	Sewerage & Sanitation	30.5	106.3	115.5	101.0	90.6	0.0	**443.9**
b	*O&M Cost-PMC*		*2.4*	*10.9*	*20.2*	*28.3*	*35.5*	*35.3*
3	Solid Waste Management	1.6	18.2	20.0	24.3	28.5	0.0	**92.6**
c	*O&M Cost-Private Investor*		*0.1*	*1.0*	*2.0*	*3.2*	*4.6*	*4.6*
4	Roads and Transportation	4.0	21.0	166.6	245.3	165.0	0.0	**601.9**
d	*O&M Cost-PWD*		*0.1*	*0.6*	*4.6*	*10.5*	*14.5*	*14.5*
d1	*O&M Cost-PMC*		*0.0*	*0.2*	*1.1*	*2.6*	*3.6*	*3.6*
d2	*O&M Cost-Private Investor*		*0.1*	*0.5*	*3.8*	*8.7*	*12.0*	*12.0*
5	Storm Water Drains	1.0	347.1	384.3	392.3	402.3	0.0	**1527.0**
e	*O&M Cost-PMC*		*0.0*	*2.8*	*5.9*	*9.0*	*12.2*	*12.2*

[9] The O&M Cost is Cummulative figure for the investments made in the Phased manner. Therefore Total O&M is same as the O&M in Year 2012-13.

S.no	Projects	Implementation Plan- (2007-12)- in Rs Crore						Total in Crore
		2007-08	08-09	09-10	10-11	11-12	12-13	
e1	*O&M Cost-PWD*		*0.0*	*4.2*	*8.8*	*13.5*	*18.3*	*18.3*
e2	*O&M Cost-BRJP*		*0.0*	*7.0*	*14.6*	*22.5*	*30.5*	*30.5*
6	Heritage Conservation	16.3	16.3	21.7	27.0	26.7	0.0	**108.0**
f	*O&M Cost-ASI & SAD*		*1.3*	*2.6*	*4.3*	*6.5*	*8.6*	*8.6*
7	Slum and Poverty Alleivation	9.1	40.0	52.0	62.9	36.0	0.0	**200.0**
g	*O&M Cost- PMC*		*0.2*	*1.2*	*2.5*	*4.1*	*5.0*	*5.0*
g1	*O&M Cost-UDD*		*0.2*	*1.0*	*2.0*	*3.3*	*4.0*	*4.0*
	O&M Cost-Beneficiary		*0.0*	*0.2*	*0.5*	*0.8*	*1.0*	*1.0*
8	City Environment	2.6	63.4	63.4	96.0	91.6	0.0	**317.0**
h	*O&M Cost-Private*		*0.1*	*3.3*	*6.5*	*11.3*	*15.9*	*15.9*
9	Urban Governance	9.7	27.7	26.7	23.2	15.4	0.0	**102.7**
i	*O&M Cost-UDD*		*0.3*	*1.1*	*1.9*	*2.6*	*3.1*	*3.1*
i1	*O&M Cost-PMC*		*0.2*	*0.7*	*1.3*	*1.7*	*2.1*	*2.1*
10	Other Development Projects	8.8	15.0	13.8	7.5	4.9	0.0	**50.0**
J1	*O&M Cost-UDD*		*0.4*	*1.2*	*1.9*	*2.3*	*2.5*	*2.5*
	Total- Project Costs	**112.4**	**694.0**	**910.0**	**1006.2**	**895.2**	**0.0**	**3618.2**
	TOTAL O&M		***7.0***	***41.9***	***87.7***	***137.9***	***182.2***	***182.2***
	O&M of PMC		*4.3*	*19.2*	*36.7*	*52.8*	*67.1*	*67.1*
	O&M of State Govt.		*2.3*	*17.6*	*38.2*	*61.1*	*81.6*	*81.6*
	O&M of Private Investor/Bene.		*0.3*	*5.0*	*12.8*	*24.0*	*33.5*	*33.5*

The total O&M cost for investment of Rs 3618 Crore (constant prices) is Rs 182.2 Crore. The O&M cost for PMC, State Government and private investor/beneficiary is Rs 67.1 Crore, Rs 81.6 Crore and Rs 33.5 Crore respectively.

16.4. MEANS OF FINANCING

The section on project investment plan details the basis of project formulation. Refer **Table 16.3.** The projects which are funded by financing institutions are classified under two categories: (i) **Category A projects (Financially Viable Projects-BOOT Projects)**: These

projects are River front Development and street furniture development under City Environment- Rs 317 Crores and Development of elevated corriodor on North of the City along Ganga River-Rs 240 Crores; (ii) **Category B Projects (Annuity Projects)**: Solid Waste Management projects- Composting and Bio-Methanation Plant Development-Rs 92.58 Crore, which will involve initial contributions from government (65 per cent) and 35 per cent is contributed by financing institutions.

Table 16.3: Means of Financing – 2007 - 12

Components	MEAN OF FINANCING					Total Rs. In Crores
	2007-08	08-09	09-10	10-11	11-12	
Govt. of India	44.99	287.94	392.47	447.91	356.90	1530.2
Govt. of Bihar	16.53	105.77	144.16	164.53	131.10	562.8
PMC	26.21	167.72	228.61	260.90	207.89	891.3
Pvt. Sector	11.98	123.39	123.37	172.80	178.26	609.8
Beneficiary Contributions	1.09	4.79	6.24	7.54	4.33	24.0

16.5. PROPOSALS FOR REVENUE ENHANCEMENT

The **revenue income enhancement and expenditure minimization measures** are finalized based on the interaction with the **Municipal Commissioner, PMC and Urban Secretary, UDD (Refer Table 16.4)**. The details of the reform measures as per jnNURM are annexed. The guiding principles for forecasting income and expenditure items are:

16.5.1. *Revenue Income:*

- Quinquennial revision of ARV[10] in FY 2007-08 and 2011-12 by fifty per cent in 2007-08 and 25 per cent in 2011-12;
- Practically feasible (and imperative) revision in water tariff and levy sewerage rentals to be carried out in FY 2007-08 and revision thereafter by fifteen per cent every three years; and
- Sewerage Connection Charges to be raised to Rs 1000 per connection.
- Water Connection Charges to be raised to Rs 2000 per connection.

16.5.2. *Capital Income:*

There are three main sources of capital income: general grants, Loans and others. For the static forecast purposes, it is assumed that the same trends will continue. For the alternative scenario the grants portion is increased to comprise the grants from the central and state governments as their shares of the new investments.

16.5.3. *Revenue Expenditure:*

- All current outstanding debt liabilities to be paid from respective accounts;
- While overall establishment expenditure has increased at an average rate of nineteen per cent (during the review period), future projections have been limited to a growth of twelve percent;

[10] Currently PMC is in the process of revision of its ARV and it is expected that current demand shall be raised by over 50 percent.

- Future growth in power charges is limited to five per cent per annum, despite the steep rise in the recent past resulting in an average annual growth of thirteen per cent.

16.5.4. *Miscellaneous:*

- Due to inconsistencies in actual realization over the review period, a five-year realization average is considered for projection (e.g., land tax, road cutting charges, school fees, etc.);
- Items indicating a low/negative growth rate have been considered to grow at a minimum of five per cent, annually; and
- Items indicating a high growth, greater than 15 percent, are capped at a maximum of 15 per cent. The criterion for fixing the maximum limit is to maintain consistency with the overall growth of municipal finances.

Table 16.4: Assumption for Forecasting Income and Expenditure-expanded PMC

No.	Item	Assumption for Forecast	Basis (Current Rate 2005-06)
1. PMC ACCOUNTS-TAX AND NON-TAX REVENUE SOURCES			
A	**TAX REVENUE SOURCES**		
1	**PROPERTY TAX**		
a	Property Tax collection	50% during FY 2007/08 and 25% 2010/11 and Introduction of Self Assessment System of Tax Calculation	Annual Rental Value (ARV) as mentioned in Chapter 9 of the report. The ARV is assessed in 1993-94. The current system of assessment covers only 50-55 per cent of total properties in city
b	Growth in Assessment	10.0%	Current average of 8.8 %
c	Collection Performance	Arrear collections are to be increased to 75 per cent in 2013-14, with 34 per cent in 2007-08 to 65 per cent in 2012-13. The Current collections are to be increased to 85 % in 2013-14, with 43 per cent in 2007-08 to 75 per cent in 2012-13.	Arrear Demand – 24.4 % Current Demand – 38.2 %
2	**Water Charges**		
a	Domestic Tap Rate Charges	Rs 100 per Month	Not Applicable
b	Non Domestic Tap Rates	Rs 150 per Month	Not Applicable
c	New Connection Charges	One time Rs 2000 and 5 per cent increase every 5 years	One time payment of Rs 1000
d	Water Consumption Charges	It is included in the property tax. It is 2 per cent of the property tax	2 per cent of the property tax
3	**Sewerage Charges**		
a	New Connection Charges	One time -Rs 700 in 2008-09 and Rs 1300 in 2012-13	Not Applicable, as only 25 per cent of city is covered by sewerage network
4	**Solid Waste Collection Charges**		
a	House to House Waste Collection	Rs 25 per HH to collected from 2007-08 and to be increased to	Not Applicable

No.	Item	Assumption for Forecast	Basis (Current Rate 2005-06)
		Rs 40 per HH in 2013-14	
5	Professional and Trade Tax	13.70 per cent, but the increase in number of professional and increasing the coverage by amending the municipal Act will enhance the collection	13.70 per cent
6	Taxes on Vehicles and Animals	The high Basis is attributed to inconsistency of the tax collection. Therefore it has been taken as 15 per cent of the total collection	1471.70 per cent
B	**NON-TAX REVENUE SOURCES-** The basic premise of the assumptions are, if the growth rate is less than 3 per cent than it is taken as 3 per cent, if the growth rate is more than 15 per cent than it is taken as 15 per cent and if the growth rate is in between 3 to 15 per cent than it is taken as the actual growth rate		
1	Road Cutting Charges	15.0%	58.4%
2	Parking Fees	3.0%	-26.7%
3	Charges for Use of Public Vehicles	3.0%	-16.1%
4	Miscellenous	15.0%	213.2%
5	Sale of Produce of Lands	15.0%	80.9%
6	D & O Trade Licence Fee	3.0%	-6.5%
7	Market and Abhotoir Fees	15.0%	413.3%
8	Rent of Land, Tourist Banglow and Others	3.0%	-9.1%
9	Mutation Fees	15.0%	66.5%
10	Stamp Fees	3.0%	-68.9%
11	Income from vendors and Stalls	3.0%	-39.7%
12	Lorry & Cycle Stand Fees	3.0%	-12.2%
13	Electric Cremation Fees	3.0%	-6.5%
14	Miscellaneous	3.0%	-60.0%
15	Surcharge on Stamp Duty	11.9%	11.9%
C	**REVENUE EXPENDITURE-**It has been estimated that the O&M and other expenses will be minimum during the intial five years of the after the project implementation, therefore the assumption for expenditure forecast is taken as 5 per cent		
1	Establishment	5.0%	-8.7%
2	Operation & Maintenanace	5.0%	2.0%
3	Collection Establishment	5.0%	-15.1%
4	Communication-Engineering Section	5.0%	-100.0%
5	Health & Medical Services	5.0%	-1.3%
6	Water Supply	5.0%	-29.7%

No.	Item	Assumption for Forecast	Basis (Current Rate 2005-06)
7	Drainage	5.0%	-13.1%
8	Street Lighting	5.0%	15.5%
9	Public Health - Sanitation & Conservancy	5.0%	-19.4%
10	Remunerative Enterprises	5.0%	-63.3%

16.6. PROPOSED CASH FLOW PATTERN EXPANDED PMC

Based on the above assumptions, the cash flow in Rs Crores for PMC, based on actuals for F.Y. 2005-06 and projected for the period starting in F.Y. 2006-07 and ending 2012-13, is presented in tabular form below and detailed analysis in **Annex IVa + IVb.**

Table 16.5: Proposed Income and Expenditure Pattern of PMC (Rs Crores)

Income	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Opening Balance	**16.4**	**9.9**	**12.2**	**17.1**	**20.5**	**24.0**	**17.7**	**3.5**
A. TAX REVENUE								
Property Tax including Water Tax etc	16.67	25.15	34.49	42.96	57.42	68.13	77.38	85.93
Other Tax Revenue	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Sub-Total	**16.75**	**25.24**	**34.59**	**43.08**	**57.55**	**68.28**	**77.55**	**86.13**
B. NON-TAX REVENUE								
Communications	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Sewage Connection Charges	0.0	0.0	0.3	2.6	3.1	3.6	4.3	5.0
Water Connection Charges	0.0	2.6	3.0	3.5	3.9	4.5	5.1	7.8
Sale of Produce of Land	1.8	2.0	2.4	2.7	3.1	3.6	4.1	4.7
Other remunerative enterprise	0.8	0.9	0.9	1.0	1.1	1.2	1.3	1.5
Government Grants and Compensation	2.6	2.7	2.7	2.8	3.3	3.0	3.1	3.2
Surcharge on Stamp Duty	4.0	4.5	5.0	5.6	6.3	7.1	7.9	8.9
REVENUE INCOME	**26.1**	**38.1**	**49.1**	**61.4**	**78.6**	**91.4**	**103.5**	**117.4**
REVENUE EXPENDITURE								
Salaries	25.9	27.2	28.6	30.0	31.5	36.4	38.2	40.1
Existing O&M	3.0	3.2	3.4	3.5	3.7	3.9	4.1	4.3

Income	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
New O&M	0.0	1.6	7.4	17.8	31.2	47.4	63.7	63.7
Debt Servicing-New	0.0	0.0	1.0	2.7	4.5	5.8	7.4	7.4
REVENUE EXPENDITURE	**28.9**	**32.0**	**40.4**	**54.0**	**70.9**	**93.5**	**113.4**	**115.5**
Surplus/Deficit	**-2.9**	**6.1**	**8.8**	**7.4**	**7.7**	**-2.1**	**-9.8**	**1.9**
CAPITAL INCOME								
PMC Contribution in NURM	0.0	0.0	8.4	13.6	14.2	11.0	12.3	0.0
Contribution of State and Centre in form of Grants	0.0	0.0	19.6	31.6	33.1	25.7	28.8	0.0
CAPITAL INCOME	**0.0**	**0.0**	**28.0**	**45.2**	**47.2**	**36.7**	**41.1**	**0.0**
CAPITAL EXPENDITURE								
Capital Works	3.6	3.8	31.8	49.2	51.3	41.0	45.5	4.5
TOTAL EXPENDITURE	**3.6**	**3.8**	**31.8**	**49.2**	**51.3**	**41.0**	**45.5**	**4.5**
Surplus/Deficit	**-3.6**	**-3.8**	**-3.9**	**-4.0**	**-4.1**	**-4.2**	**-4.4**	**-4.5**
Closing Balance	**9.9**	**12.2**	**17.1**	**20.5**	**24.0**	**17.7**	**3.5**	**0.9**

16.7. PROSPECTIVE OF REFORM INITIATIVES

The **urban local body and state government have agreed to undertake the mandatory and optional reforms as suggested in the JNNURM Toolkit** in phased manner. The municipal government is in process of undertaking the reforms initiatives for enhancing the municipal revenue streams. (**Refer Annex VI**)

(A) Property tax related initiatives:

- Currently PMC, on average, employs over seven persons per property tax assessment–phenomenally high by any standards Expansion of the property tax base and redeployment of staff, so as to cater to this increase, would solve a dual purpose of increasing revenue and right sizing of personnel.
- The average ARV per property tax assessment is INR 894, which indicates low rentals values– provides scope for expanding the base through identification of under-assessed properties.
- Only forty-three per cent of property tax assessments are covered through house service connections, which provide scope for additional connections, as water and network are available.
- Water charges have not been revised since 1996 revision is warranted at the earliest and appropriate indexation applied so as to address improved recovery of service cost.
- Collection performance of water supply charges needs improvement from current levels.

(B) Other essential initiatives:

- Discrepancies regarding deduction of dues by GoB loans and outstanding liabilities deducted from grants and compensation needs to be sorted out at the earliest to enable prudent fiscal planning in future.
- PMC needs to update its debt and non-debt liability statements to facilitate fiscal planning.
- Account statements currently show irregularities, which are attributed to non-updating the records. Such lapses need immediate rectification.
- Debt servicing commitments need to be addressed to improve credit worthiness. Currently PMC does not maintain a record of deductions, hence actual liabilities are unaccounted and actual debt due, unknown.
- Advertisement tax and trade licence fee collections are relatively low, in comparison to local bodies of a similar scale and economy. This needs to be addressed immediately.

16.8. CONCLUSION

By undertaking prudent fiscal measures and reforms the PMC is able to enhance its revenue from the current level of Rs.26.1 crore to Rs.117.6 Crore in 2012-13. In this scenario it is able to meet the O&M cost of the assets created under NURM. The financial sustenance of the urban local bodies and Parastatal departments are presented in Table below. PMC can sustain the 25 per cent of investment proposed in the project investment plan through undertaking reform measures suggested in the tool-kit. The state government have to take additional burden of Rs 1284 crore to sustain 55 per cent of the proposed investment in the PIP.

S.no	Setorwise Actual investment	Investment in Rs Crore *(inclusive of price escalation of 3 per cent per annum)*					
		Total Investment	Total Sustainable Investment	Total Investment for PMC	Sustainable Investment for PMC	Total Investment by State Deptt.	Sustainable Investment by State Deptt.
A	**ULB and Parastatal Department Investment**						
i	Water Supply	185.7	79.8	74.3	18.6	111.4	61.3
ii	Sewerage	470.9	208.4	168.6	42.1	302.3	166.3
iii	Roads	383.6	187.9	76.3	19.1	307.3	168.8
iv	Storm Water Drainage	1620.0	793.8	324.0	81.0	1296.0	712.8
v	Heritage& Conservation	114.6	63.0	-	-	114.6	63.0
vi	Slum & Poverty Alleviation	191.0	73.2	106.1	26.5	84.9	46.7
vii	Urban Governance	109.0	46.9	43.6	10.9	65.4	36.0
viii	Other Development Projects	53.0	29.2	-	-	53.0	29.2
Sub-Total in Rs Crore		**3127.8**	**1482.2**	**792.9**	**198.2**	**2334.9**	**1284.0**
B	**Private Sector Investment**						
i	Solid Waste Magmt.	98.3	98.3	-	98.3	-	-
ii	City Environment	336.3	336.3	-	- -	-	336.3
iii	Ganga Ring Road	254.3	254.3	-	- -	-	254.3

S.no	Setorwise Actual investment	Investment in Rs Crore *(inclusive of price escalation of 3 per cent per annum)*					
		Total Investment	Total Sustainable Investment	Total Investment for PMC	Sustainable Investment for PMC	Total Investment by State Deptt.	Sustainable Investment by State Deptt.
iv	Slum & Poverty Alleviation	21.2	21.2	-	21.2	-	-
v	Street Lighting	2.7	2.7	-	2.7	-	-
Sub-Total in Rs Crore		**712.8**	**712.8**	**-**	**122.2**	**-**	**590.6**
Grand Total in Rs Crore		**3816.7**	**2195.0**	**792.9**	**320.4**	**2334.9**	**1874.6**

The total amounts for sustainable investment under jnNURM by PMC and Private Investor are Rs 320.4 Crore and by parastatal departments and private investor are Rs 1874.6 crores. The total amount to be invested for Patna city is Rs 2195 Crore. The financial sustenance will increase if mandatory and optional reforms are taken up positively.