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SILVASSA SMART CITY
VISION REPORT

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VISION REPORT

July 2020
Silvassa Smart City Vision Report

Report Submitted by:
Ecofirst Design Studio & Tata consulting Engineers Limited

Report Submitted to:
Silvassa Smart City Limited

Report Credits:

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From the Desk of the Managing Director

Smart City Mission, launched in the year 2015 by Ministry of Housing and Urban Affairs has allowed cities to set their future into becoming the robust engines of economic growth, uplifting infrastructure and enhancing the quality of life of its citizens. Tata Consulting Engineers Limited (TCE) is actively involved in providing technical expertise, project management and advisory services to various smart cities across India.

The needs and aspirations of every city keep changing as it grows, opening the canvas for future possibilities. It is, therefore, essential to revisit and iterate the city visions, plans and projects. Silvassa city administrator board approached Tata Consulting Engineers with this very objective.

Ecofirst services limited, a 100% subsidiary of Tata Consulting Engineers was appointed to undertake the re-visioning exercise for Silvassa Smart City. The team from Ecofirst full-filled all necessary statutories and additionally provided the bigger picture by analysing the needs of entire Dadra & Nagar Haveli (DNH) region and proposed development of Silvassa as a gateway to DNH.

A participatory planning approach was adopted involving all stakeholders to develop a citizen-centric vision. This exercise was a collaborative effort with Silvassa administrative agency, where every member pro-actively participated and shared their opinions, desire and aspirations. We are thankful for their support and inputs at every stage of the project. I appreciate the Ecofirst Team for their meticulous work in providing a holistic vision. This treatise is a culmination of the re-visioning exercise conducted and the outcomes achieved.

I am sure that this work will be a reference for the policymakers and other implementing agencies of DNH and Silvassa for years to come. This project is one more example of TCE’s benchmark standard.

Congratulations to the Silvassa administrative board, the entire team of TCE and Ecofirst for their efforts in bringing out this vision document on such a fast track.

Amit Sharma
Managing Director
Tata Consulting Engineers Limited

Foreword

Half of the world's inhabitants—3.6 billion people—live in cities. The proportion is the highest in mankind's history, and it is growing fast. By 2030, 60 per cent of the population—5 billion people—will be city dwellers. The ways in which cities develop and cope with such rapid urbanization are of huge importance to citizens. But they matter to others too. Cities are the main source of global economic growth and productivity, and they account for most resource consumption and greenhouse gas emissions. Urban development, therefore matters to the well-being of all the world's occupants. The formidable task of managing growing cities in ways that support and drive economic growth while reducing pollution and safeguarding resources led Indian Government to launch, in 2014, the Smart Cities Mission. The aim is to develop 100 Smart cities across India and set a benchmark for other cities in making.

Various studies have looked at how cities perform in economic, environmental, and social terms, and ranked them accordingly. Such studies help us to understand the elements of a great city. But they do not tell us Urban and infrastructure aspect which make them liveable. Moreover, there is a need to understand and interpret the global good practices in the context of the stage of development in which Silvassa is at present. This Vision report research starts to fill that gap. Through analysis, case studies, and interviews, we sought to learn how to make the cities better places to live in and work. This Vision report is also an attempt to show the path towards smart growth, which means securing the best growth opportunities while protecting the environment and ensuring that all citizens enjoy prosperity. It means do more with less.

We are grateful to the Citizens of Silvassa and community leaders who talked to us in detail about their visions, philosophies, successes and failures.

Their experiences form the basis of our findings and we hope, will inform others in their task of improving the life of it's citizens.

Lastly, thanks to Ecofirst team and Tata Consulting Engineers for bringing up this Vision document together.

Dr. Apurva Sharma, DANICS

CEO (Silvassa Smart City Limited) &
Deputy Collector & SDM (Silvassa)

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Abbreaviations

ABD	Area Based Development
CPHEEO	Central Public Health and Environmental Engineering Organisation
BLC	Beneficiary led construction
CCTV	Closed Circuit Television
CETP	Common Effluent Treatment Plant
CPCB	Central Pollution Control Board
D&D	Daman and Diu
DCR	Development Control Rules
DFC	Dedicated Freight Corridor
DMIC	Delhi Mumbai Industrial Corridor
DNH	Dadra and Nagar Haveli
DP	Development Plan
ERP	Enterprise Resource Planning
ETP	Effluent Treatment Plant
EWS	Economically Weaker Section
FSI	Floor Space Index
GDP	Gross Domestic Product
GIDC	Gujarat Industrial Development Corporation
GIS	Geographical Information System
GOI	Government of India
HIG	High Income Group
ICCC	Integrated Command and Control Center
ITDC	India Tourism Development Corporation
JNTP	Jawaharlal Nehru Port
LED	Light Emitting Diode
LIG	Low Income Group
MGD	Million Gallons per day
MIG	Middle Income Group
MLD	Millions of liters per day
MMRDA	Mumbai Metropolitan Region Development Authority
MOEFCC	Ministry of Environment, Forest and Climate Change
NGT	National Green Tribunal
NH	National Highway
NHB	National Housing Bank
ODP	Outline Development Plan
PDA	Planning and Development Authority
PDCL	Power Distribution Corporation Limited
PHC	Primary Health Care
PLC	Programmable Logic Controllers
PMAY	Pradhan Mantri Awas Yojana
PWD	Public Works Department
R&D	Research and Development
RFP	Request for Proposal
ROW	Right of Way
SANKALP	Skills Acquisition and Knowledge Awareness for Livelihood Promotion
SCADA	Supervisory control and data acquisition
SCM	Smart City Mission
SCP	Smart City Proposal
SMC	Silvassa Municipal Council
SPV	Special Purpose Vehicle
SSCL	Silvassa Smart City Limited
SSI	Small Scale Industries
STP	Sewage Treatment Plant
SWOT	Strength Weakness Opportunity and Threat
TCE	Tata Consulting Engineers
TPS	Town Planning Scheme
TPS	Town Planning Scheme
UAE	United Arab Emirates
UT	Union Territory
VR	Virtual Reality
WTP	Water Treatment Plant

Executive Summary

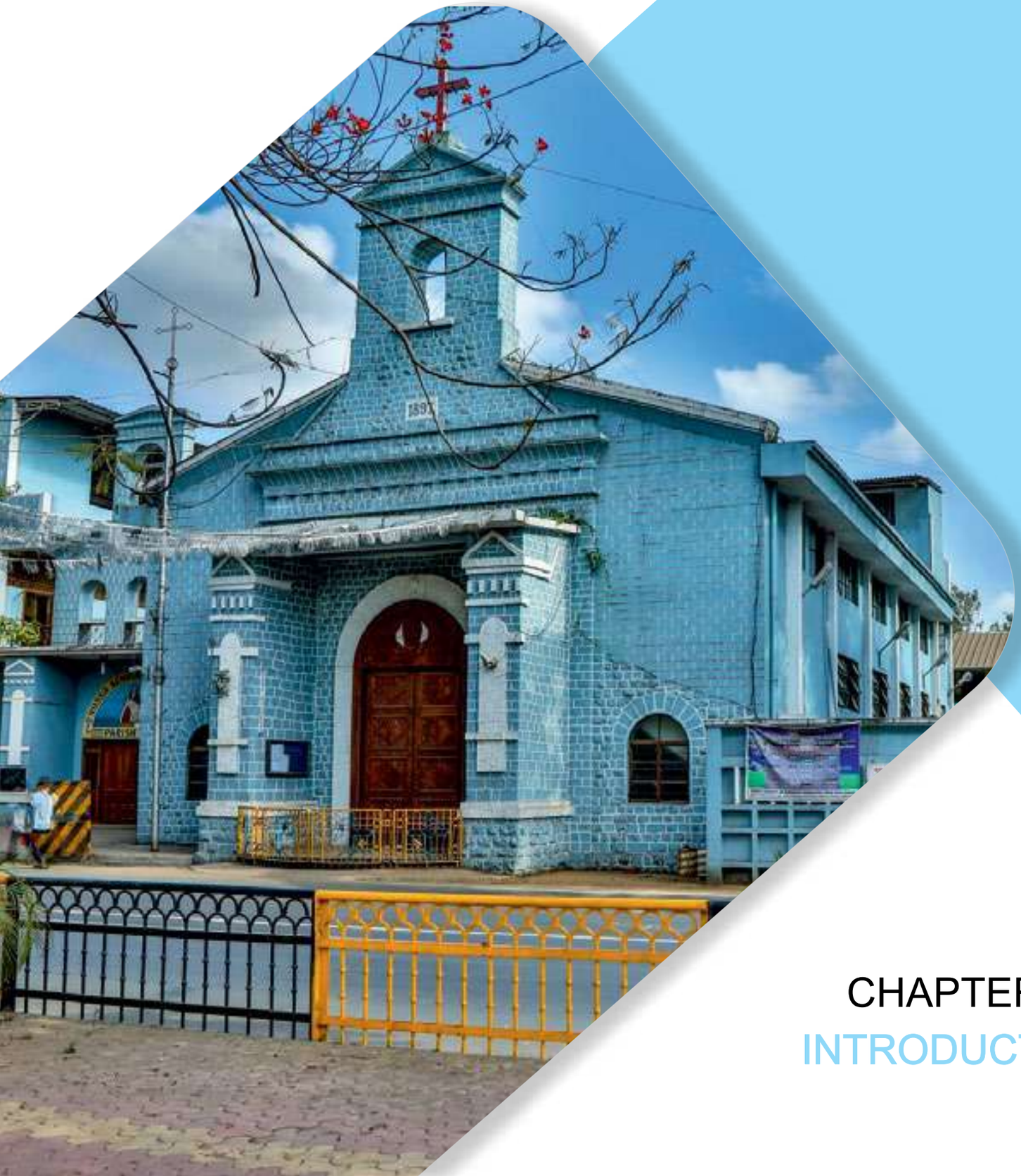
City leaders all over the India have embraced the smart city concept with enthusiasm. They are heralding innovative projects and laying out a vision for how cities can use technology to meet sustainability goals, boost local economies, and improve services. It is this commitment to changing how cities operate that is driving the continued interest in smart cities. Moreover, the smart city concept is evolving as more cities set out their own agenda and a growing range of suppliers deliver solutions to meet their emerging needs. Identifying possible paths toward more sustainable, resilient, and liveable cities is of vital importance. Today, India is experiencing an unprecedented transformation in the global urban landscape. The rapid urbanization in Indian Subcontinent presents immense opportunities and challenges. It is also generating requirements for smart grids, water monitoring systems, transportation management systems, and energy efficient buildings. This new infrastructure will be underpinned by information and communications technologies (ICT) that are deeply embedded in the fabric of old and new cities and are profoundly changing the way a city operates and how people live and work in these environments.

Silvassa by leveraging its strategically located industrial zone, dense city core, iconic riverfront and rich tribal legacy as key strengths, Silvassa aspires to be a thriving growth centre in the region between Maharashtra and Gujarat. The city seeks to achieve this by improving access, improving mobility conditions in the city centre, addressing all gaps in basic infrastructure, creating a clean and healthy urban environment, increasing avenues for art, culture and recreation, promoting skill development and using technology to provide smart governance.

This vision exercise was to asses and realign the vision and Silvassa smart city goals in achieving all the objectives and making Silvassa a healthy and liveable smart city. In-depth city profiling, direct citizen engagement, focused group discussions with stakeholders, administrative and political consultations were used to arrive at the city’s vision.

The focus of Silvassa smart city is its people, and the prime focus remains the same of providing benefits such as:

- A better quality of life for residents and visitors/Tourists
- Economic competitiveness to attract industry and talent
- An environmentally conscious focus on sustainability



CHAPTER 1
INTRODUCTION

Chapter 01: Introduction

1.1 An Overview/ Executive Summary

'Silvassa - A vibrant growth center that offers an **optimal balance** between **industrial prosperity** and **quality of life**, while promoting its **rich tribal heritage**.' By leveraging its strategically located industrial zone, dense city core, iconic riverfront and rich tribal legacy as key strengths, Silvassa aspires to be a **thriving growth center** in the region between Mumbai and Gujarat. The city seeks to achieve this by **improving access** to its **industrial areas**, improving **mobility** conditions in the city center, addressing all gaps in **basic infrastructure**, creating a clean and healthy **urban environment**, increasing avenues for **art, culture and recreation**, promoting **skill developmen**t and using technology to provide **smart governance**. In-depth **city profiling, direct citizen engagement, focused group discussions with stakeholders, administrative and political consultations** were used to arrive at **the city's vision.**

1.2 Smart Cities Overview

1.2.1 Need for Smart City

Cities are engines of growth for the economy of every nation, including India. Nearly **31% of India's current population lives in urban areas and contributes 63% of India's GDP** (Census 2011). With increasing urbanization, urban areas are expected to house **40% of India's population and contribute 75% of India's GDP by 2030**. This requires **comprehensive development** of physical, institutional, social and economic infrastructure. All are important in **improving the quality of life** and attracting people and **investments to the City**, setting in motion a virtuous cycle of growth and development. **Development of Smart Cities** is a step in that direction.

1.2.2 Convergence brief

Most of the definitions of a **"Smart City"** make direct or indirect reference to **improving performance** as one of the **main objectives** of initiatives to make cites "smarter". There have been **several approaches and models** adopted over time they have been normative or limited to certain aspects of the city's "smartness", and **a more comprehensive and holistic approach is the need**.

Defining a vision for a city is not static one but is a dynamic process.

Cities are like living organisms whose **systems function synergistically**. That's why a **holistic approach** to making cities smarter is required and is of utmost priority to create a practical and successful model.

Silvassa has positively developed its **City's Outline Development Plan (ODP)**. Silvassa as part of the Smart city challenge defined its **vision statement which encapsulated the developmental aspirations** of the people of Silvassa; it was inclusive in its essence and was in-line with the smart city mission. Silvassa prior to this had also developed the **compilation of an array of infrastructure-based projects** as part of the **Vision 2020**. Most of which has been **successfully implemented** and many had given key learning over time to develop and enhance the overall approach under Silvassa Smart city.

There has been a need over time to **revisit all the developments and assess** the projects under Silvassa Smart city and other similar scattered ones and bring them under one umbrella and **expanding its vision** to define a clear line of direction to **achieve the city goals** while moving towards a smarter city.

This will give a **clear top down view** and shall be easier for it to percolate and have **ownership till grassroots** level and have its actual on ground realization as **envisioned within the stipulated timeline**.

1.3 Silvassa Smart City

1.3.1 History & Background

Silvassa's strategic location and **conducive business environment** have led to its emergence as a **significant industrial center**. As a consequence, between 2001 and 2011, the city's population has almost doubled. This **rapid development** in the city has **impacted mobility, public spaces and delivery of basic services.** The city also serves as a **gateway to other tourist destinations** in the district. Accordingly, an area of about **2200 acres (~50% of city area)** having an **impact on 63% of the population** had been **identified for retrofitting** with three distinct objectives under the smart city vision:

• The **first objective** of the **Area Based Development (ABD)**

proposal was to create a **well-serviced industrial base** by improving access and extending **basic infrastructure** to the industrial wards.

- Second, the ABD envisioned to give **the city center a face-lift** through the development of key **physical, social and cultural amenities**, thereby creating a **vibrant city core**; and
- Finally, the ABD had to leverage **Silvassa's iconic riverfront and tribal heritage** to create a **tourist district** that draws citizens to the waterfront and visitors to the city.

1.3.2 City's Profile

Based on an **extensive literature review, SWOT analysis**, discussions with **various government departments**, and a **city-level gap analysis**, the following key **city characteristics** along with corresponding issues were identified:

- **Strategically located industrial hub**:1,235 small and medium industrial units employing over 48% of Silvassa's working population, located towards the north of the city along the Pipariya riverfront, with low levels of basic services
- **Rapidly growing city center**: infrastructure provision has not kept pace with city's rapid population growth (population has doubled in a decade); city center with high level of mixed use; confluence of heavy vehicles and city traffic, poor pedestrian facilities; unregulated parking; low last-mile connectivity for water supply and sewerage; insufficient avenues for art, culture and recreation
- **City with rich tribal heritage:** 13.2% of city population is tribal (famous Varli paintings)
- **City of riverfronts**: Damanganga (3.8 km) to the west and Pipariya (5.6 km) to the north; Damanganga riverfront development already underway though low in active use.

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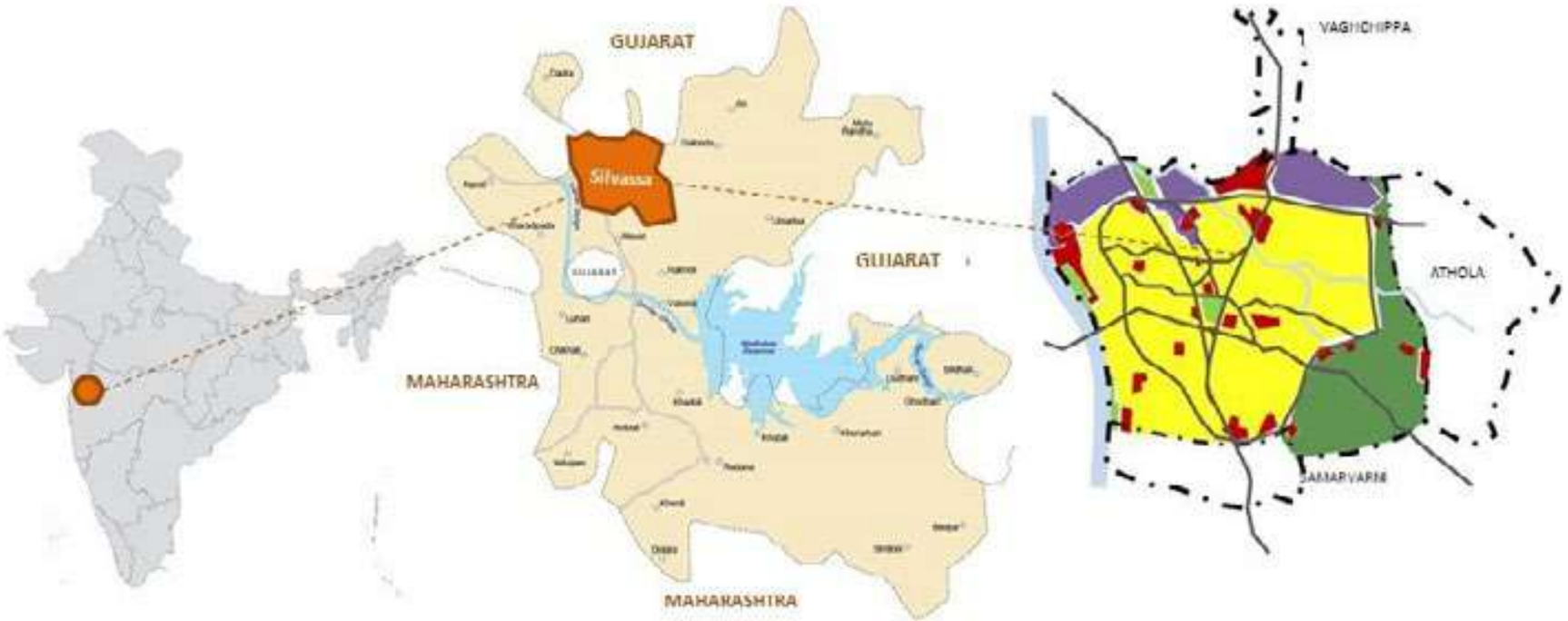
CHAPTER 2
PROCESS

Chapter 02: Process

2.1 Sectoral Analysis

2.1.1 Regional Setting

Dadra and Nagar Haveli is **located on the western coast of India,** 20.0°N and 20.25°N Latitude and 72.50°E and 73.15°E Longitude. It has an elevation ranging between 76 to 346 m above mean sea level[1].It Is **surrounded by Maharashtra (Thane district) on the south and west, Gujarat (Valsad District) on the north and east.** Silvassa, the capital of Dadra and Nagar Haveli is situated on the northern side of the district as shown in the figure below.



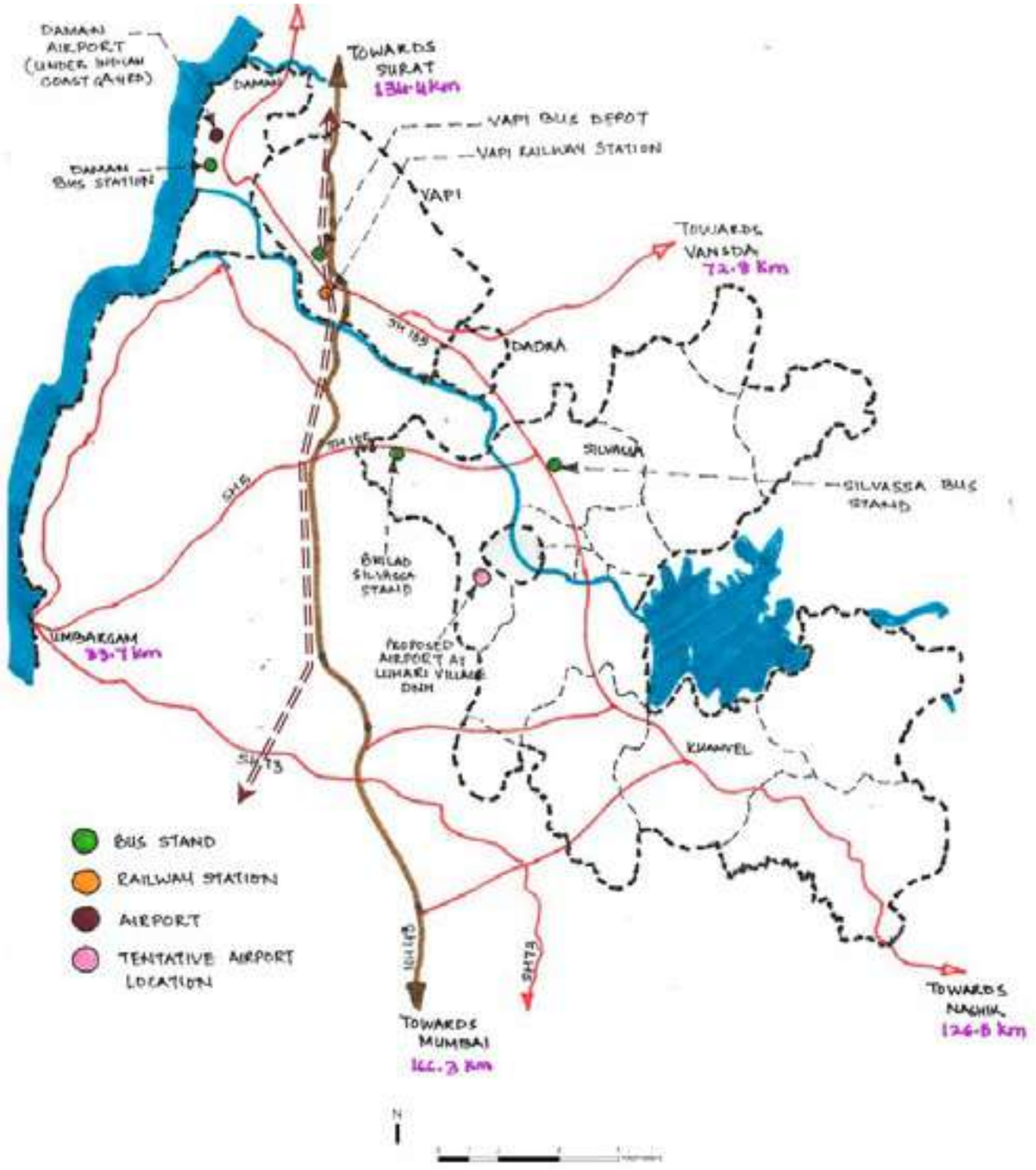
Map 2.1: Location Map

Source: Maps of India and Ecofirst

It is **well-connected by road** with important urban centers like Mumbai, Nashik in Maharashtra by NH-48 and Vapi, Surat, Vadodara, Ahmedabad in Gujarat by SH-185. Silvassa is **not connected by Railways**; the nearest railway station is Vapi Railway station (18km) and Bhilad Railway station (14km). The **nearest airport is the Mumbai airport and Surat airport.** An **airfield station** under the Indian Coast Guard is **located in Daman (27 km)** and is not commercially accessible. It can only be accessed during emergencies with prior approval. DNH is in the process of **considering to build an airport near Luhari village** (as mentioned in the Regional Plan 2007-2021 zoning map, DNH ODP-2031). Also, a **minor port in an industrial town of Umergaon** (in Valsad District) is located about 30-40 km from Silvassa, where a major port proposal is under consideration to enhance port activities.

[1]Census of India ,2011. District Census Handbook Part B.

Thus, due to **Silvassa's strategic location** in the union territory, **good connectivity and presence of industries** it stands at a thrust of attracting new industries which could fuel the growth not only limited to Silvassa but entire DNH.



Map 2.2: DNH Connectivity

Sources: Ecofirst

Below are the findings and lessons learnt:

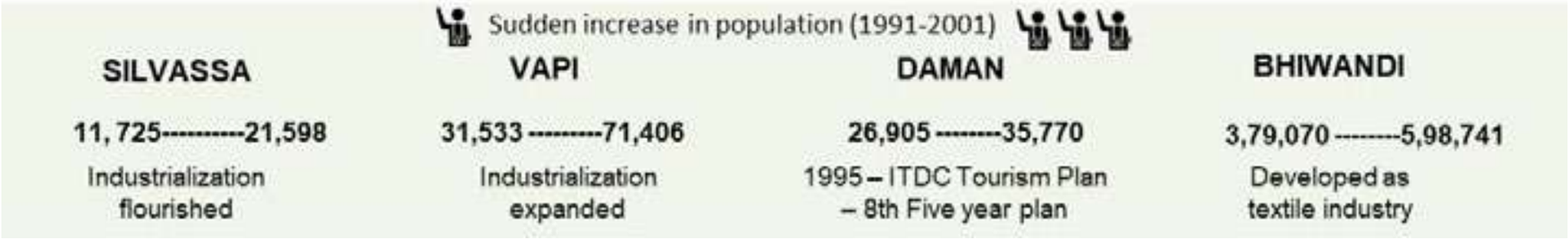
From 1960 -1970
Agriculture, Marine based Economy

During this decade majorly **economic activities were dependent on availability of natural resources**. Hence, agrarian economy and forestry was predominant in Silvassa and Bhiwandi. While marine, fishing and port activities was predominant in Daman. **Vapi was a hub for trade and commerce.**

From 1970 -1980
Industrialisation in Vapi

During this decade, **GIDC was formed in Vapi and industrialization began.** Majorly textile and chemical industries were started in Vapi. **Port activities started reducing** in Daman and due to introduction of electricity the **handlooms were replaced by power looms** and the surplus of production boomed in Bhiwandi. But **Silvassa still remained an agrarian and forestry dependent economy.**

From 1990 -2000
Industrialisation in UTs + Vapi
1993 Industrial development policy benefit. No taxes, Cheap land and labour

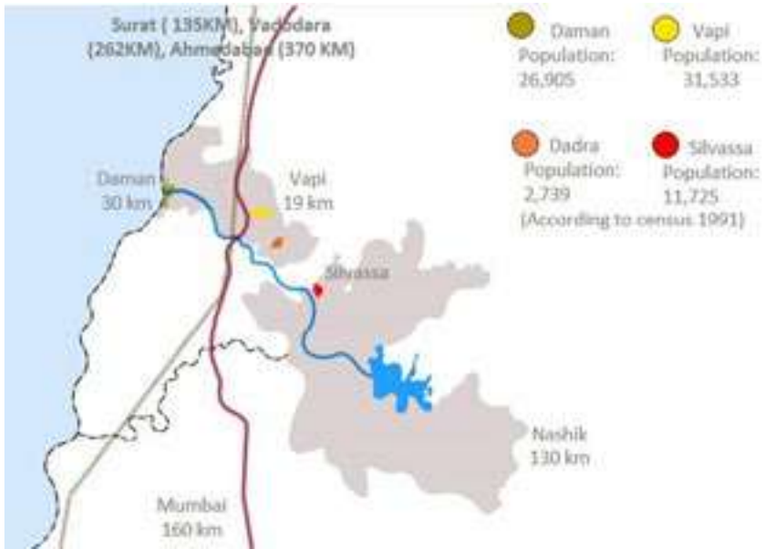


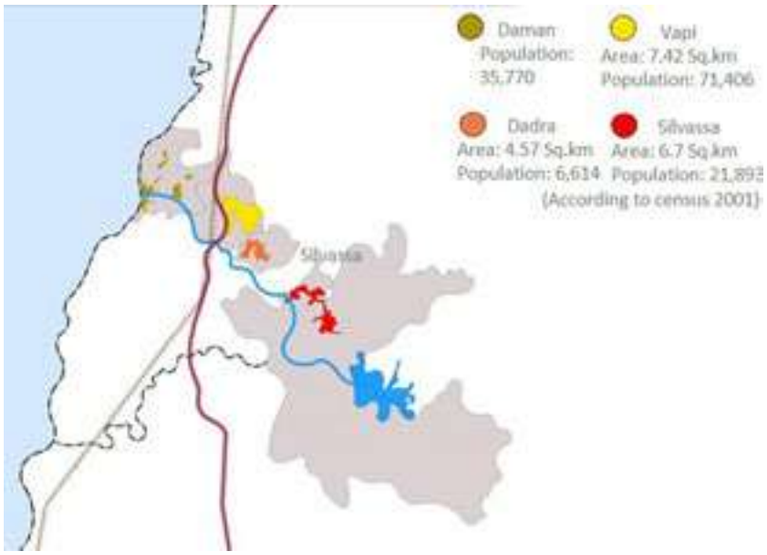
Due to **introduction of Industrial Development Policy in DNH** in 1993, there was a **100% tax relief on setting up the industries** in entire DNH which attracted the industrialists to make a substantial investment in the region. The policy was complimented by **availability of land and migrant labours** and subsidized electricity. Due to this the population in Silvassa doubled in this decade. But to avoid future risk of pollution, DNH introduced a policy where red and orange industries were banned. While at the same time **Vapi and Bhiwandi still kept attracting industries** and their growth was consistent. At the same time, **ITDC (India Tourism Development Corporation) tourism Plan was introduced** in 8th Five-year plan for Daman which set Daman in the path of transformation as a tourist hub.

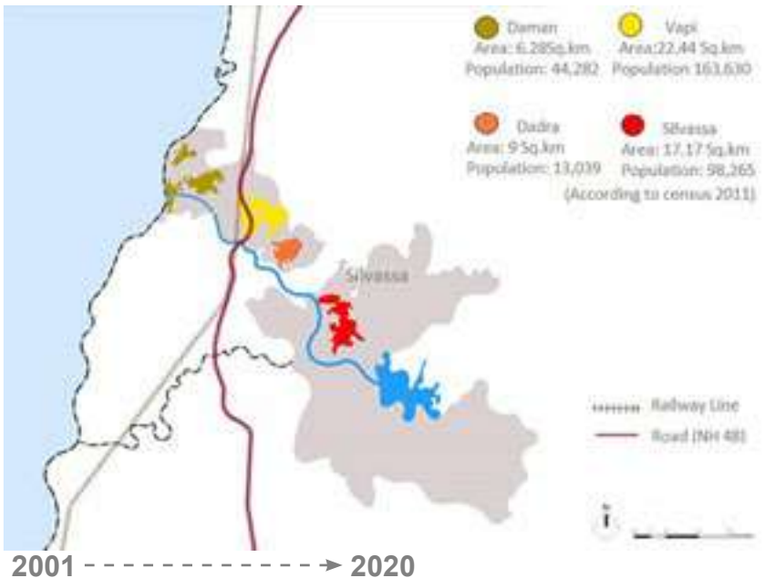
From 2010- 2020
Decline in industries
Competitive policies

During this decade, with **introduction of GST** Silvassa lost its economic advantage and **industrialization started declining** in DNH. **Bhiwandi opened up to transport and logistics activities** and shifted its focus of being a textile industry hub. **Daman continued as tourist hub,** while **Vapi was termed as the 2nd most polluted city** in India due to the **negative impacts of red industries (textile and chemical, etc).**
But as most of the industries in Silvassa are non-polluting industries (White, green industries), the environmental quality of the city was not majorly affected like Vapi.

The figure below demonstrates the Spatial and population growth over decades for the region.







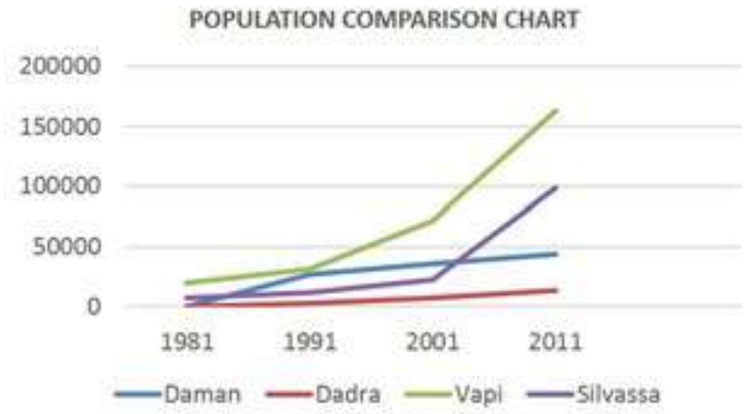


Figure 2.1: Regional, Spatial and population growth

Sources: Ecofirst

Inferences:

Even though it started as a capital of Union territory, Silvassa become an industrial hub competitive with nearby states and due to strong industrial policy, But has failed to reinvent with time and today it is struggling to maintain the momentum of growth where it need to look ahead not only to revitalize its exiting economy but also to establish itself as front liner for emerging economies. The strategic location of Silvassa could help it to become the next hub of emerging economies. Silvassa still offers a competitive advantage for future urbanization due to the good quality of environment/ life and potential to diversify its economic activities.

2.1.2 Land Use and Urban Development

Land-use planning is a process of regulating the use of land to promote environmentally balance and socially equitable growth of the area, restraining urban sprawl and optimizing efficient use of land resources.

I. Land use distribution in DNH as on 2008

Around **41.39 % of the overall area in DNH falls under forest land** (including wild-life sanctuary) and thus only 58.61% falls under developable area i.e. planning area. Out of this developable land, **45% area falls under agriculture use** and 8.36 % under water body. **Residential land constitutes of 6.88%** and **industrial land constitutes of 5.37%** as shown in the figure below:

Land use plays an important role in determining the activity patterns of a city and its development. It also helps determining the infrastructure requirement and assessment of future housing need.

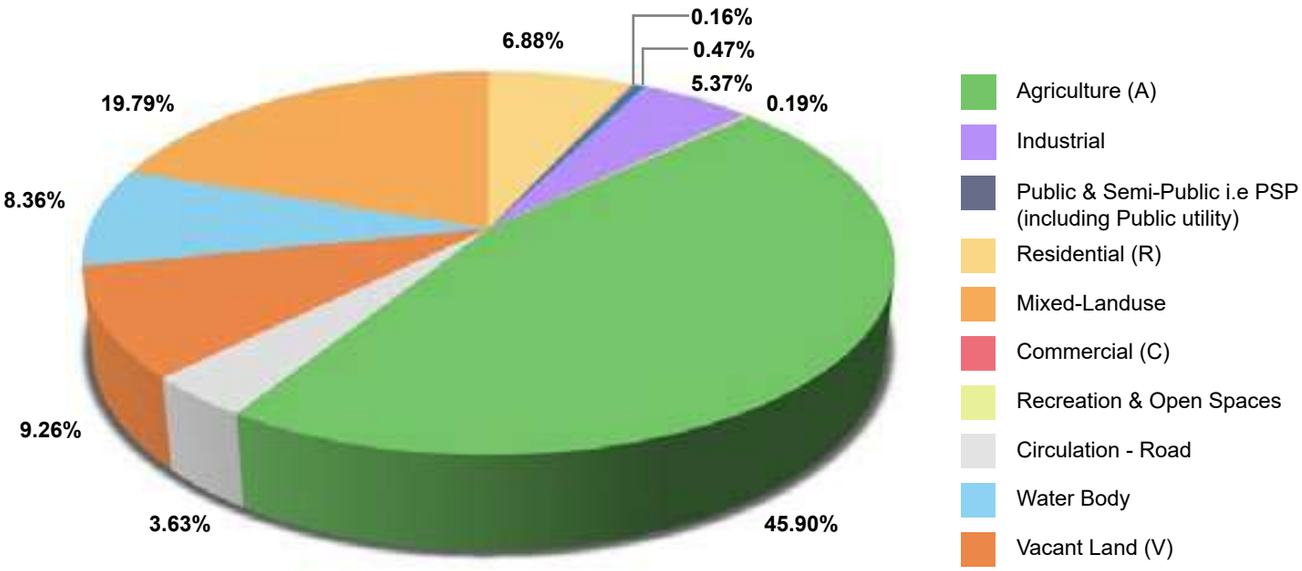


Figure 2.2: Existing Land-use distribution of DNH Planning area

Sources: ODP 2021, Ecofirst

Thus, results in improving the quality of life in urban areas.

The land-use study (Both existing and proposed) has been **undertaken in 2 levels:**

- **At Union Territory level**
- **At City level**

Dadra & Nagar Haveli covers land area of 491 sq.km. It comprises of **65 villages,1 Statutory Town** –Silvassa MCI, **5 census towns** –Dadra, Naroli, Samarvarni, Masat and Rakholi **11 patelads**. Silvassa covers an area of around 17.22 sq.km.

Also, as per the Patel-wise and Village –wise land use distribution given in ODP, it is observed that **Silvassa, Dudhani, Naroli and Khanvel has maximum residential land uses** while **Silvassa, Amboli, Naroli and Dadra have major industrial developments.**

Other Patelads, **villages majorly have agriculture land** use as their predominant land use. Thus, due to the growing industries in Naroli, Amboli, Dadra and Silvassa, the urbanization is growing in and around these areas.It is **sprawling in the direction of its connectivity** (i.e. transport routes) **in a haphazard manner.** This needs to be regulated. Also, there is a need to regulate the haphazard growth of **industrial pockets sprouting across DNH**. Planning Development Authority (PDA) of DNH has envisaged a Proposed Land use to help control this haphazard growth and regulate urbanization and industrialization in DNH for 2021, 2031. It focuses on targeting equitable growth while protecting its natural land / resources across DNH. Below are the observations from the proposed land use plan for DNH.

Proposed Land-use Plan for DNH

To regulate the future growth while conserving its rich natural heritage, new land use categories were formulated by PDA post a detailed land suitability analysis of the area. These are given below:

Table 1: New proposed Land use categories for DNH by PDA

S.No	Land Use Category	Area (sq. km)
1	Residential/ Residential Commercial (Mixed)	33.15
2	Industrial	53.09
3	Public/ Semi Public	6.75
4	Recreation & Tourism Zone	4.14
5	Transportation	16.15
6	Green Zone (G1)	89.05
7	Green Zone (G2)	37.22
8	Water Body	23.83
9	NDZ (No Development Zone)	24.02
10	Forest	203.21
	Total	**491.06**

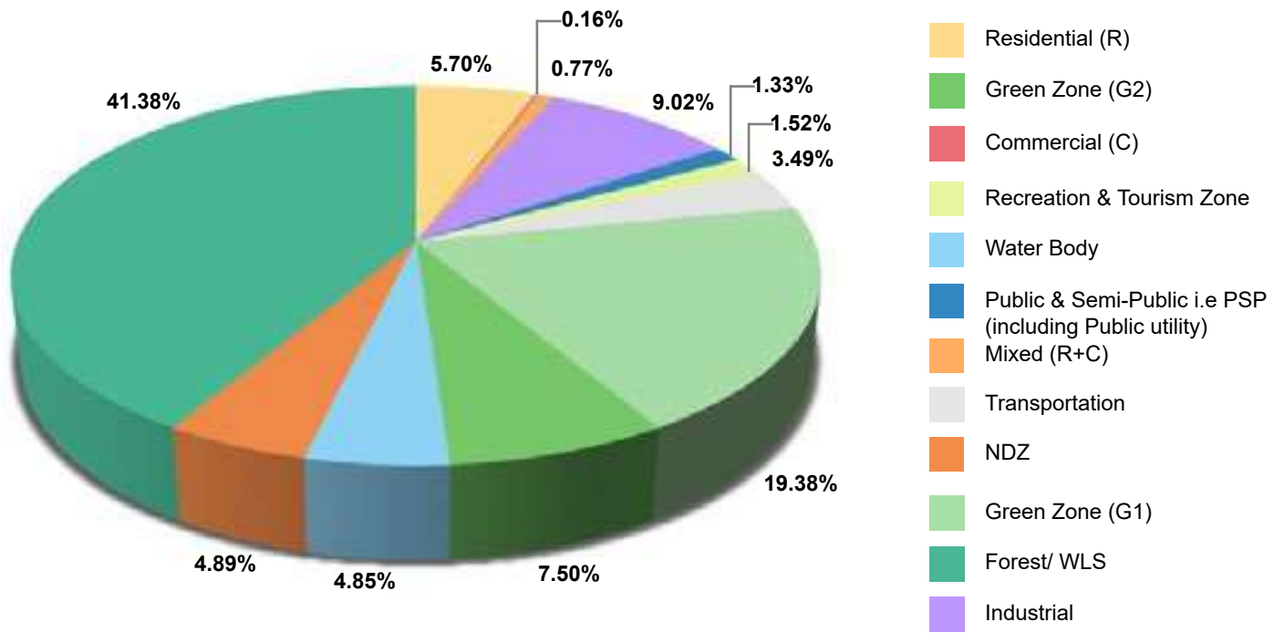


Figure 2.3: Proposed Land-use distribution of DNH area, ODP 2021

Sources: ODP 2021, Ecofirst

In the proposed land use distribution given above, it is seen that **41.39% of area still remains under forest use** while the rest forms the part of planning area. Out of the planning area 32% comes under newly defined Green Zones, **11% under Irrigation Command Area,** 8.26% under water body and 8.33% under No Development Zone formed around eco-sensitive areas. Hence only, **40% area is left for urban/rural development**. The further land use allocation within this area is –around 12% is reserved for Residential use, 17% for industrial use and around 5% for public and recreational land uses as shown below:

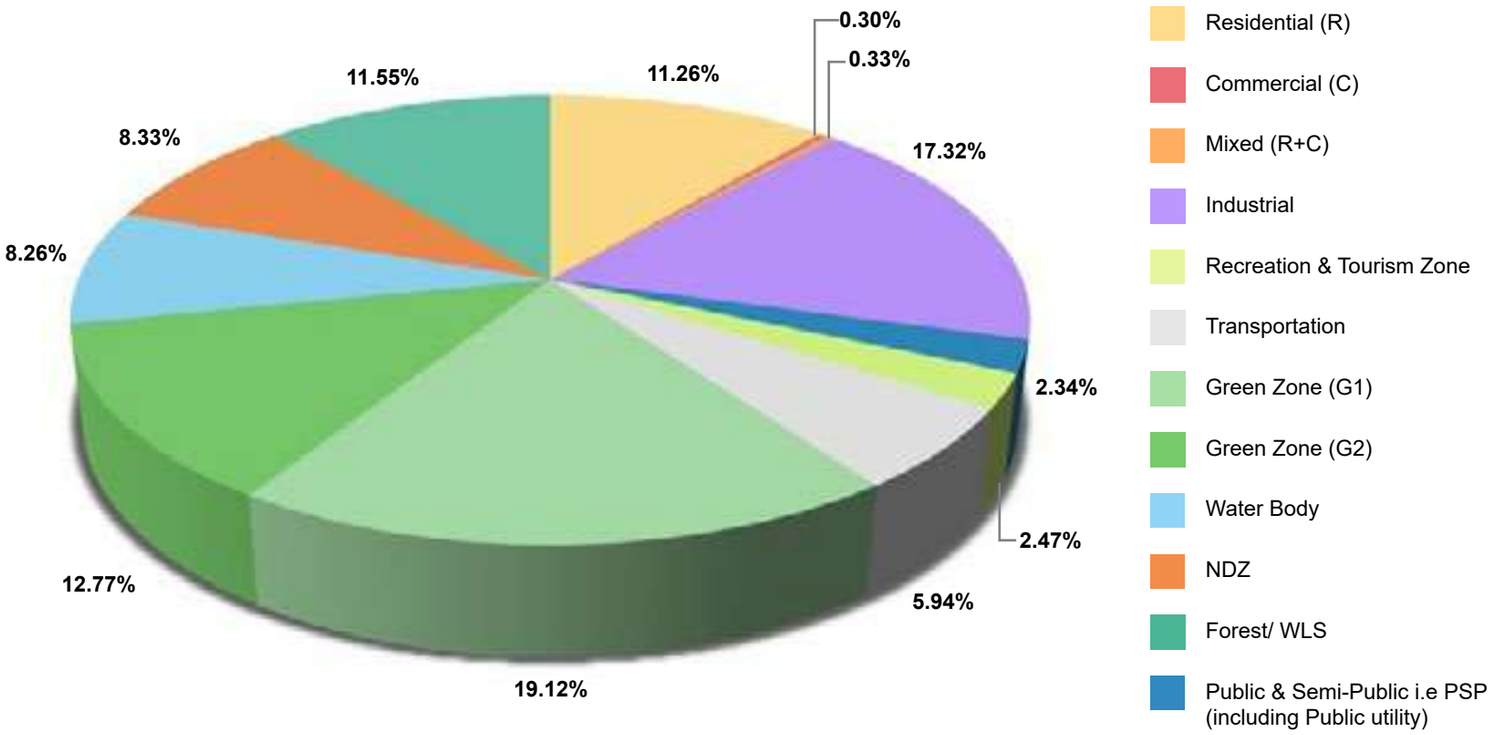


Figure 2.4: Proposed Land-use distribution of DNH Planning area, ODP 2031

Sources: ODP 2021, Ecofirst

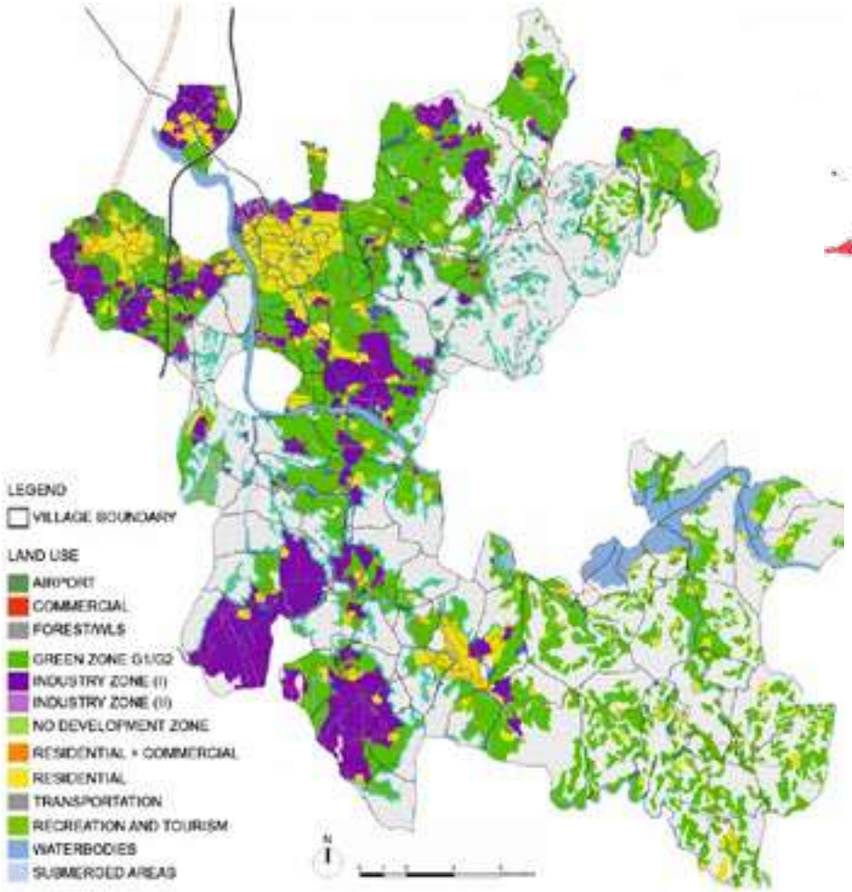
These land use allocations are distributed post a thorough land suitability analysis, considering the following criteria's in line with the vision of ODP:

- Ensuring adequate infrastructure facilities to provide standard of life
- Achieve hierarchy and equitable distribution of facilities and utilities.
- Targeting less displacement of social impact

It also targets to:

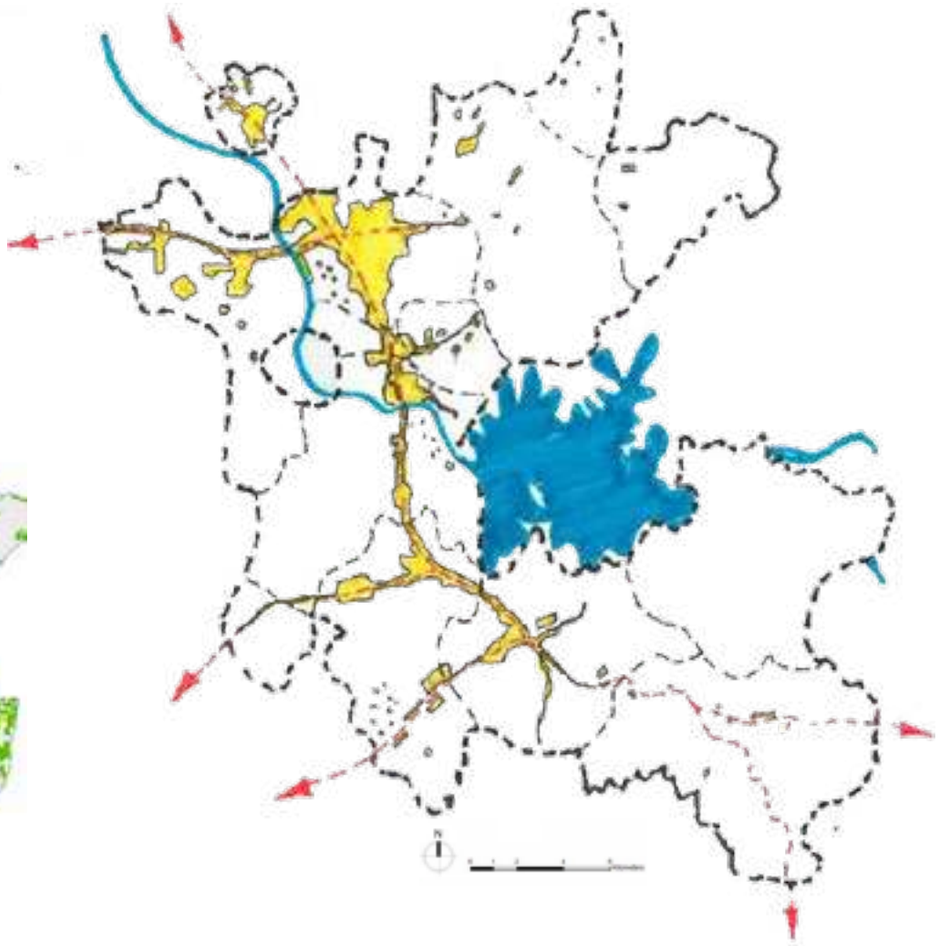
- **Develop Silvassa, Amli & Naroli as a primary urban center** with administrative and service function, providing higher level of services and facilities.
- **Develop Masat, Rakholi as primarily Industrial Township** with housing for workers located within.
- **Develop Khanvel as administrative node** for southern DNH, while **Dudhani, Mandoni and Randha as tourism nodes**.

Below Map, shows the spatial distribution of proposed land use for DNH for 2021.



Map 2.3: Proposed Land use Map for Dadra & Nagar Haveli as per ODP, 2021

Sources: ODP 2021



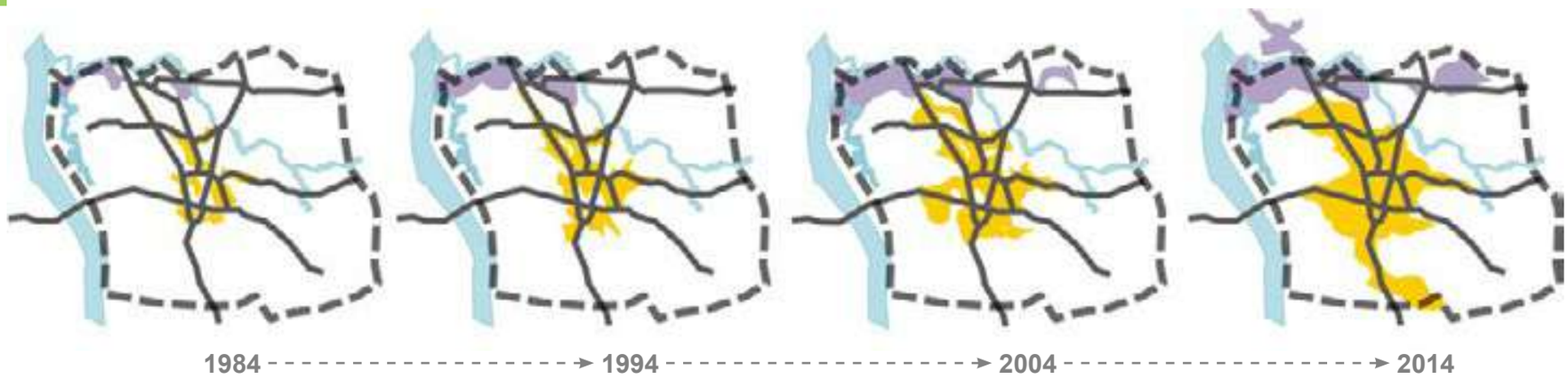
Map 2.4: Growth Pattern of DNH

Sources: Ecofirst

Thus, looking at the existing and proposed land use maps, it is observed that the **development is primarily along the central axis** (i.e. along the highway) which connects Dadra, Silvassa, Rakholi and Down south. Entire **Urbanization** is along this axis **in the form of a Ribbon which is cost intensive** for provision of effective infrastructure. Dadra, Naroli, Silvassa and Khanvel are the upcoming urban centers. This proposed land use and growth pattern will have an influence in development of Silvassa. Land use analysis of Silvassa is given below.

II. Silvassa City land use Analysis

Silvassa the capital of DNH is the first urban agglomeration of the UT. Silvassa **started rapidly urbanizing post 1993** after introduction of **industrial policy**. Below is a rapid assessment of **decadal growth pattern** of Silvassa and its land use changes.



Map 2.5: Decadal growth pattern of Silvassa

Sources: SCP Report, Ecofirst

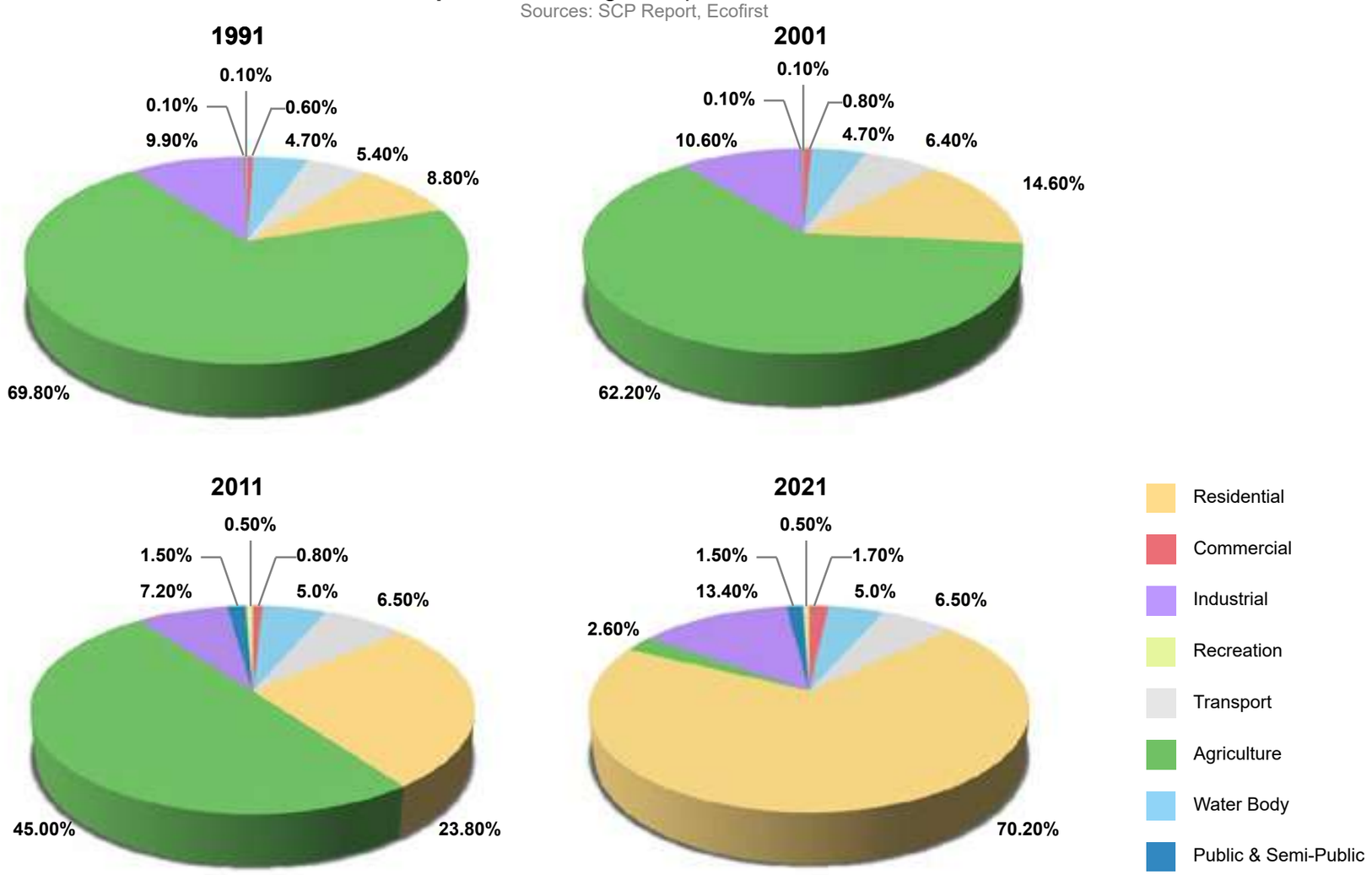


Figure 2.5: Changes in land use per decade

Sources: Ecofirst

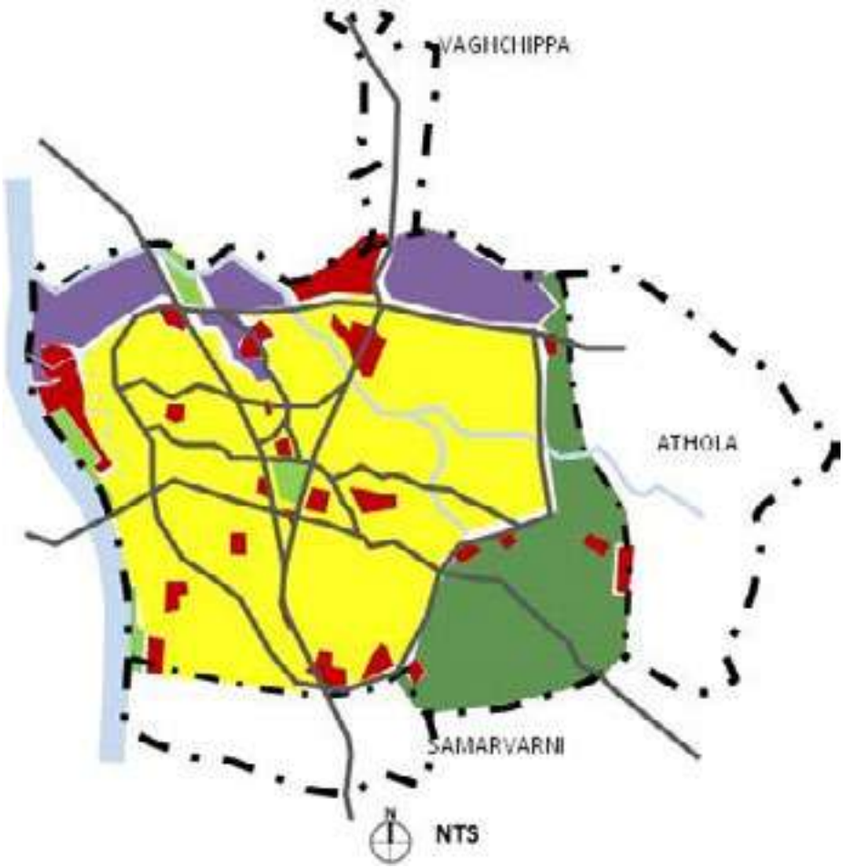
In **1984**, the **city started growing at the center** while the **industrial growth began towards the northern side** as shown in the Figure 2.9. The **predominant land use then was agriculture** which constituted to more than 69.8% of area.

In **1994**, post introduction of Industrial policy the **city kept growing in the core area** and industries grew in the northern area. Around 8.8% land was under Residential use, 9.9% under Industrial use and still **62.2% remained under agriculture use.**

While in **2004**, due to rapid increase in the population in the last decade, **both industrialization and urbanization grew**. As shown in the Figure 2.9 industries kept growing in the north while the city kept expanding at the center and **spread south-wards toward Rakholi.** In this decade thus, the residential land use increased to 14.6% and industrial land use increased to 10.6%.

In **2014**, the growth spread at the core and **linearly along the highway.** The direction of growth is towards the south towards Sayali road due to the **development of institutional buildings and other facilities.** By this decade the **agriculture use has reduced to 45%** while residential use has increased to around 23.8% which is expected to increase to around 70% by 2021 i.e. the in the next decade. Also, land for industrial is projected to increase to 13.4% by 2021. These **upcoming land uses needs to be planned and regulated.** A **strategic development guideline** should be required **to control growth** within serviceable urbanized zone.

Today, it is seen that the **most growth is restricted to the central area with no green spaces.** While the **land on the east is reserved for agriculture** as shown in the figure, which has a potential for future growth. **With the advent of ring road**, the growth is expected to spread out and will become **difficult to control.**



Map 2.6: Proposed Land use 2021 for Silvassa

Source: SCP Report, Ecofirst

Inferences:

- **As ODP envisions to develop Silvassa as one of the primary urban centers with administrative and higher quality education facilities, it will attract more development and needs to be planned for the same.**
- **Also, the development of institutional buildings outside the municipal limit on Sailly road may attract the development of city outside municipal limits.**
- **Thus, to regulate the future land use planning of Silvassa, it is crucial to develop a Development plan for the city along with updating the present DCR for a more control growth and equitable service distribution.**

2.1.3 Demography

As per Census of India **2011**, the **population of DNH was 3,43,709**. Males constitute 56% of the population and females 44%. Of the total population the tribal population constitutes 62.24% share.
The population growth rate of **DNH has shown a steady growth from 1961-1991**, while it experienced an exceptional growth rate of 59.22% in 1991-2001 due to industrialization as shown in the figure below. Also, **urbanization increased** from 13% in 1981, 17,7% in 1991 to 22.89% in 2001 **due to the industrial Development Promotion Policy of DNH**,1993.While as per census 2011, Silvassa population is 98,265. It has almost doubled from 50, 456 in 2001 due to increased industrial activities. Male constitutes 56.97% of the population and females 43.03%.

The population density of DNH has grown from 282 persons per sq.km in 1991 to 449 persons per sq.km in 2001 to 700 persons per sq.km in 2011. **Silvassa has population density increased from of 1,561 persons per sq.km in 2001 to 5,723 persons per sq.km in 2011.** This is a very low density as compared to nearby industrial towns. Vapi has population density of 7,292 per sq.km, while Bhiwandi has a population density of 26, 871 per sq.km. Thus, **to increase the population density of Silvassa** and promote a more compact sustainable growth in future, **the present mechanisms of urban development (DCR) needs be updated.**(For more details refer 6.7 section)

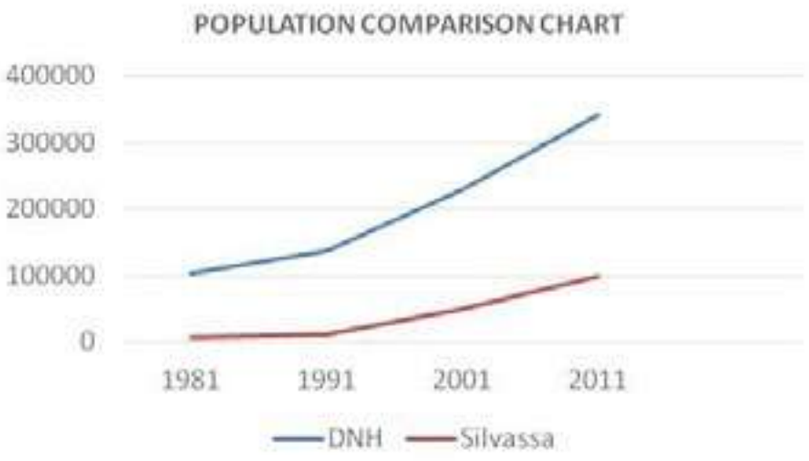


Figure 2.6: Decadal Population growth in DNH and Silvassa

Source: Ecofirst

Literacy Rate, Age composition and, sex ratio

Dadra and Nagar Haveli

The average literacy rate of DNH has increased from 40.70 % in 1991 to 57.63 % in 2001 to 76.20% in 2011. This is higher than the national average of 74.0%[2] in 2011. In DNH, the male literacy rate is 85.17% and female literacy rate is 64.32%.
The sex-ratio of urban areas in DNH had decreased from 884 in 1981 to 691 in 2001 on account of male migration/ single migrants in search of employment in the industries. But today it increased to 774[3] by 2011 as migrants have settled here with their families as the **cities provide good quality of life and good environment.**
The age- group wise population categorization indicates that almost 61% of the population falls in the working age group of 15-59 years in DNH in 2001 as per primary survey conducted in 2008.

Silvassa

The average literacy rate of Silvassa is 91.01%, higher than the national average. The male literacy rate has increased from 91.82% in 2001 to 94.84% in 2011 and female literacy rate has increased from 79.52% in 2001 to 85.53% in 2011.
The sex-ratio is 755 females per 1000 male.
The age-group wise population categorization indicates that almost 70% population falls in the working age group while 23% fall under 14 years age group and only 5.6% above 60 age group as per primary survey conducted in 2008.

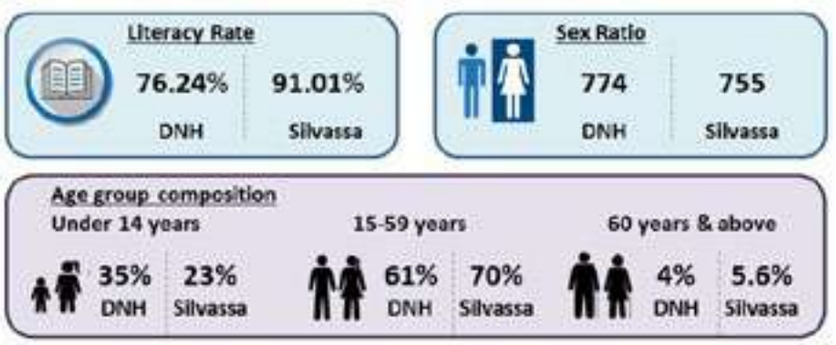


Figure 2.7: Graphs showing Literacy rate, sex ratio and age composition in both DNH and Silvassa

Source: Census 2011, Ecofirst

[2] Census of India 2011, Status of Literacy report. Link: http://censusindia.gov.in/2011-prov-results/data_files/mp/07Literacy.pdf
[3] Pg 43,50 Census District Handbook, Part A, 2011.

Inferences:

- **Present Silvassa's density is low as compared to the nearby influential industrial towns. This can be increased to promote for compact sustainable city growth.**
- **Given the good literacy rate, Silvassa and DNH are on the cusp of revolution. This is complimented by the higher age composition in the work force from industry to tertiary sector.**
- **The skewed sex ratio suggests there is huge migration and huge need to quality infrastructure for the city so that families can then come and settle in Silvassa. This will add to the economic growth of the city as well.**

2.1.4 Economy

As per the Census 2011, **53.28 percent of total population of DNH lives in rural area** in 65 villages with agriculture as their principal occupation. Only **29.25% of the total workforce** has been **involved in the primary sector** of occupation i.e. agricultural activities as cultivators and agricultural labours. The DNH region is socio-economically backward with **52% of total population being scheduled tribes** majorly comprising of the Varlis, Dhodia, Kokana, Kathodi, Dubla or Halpatis, out of which the Varlis have the maximum population share. The **tribes are distributed across the DNH** with Dhodias and Dublas living majorly in the northern region of DNH. The Varlis, Dhodia, Kokana tribes are majorly **dependent on farming as their source of income.** Kathodis depend on **forest produce** for their living and the Dublas or Halpatis works as **farm labourers**. The Varlis also have a **rich arts and crafts culture.**

Figure 2.8: Primary Occupation of the Tribes

Source: Ecofirst

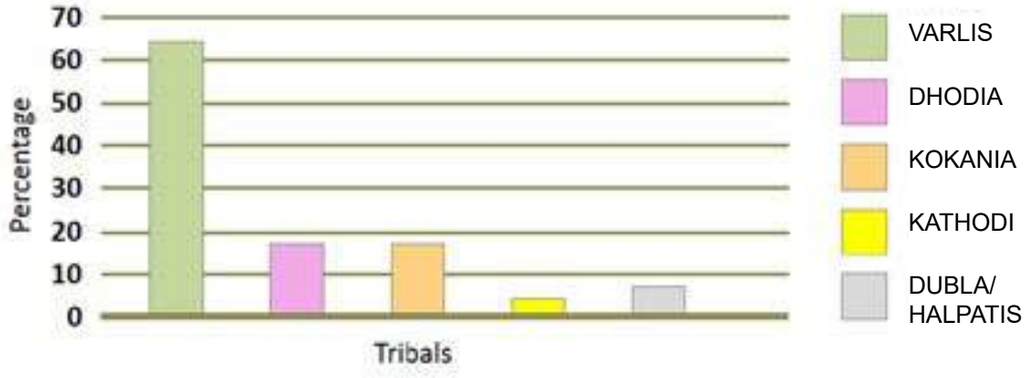
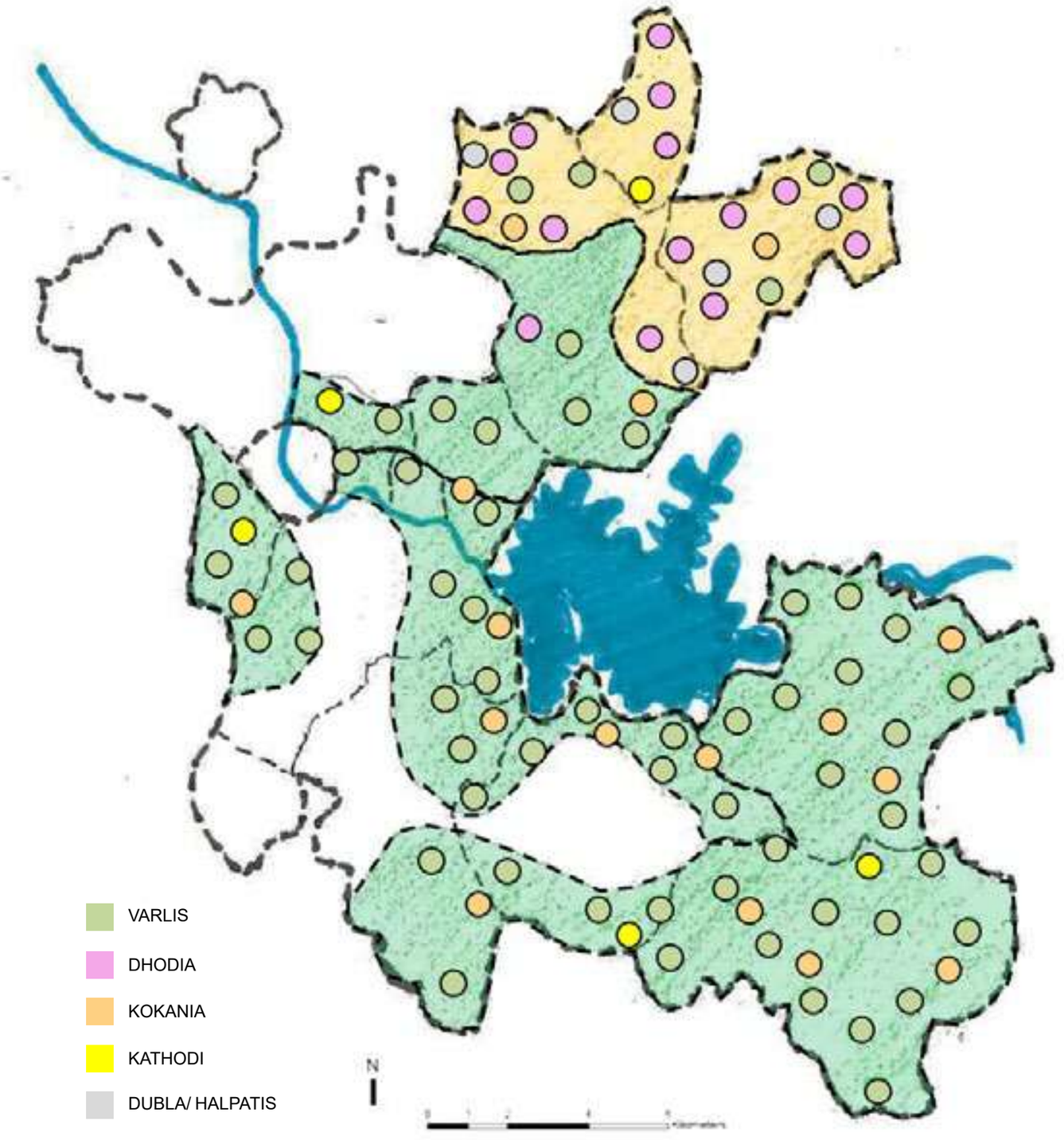


Figure 2.9: Percentage distribution of Tribal population in DNH

Source: Ecofirst



Map 2.7: Spatial distribution of Tribal Population across DNH

Source: Ecofirst

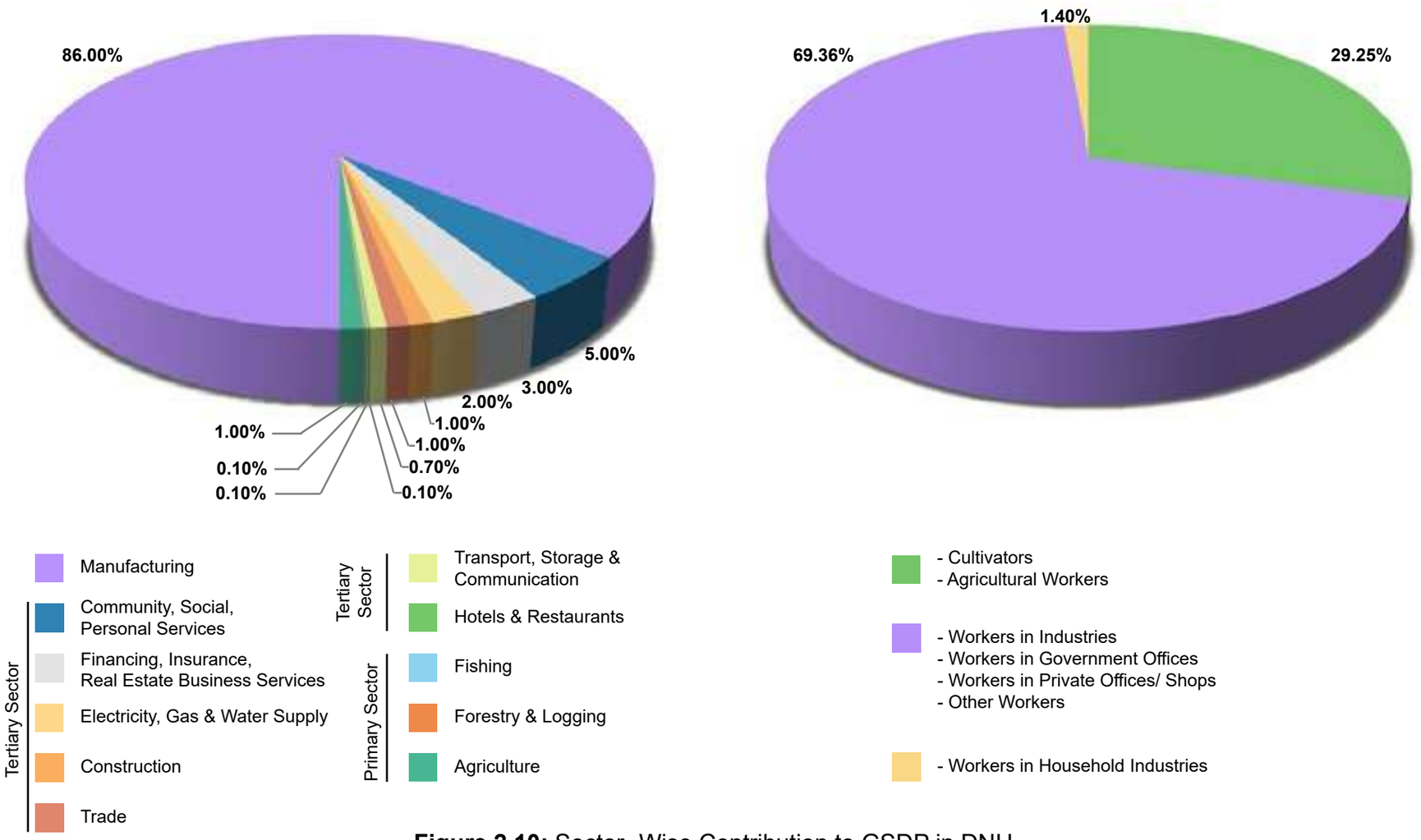


Figure 2.10: Sector- Wise Contribution to GSDP in DNH

Source: NCEAR Computations for 2012-13 GSDP of DNH, NCEAR March,2016; Census 2011, Ecofirst

Only **29.25% of the total population** works in the **primary sector**, which **contributes only 1% to GSDP** (Gross State Domestic Product) as the agricultural produce is mostly for self-consumption.

The **manufacturing sector contributes 86% of the GSDP** which **includes 70.76% of worker population**[4].

I. Primary Economy

Dadra & Nagar Haveli has a total of **160.08 sq.km. (32.72%) of area is under agriculture use** and **73.11 sq.km. (14.25%) is earmarked as irrigation command area**. **The agriculture production is mainly dependent on rainfall** and mostly on a **single crop system**.

Major crops grown are food grains, including paddy, jowar, wheat, tur, commercial crops including oilseeds and sugarcane. The vegetables grown include brinjal, tomato, cabbage, cauliflower etc.

The **land is cultivated in kharif season** mostly due to maximum rainfall received in this season. Commercial crops / vegetables / fruits are cultivated on 16% of the total cultivable land, while the production achieved is 58%.

Several **ancillary non-farming activities like dairy and poultry** keeping kept generated. **Livestock is an important source of supplementary income** of rural households[5].

[4] District Census Handbook, Dadra & Nagar Haveli 2011

[5] ODP 2021 Dadra & Nagar Haveli 2013

II. Secondary Economy

Industries form the other major source of employment in DNH, with a major workforce being the **migrants from states of Uttar Pradesh, Bihar, Maharashtra, Gujarat** etc. A rapid growth in **establishment of industrial units** in the government industrial estates and outside has been witnessed **after the Industrial Development Policy, 1993** of GoI came into effect. The **major center of industrialization being Silvassa.** The total number of industries in the year 2014 was 3175, out of which small scale industries (SSI) constituted of almost 80%. Rubber and Plastic, textile industries constitute around 40% of the total industries.
All the industries considered as highly polluting and use toxic, corrosive, explosive, hazardous, obnoxious chemicals, highly inflammable materials in their manufacturing process are banned in DNH known as Red Category Industries. **Marble industry is also an important industry,** DNH being the initial center for this industry for processing the marbles[2].

II. Tertiary Economy

Normally the tertiary sector activities include trade & commerce establishments / other services sector related activities which could be government / cooperative / private sector units, with employment as either self-employment or hired in nature.
Dadra & Nagar Haveli is traditionally not a trading center. Due to **predominance of the tribal population** the **business** of daily provisions is still **done through barter system**. There is **no regular market and shopping centers** except for a few that have come up at Silvassa urban areas. **Road-side vending as informal sector** activity is observed at various places like, in Silvassa and Khanvel where vegetables etc. are sold within the road right of way (ROW). **A weekly Bazaar is held in the villages** for trade transactions, e.g. Dudhani weekly Bazaar / Haat type activity on Thursday in a village open space[2].

Inferences:
The indigenous groups are mainly dependent on farming activities for their source of income as migrants are preferred over them in industries. Although there is enough potential for farming in DNH, the agricultural produce is majorly self-consumed and not commercial sold due to small land-holdings, due to division of land, lack of advanced farming technology and skill. There is also lack of proper market and storage facility for agricultural produce and are majorly depended on urban centers for selling their produce.

2.1.5 Housing

The National Housing Bank (NHB) describes house as a catalyst or a primary agent for a change in socio-cultural pattern and other characteristics of human life, including economic development. **Availability of adequate, affordable housing is a pre-requisite for cities** and towns to keep pace with rapid development[6].
As per the census of 2011, **there are total 73,063 households in DNH** out of which **35,408 households are in rural areas** whereas **37,655 households are in urban areas** of DNH[7].

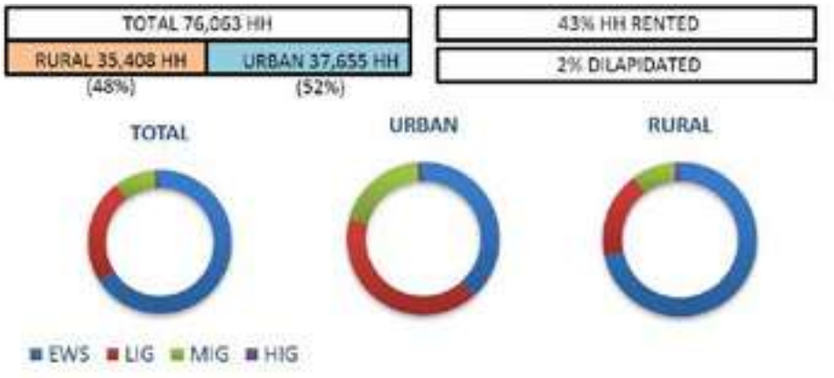


Figure 2.11: Housing distribution and condition in DNH

Source: ODP 2021, Census 2011

It is observed that in rural areas 38.95% of the total households are permanent, 57.83% are semi-permanent and 3.17% are temporary in nature. Whereas, in urban areas 88.77% are permanent, 10.63 are semi-permanent and only 0.49% is temporary[2].

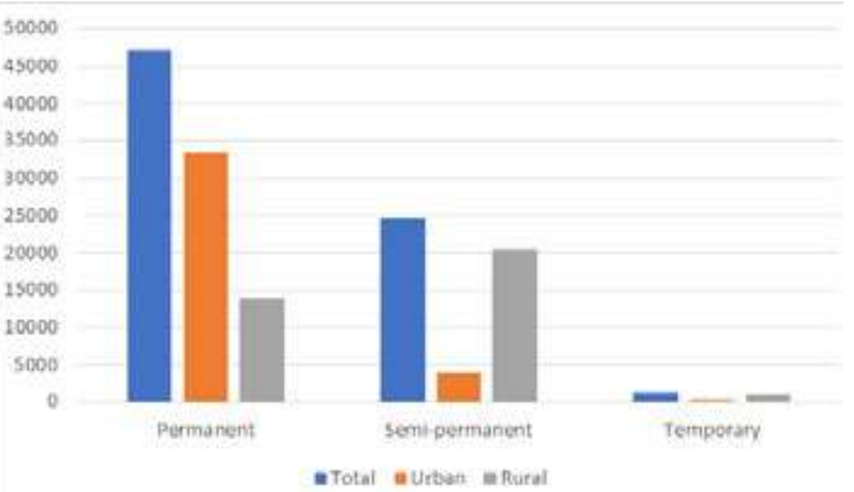


Figure 2.12: Distribution of Houses by their type of Structure in DNH

Source: Census 2011

6 ODP 2021 Dadra & Nagar Haveli, 2013
7 District Census Handbook, Dadra & Nagar Haveli, 2011

As per the census 2011, 6.14% of the total population lives in households with no exclusive room, **45.55 % live in households with one room, 29.09% live in households with two rooms,** 10.81% live in households with three rooms and 4.45% live in households with more than three rooms. The **average household size in the rural areas works out to be 5.2, whereas in the urban areas it is 4.5.** The median number of rooms per dwelling unit is 1. This implies that **majority of the population live in congested houses**[2].

Out of the total households 53.38% is owned while 41.09% is rented[2].

Due to the rising population and migration of industrial workers into DNH **there is a need for more housing units** in the area. It is estimated that by the year 2021 **there could be a deficit of around 77,000 housing** in DNH. Thus, **proper and adequate planning for supplying the housing units,** predominantly for the industrial workforce and for those requiring **housing on rental basis**[1].

Table 2: Ownership and room-type distribution of Households for DNH (Census 2011)

Ownership Status	Number of Dwelling Rooms	Number of Households		
		Total	Rural	Urban
Owned	No exclusive room	1,555	1,374	181
	One room	13,016	9,879	3,137
	Two rooms	16,359	11,202	5,157
	Three rooms	6,584	3,339	3,245
	3+ rooms	3,093	1,724	1,369
Rented	No exclusive room	2,808	742	2,066
	One room	21,081	5,496	15,585
	Two rooms	5,593	958	4,608
	Three rooms	1,524	261	1,263
	3+ rooms	249	73	176
Others	No exclusive room	308	93	215
	One room	557	170	387
	Two rooms	176	41	135
	Three rooms	121	17	104
	3+ rooms	39	12	27

Image 2.1: Labour housing in rural areas

Source: Affordable Housing Project under Beneficiary Led Construction (BLC) Silvassa

Image 2.2: Rental labour housing in Bavisa Falia, Silvassa

Source: Ecofirst

[1] Census of India ,2011. District Census Handbook Part B.

[2] Census of India 2011, Status of Literacy report. Link: http://censusindia.gov.in/2011-prov-results/data_files/mp/07Literacy.pdf

Map 2.8: Spatial distribution of labour Housing in Silvassa[8]

Sources: Affordable Housing Project under Beneficiary Led Construction (BLC) Silvassa , Ecofirst

The **industrial workers live mostly in rented houses** which are distributed all across the city as showcased in the map above. The **industrial workers live in congested houses.**

Inferences:

There is more demand in rented housing in the urban areas of DNH as compared to the rural areas, which are rented by the migrants working as industrial workforce. There is a need of affordable and comfortable housing for the industrial workers. There are more owned houses in the rural areas. The temporary houses could be made into permanent houses through the PMAY scheme. Proper and adequate planning need to be done to meet the housing demand.

[8]Silvassa Municipal Council, Affordable Housing Project under Beneficiary Led Construction (BLC)

[9] Central Ground Water Board, Report on Aquifer Maps and Ground Water Management Plan for DNH, Part 1, Nagpur, 2017

2.1.6 Environment

Climate and Rainfall

Dadra and Nagar Haveli have a **moderate climate** with an annual average temperature as 260C.

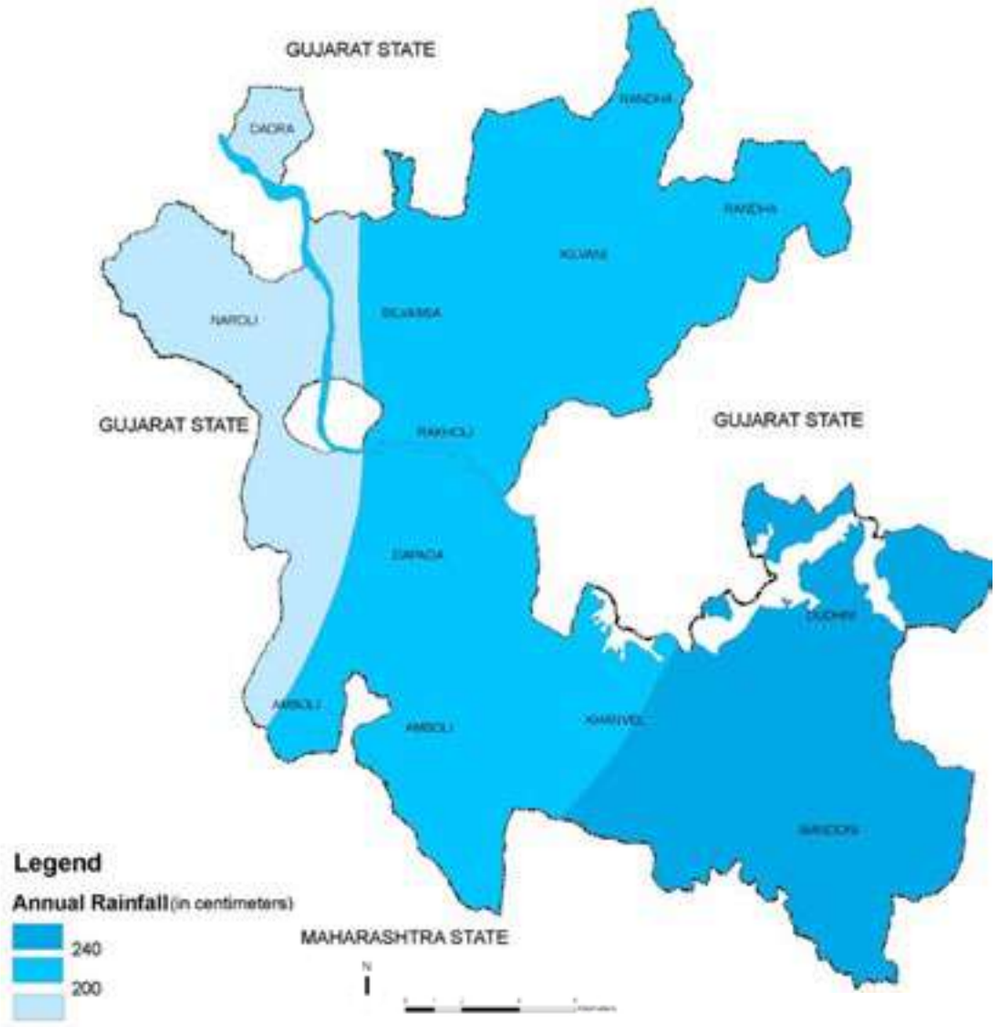
Temperatures[9]: Max. 39°C Min. 22°C (Summer)
Max .30°C., Min, 14°C (Winter)

Average Wind speed: 7.4 km/h

The **winds are moderate and cool in winter** in central Zone but **hot winds** are blowing **during summer**. **During rainy season winds are blowing ghastly** from western part to northern parts[4].

Average annual Rainfall: 200 -250 cm, (from June to September)

Rainfall pattern: The rainfall pattern distribution in DNH area is shown below. It indicates that **south-eastern part receives maximum rainfall** (contour value is above 240 cm) while the western part receives rainfall in the contours of 200cm. The average annual rainfall received by Silvassa, capital of DNH is 216.9 cm i.e. lies in the center contour (200-240 cm range). Thus, the **region has good amount of rainfall**, more than national average of 300-650 cm.



Map 2.9: Rainfall Pattern Distribution in DNH Area

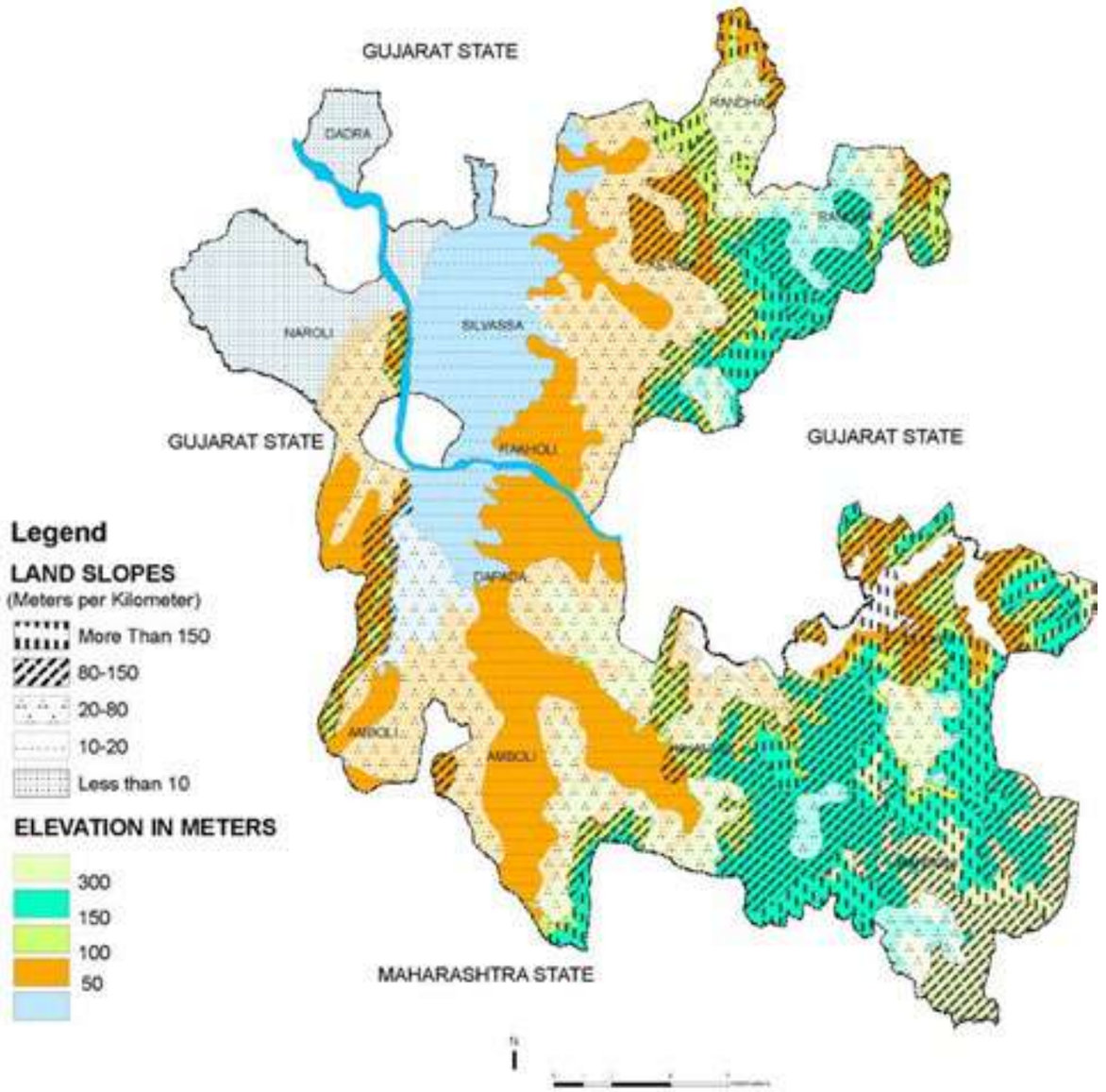
Source: District Planning Map Series,NATMO, Department of Science and Technology, GoI 1991 with Patelads names added.

[9] Central Ground Water Board, Report on Aquifer Maps and Ground Water Management Plan for DNH, Part 1, Nagpur, 2017

Topography

The topography of DNH is undulating and rolling, while few areas are plain. DNH has a hilly terrain towards the North-east and south -east where it is **surrounded by ranges of Sahyadri Mountains (Western Ghats) mostly covered under forests.** This terrain is intersected by the River Daman Ganga and its three tributaries namely Pipariya, Golak and Sakartod. The river rises in the Ghat 64 km from the western coast and discharges itself in the Arabian Sea at the port of Daman.

While the central and western part is fairly plain. The **highest point** in the region **is 423 m above the mean sea level**. Below is the map of topographical slopes and reliefs in DNH area. As **Silvassa lies in the central zone the land there is fairly plain**.

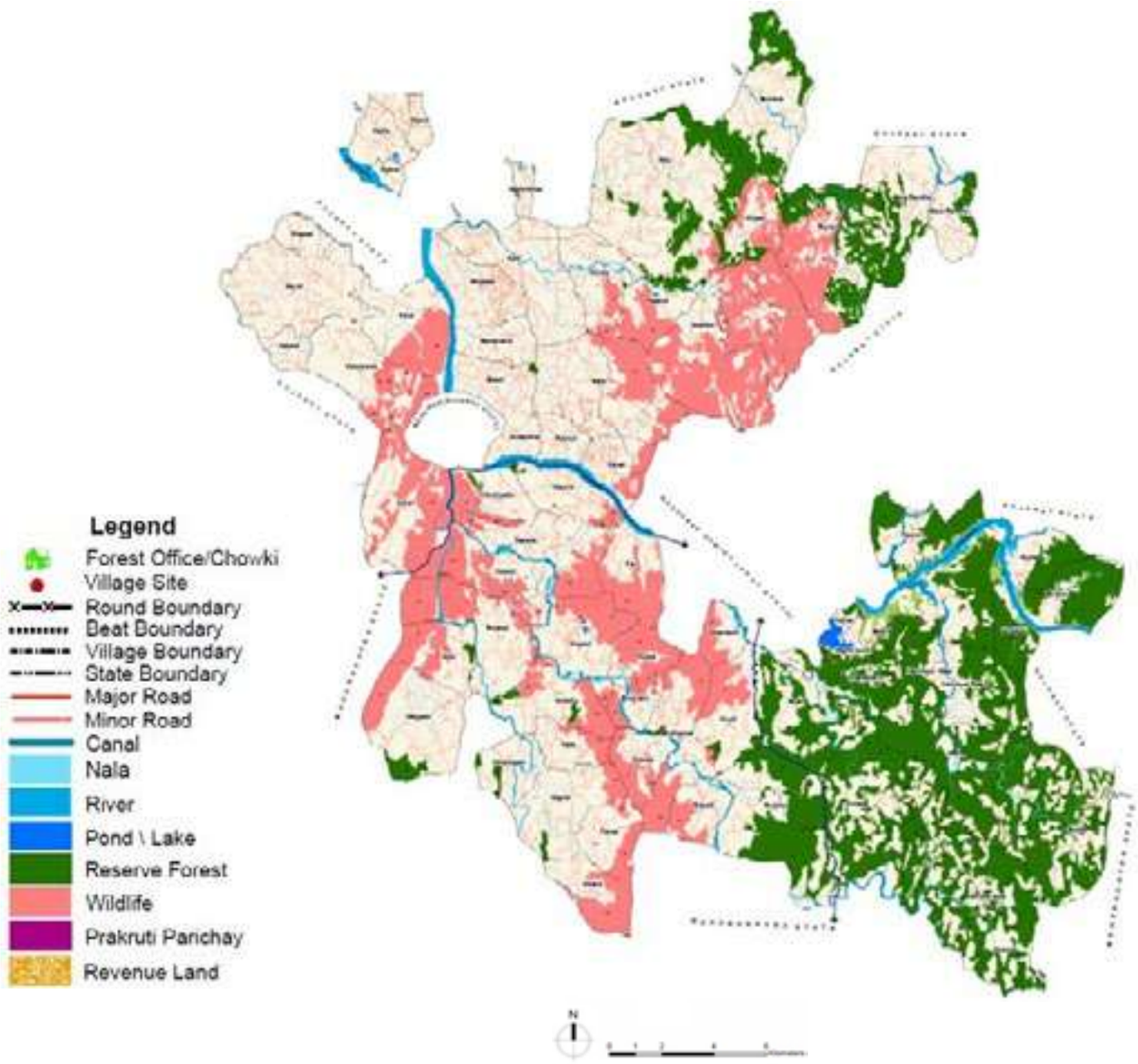


Map 2.10: Relief and Slope Map DNH

Source: District Planning Map Series,NATMO, Department of Science and Technology, GoI 1991 with Patelads names added ODP, 2021.

Natural Resources

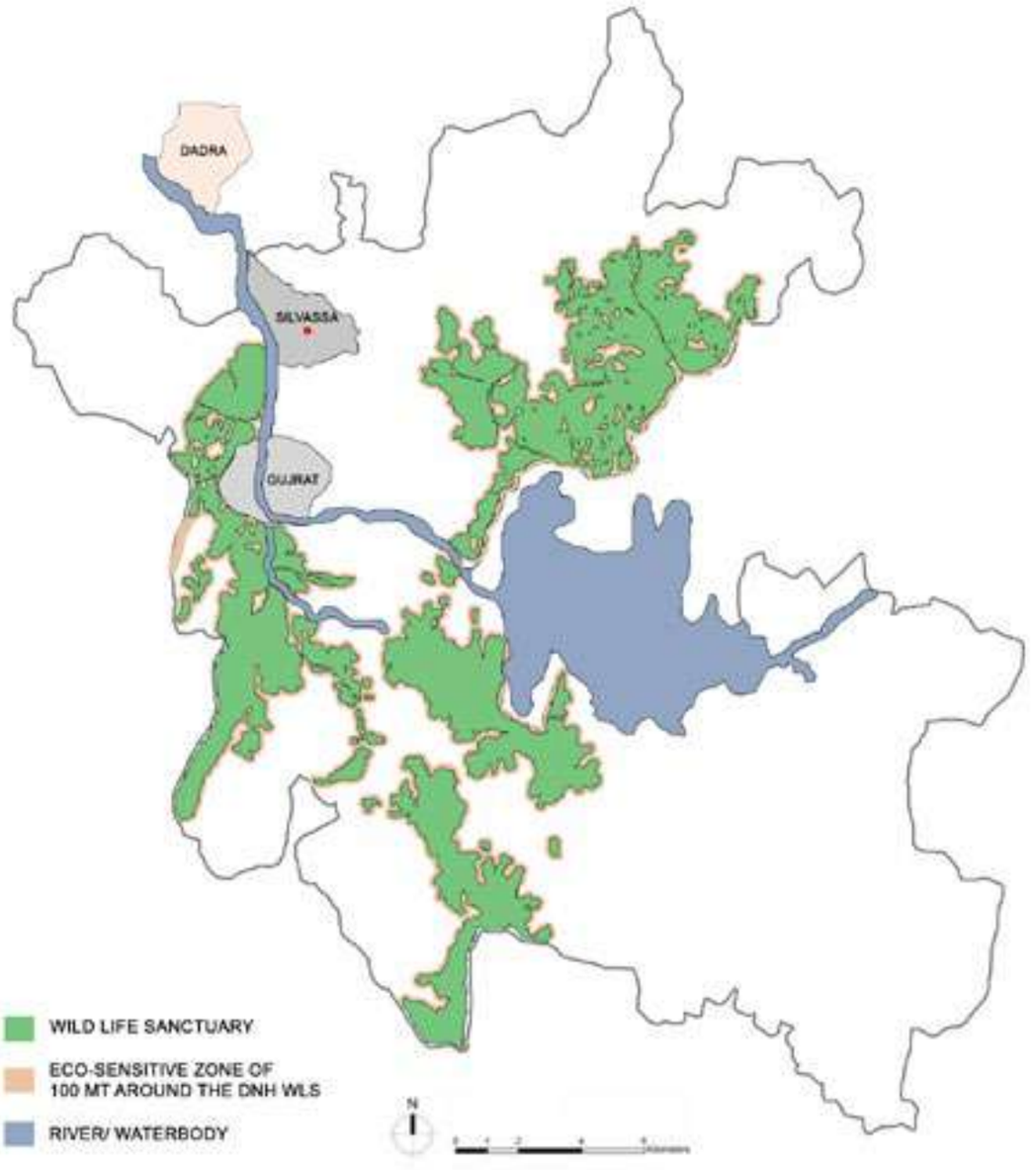
'Silvassa' means 'woods' in Portuguese. **41.4% i.e. 203.21 sq.km** of the total area of Denis **under forest**. Out of which **45 % i.e. 92 sq.km area is declared as Wildlife sanctuary** as shown in the figure below:



Map 2.11: Forest Map, Dadra and Nagar Haveli

Source: DNH Forest Department.

It has a tropical deciduous type of forest cover with Teak, Sandra, Khair,Mahara and Sisam as major tree species. and supports various livelihoods. **It has a rich flora and fauna** and is natural habitat to panther, Nilgai, Sambar, Panther, Bhekar, Hyena, Wild Pig, Peacock, Woodpecker, Kingfisher, Wild owl, Titar, Tailor,etc. Birds found in different parts of the territory and on the banks of the river upstream of the reservoir. This **rich natural heritage needs to be preserved.** Thus, **MoEFCC has thus, declared these hotspots around the wildlife eco-sensitive areas** to preserve the natural habitats and rich natural biodiversity of DNH as shown in figure below:



Map 2.12: Proposed Eco-sensitive zones around Wildlife Sanctuary in DNH BY MoEFCC

Source: Ecofirst

Few **activities have been restricted in 100 m zone around these ESZ** as given in the notification. (Refer Draft ESZ Notification[47] for more details)

Thus, if we look at the **rich Natural features** of DNH, it **can be segregated into two zones:** Environmental zone shown in green and Development/ Industrial Zone shown in pink below:

Naturally two arches of green belt are formed, one on the Western Edge and other on the Eastern Edge with **Central Axis running North – South with an urbanized ribbon** which can marginalize these natural systems and wild life.

Thus, to maintain the good climate, rich natural resources and water availability it needs to protect its natural systems.

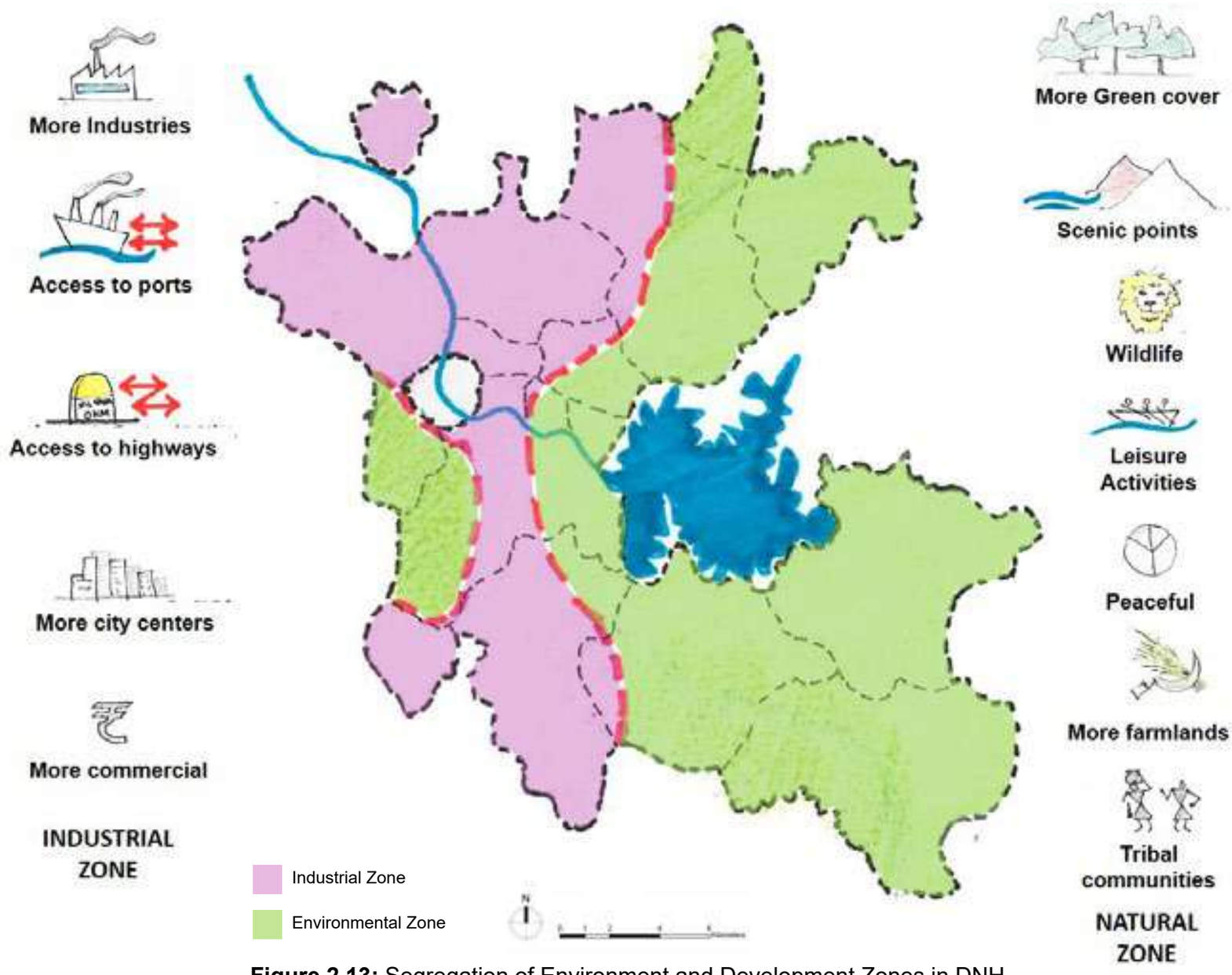


Figure 2.13: Segregation of Environment and Development Zones in DNH

Source: Ecofirst

Below are a few environmental threats envisaged for DNH and Silvassa to maintain the good environmental quality in future:

- **Threat from haphazard industrialization and urbanization**: With time, many developments and industries have sprung up in close vicinity of these natural habitats/forests, due to absence of regulatory control negatively impacting the quality of environment. This has led to unplanned urbanization with scattered growth causing difficulties to provide infrastructure. This is negatively impacting the wildlife sanctuaries and forests.
- **Threat from Water Pollution:** Due to absence of efficient waste water system presently untreated waste water of industrial and domestic waste water is discharged into natural streams, rivers, etc. Pipariya River in Silvassa has started getting polluted due to this.
- **Encroachment on natural streams:** Due to haphazard urban growth in the Silvassa the present natural drainage system in the city is under threat of encroachment. They need to be conserved.
- **Preserving ground water:** Ground water extraction should be restricted and rain water harvesting and waste water re-use systems should be adopted to recycle water and reduce the dependence of fresh water sources.
- **Controlling air pollution:** Presently, the air quality is moderate to good across DNH. But in future, industrial and vehicular pollution should be monitored and necessary local level mitigation measures (like green zones) can be proposed. For this, air quality monitoring stations should be installed across the city and near potential industrial zones/ transport corridors. This will help to keep the pollution levels in check.

Inferences:

DNH has rich natural features such as hilly, forest, river, lakes, etc. but is threatened by the haphazard growth of industrial near these natural habitats. Thus, to preserve these eco-sensitive zones should be formulated along all green cover, including wild forest buffers formed.
Due to its good rainfall and climatic condition, clean air, less pollution it has a potential to attract migration and tourists to help increase in its economy.
As the natural features are still not impacted by urbanization it is important to protect the natural streams, water bodies from impacts of future urbanization and industrialization.

2.1.7 Tourism

Dadra and Nagar Haveli have a **rich cultural heritage and diverse natural features** like hills, forests, lake, etc. which makes the UT **a potential magnet attracting tourists**. As per the Indian Tourism Statistics 2006, DNH attracts about 0.10% of total domestic tourists and about 0.01% of foreign tourists[10].
The domestic tourist arrivals in the last decade has been stable i.e. between 4-5 lakhs per year. There has been a steady growth in tourists each year as shown in the figure below, but in the **last decade a stagnant growth rate has been observed**.
80% of tourists visit for weekend vacation and 20% for business. The **average length of stay of tourists is 1-1.5 days**[11] with an average group size of 4.73[10].They mostly **visit between October to December**.

TOURISM FOOTFALL TREND

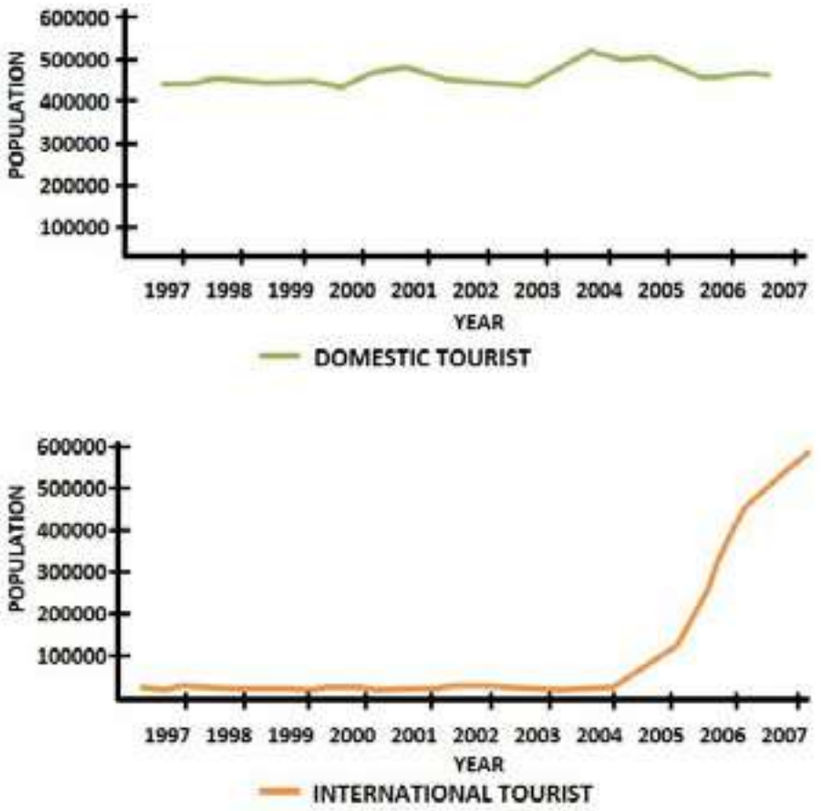


Figure 2.14: Tourism trend analysis for DNH

Source: ODP 2021

[10] DNH PDA-Planning Development Authority, Outline Development Plan, 2021, Chapter 4, Economy of DNH. Link: http://pdadnh.nic.in/
[11] Tourism Policy 2019-24, U.T. Administration of Daman & Diu and DNH

The international footfall in DNH is meager i.e. between 500-6000 tourist in last decade. Till 2004 **the annual average growth rate of tourists was very low** i.e. around 1.14%, **while a sudden exponential increase to 19.02 % in the year 2004 was observed** due to the Chinese engineers coming to DNH for machinery installations and stayed for elongated period as shown in the figure above. Their **average stay is around 2 days**. And **they mostly visit between November to January**.

Hotels have recorded highest occupancy rate in September months (50%) for both business and leisure tourists. Silvassa also acts as **a major destination wedding spot** and thus attracts tourist visiting during wedding seasons. Its **gardens were once famous spots for shooting for Hindi film industry** with added nearby serene landscapes to an advantage. Although this has reduced with time, with increase in the budget and shift in the drama subject's industry started moving to foreign locations, however **even today many Bhojpuri and other films are shot** in DNH.

Daman a major tourist destination **is located 30 km from Silvassa** and is a **magnet point for tourists** visiting DNH. As now both the UT's Daman & Diu and Dadra Nagar Haveli are merged, a **comprehensive tourism strategy and plan is under process** to be adapted for the betterment of the UT. On similar lines, Tourism Policy targeting both UT's have been formed for 2019-2024. It combines the potential of both the UT's to help attract more tourists and engage them for a longer duration.

Tourist attractions in DNH

Both Daman and DNH have various tourist attractions as shown in the Figure below. They can be categorized into two major types namely, physical attractions and cultural attractions:

Physical Attractions

These include the below destinations:

Daman	Dadra and Nagar Haveli
• Beaches – Devka, Chalplishre, Jampore,etc. • Mirasol Waterpark • Parks – Devka eco-park, Satya Sagar Udyan, Kachigam garden, Joggers park	• Wildlife -Lion Safari, Deer park, Butterfly Park,etc. • Parks – Nakshatra Garden, Vanganga lake garden, Hirwa Van garden, Luhari garden, etc. • Water body – Damanganga Riverfront- Dudhani Lake,etc. • Nature trails –Tinoda trail, Chorvedha trail, Bonta trails, Satmalia trail,etc.

Other nearby destinations include:
• Nargol Beach
• Parachute Ground KBCC

Cultural/ Architectural Attractions

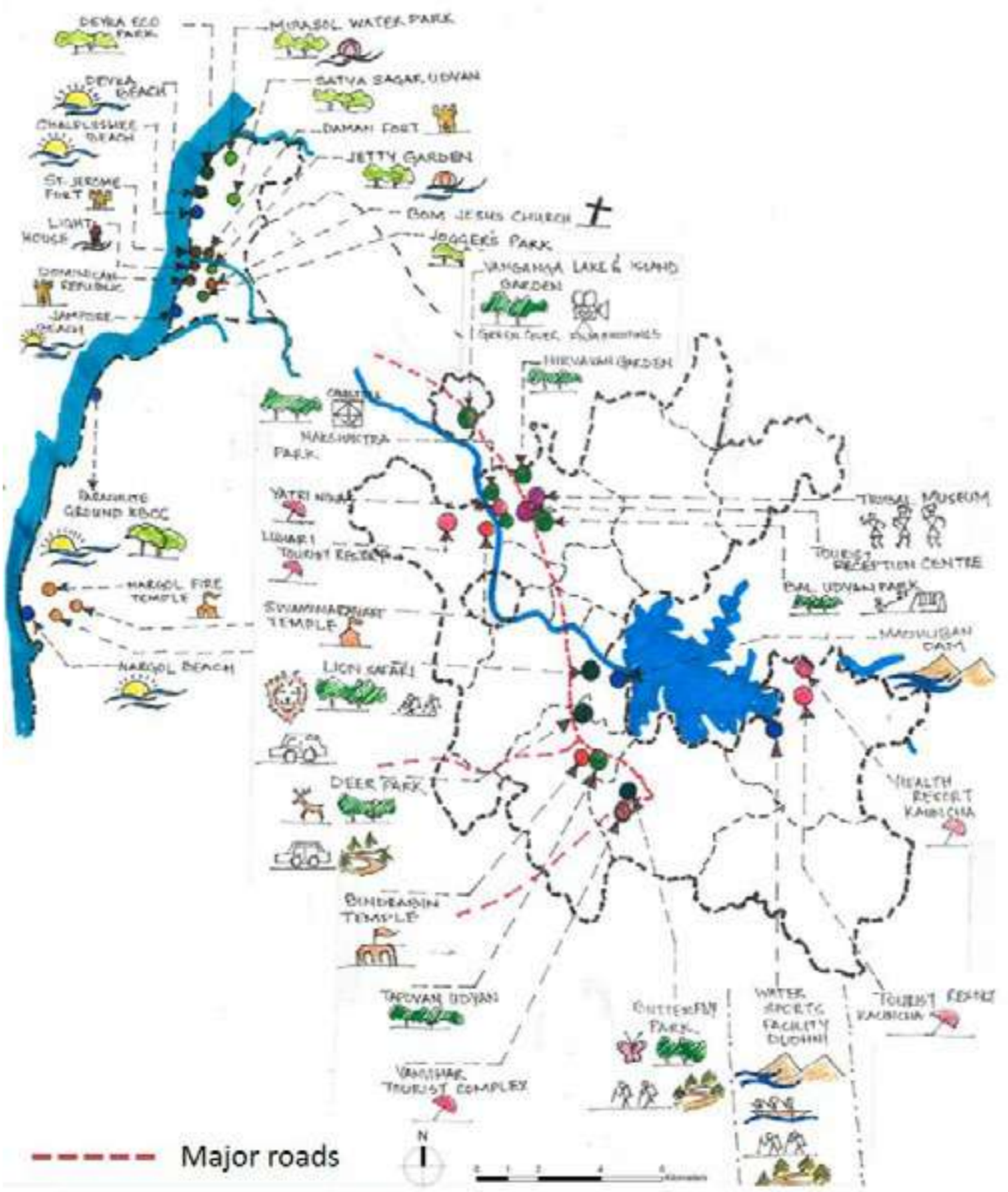
These include the below destinations:

Daman	Dadra and Nagar Haveli
• Daman Fort • Bom Jesus Church • Light House • Dominican Monastery	• Kala Kendra • Tribal Museum, Silvassa • Swaminarayan Temple • Bindrabin Temple

Other nearby destinations include:
• Nargol fire temple
• Mumbai is in close proximity with a bouquet of tourist attractions.

[10]DNH PDA-Planning Development Authority, Outline Development Plan, 2021, Chapter 4, Economy of DNH. Link: http://pdadnh.nic.in/
[11] Tourism Policy 2019-24, U.T. Administration of Daman & Diu and DNH

Below Map shows the local distribution of tourist destinations in DNH



Map 2.13: Major Tourism destinations/ attractions in Daman and DNH

Source: Ecofirst

Connectivity

One of the main reason that DNH and Daman attracts more tourist is that both DNH and Daman are **well connected to major urban centers of Maharashtra and Gujarat** namely Mumbai, Vapi, Surat,etc and thus due to close proximity forms a perfect weekend destination. They are **well-connected by Roadways through NH-48, railway and airway** as shown in the figure below. Most of the tourists prefer road travel (private car) to arrive in DNH.
In near future, the **connectivity will be enhanced by upcoming transport projects** like the high-speed rail corridor/Bullet train near Naroli and tentative airport proposed in Luhari in DNH.
Through the local stakeholder interactions, it has been observed that the **inter –connectivity to tourist destinations is weak** and more **local transport options needs to be provided** to connect them to the remote tourist spots and to further enhance last mile connectivity.
Presently the **accommodation and food options available in Silvassa are limited** due to various reasons such has inconsistency in demand, gap in quality, reliability of corporate tourists, missing comprehensive policies & schemes in this sector etc.
Thus, the **physical infrastructure that compliment tourist activities should be uplifted** to make DNH and Silvassa more welcoming and comfortable tourist destination.

Inferences:

- **Unique tourism potential to attract more tourists in future with existing rich cultural and natural heritage.**
- **Need to strengthen hospitality industry and uplift tourism infrastructure facilities to make them more welcoming & adequate with combination of options suiting all types of visitors.**
- **Potential to form day/theme wise packages and connect tourism destinations to form integrated circuits in both Daman and DNH with a balanced approach.**
- **Potential to explore concept of experience-based tourism and other tourism themes.**

2.1.8 Physical Infrastructure

I. Physical Environment

A. Water Supply

Daman Ganga river is the primary source of water supply for Silvassa city. As per the agreement (made between Administrator of DNH and Governor of Gujarat, in sept 1992) total 12.75 MGD i.e. 57.96 MLD water has been reserved for Dadra and Nagar Haveli.
Silvassa city, currently has population of 1.39 lacs people. As per CPHEEO and Indian Standard, considering 135 LPCD as rate of **water demand results in 25.70 MLD of freshwater** for the Silvassa city. Demand forecasted for population of 2.5 lacs people **by year 2035 will be 45.55 MLD**. As an alternative, to supplement any shortfall additionally about 86 Bore/ tube wells spread over the city were being used as ground water sources (bore wells, tube wells).
The current water supply system is intermittent which **supply water for 8 hours** i.e. 4 hours in morning and 4 hours in evening. **Water treatment is being done with existing facilities** comprising of 4 MLD & 15 MLD water treatment plant. The 4 MLD is under refurbishment, 15 MLD is currently working. Both **treatment plants are in dilapidated condition**. To support water treatment requirements **another WTP of 11 MLD plant is under consideration.**
The entire Silvassa city water supply distribution system has been divided into 5 zones. The water from treatment plant is pumped to the storage reservoirs (GSR-4 Nos. and ESR – 8 Nos.) and then supplied to each household connection via gravity fed networks.
But today only **60% of city is covered by water supply network.** There is **absence of water meters** and around 25-30% is NRW with a few leakages recorded in the system.

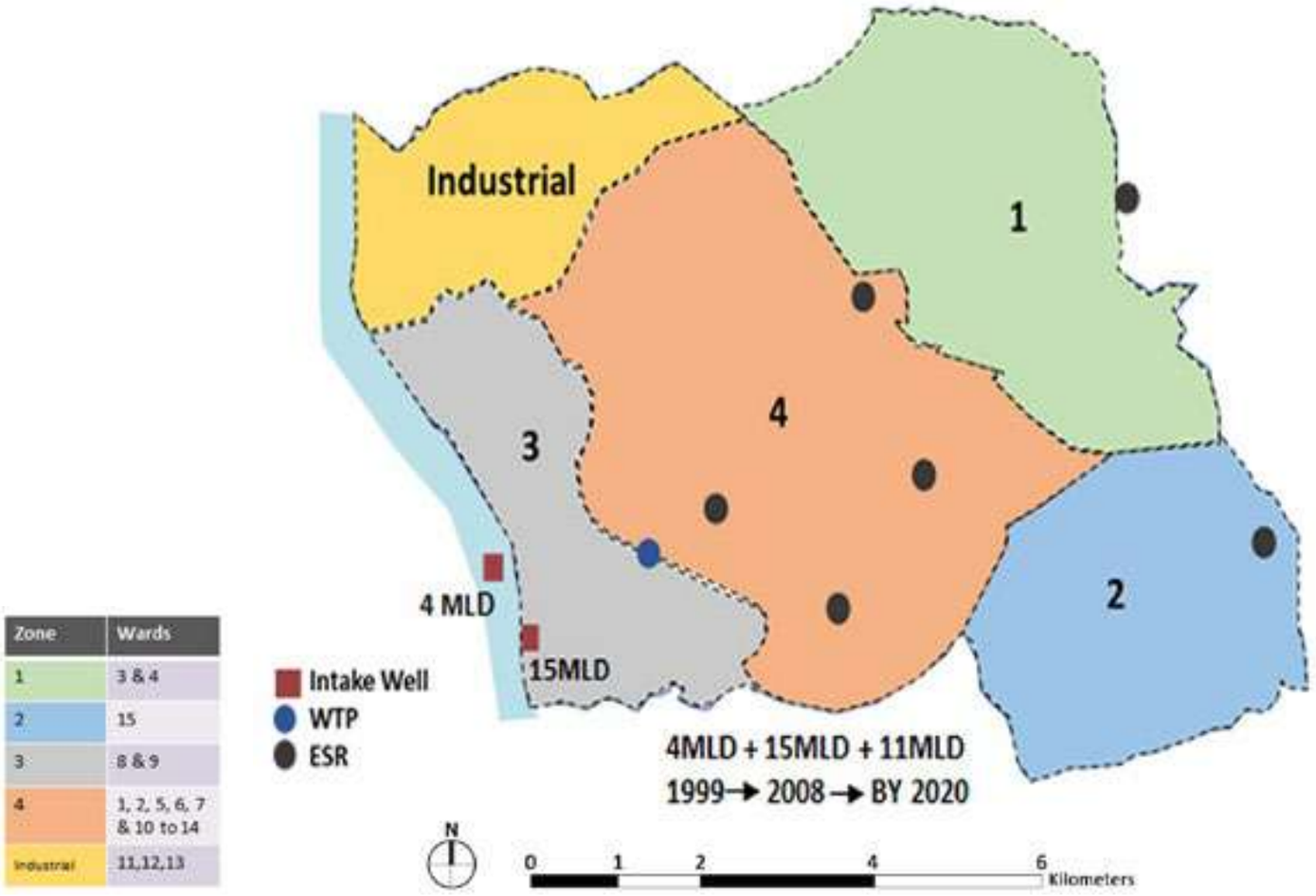


Figure 2.15: Water Supply System in Silvassa

Source: Ecofirst

Inferences:
Silvassa has availability of water for present and future need but lacks in equitable distribution. Thus, to provide 100% access to 24 hours tap water supply, the present water supply network should be expanded to reach every household.
Along with availability, it is important to ensure good quality of water. Thus, 100% water supplied should be treated to national standards and smart water quality monitoring system should be implemented.
To ensure future water sustenance, water leakages in the system should be reduces and % NRW water, should be minimized, smart metering and SCADA system should be installed.

B. Waste Water

With current level of water demand and water supplied about **24 MLD of waste water is being generated** in the Silvassa city. Currently, about **75% of the area is covered with sewerage network** with 8 numbers of sewage pumping stations connecting 1955 housed connections (out of total 4052) along with 2751 properties.

Treatment:
At present **13 MLD sewerage treatment plant is working to treat collected waste water.** This treatment plant is based on Sequential Batch Reactor (SBR) technology commissioned in 2018. **Only 0.9 MLD of waste water is reaching to sewage treatment plant** resulting collection network and treatment plant,

both are functioning well below the expected flow.

Sludge Unit and Treated waste water:

Since 0.9 MLD of wastewater is reaching STP the **generation of sludge is quite less.** Also, the **quantity of treated waste water is significantly low** therefore, it is **being reused at nearby areas**. Further, out of that, only **3% is being reused in irrigation** for gardening, Construction sites, Road washing, etc.

Industrial waste:

No common effluent treatment plant (ETP) exist to treat the industrial waste water.

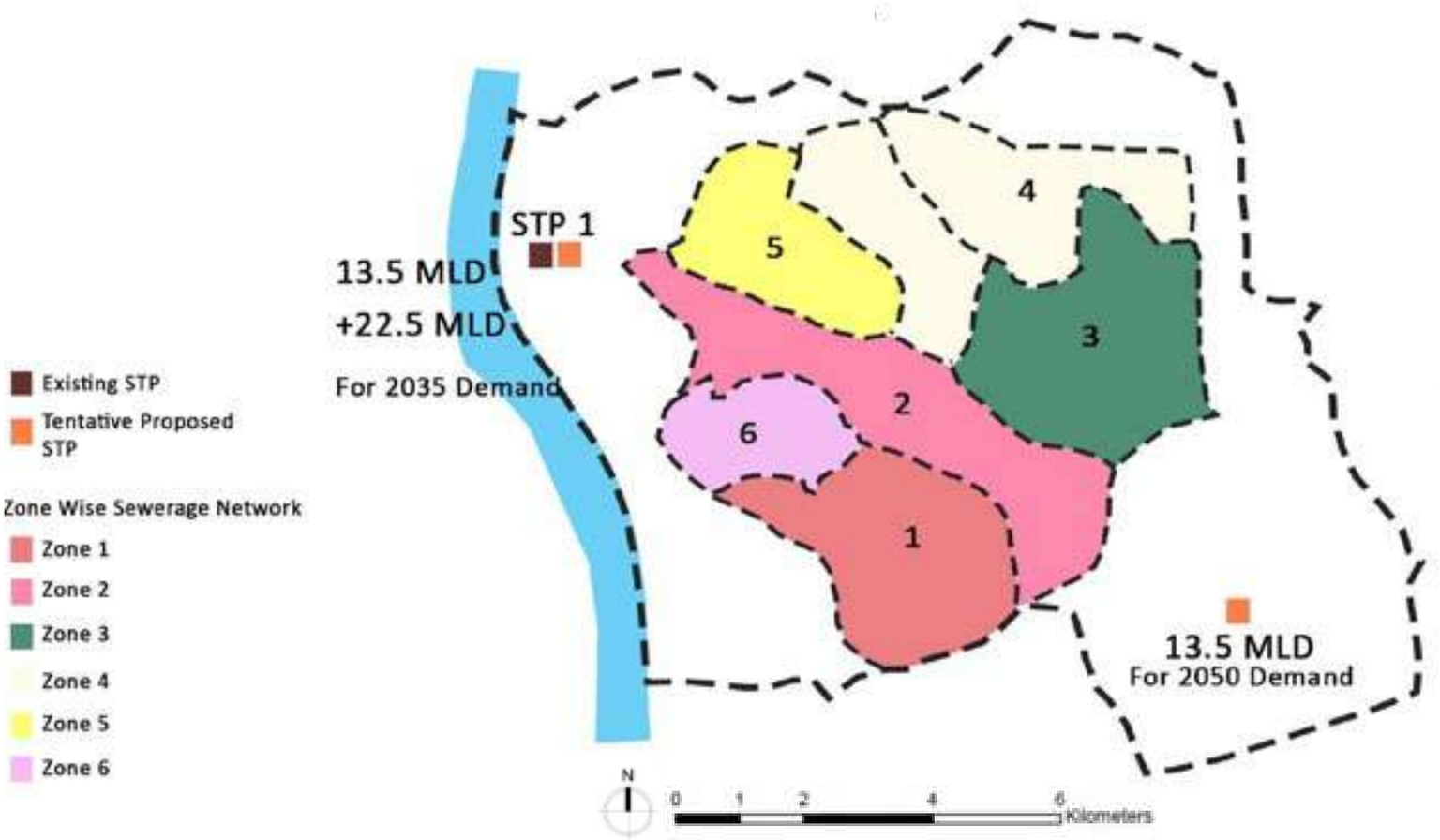


Figure 2.16: Waste water system in Silvassa

Source: Ecofirst

Inferences:

To reduce Silvassa's dependence on fresh water, waste water can be treated to National standards and reused for non-portable uses. For this 100% collection, treatment is required. Thus, every household should have connection with the sewerage network.

Industrial waste water can be toxic and is leading to pollution of Pipariya River. Hence, it is important to provide a CETP to treat the waste water before discharging.

Also, SCADA system can be implemented for efficient functioning of the system.

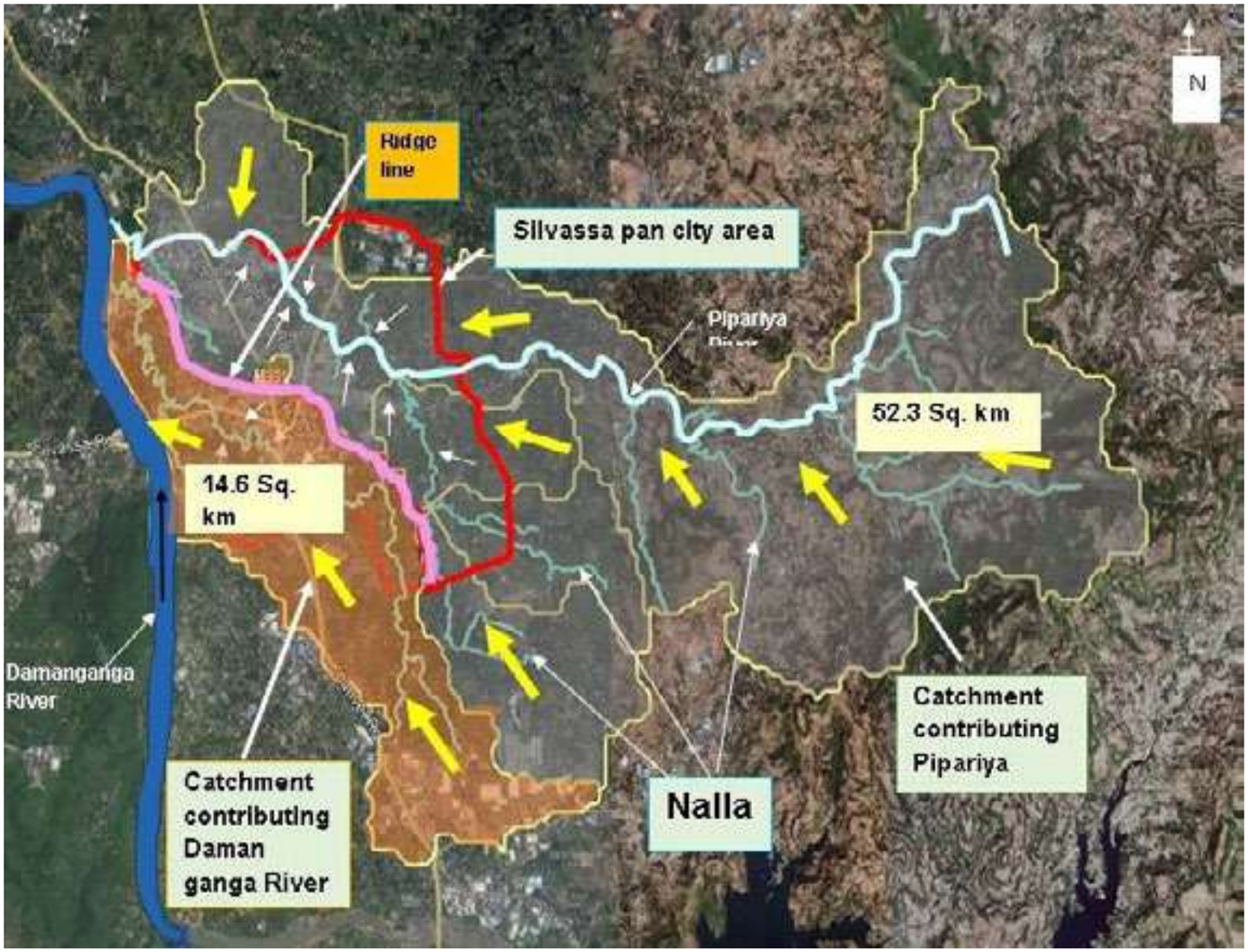
C. Storm Water

Silvassa city covers a geographical area of about 17.20 sq.km. with Daman Ganga River flowing adjoining to it before merging in Arabian sea via Diu. **Daman Ganga River has total catchment area of 66.9 Sq. Km.** which generates annual rainwater runoff of about 58.04 M.cum.

Looking to the regional drainage pattern there are many natural streams with Pipariya as the major one as tributaries to the Daman Ganga River which passes through the city. From storm water management perspective, **the entire area can be divided into two major catchment zones** as presented in the figure below.

Currently the city has about 72.08 Kms of Drainage network spread across the city covering ABD area and pan city area inclusive of PWD & ring road. The **drainage network consists of box drain, conduits and open drains** with manholes, catch basins, catch pits.

As of now the GOI's ministry program of Jal Shakti Abhiyan the **rain water harvesting is being carried out in city**. For Silvassa city, 70 locations have been identified for Rain water harvesting under Jal shakti Abhiyan.



Map 2.14: Silvassa Catchment distribution

Source: Ecofirst

Below are the issues encountered under this sector:

- **Absence of drainage system**
- **Inadequate capacity** (size, slope etc.) of existing drainage system
- **Pathetic conditions existing drains** (at some locations)
- **Solid waste dumping** in the storm water drain
- **Frequent Flooding** at specific places.
- **Pollution in the storm water**

Image 2.3: Present Status of Storm water drains – polluted and broken

Source: T.C.E

Image 2.4: Present Status of Storm water drains – broken and unmaintained

Source: T.C.E.

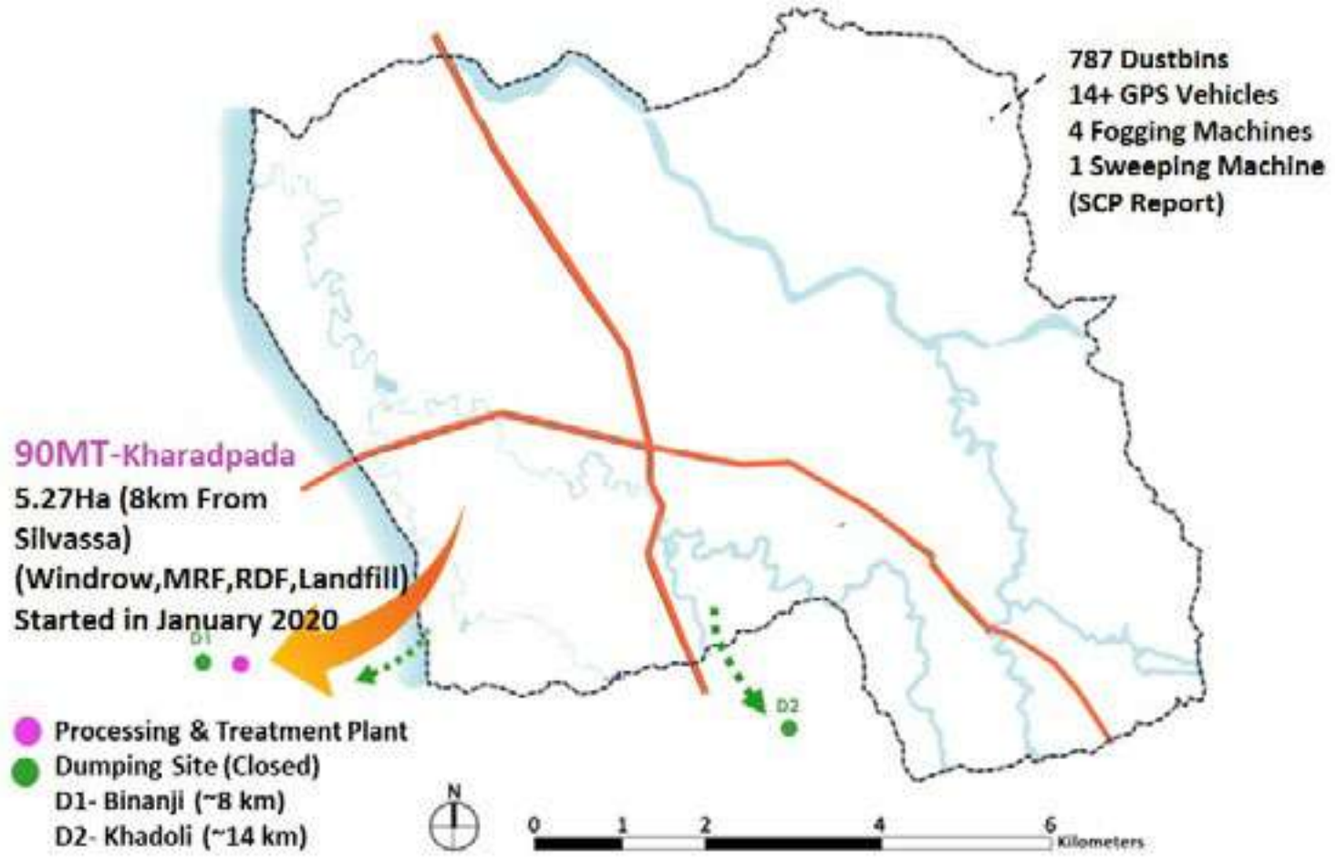
Inferences:
Adequate drainage system should be provided across the city to avoid instances of water logging in future.
Pollution of drains due to solid waste dumping or waste water discharge should be monitored and suitable fines can be implemented. Also buffers to be created around these natural drains to preserve them from future encroachment.

D. Solid Waste Management

Silvassa has an **effective solid waste management system** in place. At present the municipal solid waste generated by the city is around 48-55 TPD. The **city has achieved 100% door-to-door collection** and transportation. The collection frequency for residential areas is once per day (i.e. in morning between 6:00-9:00 am) and in commercial, institutional areas it is twice per day (i.e. morning between 6:00 to 8:00 am and in evening between 4:00 to 6:00 pm)[12]. SMC has employed vehicles, to transport the collected waste to the Waste Processing and Treatment plant at Kharadpada site. **This plant is located 8km towards west of city, with an area of 5.27 Ha.** The present operational treatment capacity of the plant is around 90MT which caters to the present need of Silvassa urban areas and waste from 6 nearby villages, namely Dadra, Naroli, Samarvarni, Masat, Rakholi and Sayali. It **includes composting facility with windrow technology** with a capacity of 40 TPD, facilities like Refuse Derived Fuel plant of around 25 MT capacity[12]. Also, a **scientific landfill is under construction** in this plant area for disposing residual waste. Provision is made to increase the plant capacity in future to cater to the waste of up to 120 MT. Apart from above **well-planned waste management system,** SMC also does **regular cleaning of its streets and public areas.** Sweeping is done once a day in residential area and twice a day in commercial and public areas. 80% of sweeping is done manually and 20% mechanically. **Silvassa has achieved the benchmark of being a bin-less city**[13]. Around 107 sweepers and 16 supervisors were assigned to effectively manage the waste plan as of 2019[13]. But till the above system became effective, the **city used to dump its waste in 2 landfill sites** - Binanji 8km to the

[12] Tata Consulting Engineers, Situation Analysis Report for Solid Waste Management Project, March 2019.
[13] Annual Report 2018-19, Swatch Survekshan Survey, Shared by Silvassa Municipal Council (SMC).

west and Khadoli 14km to the south of the city. Although dumping has been stopped in both these sites today, to reduce it negative impacts on environment and health of residents staying in nearby areas i.e. risk from polluting ground water due to leaching and air pollution due to emission released from dumpsite, it is important to scientifically close these dump sites.



Map 2.15: Waste Dumping at Khadoli

Source: Ecofirst

Apart from Municipal solid waste, for other waste streams such as **bio-medical waste, e-waste, industrial hazardous waste,** SMC has signed **MoU's with respective authorized vendors** for their timely collection and disposal, in line with the provisions made in the respective Solid Waste Rules 2016.

Also, an **Integrated Solid Waste Management policy**[14] was formulated for Dadra and Nagar Haveli (DNH) by Department of Urban Development, DNH in 2018. Silvassa city adheres to the provisions given in this **policy to become a clean and zero waste city.**

Inferences:

Silvassa itself is a model city demonstrating effective integrated solid waste management system.
The existing legacy waste has negative impacts on citizen's health and environment hence these should be capped/ bio-mined at the earliest.

[14] Department of Urban Development, Dadra and Nagar Haveli Solid Waste Management Policy, 2018. Link: http://dnh.nic.in/Docs/19Sep2018/SWM_Policy.pdf [Accessed on 9th April,2020]

II. Social Infrastructure

A. Education & Skill Development

There were only 5 schools with 9.5 literacy rate at the time of liberation in DNH. After liberation, the administration has set up 337 schools including middle, secondary and higher secondary schools **raising the literacy rate to 76.20 %,** with **Silvassa being the epicenter of education** in DNH.

Tribal students are provided free co-education up to higher secondary level. They are supplied with free mid-day meals, free exercise notebooks, textbooks, teaching aids etc. For technical education there is **one ITI, a Polytechnic and an Institute of Hotel Management and Food Craft.**

The Department of higher education has opened a **Government Arts, Science and Commerce College.** The Education Department has implemented Centrally Sponsored Schemes like Information Communication Technology (ICT), National Means cum Merit Scholarship Incentives for Girls, Rashtriya Madhyamic Sikhsa Abhiyan (RMSA) etc.

There are 11 libraries in the U.T., where Gujarati, Hindi, English and Marathi books and newspapers, daily, weekly and monthly magazines are provided. A scheme of providing grant in aid to private school is under active consideration of Govt. of India[15].

Silvassa sees daily commute of students from nearby areas such as Vapi, Naroli, Dadra, Rakholi etc for schools. Silvassa also houses the **APJ Abdul Kalam College for higher studies** with **15 government schools providing education from primary to senior secondary level.**

The schools have **well-trained teachers having a necessary B.Ed degrees with regular trainings.** There are **upcoming education centers at Tukurkhada and Zanda Chowk campuses.**

Image 2.5: Government High School Dokmardi

Source: Ecofirst

Image 2.6: APJ Abdul Kalam University

Source: Ecofirst

[15] Socio Economic development of Dadra & Nagar Haveli since its liberation (2012-13)

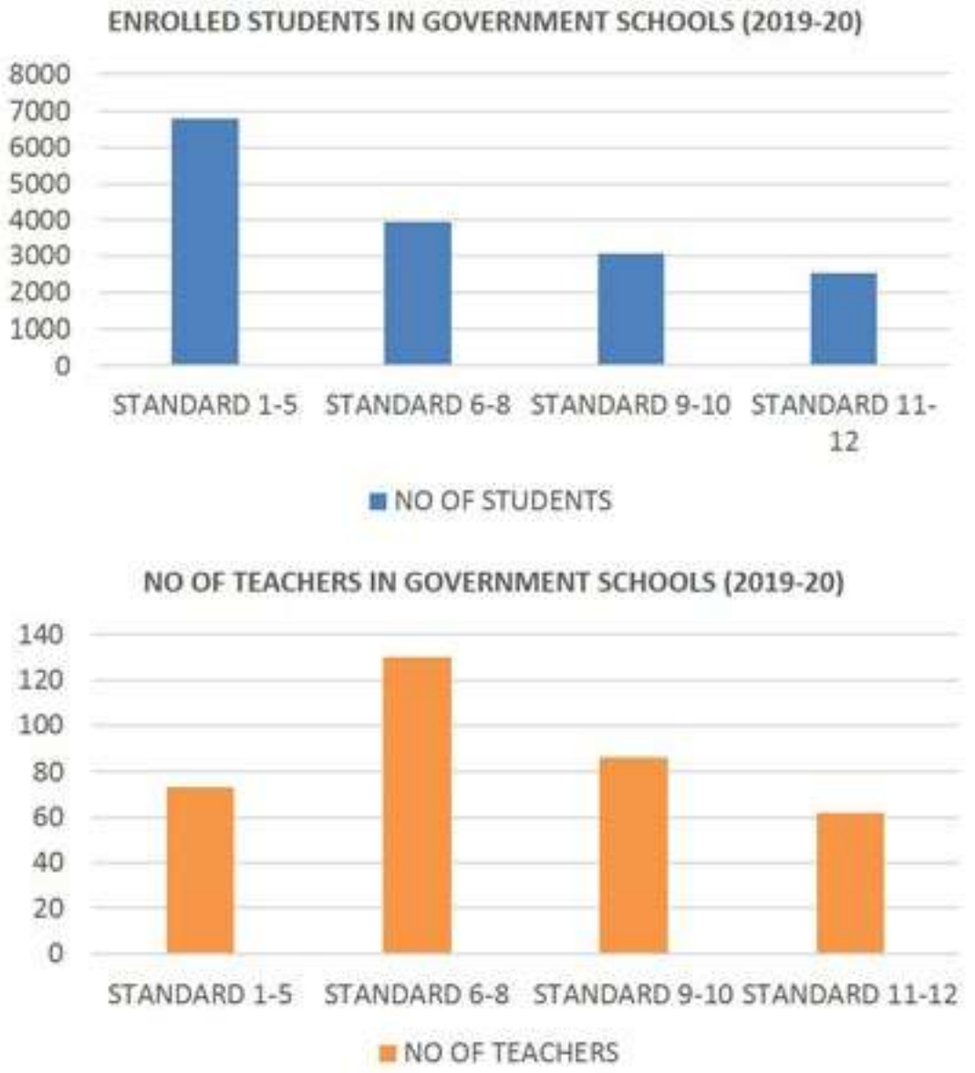


Figure 2.17: Statistics of Students and Teachers in Silvassa Government Schools

Source: Ecofirst

All the government schools in Silvassa have **well maintained infrastructure** such as toilets, drinking water, furniture, play equipment. The schools have **access to digital education** such as smart boards/TV, computer labs. Government schemes and programs like Sarva Siksha Abhiyan, Mid-day Meal, Samagraha Siksha are implemented[15].

Inferences:

There are no professional institutions such as engineering and management, which leads to migration of students to other states for higher education. Silvassa sees daily commute of students for school. There has been a significant improvement in the education facilities and infrastructure in DNH which has been a result of the government working on education policy for the UT. An education hub housing all major courses could be set up, which would also welcome students from other states.

B. Health

"Every poor deserves the best" is the motto of Health Department. To make it true, **special attention has been given to public health** particularly **in pre-dominantly rural areas** inhabited by poor tribal's. **There is a District Civil Hospital**, 2 CHCs, 9PHCs, 8 maternity homes, 1 dispensary, 131 aanganwadis, 10 diagnostic center, 4 mobile clinics. The department has started 108 EMRI Ambulance Services in the U.T. Non-Emergency Medical Response Services. Mother & Child tracking System has been implemented to track the services to each mother & infant[1].

Silvassa has 79 Primary health care units (both private & government), 21 Secondary health care units (both private and government), however **there are no tertiary health care unit, the nearest being in Valsad.** There are 124 registered doctors (allopathy), 107 doctors under AYUSH,224 trained nurses, 44 dentists, 190 licensed pharmacists, 122 multi-purpose health care workers (Auxiliary Nurse Midwives, HWs males). **The city has total 887 hospital beds out of with 448 are in government hospital** (Sri Vinobha Bhave Civil Hospital).

Image 2.7: Existing Sri Vinobha Bhave Civil Hospital
Source: Ecofirst

Image 2.8: Upcoming facility at the Civil Hospital
Source: Ecofirst

Sri Vinobha Bhave Civil Hospital doctors with **qualified doctors** (MBBS, MD, MS, MCH) **and nurses** (GNM, B.Sc. Nursing, M.Sc. Nursing). The hospital **has treatments in Neurosurgery, Plastic Surgery, urology along with Trauma center** in the civil hospital. The hospital is **NQAS compliance** and **sees footfall of patients from all around the country, specially the economically weaker section,** due to the **availability of low-cost health services and free medicines.** The hospital in addition runs the School Health Programme, Integrated Counseling and Testing Center, District Mental Health Programme, and School of Nursing.

The **upcoming activities of the dept. includes up gradation of CHS Khanvel to 100 bedded Sub-District Hospital, New PHC at Rakholi & Dadra** has already started[16].

Inferences:

The health facility in the U.T. is satisfactory with the presence of Civil Hospital in Silvassa, which provides health services to patients from all over the country particularly the LIG. And with the up gradation of the existing facility it would be able to cater more public. Although most of the facilities are present, but there is an absence of a Tertiary Care unit in the U.T., nearest being at Valsad. There are also several specialties which are missing in the civil hospital. There is also a shortage of quality doctors.

[16] Socio Economic development of Dadra & Nagar Haveli since its liberation (2012-13)

2.1.9 Industries

The **pace of Industrial development** in the territory **picked up in the mid-1960s**. in 1971, the government of India **declared the UT as industrially backward and extended cash subsidy** on capital investment with the **benefits of Sales Tax and Income tax** holiday, which **catalyzed industrial development** in the area. In the **1990s** DNH was **declared as tax haven** which led to the **rapid increase in the rate of industries**[17].

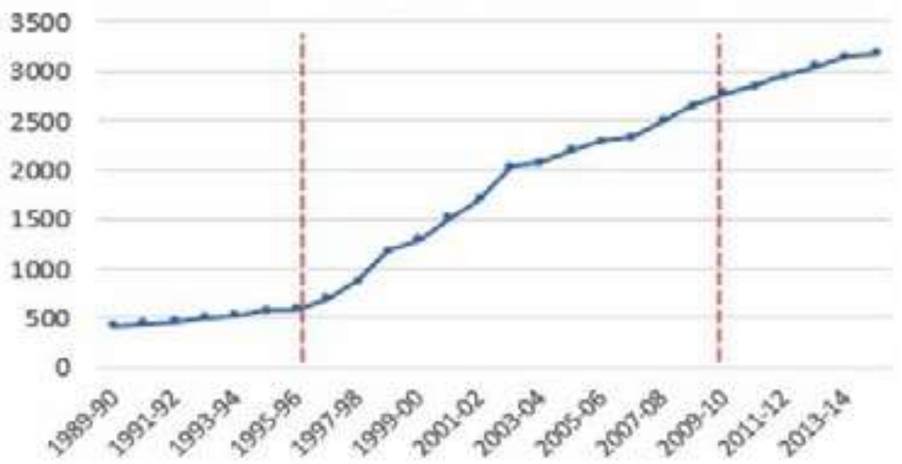


Figure 2.18: Industrial Growth in DNH

Source: Industrial Statistics 2014, Ecofirst

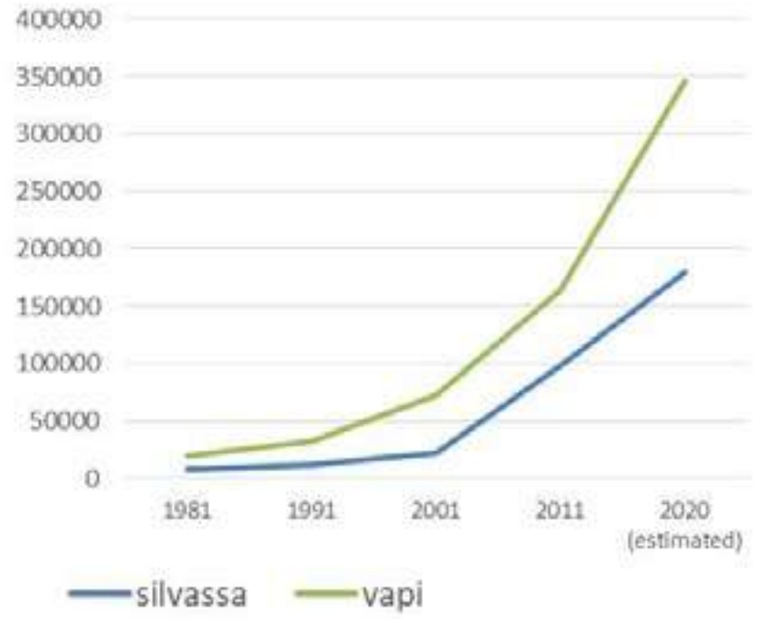


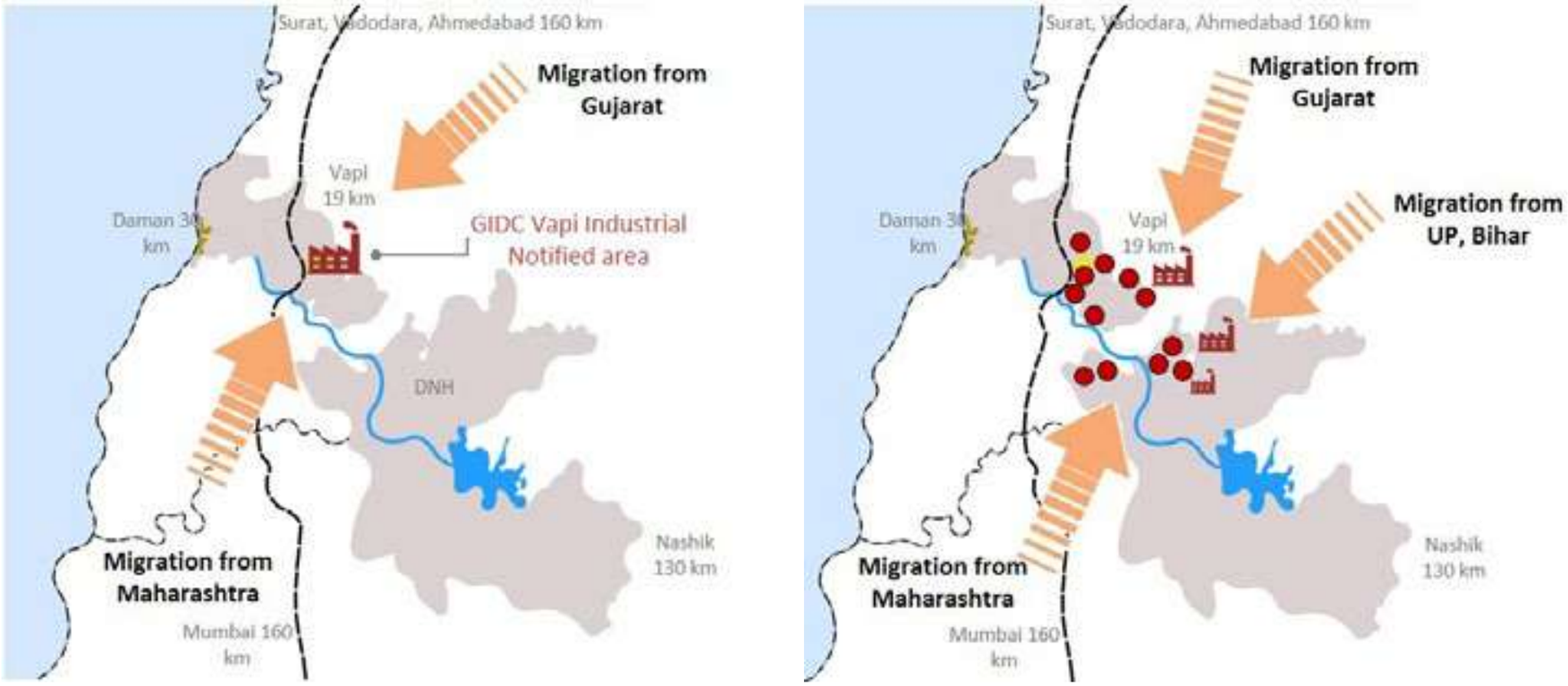
Figure 2.19: Sudden population Increase due to Industrialization

Source: Census 2011, Ecofirst

[17] Industrial Policy 2018 – UTs of Daman & Diu and Dadra & Nagar Haveli

The nearby town of **Vapi**, Gujarat also rise as an **industrial center after the formation of Vapi GIDC** in the 1970s. This **industrialization led to the migration** of the workforce from states such as Maharashtra, Gujarat, Uttar Pradesh, and Bihar.

After the **globalization**, which **led to industrialization** in this industrial belt, there was an **exponential rise in the population** due to **migration of the industrial workers** in search of jobs.



Map 2.16: Regional Triggers for Industrial Development

Source: Ecofirst

The Union Territory of Dadra and Nagar Haveli houses around **53 Industrial Estates**, out of which **three are developed by government** at Pipariya, Masat and Khadoli. There are around **3490 Industrial units**, out of which 2891 are in micro/small sector 556 are in medium sector and 43 are in large sector. **Plastic and plastic products** have the major production followed by **textile, paper and paper products, machinery and basic metal** and equipment[18].

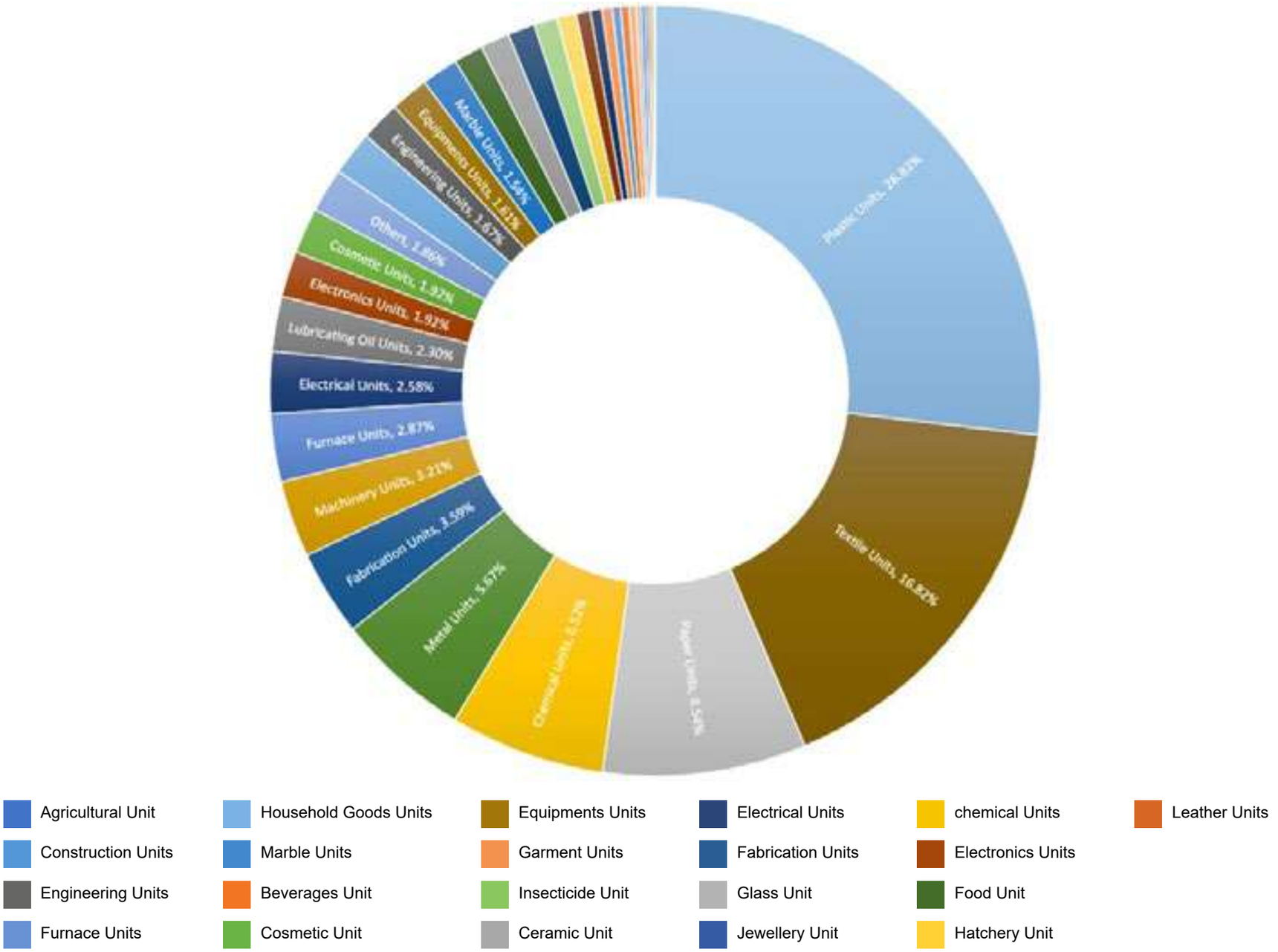


Figure 2.20: Percentage Distribution of Industries in DNH[18]

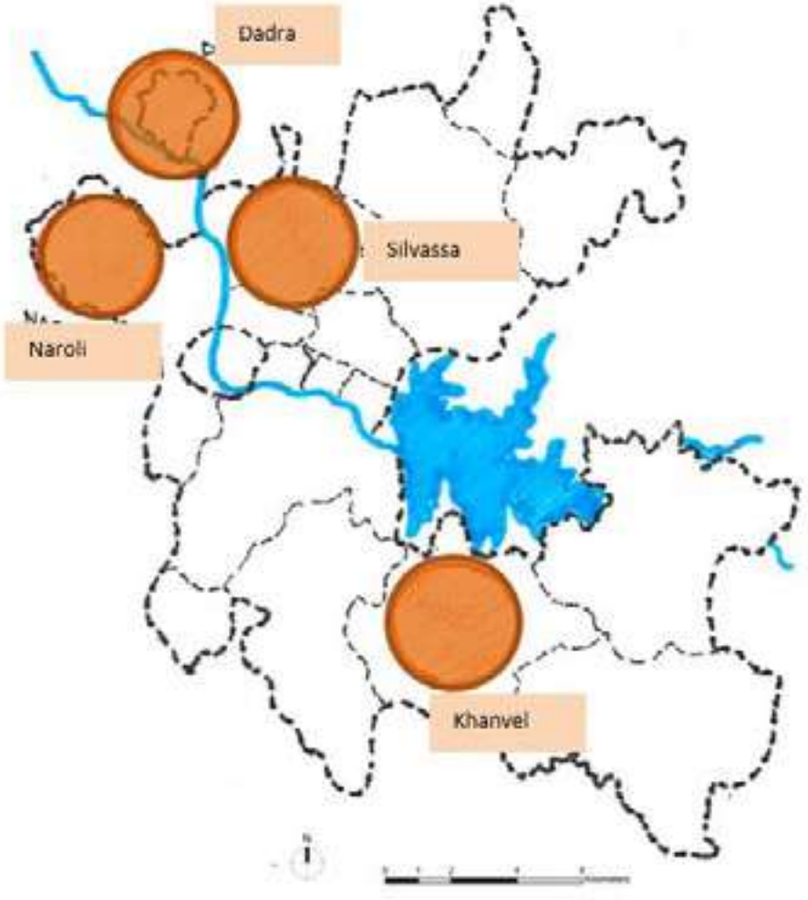
Source:Industrial Statistics 2014, DIC

[18] Industrial Statistics 2014, DIC

However, the industries still **lack infrastructure** such as CETP, government **water supply and drainage** which is being done locally. The **road infrastructure is also lacking** which could be improved along with the **policy reforms to promote sustainable and inclusive industrial growth** and economic development.

There are **four major growth** centers in the U.T. viz. **Silvassa, Dadra, Naroli and Khanvel**, with major works centers located in these areas. The worker travel daily to these work and city centers. However, there is **weak connectivity** between the **remote areas and the city centers**.

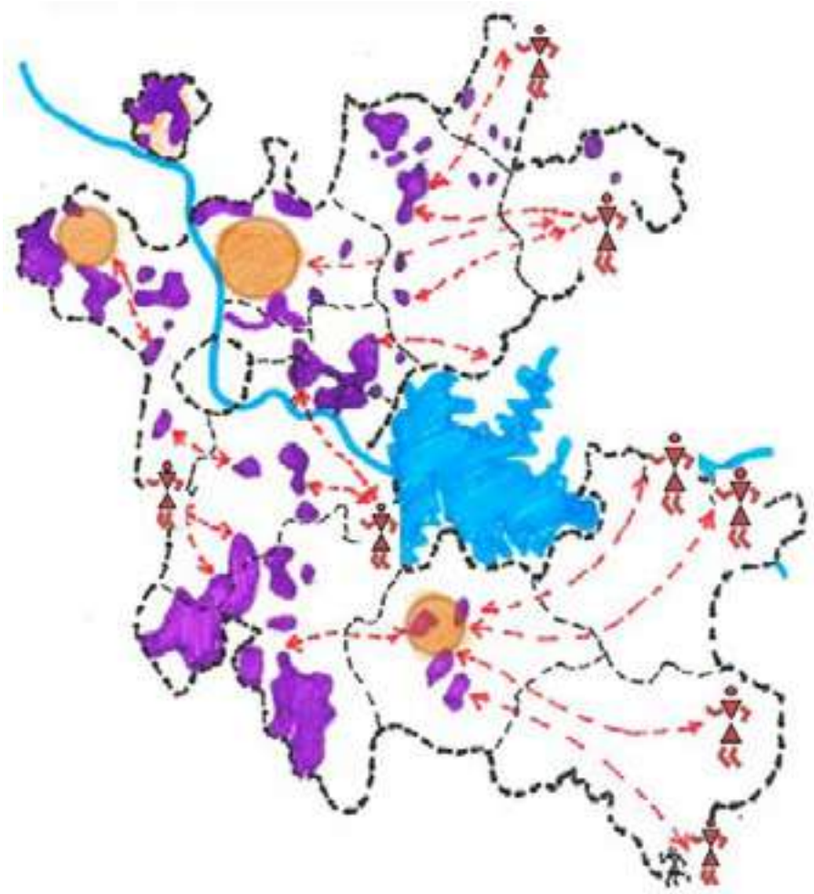
GROWTH CENTRES



Map 2.17: 4 major growth centres with most population density and work centres.

Source: Ecofirst

LIVE-WORK CONNECTIVITY



Map 2.18: Weak connectivity to remotely located residential centres.

Source: Ecofirst

Since the last decade the **industrial growth** in DNH has been very **stagnant** due to:

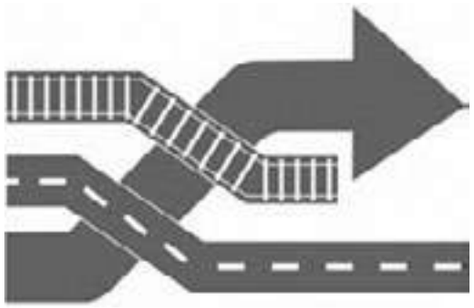
- **Reforms in Industrial policies** in neighbouring states.
- Similar opportunities in **tax benefits and subsidy** in other states.
- **Cap on types of industries**

No pollution causing industries allowed:

- Chemical
- Textile and garments

The Union Territory of Dadra and Nagar Haveli is at a very **strategic location** with several **upcoming triggers** which would **enhance the industrial sector** of the area, and thus lead to the overall development of the DNH.

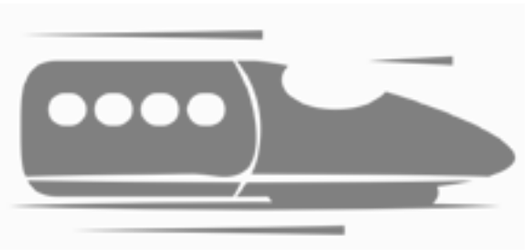
Upcoming triggers in DNH



Delhi Mumbai Industrial Corridor
- 18 Kms away from border of DNH
- Magnet for Investment
- New opportunities for entrepreneurs
- DNH under influence zone of DMIC

Ports
- Nearest operational ports Hazira port and JNPT port
- Upcoming Nargol port at 35 Kms

DFC- Dedicated Freight Corridor
Western Dedicated Freight Corridor passing near DNH.



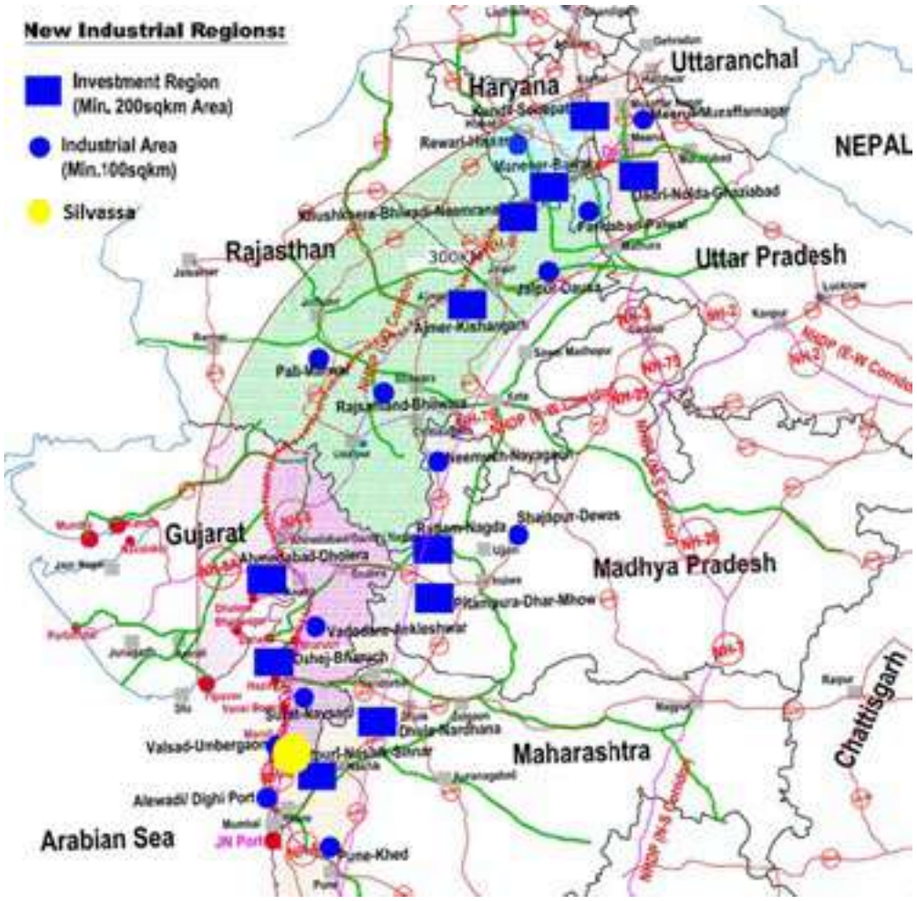
Bullet Train
- Corridor Passes through Naroli town of DNH.
- Station at Vapi, 18 kms from Silvassa

Mumbai Vadodra Expressway
Mumbai-Vadodra expressway passes through DNH, covering 5.5 Kms within DNH

The upcoming triggers would **improve the connectivity** of the industries in DNH with the neighbouring region and would also **lay opportunities** for other and **upcoming industries** like logistics, warehouses, nano-technology, finished goods industry, Research and development industries to name a few[1].

Map 2.19: Upcoming Infrastructure in context of DNH and Silvassa

Source: Comprehensive Traffic and Transportation Studies Report, 2015.



Map 2.20: Influence zone of DMIC Corridor[19]

Source: Delhi Mumbai Industrial Corridor, EJatlas.

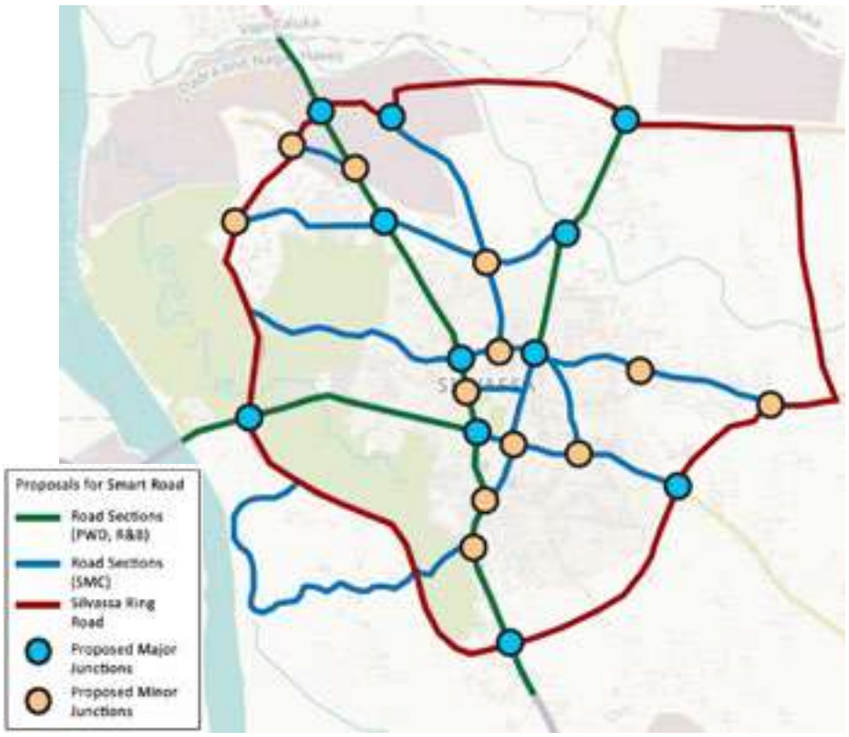
Inferences:

There has been a stalled development plan for industrial development in the area. There has been a stagnant growth in industries due to the new industrial policies and tax exemption from the nearby industrial hub such as Vapi.
The upcoming infrastructures such as DMIC, DFC and others will play a pivotal role in the development of the industries in the area, which would open gates for emerging industries such as logistics, warehouse, R&D, nano-technology, IT & IT-ES, allied & finished goods market in the area and would also strengthened the existing industrial hub with the improved connectivity.

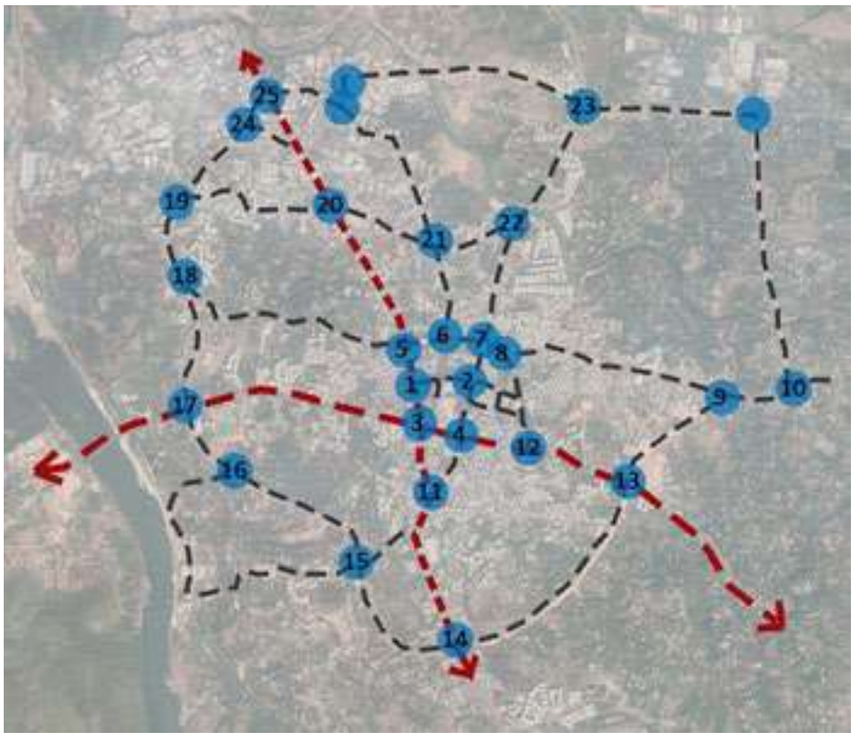
[19] Delhi Mumbai Industrial Corridor, EJatlas. Link: https://ejatlas.org/conflict/delhi-mumbai-industrial-corridor

2.1.10 Traffic and Transport

Transport has been **key driver for boosting economy**. Silvassa being in UT, is **situated on a strategic location** i.e. near to the border of Maharashtra and Gujarat. There is **no railway station** in the Silvassa City, Vapi & Bhilad are two nearest railway station, 18km & 14 km away from Silvassa. The city is **mostly accessible by the road** network, national highway NH 48 is 30 kms away from the city. To carter the road transport i.e. interstate buses and other vehicles, there is **one bus stand** built in the city. In past few years the population of the city has grown tremendously and the **infrastructure was haphazardly developed** and so is traffic and transport infrastructure. Although the road network was built in the city, but it was **not upgraded with growing traffic** which leads to the **deterioration of the overall transportation infrastructure**. Presently, as per the records there is **108 kms of road network** in the city. **SMC is in charge of 82.60 kms of road** and remaining **19.50 kms is managed by PwD** Department. The roads falling under SMC are of various widths and being constructed Below attached image is the map showing the road network in Silvassa city.



Map 2.21: Road Network in Silvassa
Source: Traffic Assessment Report of Silvassa City, ABD Zone 2019, TCE; Ecofirst



Map 2.22: Junctions of Silvassa
Source: Traffic Assessment Report of Silvassa City, ABD Zone 2019, TCE; Ecofirst

To **upgrade the transport infrastructure**, the **assessment** of its **physical properties** of the road, **junctions** and other allied elements is needed for further upgradation.
Various **transportation surveys** were **conducted** such as turning movement count, total volume count, origin destination survey, axle load survey, speed and delay, pedestrian volume count survey and parking survey to **analyze the traffic generation and its impact.**

The **surveys conducted** and their **results were analyzed** and it has been evaluated that total count survey suggests Civil Court road, Lion's School road, Daman Ganga road, and Hirva Van Garden Road need 4-lane divided (Two way) in year 2039, 2037, 2041 and 2041 respectively. Currently there is **no need of grade separation** at any location for present traffic and non the road observes 10,000 PCU's. As most of the traffic is attracted from Dadar Nagar Haveli, some amount is generated from Gujarat and rest of India, origin destination survey brings the out-come that a by-pass road and other **allied services like transport hub**, etc. is needed which would in turn **reduce the traffic congestion** in the city and also would not deteriorate the pavement condition easily. To access the pavement strength, axle load survey was done and based on the load that each of the roads are demanded to bear as per traffic volume it caters. The axle load survey was also supported by speed and delay survey and it has been found that maximum speed of 56.95 kmph and minimum speed 31.99 kmph. It is observed that the average speed is around 45 Kmph and most of t**ravel delays are due to traffic mainly on intersection**. **Congestion also leads to attack to the pedestrian's safety** and parked vehicle. It is further noticed that currently there is **no need of foot over bridge or under pass** but high **need of the dedicated footpaths for pedestrian's safety**. The **city population** is mainly **depending on own vehicles**, the dedicated **parking spaces** near Civil hospital area and Kilvani Naka Circle **are highly warranted.** The physical **infrastructure of transportation system is also absent**, lacking street lights, street furniture, bus stops, etc.

Inferences:

The road needs to be upgraded as smart road with improved junction and place making
Proper infrastructure facilities such as continuous footpaths, with 100% street lighting, safe road crossing and signalized junctions, etc should be ensured for safe NMT.
Public e-bus and smart bus-stops can also be proposed to enhance the public transport.

2.1.11 Policy and documents review

Along with a detailed analysis of each sector, the **relevant policy and urban planning documents were also studied t**o understand its **impact on the growth / development** of DNH and Silvassa. Below are the findings per document:

Table 3: Analysis of Relevant Policy documents

S. No.		Policy/ Document	Salient Feature	Impact/ Analysis
1		**Industrial Policy, 2018 UT Of Daman & Diu And Dadra & Nagar Haveli**	• Provides details on the following: • Economic and industrial profile of DNH • Present scenario of industries & investment history. • Key drivers for industrial growth • Industrial policy-vision, mission, objectives & strategies.	• Gives way forward for the industrial development in the UT. • Provides Foundation for the upcoming industries.

2		**Industrial Statistics, 2014, DIC**	• rovides details on the following: • Types of industries in DNH • Growth rate per year in the number of industries in DNH	• Provides understanding of the growth pattern of the industrial development. • New, emerging & allied industries can be explored.
3		**Tourism Policy, 2019-2024 U.T. Administration of Daman & Diu And Dadra & Nagar Haveli**	• Provides details on the following: • Tourism profile of DNH. • Tourism potential in DNH. • Major tourist destinations-existing & proposed • Tourism policy- vision, objectives, development strategies. • Marketing & Branding	• Increase in the tourist footfall.Incentives & relaxations provided. • New tourists' spots will be developed. • Tourism circuit and event calendar to be developed. • Including the tribal's in tourism industry. • Improved connectivity with buses and other modes.
4		**Development Control Rules For DNH, 2014**	• Provides details on the following to regulate built development: • Zoning and planning regulations on land use zones with their permissible activities, Set-backs, ground coverage, height restrictions, FSI/FAR/VPR regulations, development rights, etc. • General building requirements which include space requirements for various parts of building, fire protection requirements, etc. • Structural and safety requirements	• Provides details on the present development possibilities and restrictions. • This can help in identifying present lacunas, challenges and gaps in the development regulations and modify them future requirements.
5		**Outline Development Plan, DNH, 2021 Outline Development Plan, SMC Area, 2021**	• The ODP provides the present scenario of all sectors for DNH region, its detailed analysis and future proposals.	• Provides future roadmap through - vision, strategies document, projections and planning proposals for each sector and holistic development of DNH for 2021.

6		**District Census Handbook, Dadra & Nagar Haveli, 2011**	• It has two parts. Part A provides Village and Town directory and Part B provides Village and Town wise Primary census abstract data with its brief analysis. It includes both • Census and non-census data for urban as well as rural areas of DNH. • This detail includes data on • Status and Growth History of towns, • Physical Aspects and Location of Towns, • Civic and other Amenities, • Medical Facilities, • Educational, Recreational & Cultural Facilities, • Industry & Banking, and (vii) Civic & other amenities.	• Provides base authentic details of census and non-census information from village and town level to district level of entire DNH which acts as base data for: • Understanding the growth pattern. • for future projections and for developing planning proposals for the region. •
7		**Socio Economic Development Data of UT Of DNH, 2018-19**	• Provides details on the following: • Social & physical infrastructure profile of DNH including education, health, industry, transport, etc. • Salient features of development after liberation. • Plan layouts & expenditure	• Highlights lacunas in social infrastructure. Education, health as per other standards • Interventions for filling gaps in these areas can be formulated.
8		**Handbook of Service Level Benchmarking, MoUD, GoI Central Public Health and Environmental Engineering Organization (CPHEEO)**	• This document sets forth the service level benchmarks for Water, Sanitation, Solid Waste management and storm water drainage sector. • These are guidelines for achieving access to clean and healthy urban infrastructure services. For this it includes targets for physical reach, access and availability of above urban services and also its management/ governance.	• Achieving the targets given in the SLB will ensure 100% access to the respective infrastructure facility (water, waste water, solid waste management, storm water) and provide for means to efficiently manage the facility (through user charges, monitoring, tools and reuse/recycle norms)

9		**Affordable Housing Project Under BLC, Silvassa**	• Provides details on the following: • Addressing the housing requirements of urban poor and slum dwellers. • PMAY mission & scope • Existing conditions of slums. • Non-slum dilapidated houses. • Proposal under BLC and implementation process. • Affordable housing project under AHP.	• Understanding the need of affordable housing in Silvassa. • Quantity of affordable housing needed. • Similar implementation PAN DNH could be adopted. • Similar projects for industrial workers near their work centers.
10		**Comprehensive Traffic & Transportation Studies Report, 2015**	• Provides details study of traffic and transport sector scenario for entire DNH. It includes: • Mode of transport, type and purpose of trips, traffic volume surveys, origin-destination surveys, Household surveys and other traffic surveys' for DNH area. • Analysis on road, junction infrastructure facilities • Public transport and connectivity in DNH, etc.	• Provides a clear understanding of transport sector for entire DNH, its lacunas, need assessment and gaps identification required to develop future possible interventions to improve connectivity and strengthen transport infrastructure
11		**Traffic Assessment Report of Silvassa City (ABD Zone), 2019, T.C. E**	• Provides analysis of detailed on-ground surveys conducted by TCE to assess the existing traffic condition. • These include: • traffic volume surveys, Origin-destination surveys, turning movement survey and Junction improvements, speed and delay survey, pedestrian volume count survey, parking survey, etc.	• Identifies trip pattern, purpose, distribution, modes used, traffic volume (present and projected) useful for decision making • This data is useful for devising appropriate traffic management measures, road sectioning/design requirement for present and future projected capacities. • And to provide for safe pedestrian facilities

12		**Silvassa SCP Report , 2017**	• It provides details on the Silvassa Smart City proposal which includes, • The present city profile, its analysis (as on 2017), issues identified, results of citizen engagement workshops conducted, overall SWOT for the city, • Rationale for smart city vision envisaged, details on ABD and pan-city proposals identified and • A detailed implementation/ financing plan.	• Provides the gap analysis done during proposal submission, vision and proposals envisaged. • This document acts a base document to understand which strategies and proposals are valid today, which had difficulties during implementation, which can be modified/updated to cater to present need of the city.

Thus,these policies and planning documents enhance understanding of the past, present and future needs of Silvassa within the context of DNH. This will help in formulation of road map and strategies for Silvassa's future development which will compliment with the impacts of these on-going policy/planning programs. But it was observed that there is no specific policy to regulate the urban growth of Silvassa and as a result of this its growth is unguided. Thus, it is important to form policies and guidelines for a controlled and planned development of the city which can be reflected across DNH.

2.2 Citizen Engagement

Citizen engagement was an **important tool** used to develop the vision for Silvassa Smart City. Through this participatory method it was possible to involve various **stakeholders** in the **decision-making process**. It helped to understand the **aspirations, needs and issues** of the various stakeholders and also to understand the **perspective** of the various stakeholders for the city of Silvassa and DNH as a whole. The stakeholders involved in this exercise involved the indigenous groups or the **tribes**, the **migrant workers** and their families, vendors and shopkeepers, **tourists**, hoteliers, **industrialists** and investors, national as well as foreign, various departments and officials, who extensively work for development and functioning of the city.

2.2.1 Cognitive Mapping

A cognitive map is a type of **mental representation** which serves an individual to acquire, code, store, recall, and decode **information about** the relative **locations and attributes of phenomena** in their everyday or metaphorical spatial environment. Cognitive mapping involved **field surveys, site visits, interaction with various stakeholders** to understand the **physical and social issues** faced by the people of Silvassa. The stakeholders and the target groups shared their perspective of the city, their issues, needs.

1

Image 2.9: Interaction with the wives of Industrial Workers who are engaged in work for secondary source of income

Source: Ecofirst

2

Image 2.10: Interaction with vendors in Fruit Market portion of Vegetable market who need uplifment at their current location

Source: Ecofirst

3

Image 2.11: Interaction with Tribals Living in DNH who need better work opportunities, infrastructure and better connectivity.

Source: Ecofirst

4

Image 2.12: Interaction with Shopkeepers of Panchayat market who wants upgradation of Physical Infrastructure

Source: Ecofirst

5

Image 2.13: Interaction with International Businessman(USA) who needs better Hospitality Options

Source: Ecofirst

6

Image 2.14: Vegetable Market needs better infrastructure to scale-up the business

Source: Ecofirst

7

Image 2.15: Industrial Area lacks quality roads and infrastructure

Source: Ecofirst

8

Image 2.16: Polluted Natural Drain- Pipariya Stream

Source: Ecofirst

9

Image 2.17: Newly Constructed Daman Ganga Riverfront lacks green cover, resulting in low footfall.

Source: Ecofirst

10

Image 2.18: Existing Sports Facility at Shaheed Chowk can be upgraded with more Sports Facilities.

Source: Ecofirst

11

Image 2.19: Thriving Marble industries due to favorable policy of International Import and setting up relevant infrastructure

Source: Ecofirst

12

Image 2.20: Panchayat market in the heart of the city needs upgradation

Source: Ecofirst

13

Image 2.21: Upcoming Kala Kendra can be incorporated with facilities like convention halls and cultural centre.

Source: Ecofirst

14

Image 2.22: Tribal Museum is an important landmark of the city hidden behind the advertisement hoardings

Source: Ecofirst

15

Image 2.23: 'Our Lady of Peity' church one of the important landmarks and tourist attractions reminiscent of Portuguese architecture.

Source: Ecofirst

16

Image 2.24: Collectrate Office : A major Landmark

Source: Ecofirst

Map 2.23: Key plan for photos from site visits and Cognitive Mapping

(Source: Ecofirst)

2.2.2 Stakeholder Consultation

Table 4: Analysis from Stakeholder Consultations

Stakeholder	Narrative & Aspirations	Action Points
 **Indigenous group/ Tribals**	• **Job preferences** given **to migrants** over tribal's • **Losing** their touch with c**ulture, arts & crafts** • Lack of **connectivity to the remote locations** • **Facilities** of drinking water, electricity, sanitation, health services are **available**. • Lack of **education at remote locations** • Better **livelihood opportunities** needed • No integration of tribal's **with tourism department**	• **Creating & promoting job opportunities locally** • **Farming** (advanced & integrated) • **Allied activities:** dairy, animal husbandry, fishing • **Arts & crafts - skill development needed** • **Tribal tourism societies,** integrating tourism & tribal's • Promotion of art and culture

 **Locals & Migrants**	• Lack of spaces for **entertainment & recreation** • **Better connectivity** with nearby places- bus stop, railway station • **Permanent markets/spaces** for vegetable & allied vendors • Need **household industries** for housewives	• Providing & promoting e**ntertainment & recreation zones** at various locations: cinema halls, shopping centers, eateries • Development of dedicated **vendor zones** • Redevelopment of **existing market spaces** • **Improve connectivity** to nearby places: Vapi, Dadra by • **Strengthening bus connectivity** • **Increase frequency of buses** • **Providing more para-transit options** • **Skill development centers for women** to promote household industries as second source of income
 **Locals & Migrants Unstructured Discussions on Health, Education & Sport**	• Good **quality & quantity of institutes** needed • Quality **teachers required** • Missing links from p**rimary to PG education** • Possibility of **education on PPP model** • People **satisfied** with **healthcare facilities but need quality doctors** • Need for **good sports facilities**	• Up gradation of primary education infrastructure throughout DNH. • Development as e**ducation hub to be explored** • Inviting more **private players** to create competitiveness in offering quality education. • Promoting & establishing good i**ndoor & outdoor sports facilities** • Maintaining quality of **healthcare facilities with regular inspections & audits** & further up gradation for higher income groups also such as private rooms etc.

 **Agriculture, Farmers, Fruit & Vegetable Vendors**	• **Agriculture** activities carried out **by tribal** population • Monsoon: rice, winter: millets, summer: sugarcane (not much production) • **Sufficient for self-consumption** • Cultivation of **seasonal fruits & vegetables** • **Storage facilities** needed for agricultural produce • **Fish farming, poultries & hatcheries** absent • **Animal markets** absent • **Smaller land holdings**	• Vegetable mandi with e-chaupal, warehouses, trading hub could be explored • **12 months farming calendar** w.r.t. DNH to be developed & promoted amongst farmers • **Low input – high value crops** could be promoted such as mushrooms • **Central Agri-storage hub,** check possibility and need • Promoting **fish farming** in catchment areas • Education & promotion of **poultry, animal husbandry** • Policy level intervention by incentivizing farming • Create niche **export market** & facilities
 **Forest Department**	• **40%** land under **forest cover** (20,359 ha) • Places of tourist interest in forest areas • **- Deer park** • **- Lion safari** • **- Butterfly park** • Opportunity for good **footfall** but **not** well **integrated** with **hospitality industry**	• Maintaining & increasing the **current forest cover** • Integration of **forest department** with tourism dept. • Allied facilities near tourist spots such as – toilets, eateries etc. • Develop option for stays • Better hospitality services

 **Hoteliers**	• Most **tourist parks** are under **forest department** • Decline in **shooting of movies** • **Decline in festivals – taarpa, diwasa** • Adverse effect on culture • **Cultural difference** between tribal's and urban population • **40% land under forest** • **Historical buildings redeveloped** • **Need for revival of parks and tourist spots** • **Clientele shift** to corporates from tourists • Lack of **choices in affordability** of hotels • **Absence of recreation/ theme parks** • Newly created **riverfront** with **promenade** • **Destination wedding** – Gujarat & Maharashtra	• I**ntegration of forest & tourism dept**. For better reach and **branding** • Development of **film city/ TV studios** • **Theme park** • **Industry tourism** with souvenir shopping & branding • **Cultural tourism** to generate economy and revival of tribal culture • Promoting **eco-tourism** • **Policy reforms required** • **Single window clearance** for permission • **365 days event calendar of festivals** • **Maintenance of parks** & tourists spots through PPP • Inviting **big hospitality players** • **Expansion of riverfront** on both sides • More **green cover** on river front to be explored • Integrating **vendors and eateries** • Making **complete streets** for public activities • Integrated **hospitality & destination wedding and allied markets and industry**
 **Tourism Department**		
 **Builders Association**	• **75% - 1bhk & 2bhk** • **Land accessibility** issues • Service road along the ring road • Infrastructure lacking: storm water drainage, water supply • Direct access to plot from highway • Denotification of NH passing through city • **IT hub, logistic hub, tourism hub, education hub** could be promoted • **TP scheme** lacking • Development plan & development strategies missing	• Expansion of city through **TP scheme** • **Infrastructure development** to be promoted for better quality of life • Restriction on building height to be removed for optimum utilization of F.S.I

 **Departments/Industry** **• Revenue** **• District Industrial Center** **• Industrial Association** **• Industrialists** **• Labour Association & Contractors**	• **Policy changes & tax reforms** affecting industries • **Rising electricity rates** • **No additional benefits** in services & taxes compared to other states • **Advantage of location** • **Proximity** to Gujarat and Maharashtra • **Saturation of land** for expansion of industries • **Infrastructure and hardware support available** • **Warehouses** could be developed • **No water supply by ULB for industries** • Need **quality education** • Silvassa has **imported marble industry** due to DNH being first & only place to give license for gantry crane used for marble processing • Production of allied construction or fitting difficult	• Maintaining **conducive environment** for industries by promoting policies, services & infrastructure support • Better **road connectivity** • Intra & inter nodal **transportation hub a possibility** • Promoting **planned industrial development** • Development of warehouses & **logistic hub** • **Social responsibility** to be integrated with industrial association • Education • Health • Sanitation • Transportation • Promoting & branding the marble industry and market for allied products •
 **Officials**	• Proximity to **highway, ports** • **Connectivity** with Gujarat & Maharashtra • **Absence of strong heritage & culture** • **Focus on education** • **Warehouses growth** possibility • Need **skill development** • **Land limitation** • **Potential for tourism** • **Efficient delivery of municipal services** • **Enhance safety** • **Disaster management** • **Improved traffic management** • Increase in **agricultural produce** • **No municipal water supply to industries** • **E-governance** needed	• UT internal **connectivity** to be strengthened • Inter modal **transportation hub** to be explored • Revival of **tribal culture** • **Educational reforms** needed • **Logistic & warehouse** feasibility • Promoting **finished goods market** • **Town planning scheme, need for DP** • Quality tourism with **branding** • **Technological interventions for efficient delivery** of services to citizens • **Integrated command and control center and surveillance** • **Disaster management** to be integrated with ICCC • **Intelligent traffic management system** • Agriculture produce direct market • Renewable source of energy integration • IT infrastructure for industries for ease of doing business

2.2.3 Stakeholders Activity Mapping

Present as well as prospective activity mapping of various target groups namely the tribal's, locals & migrants, industrialists and tourists were done on basis of their **day to day activity, their interests and needs from the city**. This activity mapping helps in understanding the **possible area of interventions** for various target groups which could be incorporated in the development of the city for creating a **better physical and social infrastructure** for the people and giving them a **better experience** of the Silvassa city and DNH as a whole. The activity mapping also helps in **preferencing the activities** for various target groups.

Indigenous groups/Tribals

Aspirations:

• The tribals live in the remote locations of DNH in their traditional houses. They **rely on agriculture**, animal and forest product for income. However, they have a **strong sense of arts & crafts** but it is being lost. They also **engage in cultural activities** like d**ance and local sports.**

• They aspire to have **Good Social and Physical infrastructure**/ Local markets/ Gathering Spaces/ First Mile -Last mile connectivity

• **Good education and health facilities** within their reach

Possible Interventions:

• There is a potential to **enhance the indigenous economy** of the tribal's and establish market to sell their produce.

• The tribal's could be uplifted by **integrating them with the tourist** circuit and upgrading their arts & crafts by establishing skill development centers.

• Provision of **education, health facilities**, and **improvement of connectivity** to their remote locations.

Up gradation of their houses, which are in **dilapidated condition,** through PMAY scheme.

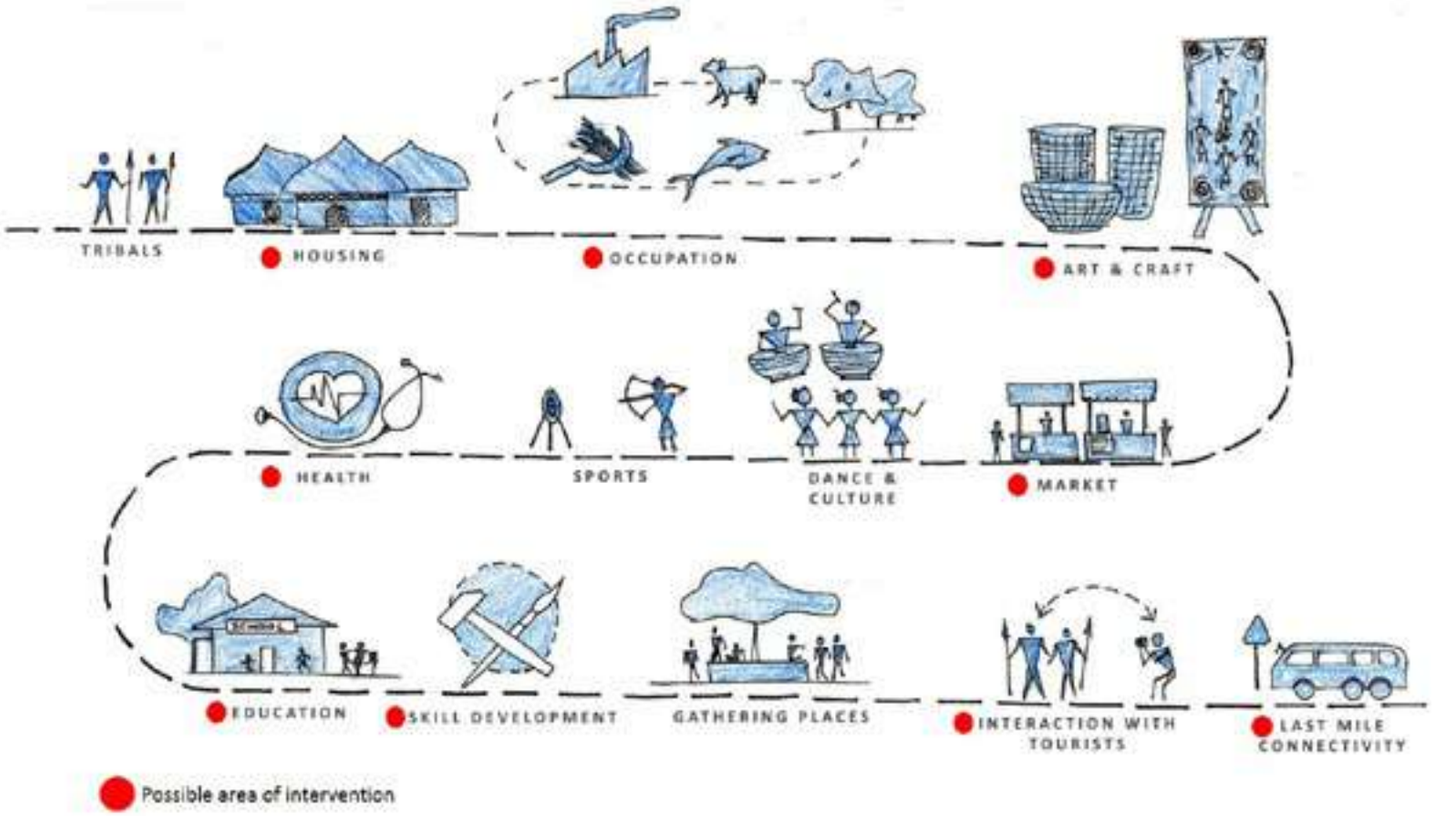


Figure 2.21: Activity Mapping for Indigenous group/ Tribals

Source: Ecofirst

Locals & Migrants

The migrants coming to DNH/ Silvassa live in **chawls or housing societies**. They are mainly **involved in Secondary and Tertiary Economy**

Aspirations:

- **Affordable housing**/ Social and Physical Infrastructure
- **Good connectivity** to work centers
- **Market places**/ Green Spaces/ Sports Facilities
- Theme/ Adventure Parks
- Better eatery options
- Shopping and Entertainment centers
- **Skill Development Centers**

Possible Interventions:

- Provision of **Affordable and comfortable housing** for industrial workers located near their work centers for easy commute.
- Inter and intra U.T. **bus connectivity** for better connectivity
- **Accessible green** and open spaces which would act as space for public activities such as jogging, cycling, exercise, cultural activities and meeting place.
- An **education hub** housing all major courses could be set up, which would also welcome students from other states.
- Eateries and restaurants along the major tourists' spots and important centers.
- Sports complex housing sports facilities of international standards.
- Market places and **dedicated zoned for vendors**.
- **Skill development centers** for women to help generate a secondary source of income for the families.

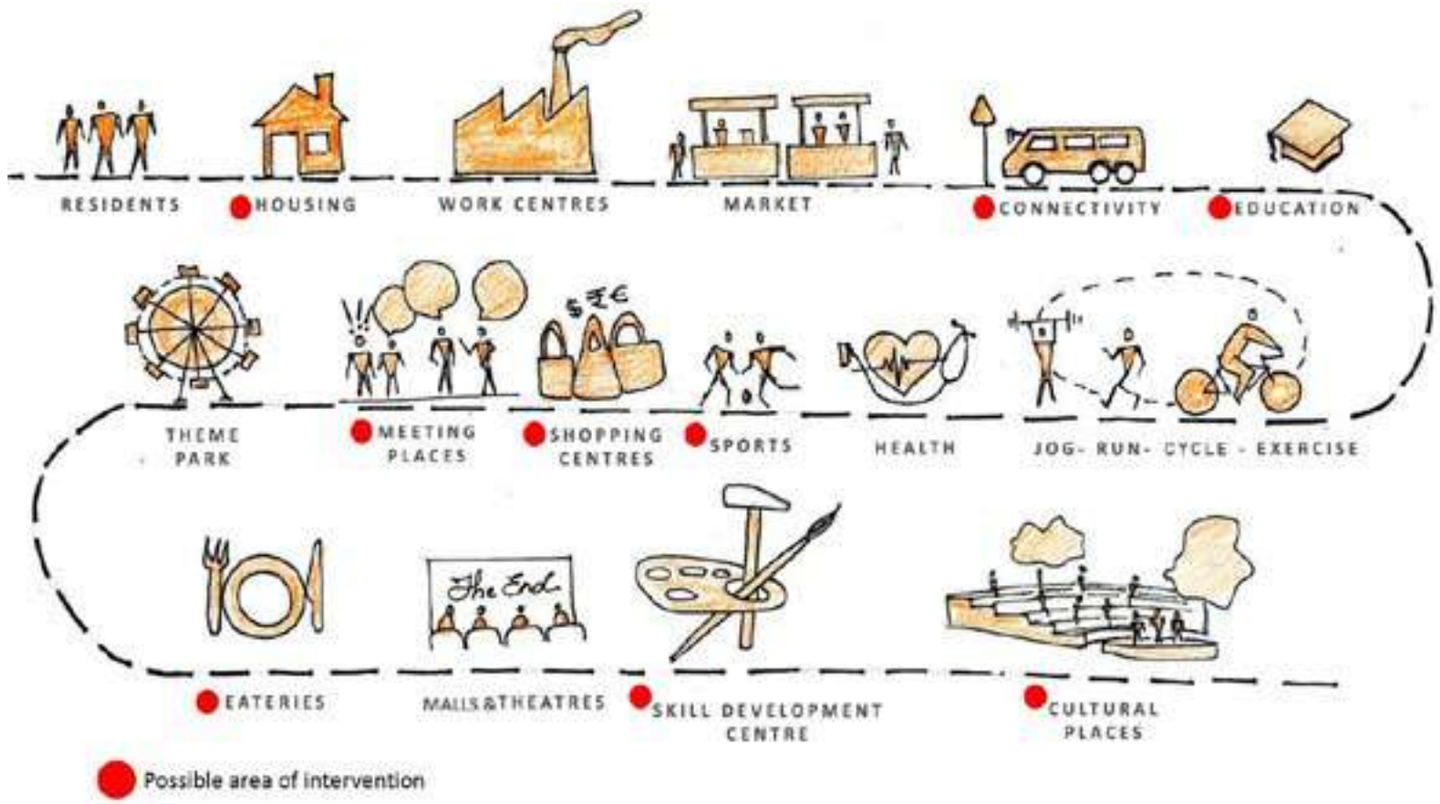


Figure 2.22: Activity Mapping for Locals and Migrants

Source: Ecofirst

Industrialist

Aspirations:
An industrialist coming to DNH would require:
• **Quality of Life** – Housing, Recreation Zones, Shopping, Green Space, Better Infra and transport
The industrialist would explore:
• Competitive policy of Expansion/ Investment.
• **Business** and Leisure Options
• **Convention center & exhibition center** for displaying products and organizing national-international conferences
•The industrialist could also explore **amazing nature** of DNH.

Possible Interventions:
• Provision of **infrastructure and facilities** for hoteliers.
• Inviting giants in the hotel business to the U.T.
• Eateries and restaurants at important nodes.
• **Better road connectivity** to the nearby transit point such as railway stations, airports.
• **Provision of convention center and exhibition center** in the existing kala Kendra Center.

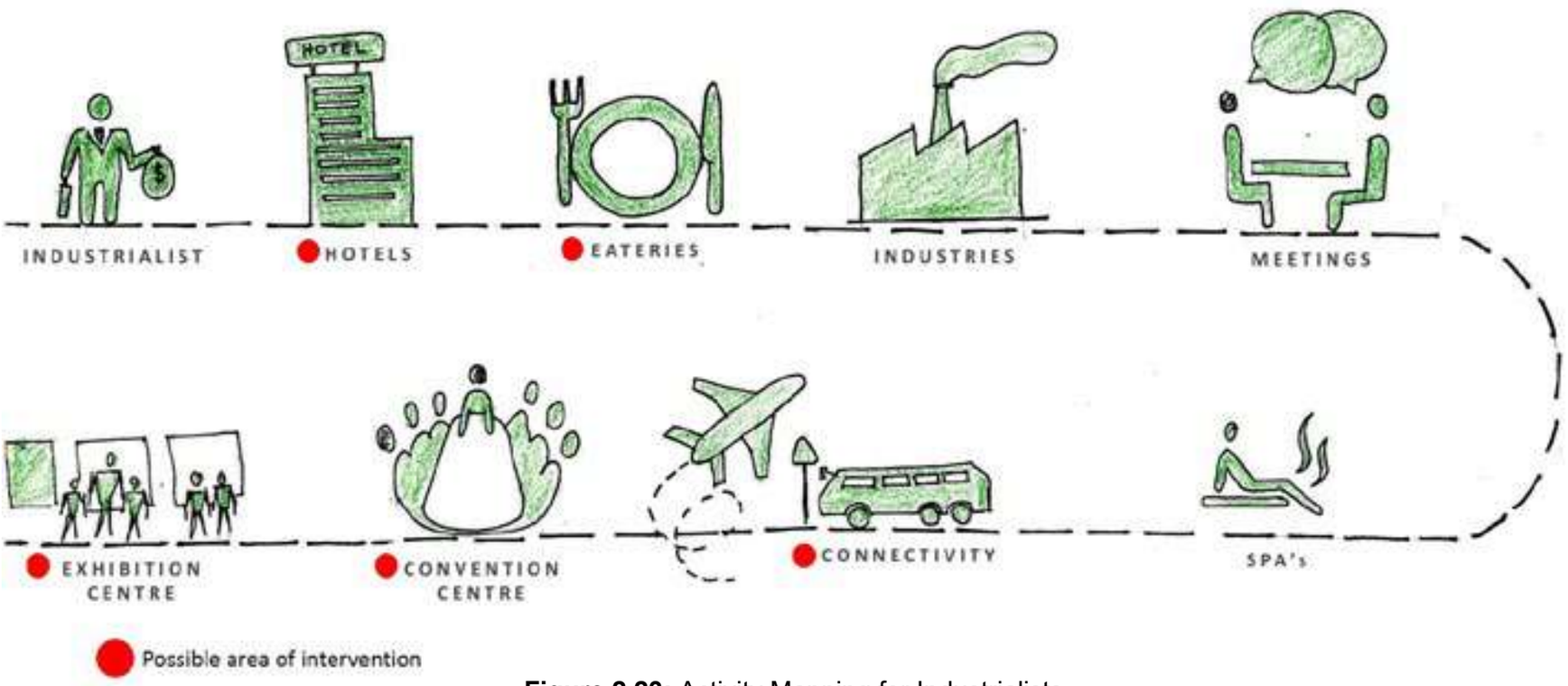


Figure 2.23: Activity Mapping for Industrialists
Source: Ecofirst

Tourists

Aspirations:
A tourist coming to DNH would require:
- **Hotels** – Branded as well as affordable
- **Entertainment / Connectivity**
- **Information centers**

A tourist can explore the followings:
- Jungle safari/ Scenic locations/ River front and parks
- **Adventure** and Water sports
- Boating & fishing/ **Industrial Tourism/ Film city** & Theme parks
- **Tribal village**/ Nature Trail/ Spas/ Beaches nearby

Possible Interventions:
- Provision of **infrastructure and facilities** for hoteliers.
- Inviting giants in the hotel business to the U.T.
- **Integrating** all the **tourist's centers** with better connectivity.
- **Information center** - digital and experience centers
- Including adventure and water sports
- Developing a **365 days event calendar**.
- Integrating **industrial tourism, film city, tribal village**, light and sound show at river front to the tourist circuit.
- Developing DNH as a place for **Destination wedding**.

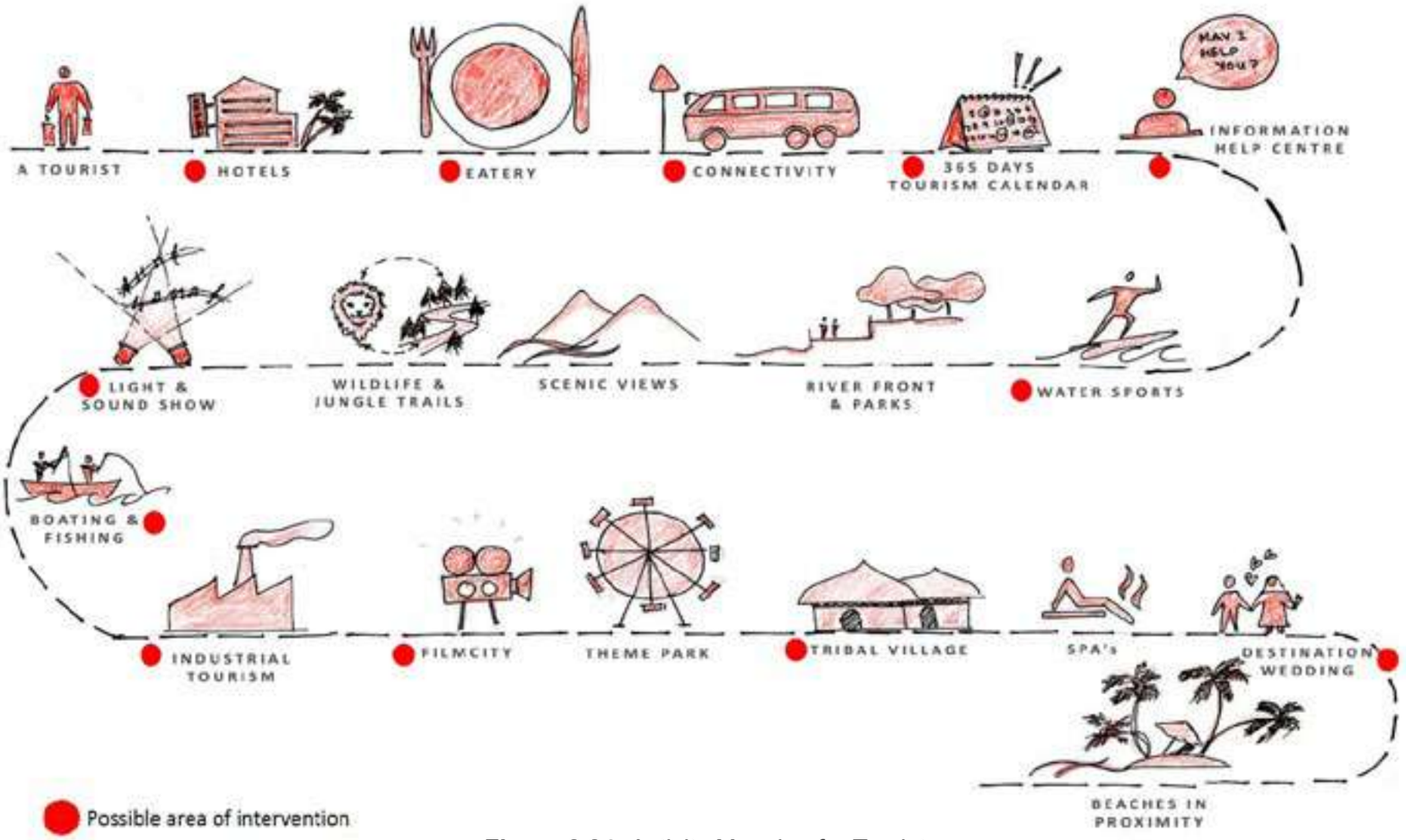


Figure 2.24: Activity Mapping for Tourists
Source: Ecofirst

2.3 S.W.O.T. Analysis

Strength

Strategic Location
DNH is located at the border of Gujarat & Maharashtra and near the western coast

Former Capital of DNH
Silvassa is the former capital of DNH, which is the administrative center of the U.T.

Topography
DNH has varied topography ranging from hills & plains, Silvassa has a flat terrain, better for development as town centers

Rich Natural Heritage
Flora & Fauna spread across the U.T. & Natural streams

Forest Cover
40% forest cover throughout DNH

Weakness

No Railway Station
No railway station in the U.T. nearest station at Vapi

Tribal Population
Tribal population does not contribute significantly to the GSDP

Limited Land
Limited land for agriculture, due to small landholdings

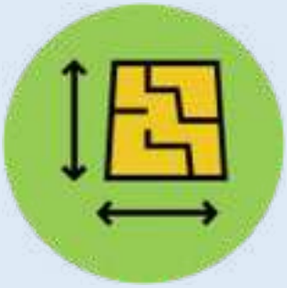
No Direct Access
No direct access from National Highway

Opportunities

Limited Land
Limited land for agriculture, due to small landholdings

Existing Industrial Hub
Already established industries throughout the U.T. lay a foundation for further expansion of the industries

Low Cost of Living, Labour & Electricity
The U.T. has availability of cheap labour & electricity, thus giving better scope for establishment of industries.



Easily Available land
Easily available land gives better opportunity for development

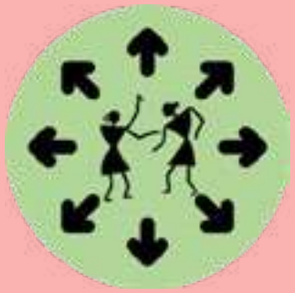
Upcoming Infrastructure
DMIC, DFC, Mumbai-Vadodra Expressway would improve the connectivity & also help in strengthening the existing industries & establish the emerging industries

Easily Available land
Easily available land gives better opportunity for development

Threats

Industrial Policies of adjacent areas
Industrial policies of the nearby industrial towns are a competition, which has resulted in stagnant industrial growth in the U.T.

Haphazard & Unplanned Development
Unplanned and haphazard urban development is cost intensive for provision of effective infrastructure



Lack of opportunities for Indigenous groups
Migrants are preferred over the tribal's in the industries, which leads to lack of job opportunities for the tribal's.

CHAPTER 3

CHALLENGES AND OPPORTUNITIES

Chapter 03: Challenges and Opportunities

3.1 Challenges

DNH has a very s**trategic geographical location**, lying between the borders of Gujarat and Maharashtra, but still **lacks direct access and connectivity**. The nearest railway station being at Vapi (18 Kms away), Nearest airport at Daman (27 Kms with limited connectivity), Surat (135 Kms), Mumbai (167 kms). There is low frequency of intra and inter U.T. public transport. There is now direct access to Silvassa, which is only accessible with road the state highways connected to the National Highway (NH-48).

Although, around 29% of the total population and majority of the tribal population is involved in agriculture the produce is not surplus and contribute only 1% to the GSDP. The challenge is to **enhance agriculture produce** and to gain profit out. Low rate of education amongst the indigenous groups is also a challenge.

The existing policies, reduction in tax exemptions, the **competition from the nearby industrial hubs** like Vapi, and the new industrial policies in the neighbouring states like Gujarat have led to the **stagnant growth in the industrial** growth of DNH leading to low migration and loss in investment. The stagnant growth rate of industries results in low wages to the labours which further leads to low quality of life for the residents of U.T.

There is also **lack of infrastructure for the existing industries,** such as government water supply, waste disposal, CETPs, road infrastructure to name a few.

Haphazard and unplanned urban development in the region has led improper utilization of spaces, ribbon development, created locked land parcels, land parcels without direct access from the ring road, which creates pressure, both physical and financial, on the government to lay the necessary infrastructure. Height restriction mentioned in the bye-laws lead to unutilized F.S.I. There is also low open space per capita, leading to lack of open spaces and accessible green for the public.

DNH which also used to be **tourist heaven** has also **lost the footfall of tourists** which it used to have in the past, thus, leading to further decrease in the economy of the region.

Thus, the challenge is to **reposition DNH as an industrial hub, tourism hub** along with provision of infrastructure, controlled development and revitalizing the indigenous economy, arts and crafts, industries with Silvassa as the epicenter.

3.2 Opportunities

The **rich natural heritage, forest covers, topography** could be banked upon to establish DNH as a tourist hub. The rich tribal culture, arts and crafts could also be integrated along with the tourism circuit to give the tourists an exclusive experience, which would **increase the footfall of tourists** in the U.T. thus, improving the economy of DNH. DNH is also in close proximity to already established tourist spot Daman.

Silvassa could as a gateway to the tourist spots with DNH and nearby places and a halt point for tourists with hospitality facilities for different range groups and house various other infrastructure for tourism both physical and digital, tourism information & experience center.

For the enhancement of the economy of the indigenous group, **Silvassa could act as a market hub** for selling the **agricultural produced good** and establish a **skill development center** to train the farmers with **new tools and techniques** to improve their agriculture produce and **generate income** from it.

The **upcoming infrastructures** such as **DMIC corridor** passing 18 kms from the border of DNH and DNH comes in the influence zone of **DMIC, DFC corridor, Mumbai-Vadodra Expressway** which passes through DNH, covering 5.5 Kms within DNH, **Bullet train corridor** which passes through Naroli town of DNH with station at Vapi 18 kms from Silvassa. The proximity to the ports like the Hazira and JNPT port and the upcoming Nargol port 35 kms away.
The existing industrial hub, which is having a stagnant growth rate, can also be cashed upon by **providing it better connectivity, infrastructure, revising policies** to promote the growth of industrial development in the U.T.

These **upcoming infrastructures** would help in **improving the connectivity** to DNH which could further improve the industrial development in the U.T. and **open door for the emerging industries** like logistics, warehouses, cutting edge technology industries, allied and finished goods markets, R&D industry, Bio-

technology, IT & IT-ES industry and nano-technology industry to name a few.
Silvassa could act as an **epicenter for the emerging industries** and act as an **administrative center** for the **industrial development** throughout the U.T. so as to control the exploitation of the existing natural heritage in the U.T.

The availability of land at cheaper rate could also lead a path for **planned and controlled development** in DNH which would reduce the pressure on the infrastructure and would help in providing better quality of life to the citizens with affordable housing, quality infrastructure at affordable rates. The availability of land would also encourage investment from developers from within and outside DNH.

Silvassa would be **developed as a city center** with **compact and controlled development** with application of TP scheme, street guidelines, DCR which would help **control the haphazard development** and led to provision of effective infrastructure at low cost. Further, **Silvassa would set standards** for further development in the U.T.

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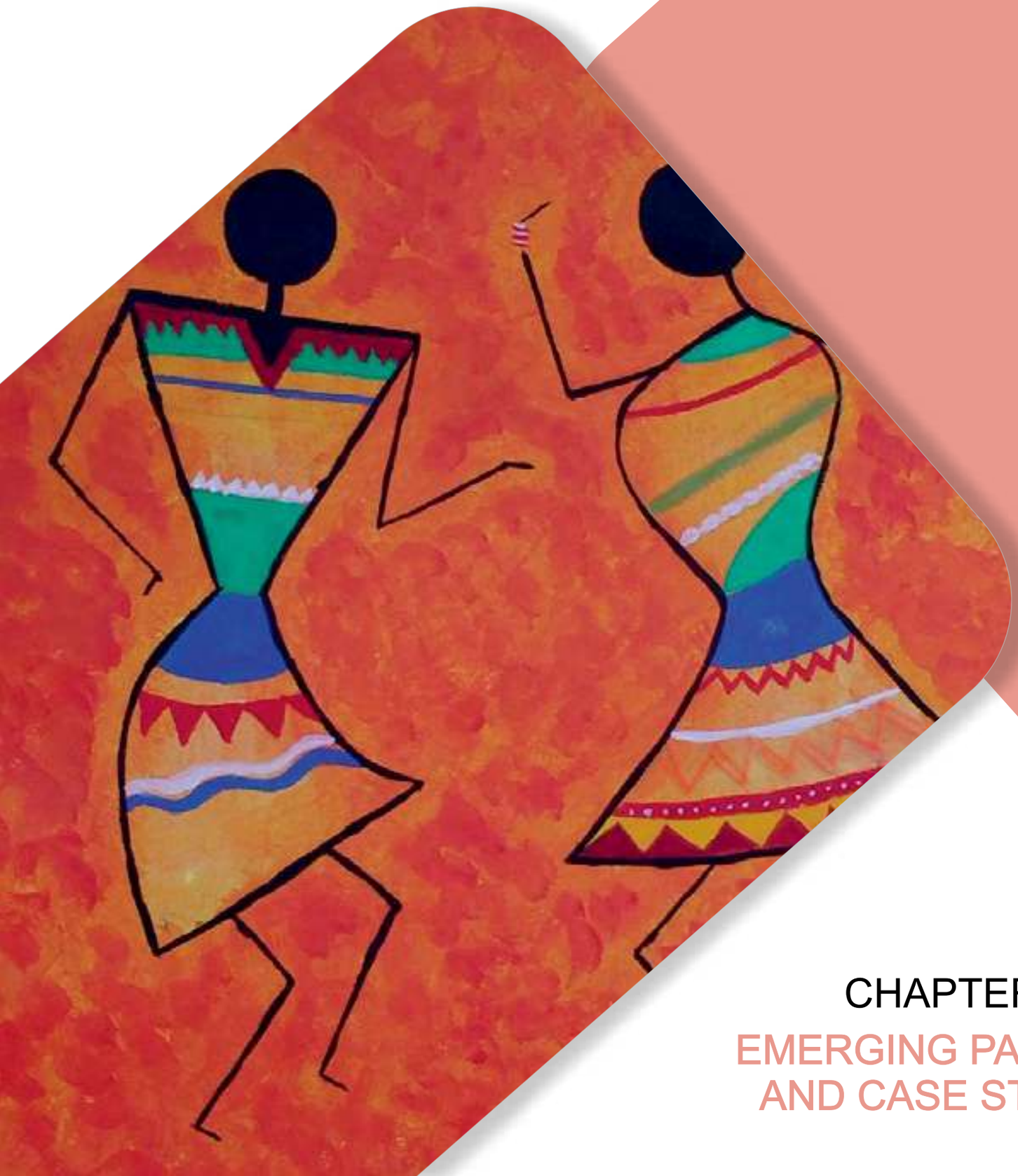

CHAPTER 4

EMERGING PATTERNS AND CASE STUDIES

Chapter 04: Emerging Pattern and Case Studies

4.1 Emerging Patterns

4.1.1 Organic Farming

Organic farming is an **alternative agricultural system** which originated early in the 20th century in reaction to rapidly changing farming practices. It is defined by the use of **fertilizers of organic origin such as compost manure, green manure, and bone meal** and places emphasis on techniques such as **crop rotation and companion planting**. **Biological pest control, mixed cropping** and the **fostering of insect predators** are encouraged.

Image 4.1: Organic Farming adopted for better agricultural produce

Source: Indochem blog

Organic farming encourages **Crop diversity**. Planting a **variety of vegetable crops** supports a wider range of beneficial insects, soil microorganisms, and other factors that add up to overall farm health.

Adopting **new farming tools and techniques** such as organic farming could **improve the fertility of the land** and **more crops could be produced on limited land**, which could **make more profits** for the farmers. [20]

[20] https://en.wikipedia.org/wiki/Organic_farming

4.1.2 Skill Development Center

As per the definition skill development center is a **platform to enhance the skill** and make the **trainees industry ready** for organizational development and its success.

Skill development centers could be used to **uplift the dying traditional arts and crafts of a community**. These centers could train the artisans and upgrade their **skills as per the current market trends** but keeping their **tradition intact** and commercialize the arts and crafts, thus, **improving the quality of life** of the artisans. **Government** is also helping in setting p and running skill development training centers through various **schemes and programmes** such as Pradhan Mantri Kaushal Vikas Yojna (PMKVY), Skills Acquisition and Knowledge Awareness for Livelihood Promotion (SANKALP) under the Ministry of Skill Development and Entrepreneurship.

Image 4.2: Skill development centers for improving the skill sets of artisans

Source: Sargaalaya.in

4.1.3 Emerging Industries

I. Logistics & Warehouse

With the **increase in e-commerce** there has also been an increase in the **need of logistics and warehouses**, thus, a shift towards

logistics and transportation industry is noticed in the present time which involves **planning, organizing and arranging** for the **transportation and storage** of particular goods from the **place of origin to the destination**.

Image 4.3: Logistic Industry and warehouses

Source: londonchamber.blog

II. IT & IT-ES industry

Information Technology (IT) means **creating, managing, storing and exchanging information**. IT includes all types of **technology** used to **deal with information**. Information Technology that enables the business by **improving the quality of service** is Information Technology enabled Services (ITeS). ITeS is also called web-enabled services or remote services that **cover the entire operations** which exploit Information Technology for **improving the efficiency of an organization**.[21] It is estimated that the **Indian IT industry** would grow to about **$300 billion by 2020**, with software services and e-commerce leading the race.

Image 4.5: IT & IT-ES Industry

Source: thenewsminute.com

III. R&D Industry

Research and development (R&D) include activities that companies undertake to **innovate and introduce new products and services**. It is often the **first stage** in the **development process**. The goal is typically to take **new products and services to market** and add to the company's bottom line.[22]

Companies spend **billions of dollars on R&D** to produce the **newest, most sought-after products**. The research ecosystem in India presents a **significant opportunity** for multinational corporations across the world due to its **intellectual capital available in the country**.[23]

Image 4.4: Research & Development Industry

Source: toukomst.nl

IV. Film City

The film industry or motion picture industry, comprises the **technological and commercial institutions of film-making**, i.e., film production companies, film studios, cinematography, animation, film production, screen-writing, pre-production, post-production, film festivals, distribution and actors, film directors and other film crew personnel.[24]

A film studio is a **major entertainment company or motion picture company** that has its own **privately owned studio facility or facilities** that are used to make films, which is handled by the production company.[25]

A film city is an **integrated film studio complex**. It has several **recording rooms, gardens, lakes, theaters and grounds** that serve as the **venue of many film shooting**.[26]

[21] https://www.indianchamber.org/sectors/it-ites/
[22] https://www.investopedia.com/terms/r/randd.asp
[23] https://www.ibef.org/industry/research-development-india.aspx
[24] https://en.wikipedia.org/wiki/Film_industry
[25] https://en.wikipedia.org/wiki/Film_studio
[26] https://en.wikipedia.org/wiki/Film_City

Image 4.6: Film shooting in a studio
Source: mvpmotionpictures.com

V. Supply Chain Management

Supply chain is a **system of organizations, people, activities, information, and resources** involved in **supplying a product or service** to a consumer. Supply chain activities involve the **transformation of natural resources, raw materials**, and components into a **finished product** that is delivered to the end customer.[27]

Supply chain management (SCM), the **management of the flow of goods and services**, involves the **movement and storage of raw materials, of work-in-process inventory, and of finished goods from point of origin to point of consumption**. Interconnected, interrelated or interlinked networks, channels and node businesses combine in the provision of products and services required by end customers in a supply chain. [28]

Image 4.7: Supply Chain Network demonstration
Source: zinkiun.es

[27]https://en.wikipedia.org/wiki/Supply_chain
[28] https://en.wikipedia.org/wiki/Supply_chain_management

VI. Finished Goods Industry

Finished goods are goods that have been **completed by the manufacturing process**, or purchased in a completed form, but which have **not yet been sold to customers**. Goods that have been purchased in completed form are known as **merchandise**.[29]

With industries processing & manufacturing raw materials, there is also a need of finished goods industries. Finished goods industry and market **play a vital role in the commercial growth** of industrial sector.

Image 4.8: Finished Goods Industry
Source: timesofindia.indiatimes.com

VII. 3D Printing industry

The 3D printing process **builds a three-dimensional object** from a **computer-aided design (CAD) model**, usually by successively adding material layer by layer, which is why it is also called **additive manufacturing**. The term "3D printing" covers a variety of processes in which material is joined or solidified under computer control to create a three-dimensional object, with material being added together (such as liquid molecules or powder grains being fused together), typically layer by layer.[30]

Industries such as **aerospace, automotive, manufacturing, robotics, education** uses 3D printing technology. 3D printing is used to manufacture molds for **making jewelry**, and even the jewelry itself. 3D printing is becoming popular in the customizable **gifts industry**, with products such as personalized models of **art and dolls**, in many shapes: in metal or plastic, or as consumable art, such as 3D printed chocolate.[31]

[29]https://www.accountingtools.com/articles/2017/5/10/finished-goods-inventory
[30]https://medium.com/@boccalattem/3d-printing-c59657c31c5d
[31]https://www.makemymini.com/multiple-uses-of-3d-printing-technology-in-todays-world/

Image 4.9: 3D Printing Industry
Source: fmglobal-touchpoints.fr

VIII. Biotechnology Industry

The wide concept of “biotech” or “biotechnology” encompasses a wide range of procedures for **modifying living organisms** according to human purposes, going back to domestication of animals, cultivation of the plants, and “improvements” to these through breeding programs that **employ artificial selection and hybridization**. Modern usage also includes **genetic engineering** as well as cell and **tissue culture technologies**.[32]

Image 4.10: Biotechnology Industry
Source: erikhare.com

The biotechnology sector of India is **highly innovative** and is on a strong growth trajectory. The sector, with its immense growth potential, will continue to **play a significant role as an innovative manufacturing hub**. The sector is one of the most significant sectors in **enhancing India’s global profile** as well as contributing to the **growth of the economy**. India is among the top 12 biotech destinations in the world and ranks third in the Asia-Pacific region. Biotechnology is widely used in industries include **medicine, agriculture, manufacturing industry** etc.[33]

IX. Nano technology industry

Nano technology is the engineering of **functional systems at the molecular scale**. In other words, nanotechnology is the study, process, and **manipulation of material at a molecular level.** Nanotechnology is used in **food industry, agriculture industry, oil & gas industry**, consumer goods industry, aerospace industry, chemical industry, construction industry, electronics industry to name a few.

The government has played a pioneering role in promoting nano-technology R&D in India. It has taken many initiatives to foster and promote R&D in India through several of its departments. Many schemes/programmes have been launched for infrastructure and human resource development. It has also **encouraged PPP model** to encourage **nano-based product development**.[34]

Image 4.11: Nano-technology Industry
Source: imcgrupo.com

[32] https://en.wikipedia.org/wiki/Biotechnology
[33] https://www.ibef.org/industry/biotechnology-india.aspx
[34] Nano-technology Development in India An overview, Amit Kumar, December 2014, Research & Information system for developing countries (http://ris.org.in/images/RIS_images/pdf/DP%20193%20Amit%20Kumar.pdf)

4.1.4 Future of Tourism

I. Experience based Tourism

At present there is a **shift** from destination based tourism to **experience based tourism**, where people rather than just sightseeing want to experience the places they visit by involving in various activities such as **adventure sports, hands-on activities** such as pottery, sculpture and staying in a theme hotels such as tree houses in Kerala, Choki dhani, visiting theme parks, wild life sanctuaries, aquariums & oceanariums which helped them connect emotionally to the place. The **Virtual Reality (VR) technology** is also being used which helps the tourists to **gain experience of a place virtually** i.e. without any physical presence.

Image 4.12: Adventure sports a part of experience tourism
Source: theodysseyonline.com

Image 4.13: Experiencing through Virtual Reality (VR) technology
Source: pinterest.com

Experience tourism is **becoming the norm** because consumers would rather spend their **money on experiences and not on things**. The emphasis now is on “seeking out activities that appeal to niche personal interests” rather than on “checking must-see sites and monuments off the to-do list.” [35]

II. Industrial Tourism

According to a widely used definition, industrial tourism is based on **former or still existing production** (manufacturing or other). This activity can have various forms such as i**ndustrial heritage tourism or scientific parks** etc.

From a different point of view, industrial tourism means that objects

Image 4.14: Industrial Tourism demonstration
Source: chinadaily.com.cn,gomselmash.by

[35]https://pro.regiondo.com/experience-tourism/

which were **created not for being attractions** (and in some cases it is not their primary function in the present) **became tourist destinations**. It means that sometimes the p**roduction itself can be a part of the attraction**. However, the term, "industrial tourism" is a bit misleading because not only industrial activities and facilities can become attractions in this type of tourism, but all kinds of economic activities and buildings. Visiting **agricultural facilities or service centers** also can be defined as industrial tourism.[36]

Industrial tourism can have various benefits but maybe the most important ones are **strengthening the image of the region** and contributing to **public relations activities**. Tourism can help the residents feel **safer about the industrial activities** near them as well. Information transfer and learning are also important motivations for developing this type of tourism.

III. Destination Weddings

With Indian economy growing and increase in disposable income, **shortage of venues in India**, **destination weddings** have increasingly been **becoming popular**. With every passing year, **Indian weddings are getting bigger and better**. Aspirational travelers with **spending propensity** are now seen **looking at international venues** to celebrate their special day.

Image 4.15: Destination Wedding a flourishing trend

Source: destination-weddings.com

To say that destination weddings are just for the upper class could be wrong the last few years have seen some **major changes** in terms of **wedding expenditure** in terms grandeur. **Earlier only the elite** were known for organizing such lavish affairs but today a new consciousness has been seen in the **upper middle-class** as well and they too desire to have **grand celebrations**.

This led to expansion of the size of the Indian wedding industry. The wedding industry in India is flourishing and statistics corroborate the fact. Currently, **the industry is over Rs 100,000 core** and is **growing at 25-30 per cent annually**. [37]

4.2 Case Studies

4.2.1 Case Study 1: Dubai

Dubai is **one of the seven states (called emirates)** along with Abu Dhabi (the capital emirate), Ajman, Fujairah, Ras al-Khaimah, Sharjah and Umm al-Quwain to form the United Arab Emirates (UAE) which was established in 1971. Dubai, **a tiny city state**, covering an **area of 4,110 sq. km**, located in the Persian Gulf has **undergone an impressive transformation** over the last four decades, managing to shift their economy **from that of fishing and trading to tourism, mass communications, shipping, and finance**. Dubai has created for itself an **image synonymous with luxury, multi-billion dollar real-estate ventures**.[38]

Image 4.16: Transformation of Dubai from 1991 to 2018

Source: viralgala.com

With the **collapse of the pearling industry in the 1930s**, Dubai fell into a deep depression. However, when in **1966 oil was discovered**, the late ruler of Dubai, His Highness Sheikh Rashid bin Saeed Al Maktoum, **utilized the oil revenues to spur infrastructure development** in Dubai, such as schools, hospitals and roads as well as a modern telecommunications network. It was

[36]Industrial Tourism-trends and opportunities, Lajos Boros, Viktor Pal, Zita Martyin, June 2013, ResearchGate (https://www.researchgate.net/publication/272777655_Industrial_tourism_-_trends_and_opportunities)

[37]https://www.traveltrendstoday.in/people/item/4860-destination-weddings-becoming-a-lucrative-business-opportunity

[38]Matly, M., & Dillion, L. (2007). Dubai Strategy: Past, present, future.

later estimated that the **oil reserves of Dubai will end by 2010s**. Sheikh Rashid was determined to build up Dubai's economy so that could it survive the end of the oil boom.

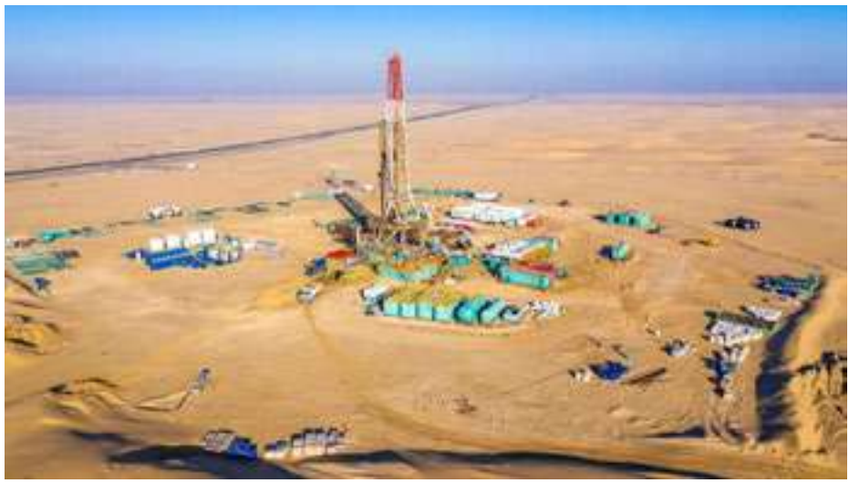

Image 4.17: Jebel Ali gas reservoir
Source: meed.com

Dubai is distinguished as one of the trade centers in the Arabian Gulf region, high lighting a strategic competitive location in the middle of the UAE coast and linking maritime lines and transporting goods between East and West. I**n 1979, Jebel Ali Port, the biggest port in the Middle East opened and in 1985 Emirates airline launched. The same year Jebel Ali Free Zone was also inaugurated**, attracting overseas investment and today Dubai has free zones throughout the city .[39]

Image 4.18: Jebel Ali Port
Source: fm-middleeast.com

Image 4.19: Dubai International Airport
Source: logisticsmiddleeast.com

Sheikh Mohammed bin Rashid Al Maktoum is responsible to setting the **"Dubai Vision 2010" which would attract the world's top companies to transform Dubai to a knowledge-based economy**[38].

The city is also home to **two world iconic landmarks**: (i) **Burj Al Arab**, the sail shaped seven-star hotel built in 1999; and (ii) the world's tallest tower at 828 m (more than twice the height of the Empire State Building) – **the Burj Khalifa**, built in 2010. In 2006, **the palm-shaped artificial archipelago of Palm Jumeirah** – home to luxury beachside residences, apartment buildings and luxury resort hotels such as Atlantis – increased Dubai's shoreline by a total of 520 km.

In fact, no longer depending on oil, the **internationalization of the economy through tourism** has been a major element in the diversification process.

Tourism industry in Dubai has become a **major component in the city's economy**. Dubai has actually experienced a rapid tourism growth since the establishment of the nation. From having no hotels in the 1950s, by the late 1990s Dubai managed to enter the international high-end tourist market by investing in some of the world's **most luxurious hotel projects**.

During the past decade, the **increased number of visitors** is strong evidence that **Dubai has earned a reputation as a global tourism destination**. Dubai was a fishing and pearl-diving village and through visionary leadership, it used its **strategic location to grow into a trading center, and has been transformed into an economic beacon for the Middle East.**[39]

[38]Matly, M., & Dillion, L. (2007). Dubai Strategy: Past, present, future.
[39]Kotsi, F., & Michael, I. (2015). Planning and Developing ' Destination Dubai' in the context of the United Arab Emirates (UAE). Research Gate , 149-168.

Image 4.20: Burj al-Arb
Source: lustforsublime.com

Image 4.21: Palm Jumeirah
Source: dubaimasteryachts.com

Image 4.22: Desert Safari in Dubai
Source: desertadventuredubai.com

Image 4.23: Burj Khalifa
Source: admexico.mx

Image 4.24: Atlantis, Palm Jumeirah
Source: hu.pinterest.com

Image 4.25: Dubai Aquarium & Underwater zoo
Source: nowtravelasia.com

4.2.2 Case Study 2: Bhiwandi

Image 4.26: Aerial View of Bhiwandi's Industrial Area

Source: thehindu.com

Bhiwandi is **located in Thane district in Maharashtra state**, 20 km to the north-east of Mumbai. It has 7,09,665 population as per census 2011. It falls under the Bhiwandi Nizampur Municipal Corporation jurisdiction and is a part of Mumbai Metropolitan Region. Due to its **strategic location, good regional connectivity with other nearby commercial hubs**, close proximity to Mumbai and nearby ports the city kept evolving its economy with time. From being a **trading, fishing, agriculture driven economy** till 1960's to becoming a **hub for handloom industry** in 1980's due large spread of handloom industry and now is the **most preferred logistic hub of India**. Below are the reasons and economic triggers behind these paradigms shift and lessons to learn on how the **city adapted and re-skilled itself** to meet the future needs.

Till 1930's the major economy of the city was **depended on agriculture, trade and fishing activities**. It is believed that a trader Mr.Haji Abdus Samad pioneered **Bhiwandi into a textile city**. Due to the i**ntroduction of electricity** in 1930's, the city adapted to the changing technology and rapidly **transformed itself from handlooms to power looms industry**. With the decline in textile industry in Mumbai, Bhiwandi became an **industrial attraction due to the convince of transport and 24x7 electricity** and also as it had grey fabric demanded by Maharashtra. Moreover, this was supported by **less regulating authorities and less taxes**. It **attracted many workers** from UP, Bihar and other parts of India.

It became the h**ub for handloom industries around 1970-80s,** producing **33 % of the country's total power looms**, second largest after Surat. 50% of handlooms made were **exported outside India**.[40]

Image 4.27: Handloom mills in Bhiwandi

Source: frontline.com

The stooping increase in population was an outcome of this industrial boom Power looms employed more that 77 % of the taluka's population. They grew rapidly from 16,500 in 1960 to 2,50,000 in 1991 and today houses up to 9 lakh units. But with time, this i**ndustry came to a slow-down as the export demand decreased** due to competitive foreign cloth i.e. high export duties of India were higher as compared to the cloth made in China, Bangladesh and Pakistan and also yarn prices were vacillating. This **led to closing of around 35% looms**. This situation got aggravated due to more **reduced market demand** post demonetization which took the industries 5 years behind, increasing unemployment and slow-down stand the city's economic growth. As the **city depended on only one type of industry** and there was **no fallback option**. The city needed to shift its economic focus.

Due to **its strategic location and good connectivity**, the state government and MMRDA planned to shift **Bhiwandi's economy from handlooms** to convert it **into economic corridor and make it a logistic hub**. Through MMRDA's regional development plan around Rs 985 Crore were allocated to be spent on various development projects undertaken in **60 villages in Bhiwandi taluka which included a logistics parks, creating godown, cold storage warehouses** and at the same time uplifting school , hospitals and other infrastructure facilities to provide quality of

[40]https://www.thehindu.com/news/cities/mumbai/Bhiwandi-is-unravelling/article17195077.ece

life to its migrants and its residents. Also, investments were done to **strengthen its transport connectivity** and flyovers were built to decongesting it routes such as Mankoli Naka Flyover to decongest traffic in Bhiwandi and Thane-Nashik road to ease inter- connectivity and bring down travel time. On similar lines **"Make in Bhiwandi"** initiative[41] was launched to **facilitate and attract manufacturing companies** and investors in the region of e-commerce and retail industry.

Due to this push and facilitation done by the government, the city has evolved into a **first-of-its-kind e-commerce logistics hub** in India. The **builders started developing warehouse** in this textile industry. At the start of 21st Century retailers like D-Mart, Big Bazaar started setting up warehouses. Other e-commerce companies followed- both national and international. New and standard warehouses started emerging. Also as it **offered competitive land prices/rate** as compared to Delhi, Ghaziabad, and due to its close proximity to Mumbai ,**most e-commerce companies preferred locating their units here** and the business has grown at warp speed for key stakeholders in this gig — builders, property dealers, staffing companies and the local workforce, among others. While the **power looms largely employ skilled labour, the e-commerce gig has given avenues to unskilled labour.**

Image 4.28: Fulfillment centers (FC) in Logistic hubs of Bhiwandi
Source: m.economictimes.com

Today more than **100 retail companies have warehouses** here. It has been **converted into logistics haven** where e-commerce companies manage deliveries for the entire western region- roughly 30-35% of all online retail sales across various category of companies have taken land on lease. These include Amazon,

Image 4.29: Warehouses and storage units
Source: m.economictimes.com

Flipkart, Nykaa, Pepperfry, Grofers and Bigbasket,etc. Also, Third-party logistics companies (called 3PLs) such as DHL, Blue DartNSE 2.80 %, DTDC, Safexpress — the entities that deliver these goods to the customers' doorsteps — also have their own fulfillment centers or FCs here.[42]

This shift to **becoming a logistics hub due to its strategic location and regional connectivity has regained the economy** in Bhiwandi, making it a success story.

4.2.3 Case Study 3: Nashik

The city of Nashik is **situated in the State of Maharashtra**, in the northwest of Maharashtra[43]. The city, **having an area of 264.2 sq. km**, is situated **on the banks of the Godavari River**, making it one of the **holiest places for Hindus** all over the world[44]. Nashik city is one of the five places in India where the **famous Kumbh Mela is held** once in 12 years.

Nashik today is one of the **fastest growing cities in India** and has even been **identified as a tier-2 metro**. The city's economy is driven chiefly by the **engineering and manufacturing industry** as well as the **progressive agriculture in area surrounding the city**. Developments of past two decades have completely transformed this **traditional pilgrimage center into a vibrant modern metropolis** and Nasik is poised to become a metropolis with global links[45].

Once the whole **district was humming with handicraft** activities mainly in **engraving on gold, silver, copper** and brass utensils, manufacturing locks, making paper and **weaving textile items** like colored sarees, Paithanee, carpets, blankets, silk cloth etc. Nearly **35000 artisans were engaged** in these cottage-industrial

[41]https://www.thehindu.com/news/cities/mumbai/news/make-in-bhiwandi-launched- to-boost-region/article8216901.ece
[42]https://economictimes.indiatimes.com/industry/services/retail/how-bhiwandi-has-rebuilt-itself-to-become-a-logistics-hub-for-online-retailers/articleshow/72201341.cms?from=mdr
[43](Gadakh & Jaybhaye, 2016)
[44](Anon., n.d.)

Image 4.30: Ghats at the Godavari River in Nashik
Source: 123rf.com

Image 4.31: Kumbh Mela at Godavari River, Nashik
Source: patrika.com

Image 4.32: Urban Development in Nashik
Source: patrika.com

activities.

The **first sign of modern industry** as such in this region can be traced back to **1882 when a Paper Mill at Yeola** with an employment of 200 workers was started. Encouraged by the **favorable conditions** conducive to the industrial growth, the private sector also stepped in. The era of modern industrialization started during the 4th decade of the 20th century. Mumbai-Pune-Nashik is being seen to be developed as **Golden Triangle of Maharashtra** and accordingly **infrastructural facilities are being developed by the Government**. It is also a **pharmaceutical hub** with presence of Glaxo SmithKline,

In recent years, Nasik has also **carved a niche for itself as India's "Napa Valley"** and locally established wine brands such as "Sula" and "Zampa" have **attained international acclaim**. The **natural benefits of geography and climate and abundant availability of water** catalyzed this growth. Modern efforts are on to p**romote the growth of an export-oriented rose farming and wine industry** in the district. The **vineyards also attract tourists** from across the country.

[45](Anon., n.d.)

Image 4.33: Sula Vineyard at Nashik

Source: farmdrop.com

Recently the government decided to prepare **IT parks in the city** of Nashik. About 1**5 percent of IT professionals from Pune and Mumbai have moved to Nashik** for employment. With the **airport becoming functional** and **low leasing rates**, many **IT companies are looking set up base** in Nashik[46].

Nashik is also **known for various educational institutes** starting their units in the city. As **Pune becomes saturated, Nashik is set to become to next education hub** with a large number of **academic institutions setting up their base here**.

Global connections of Nasik have been traced back to second century BC. **Archaeologists have established its links to Roman Empire through trade**. **Buddhist stone-cut caves dated 175 BC and Chamar caves** of the Jain period still attract large number of visitors.

Nashik, a **very old city having history right from the Ramayana days** has changed according to the developments all over. It is the city having **nice combination of pilgrim city and industrial hub** in North Maharashtra. **Kumbh mela held every 12 years** is the holy icon for the city. Government and Private **Large-Scale Units operating in and around city** give special importance to the city on the industrial map on India. **Small and Medium size industries** which are vendors of all such large-scale units are also large in numbers and have **created ample number of employments.**

Image 4.34: Gajpanth, a Digambar jain pilgrimage, Mhasrul village, Nashik District

Source: bn.wikipedia.org

Image 4.35: Dharmachakra Jain Temple

Source: commons.wikimedia.org

[46](Living, 2018)

Image 4.36: Pandava Caves, Nashik

Source: justnashik.com

Image 4.37: Sinnar, Nashik

Source: trawell.in

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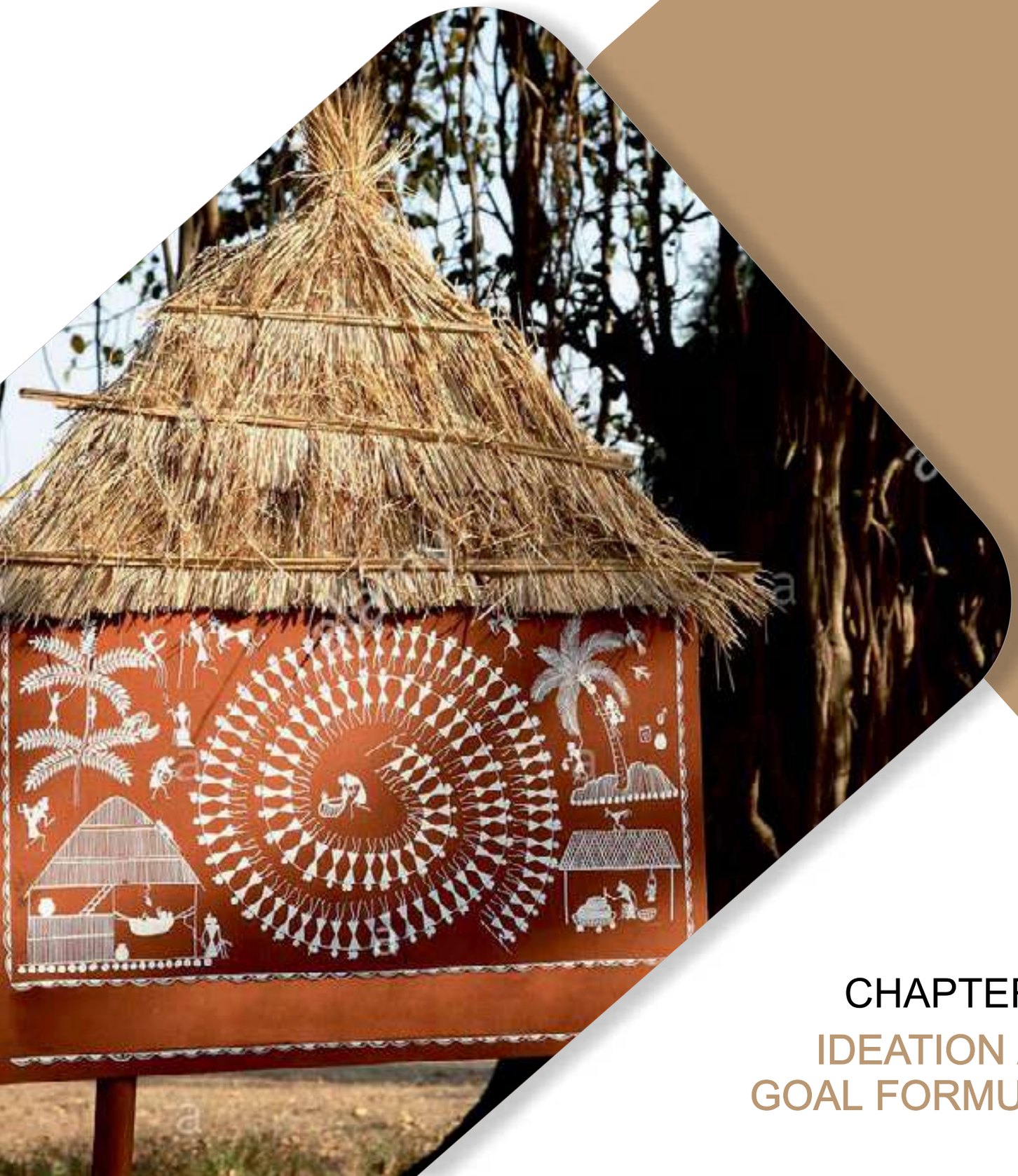


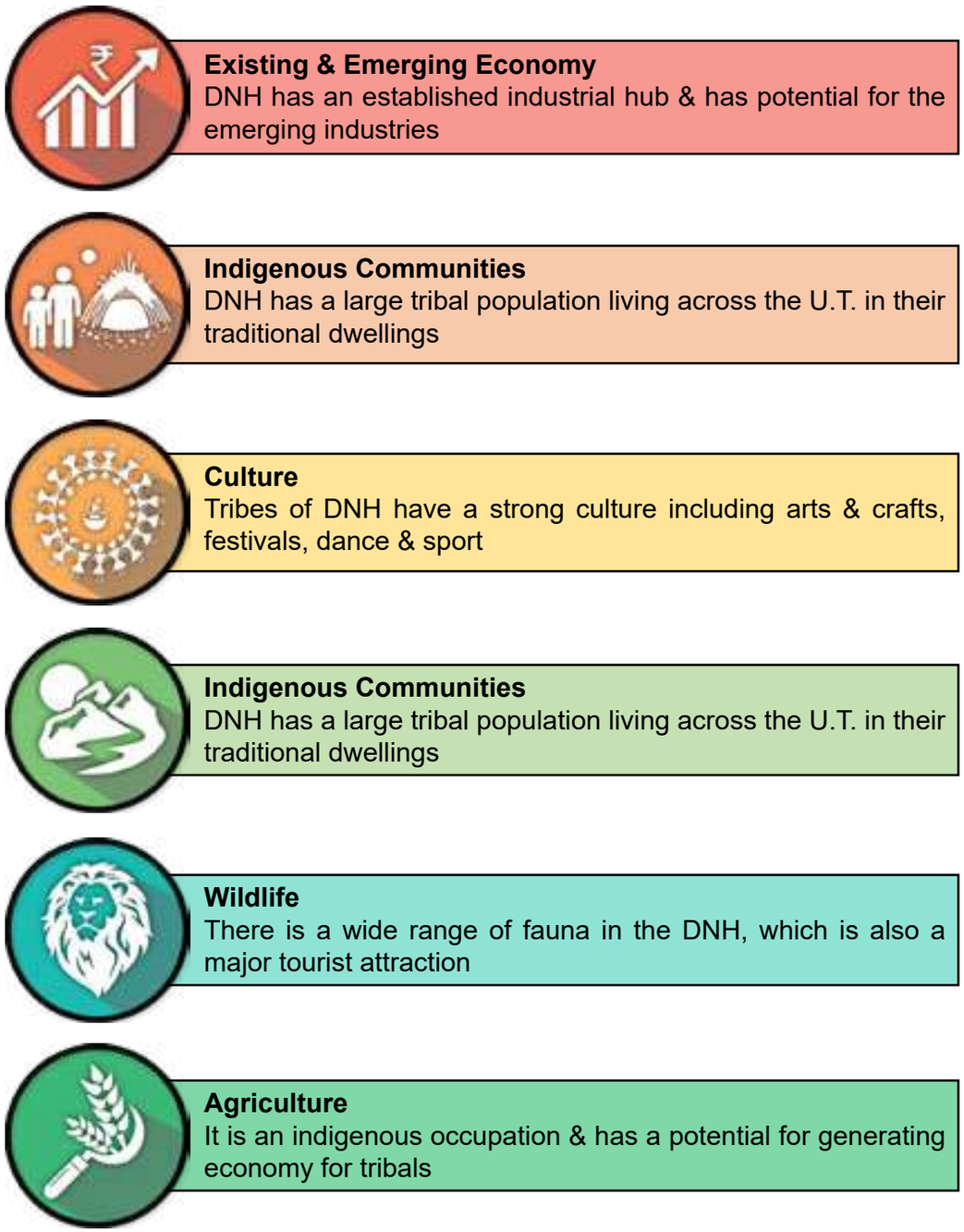
CHAPTER 5

IDEATION AND GOAL FORMULATION

Chapter 05: Ideation and Goal Formulation

5.1 Themes

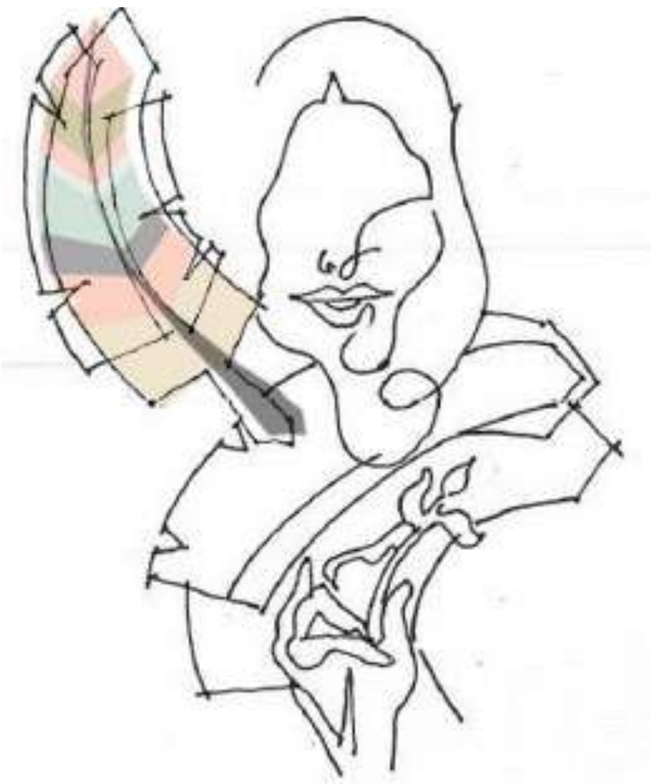
From the **data collected** through **primary and secondary sources, filed surveys, site visits, stakeholder consultation** the entire study could be divided into **six different themes** upon which the **foundations of the vision** of the Silvassa smart city and its **development and prosperity could be laid**. These themes would further help in **categorizing the broader areas of interventions**. The themes are:



5.2 Vision

The **Vision statement for the Silvassa Smart city** could be stated as:

CITY OF ***SILVASSA*** *TO BECOME A* ***VIBRANT GATEWAY TO DNH*** *WITH FOCUS AROUND* ***EXISTING AND EMERGING ECONOMY*** *WHILE PRESERVING ITS* ***INDIGENOUS COMMUNITIES****,* ***CULTURE****,* ***NATURE****,* ***WILDLIFE*** *AND* ***AGRICULTURE***



5.3 Objectives to achieve vision

To **attain the goal** of the smart city mission for Silvassa city, the following **objectives** have to be achieved:

1. Protecting Natural Systems

2. Enhance Indigenous Economy

3. Boost Industries

4. Promote DNH as Tourist Hub

5. Urban Development for Silvassa

6. Quality Infrastructure & Transportation

7. Institutional Reforms

CHAPTER 6

STRATEGY FORMULATION AND PROJECT IDENTIFICATION

Chapter 6: Strategy Formulation and Project Identification

6.1 Protecting Natural Systems

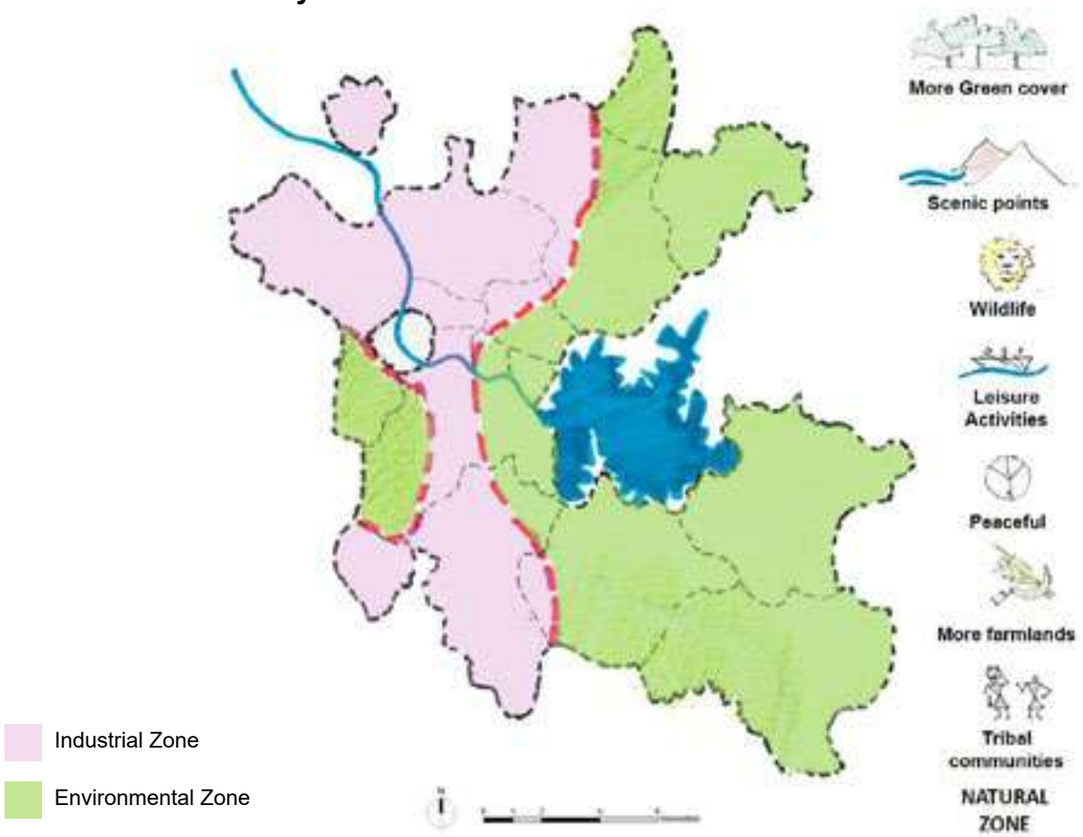
Present Scenario

Dadra and Nagar Haveli have a **rich natural heritage** and around **41.39 % of the overall area in DNH is covered by forest** land (including wildlife). This section is beautifully dotted by **natural features** which include: **Forestry, Wild-life sanctuary, Water bodies, Green cover, Hills and hill-locks and Tribal villages.**

As shown in the figure below, **DNH can be segregated into two zones: Environmental zone** shown in green and **Development/ Industrial Zone** shown in pink.

It can be observed these that t**wo arches of green belts** are formed, one on the Western Edge and other on the Eastern Edge with Central Axis running North – South with an urbanized ribbon which can **marginalize these natural systems and wild life**. As this belt has more **plainer geology** its gives **scope for urbanisation**. Also, as the **eastern side**, having hills are covered in forests, water body, tribal villages, it has a **potential to be developed as a tourist zone**, which would have the following activities:

- Nature trails & treks
- Adventure Sports
- Water Sports
- Tribal Tourism
- Jungle Safaris
- Camping
- Wellness Centers



Map 6.1: Environmental Zone segregated from Development Zone

Source: Ecofirst

But in the last decade the **haphazard industrial growth** has been observed in close vicinity to these natural habitats, followed by **unplanned urbanisation**. Also, these areas are connected by road passing near the wildlife sanctuaries. The pollution, infrastructure pressure, movement of vehicles, noise, etc. **negatively impacts the biodiversity** and affects the environmental quality of these natural habitats. Thus, **preservation of Natural system** becomes a start point in defining Silvassa as a Smart City, a Face of DNH.
Hence, it is proposed that **Eco-sensitive zones should be formed** in line with ESZ demarcated for DNH Wildlife sanctuary by MoEFCC. According to this a **100m buffer from these zones** is no go area with development restrictions. (Refer Draft ESZ notification[47] for more details). Along with no development restrictions, strategies such as **quick forestation** can be done along these areas to create ecological buffers and reduce the impacts (noise/air pollution, etc) of the development activities on wildlife and other eco-sensitive zones.
Similarly, 8.36% of land is under water bodies which include the River Daman Ganga and its three tributaries namely Pipariya, Golak and Sakartod. Silvassa is enclosed by Pipariya River on north and Daman Ganga River on the east. With **industrialization and absence of waste water treatment system** in Silvassa, the waste water was discharged into Pipariya River, **polluting the river** today as shown in the figure below:

Image 6.1: Polluted Natural Drain –Pipariya River system

Source: Ecofirst

Silvassa also has a **good natural drainage system** of **Kothar-drains.** Due to **unplanned urbanization** they are at a risk of getting **polluted and encroached**. Silvassa is at a correct stage of development where these kothars are visible and can be preserved. If not preserved on time, it can lead to flash floods, **impact water balance of the city** in future like the case of Raj-Kulves of Bangalore, Nallahs of Pune, etc.
Hence, not only **Pipariya river** needs to be **conserved** but also the **natural drainage system** of kothars. This can be done by demarcating them, **adding buffer on both sides** of the main drains and **developing nature trails and other recreation facility** along it.

[47] Ministry of Environment, Forest and Climate Change, Draft ESZ Notification for Dadra and Nagar Haveli, 2014

Key Issues and challenges

- Threat due to **rapid unplanned urbanization** and **haphazard industrialization** on natural habitats i.e. Wildlife as well as forests.
- **Pollution** in Pipariya River
- **Threat of urbanization** (Pollution and encroachment) to the **natural drainage system** in Silvassa

Proposed Strategies

Below are the few strategies proposed to address the above identified issues:

S1. Conserve Natural Rivers and Drains

To ensure conservation of existing rivers and their streams/drains in and around Silvassa. This includes **un-polluting them, creating natural buffers/ no development areas** along them to protect them from encroachment, proposing nature trails and other recreations to **utilize the buffer areas for public activities,** etc.

S2. Form Eco-sensitive Zones

To protect the existing rich natural heritage/ features in DNH it is important to **demarcate eco-sensitive zones and buffer areas with less development activities**. Also, places where development activities and wildlife areas are conflicting **quick forestation drives** are proposed to form a **green buffer** to reduce the negative impacts of development on the natural features.

Project Identification from S1 and S2

P1 – Pipariya River Conservation
P2 – Natural drain protection program
P3 – Quick forestation drive (Miyawaki Method)
P4 – Natural Trails
P5– Central Park

6.2 Enhance Indigenous Economy

Present Scenario

The indigenous group of DNH are **dependent on the agricultural produce and forest products** for their primary source of income. Some of the tribal's are also involved in industries as industrial workers, however, **industries prefer migrant workers** over the tribal's. The **agricultural produce is majorly used for self-consumption** and only limited amount is sold commercially. DNH does not have a market place and storage for agricultural products.

The tribal's have a **strong culture of arts & crafts**, but it is **not practiced commercially** and the craftsmanship is being lost. The various tribal of the U.T. are involved in the following occupations as their primary source of income:

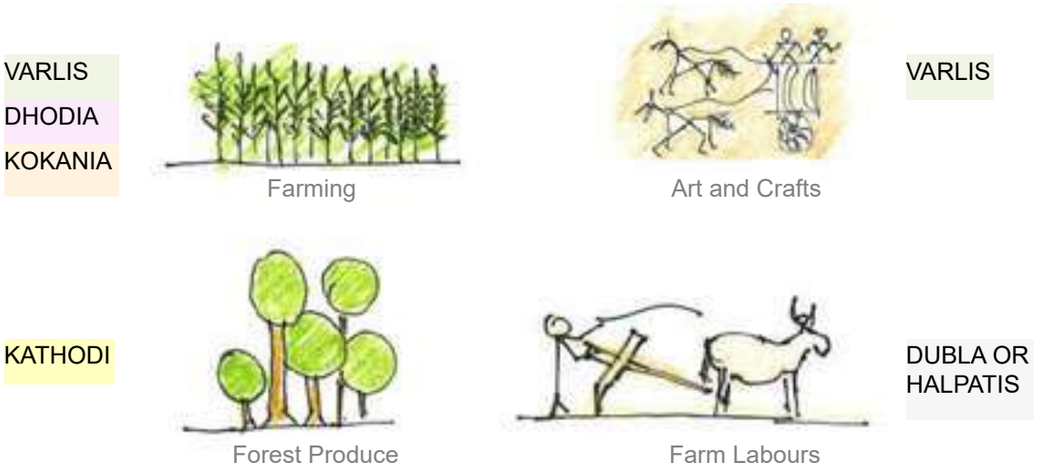


Figure 6.1: Primary source of income of Indigenous Communities of DNH

Source: Ecofirst

Key Issues and challenges

The limited agricultural produce is due to **small land-holdings** by the farmers, which is a result of division of land. The farmers **lack advanced tools and techniques** of farming thus the farming is very limited. **No dedicated market** to sell their farm produce. Their arts and crafts are being lost due to **no demand for their art in the market**, and **lack of training** in the future generation. Thus, to sum up below are the strategies proposed and their respective projects identified for this sector:

Proposed Strategies

Below are the few strategies proposed:

S3. Promote art & culture

To promote the culture, arts & crafts of the indigenous groups by branding, celebrating their local festivals, **integrating their arts & crafts with the tourism industry** of DNH.

S5. Skill development/Trainings

To provide **trainings to the farmers** regarding the **modern tools & techniques** being used in farming to increase their produce. As well as **train the artisans to meet the current trends** in the market and improve their skill set to generate income out of their arts & crafts.

S4. Develop community centers

A community center where the **tribal's can interact with the tourist** and locals and **exhibit and sell their goods** and arts to the tourists. It is to give a **platform to showcase their rich arts & culture** on a global level.

Project Identification from S3,S4 and S5

P6 – Varli Village
P7 – Local markets
P8 – Skill development center
P9 – Civic & cultural center

6.3 Boost Industries

Present Scenario

The **industrial growth** started in 1993 **post tax exemption** in 1991, with **Silvassa being its epicenter**. The growth spiked but had to combat the challenge of ban on industries causing pollution, introduction of GST and industrial policy of GIDC, thus, there was a **stagnant growth in industrial development** in the last decade. There are **upcoming infrastructures** which would act as a **trigger for boosting the industrial development** in the U.T. DNH lies in the influence zone of DMIC corridor, bullet train having one of its proposed station at Naroli, Mumbai-Vadodra expressway passing through the U.T. These new infrastructures would help in **establishing emerging industries** such as ITES, Logistic, Allied industry & finished goods market, R&D industry, Cutting edge technology industry, bio-technology, nano-technology.

Allied industry & Finished goods market

Logistics

R&D industry

Cutting edge technology

Bio-technology

IT & IT-ES industries

Nano-technology

Figure 6.2: Emerging Industries

The industries witness a lot of workers migrating to the U.T. for job. However, the **migrant labours are forced to live in compromised condition**. Worker housing form 50% of the urban **housing** & hence **need to be upgraded for urban poor.**

Key Issues and Challenges:

The stagnant growth of industrial development is due to the **competition from the policies and tax exemptions** adopted by the **neighbouring industrial town.** There is a **lack of infrastructure** for the existing industries such as road infrastructure, CETP, municipal water supply, sewage etc. There is a **cap on the types of industries** allowed in DNH.

The **migrant labours live in congested and cramped places.** There is a **lack of connectivity** between the work centers and the remotely located residential centers. Thus, to sum up below are the strategies proposed and their respective projects identified for this sector:

Proposed Strategies

Below are the few strategies proposed:

S6. Education hub to enhance technical skills

To **train and develop better skill set** in the industrial works force to increase the efficiency of industrial production, there is a need of an educational hub, where **education based on technical, management** and other fields are imparted.

S7. Provide Infrastructure support (Physical & Digital)

To provide **infrastructures both physical and digital** to the existing industrial hub as well as laying foundation for the **emerging industries**. The digital infrastructure could help in **easy management and administration** of the industrial hub

S8. Labour Accommodation

To provide **affordable, comfortable and uncongested accommodation** to the labours, with all the facilities & infrastructure and in **close proximity to their work centers**.

Project Identification from S6, S7 and S8

P10 – Transportation hub
P11 – EWS housing

6.4 Promote DNH as Tourist Hub

Present Scenario

DNH has been a **perfect weekend gateway** and tourist destination as it is dotted by **serene natural features** like hills, forests, rivers/ water bodies, etc. and also is well connected to urban centers of Gujarat and Maharashtra. 80% of tourists visit the UT for weekend stay/ vacation and 20% for business. Apart from these purposes, the tourists also visit DNH for **wedding celebrations** and for **religious reasons**. Silvassa city acts as a host city for tourists and business visitors as it is a gate-way and is well-connected to rest of DNH. Daman another major attraction, located only 30 km from Silvassa also **has many tourist spots**. **Daman and DNH** together can offer a **plethora of tourist attractions**.

Issues and Challenges

In the last couple of years, the **growth rate of visitors has become stagnant.** Post analysis of this sector and through stakeholder consultations, the reasons behind this stagnant growth can be listed as below:

Lack of Hospitality in terms of capacity and options

Lesser quality food options

Week Public transportation and connectivity

Lack of Branding and Marketing

Below are a few strategies proposed to counter the challenges faced in this sector:

I. Categories that streamline the tourism potential into themes

Apart from being a **eco-tourist attraction**, **other themes** can also be explored such as **Industrial tourism, Wedding tourism, healthcare tourism**, etc. as shown in the figure below.

Figure 6.3: Potential sectors of tourism themes and their categorization

Source: Tourism Policy of UT of DD and DNH 2019-24; Ecofirst

Figure 6.4: Project categorisation and connection

Source: Tourism Policy of UT of DD and DNH 2019-24; Ecofirst

All the present **tourist destinations** can be **categories and packaged into different themes** as shown above, to provide **variety of options for visitors** to choose and explore. Various **experience-based activities** can be developed under each theme/ destination and respective circuits can be formed and facilitated. For the development or **enhancement of the physical infrastructure** there is a need to have Public and private partnerships and a **holistic overview** with a roadmap.

II. Develop a robust Marketing strategy

Along with promoting/providing for various tourism avenues and sub-activities, a **robust marketing strategy** is equally important. Presently around 4-5 lakhs domestic tourist and 500-6000 international tourist footfall is observed in DNH every year. This footfall can be increased by **making DNH more visible and attracting tourist** by providing more exciting activities/options.

Few of the strategies as per the 2019-20 tourism policy of the merged UT are as below:

- Ensure presence of **DD and DNH tourism department in international and national tourism events/marts**, road shows, expos, etc.
- The department to ensure **strengthening of ICT infrastructure** to provide year-round access to all destinations in DD and DNH, especially remote tourist locations.
- The department shall **liaise with mobile operators** to ensure **good digital connectivity** for all tourism destinations in the UT, especially far-flung areas.
- **24X7 Tourism Helpline** number to be set up to provide instant help to tourists. This service can be made available and run in Hindi, English and other prominent foreign languages.
- The number of **Tourist Police to be deployed** at all prominent tourism spots.
- Special emphasis to be given to the **security of female tourists.**
- **Regular Cleanliness drive**s to be conducted at important tourist destinations with the help of schools, NGOs, CBOs, corporates, etc.
- Department to develop **3-year event calendar in-sync with other themes** and business events to attract tourists
- The state to **honor individuals/ organizations doing exemplary work** in the field of tourism to **encourage provision of best services** by them in the field of tourism.
- To provide information to the tourists, **Tourism Information Centers** will be established at prominent airports, railway stations and bus stations across the country.
- The department DoT to do conduct **aggressive marketing campaigns** of tourism places at a prominent location at such as airports, railways station and other important tourist destinations in across the country.
- UT's image to be improved as a tourist spot through **strategic advertising campaigns** across print, electronic and outdoor media channels.
- Tourism information, **research and forecasts** can be made more effective to serve the needs of the industry and the Government.
- Use of **social media to be maximized for tourism promotion and publicity.** Department's website, Facebook page, Twitter handle, etc. will be enriched further and regularly updated.
- Tourists to be provided information through better use of information technology and communication channels in a tourist-friendly manner.
- **Digital marketing techniques to be utilized** more to inform and educate tourists on the uniqueness of the tourist destinations and products, thereby, enhancing the UT's image and perception.
- These will **directly and indirectly help in accelerating investment**, increase revenue generation and provide more livelihood opportunities to locals.

III. Uplift the supporting infrastructure facilities (Physical and Digital), etc.

Silvassa can be developed as a **city to host all the visitors** as it is well-connected to entire DNH and to Daman. **Hospitality facilities needs to be uplifted** and more options for food, bed and breakfast to be provided. **Transport connectivity and infrastructure should also be enhanced** specially to connect remote tourist spots/locations.

Also, few tourist destinations are proposed within Silvassa city to entertain the tourist during their stay in the city. These include:

- **Silvassa Haat**
- **River-front development** with **water sports activities** and river-side restaurants, etc.
- The present **Information center can be uplifted** with addition of **experience center** facilities
- **Experience tourism** can be introduced like **varli art, live like tribals**, etc.
- As Silvassa is known for its industries, **industrial tourism activities can be proposed** to show-case the manufacturing processed as study tours or for inquisitive tourists to learn the processes.
- Apart from the above physical interventions a **digital platform can be formed** for tourists to **plan and customize their trip-stays.**

IV. Developing 365 days calendar

The tourist majorly visits DNH and Daman **during October-December** and their average length of **stay is around 2.2 days**. To increase this and attract tourist throughout the year, a **365 days calendar has been proposed** below **merging with local festivals and tourist attraction activities**.

Figure 6.5: Proposed 365 days Tourist Calendar
Source: Ecofirst

Based on the above **study and analysis** below are the strategies proposed and their respective projects identified for this sector to **achieve our goals** in successfully uplifting DNH as a **quality tourist destination.**

Proposed Strategies
Below are the strategies proposed:

S9. Integrate Tourism and Forest Department

Currently **Tourism and forest departments work independently** with their respective tourist destinations spread across DNH, however an **integrated approach would be more beneficial** in terms of finances, time and efforts for government as well as tourists.

S10. Branding & Marketing

Promote and establish Silvassa as a **branded and quality tourist destination** by its characteristics, creating its identity by **emphasizing its authenticity** while using all possible modes of marketing.

S11. Quality Bed & Breakfast facilities

To provide for **quality accommodation and food options** within DNH (with different price range) to make it more welcoming and tourists stay more comfortable and pleasant.

S12. Operational 365 days events Calendar

To **welcome tourist throughout the year** instead of just between October –December by **combining tourist attractions with local festivals** and designing them to offer varied activities throughout various seasons. This will help in **increasing the footfall, generate revenue** throughout the year.

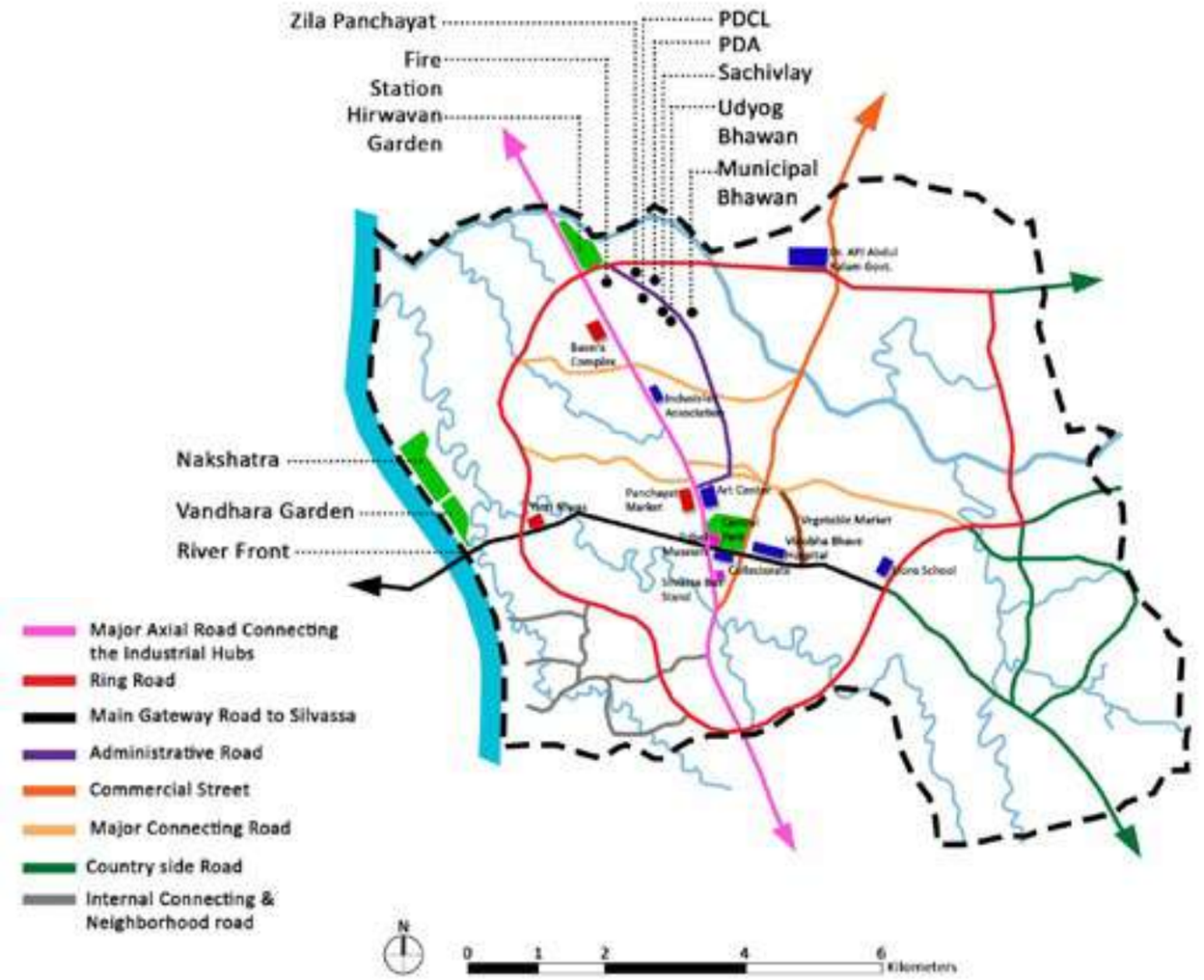
Project Identification from S9, S10, S11 and S12
P12 – Infrastructure for Tourism (Physical & Digital)
P13 – Silvassa Haat
P14 – Tourist Information & Experiences center (VR & Digital)
P15 – Water based events – Daman Ganga

6.5 Urban Development for Silvassa

Present Scenario

The existing structure of Silvassa **misses to express itself as district headquarter** and face of DNH. The place **lacks character** which are read through its **important landmarks, streets, nodes, district and paths**. There are **few important landmarks** like vegetable market, panchayat market which needs a facelift. The **other significant landmarks** like the tribal museum, our lady of piety church which seems to have **lost its luster and needs to be used as icons** for the city. Silvassa also has **deficit of housing.** There is a **need of planned and affordable housing** in the city.

The **typologies of the roads** are emerging as administrative road/ civil street connecting all important buildings from the collectorate to secretariat. The kilwani naka to Vinoba Bhave municipal hospital emerges as a commercial street. **Ring road needs to provide an image of an emerging town**. All-important junctions offer opportunity to **create lively nodes**. The **ground** used for celebrations and conglomeration **need an upliftment**. There is also a need to **develop neighbourhood green** in the city, which is significantly missing.



Map 6.2: Road Characteristics of Silvassa

Source: Ecofirst

Image 6.2: Vegetable Market road
Source: T.C.E.

Image 6.3: Silvassa-Vapi road
Source: T.C.E.

Image 6.4: Zanda chowk road
Source: T.C.E.

Based on the strength, the **major streets and landmarks can create experience** for the cities of **green and walkable and equal streets**. There is also a need of **expansion of industrial area** with **world class infrastructure** would offer opportunity to showcase the industry as part of **urban development with walkable residential colonies**.

Issues and Challenges:

There are **no distinct characters** to the streets. The streets **lack streetscapes, pathways, vendor zones, street parking** etc. **The landmarks** in the city such as panchayat market, vegetable market is in dilapidated state and **needs a facelift**. The other major landmarks such as tribal museum, our lady of piety church is **not distinguished and has a potential to be uplifted as the icons** in the city. The city also **lacks neighbourhood greens** which is a need of the hour. There is also a **need of affordable housing** in the city for the urban poor as well as other class of the society. There is also a **need of up gradation of central ground** which is a major public gathering space.

Thus, to sum up below are the strategies proposed and their respective projects identified for this sector:

Proposed Strategies
Below are the strategies proposed:

S13.Develop Character of Roads

To **develop distinct character to each street** according to their nature with proper streetscapes, sidewalks, vendor zones, parking, thus, creating walkable and equal streets.

S14. Develop Landmark Areas

To **develop the major landmark areas** and to **create them as icons** of the city, which would put Silvassa on the national and international face and **become the identity** for Silvassa.

S15. Accessible Green with First/Last Mile Connectivity

To **develop accessible green**, which would act as **breathing space** for the city and open spaces for the people **for leisure**. There will also be **first to last mile connectivity** through the **green covered pathways**.

S16. Affordable Housing

To provide **comfortable, uncongested living spaces** to the people especially the **migrant workers** at affordable cost.

Project Identification from S13, S14, S15 and S16
P16 – Streetscape –Equal Streets
P17 – Green Covered walkways
P18 – Revitalizing Landmarks
P19 – Public bicycle scheme
P20 – Sports complex extension (Silvassa Gymkhana)
P21 – Affordable Housing Development

6.6 Quality of Infrastructure & Transportation

Present scenario

As shown in the Water Transition Framework diagram below, Silvassa present **water infrastructure is at the Sewered city stage** i.e it is at the stage where it is **ensuring to provide 100% water supply** to all households, **100% connection sewerage system and 100% storm water network**. It needs to progress towards a **water sensitive city where it becomes self-sufficient**.

For this a silo approach for water , waste water, storm water will not help. Hence, it is **recommended** that Silvassa city adopted an **integrated water resource managemen**t where the entire water cycle is considered and city infrastructure is developed holistically. (Refer figure 6.12 below)

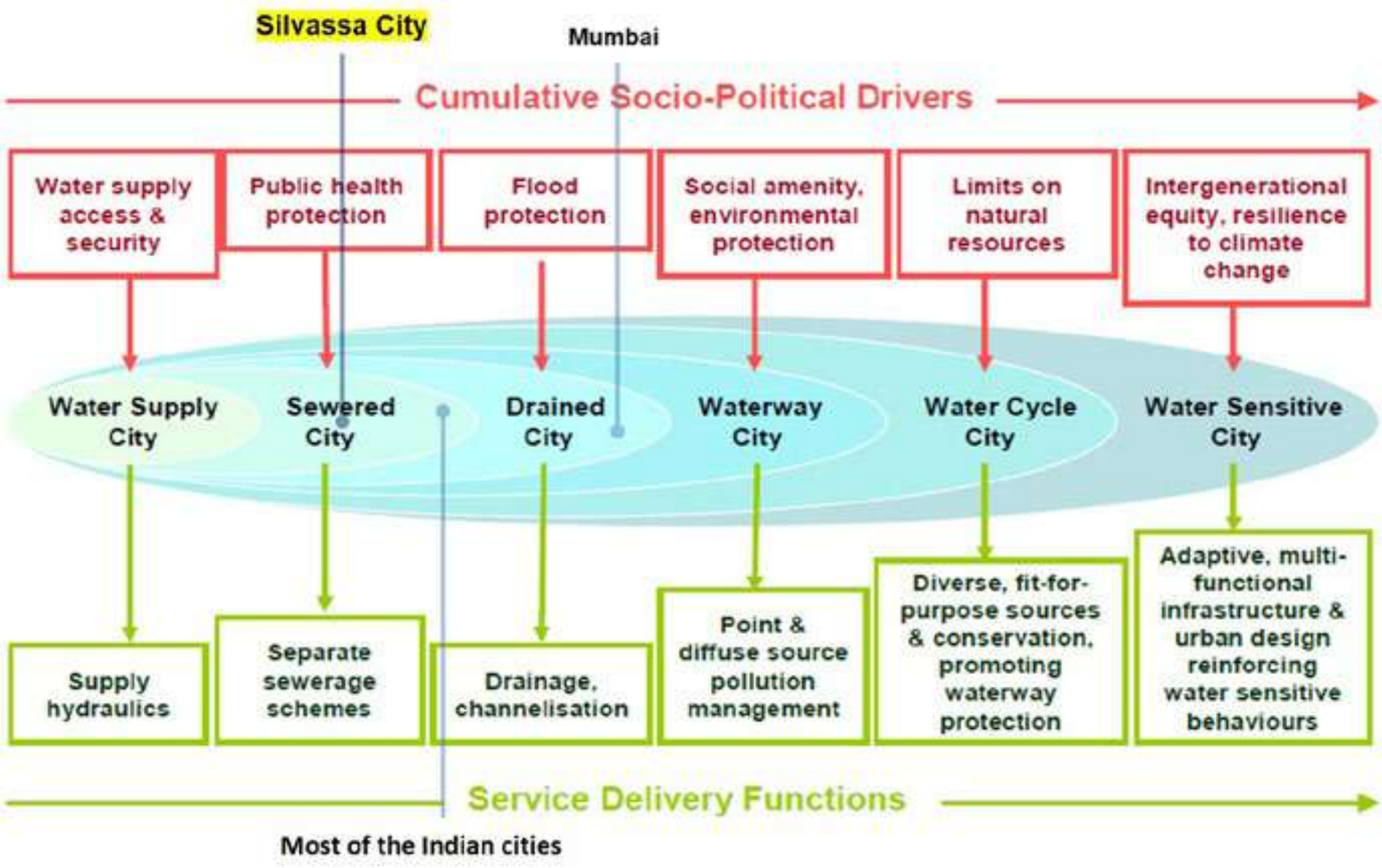


Figure 6.6: Water Transition Framework

Source:Detailed Project Report on augmentation of water supply system under Silvassa Smart City Vol.01

Figure 6.7: Sustainable Urban Water Management framework

Source:Detailed Project Report on Infrastructure Assessment for Sewarage including SCADA System in Silvassa Smart City

Adopting this approach below is the analysis i.e issues encountered under each component of water resource management and common set of strategies have been derived to look at the system as a whole.

Issues and Challenges

6.6.1 Water Supply

The provision of sustainable, safe, reliable and affordable potable water supply through **efficiently managed network system is the key goal** for the water supply system for the Silvassa Smart City.

Service level benchmarking was done with **CPHEEO Standards.** Below is the assessment:

Figure 6.8: CPHEEO Benchmarking Assessment for Water Supply

Source: Ecofirst

Only **60% of the city is covered with water supply line**. The consumers are facing problems due to **infrequent timings** (odd 8 hours of supply) and the **quality of water supplied**. The **laid piped network** is quite **old and experiences frequent leakages leading to quality issues** at certain locations even after treatment at WTPs. The old water infrastructure has also resulted in **significant level of non-revenue water (NRW)** and increased expenses in operation and maintenance.

Possible Projects

- **Continuous 24 x 7 water Supply System** – Upgrading water supply lines and laying new lines in left out areas.
- **Water Security from the Daman Ganga river** - Construction of Intake well structures.

Thus, **first strategy** for this sector is **to provide 100% access to basic service of water supply**. It includes:

- Ensuring **100% availability of water** from source by Upgrading water supply intake structures.
- **Upgrading water supply zone** for 100% coverage of population.
- **Upgradation of existing water treatment facility** to ensure the 100% treatment of supplied water.
- **100% coverage of households** with metered connections

- **Upgradation of existing and construction of new water treatment plant** with PLC and **SCADA system.**
- **Installation of Ultrasonic water meters** at each household to collect the revenue for water supplied.

6.6.2 Waste Water

Service level benchmarking was done with CPHEEO Standards. Below is the assessment:

Figure 6.9: CPHEEO Benchmarking Assessment for Waste Water

Source: Ecofirst

With current level of water demand and water supplied about 24 MLD of waste water is being generated in the Silvassa city. Currently, about **70% of the area is covered with sewerage network**. But the **sewerage network collection is working inefficiently** as only 0.9 MLD of waste water reaches the STP as the properties under sewerage zones areas are not actually connected to sewerage network.

The **sewage treatment plant is not functioning efficiently** because the minimum required quantity to ideally run the system is not reaching. Also, the **self-operation and maintenance cost is increasing**. Further, out of that, only **3% is being reused in irrigation for gardening**, Construction sites, Road washing, etc. According to NGT Order every state and UT need to submit an action plan for utilization of waste water. DNH has submitted action plan to CPCB in 2019.Thus, to meet this statutory requirement it is **proposed to reuse 100% of treated waste water** for both irrigation and non-potable usages. This will also help reduce Silvassa's dependency on fresh water.

There is **no provision for treatment of industrial waste water** which being toxic can contaminate surface water bodies and ground water and even Daman Ganga River which is the primary source of drinking water supply for the city. **No common effluent treatment plant (ETP)** exist to treat the industrial waste water.

Thus, below are the objectives proposed:

- **100% coverage of city** with sewerage network.
- **Ensuring periodic maintenance of sewage pumping station** and **sewage treatment plant.**
- **Ensuring reuse of treated waste water** for irrigation and non-potable usages.
- **Protecting natural streams, water bodies** from contamination from untreated waste water discharge.

Possible Project:

- **Up gradation and laying of sewerage network system** to cover 100% area within municipal limits.
- **Upgradation of existing and construction of new sewage treatment plants.**
- **Enforcing Policy for reuse of treated waste water** and Laying of piped network treated water supply to potential areas.
- **Installation of Bulk flow meter with PLC and SCADA System** at sewage pumping station for effective monitoring and control of the system.

6.6.3 Storm Water

Service level benchmarking was done with CPHEEO Standards. Below is the assessment:

Figure 6.10: CPHEEO Benchmarking Assessment for Storm Water

Source: Ecofirst

Currently the city has about **72.08 Kms of Drainage network** spread across the city covering ABD area and pan city area inclusive of PWD & ring road. The **drainage network consists of box drain, conduits and open drains** with manholes, catch basins, catch pits. But due to absence of drainage system and Inadequate capacity (size, slope etc.) and **bad conditions of existing drainage system**, **water logging has been observed** at few locations.

As of now the GOI's ministry program of Jal Shakti Abhiyan the **rain water harvesting is being carried out in city.** For Silvassa city, **70 locations have been identified for Rain water harvesting** under Jal shakti Abhiyan.

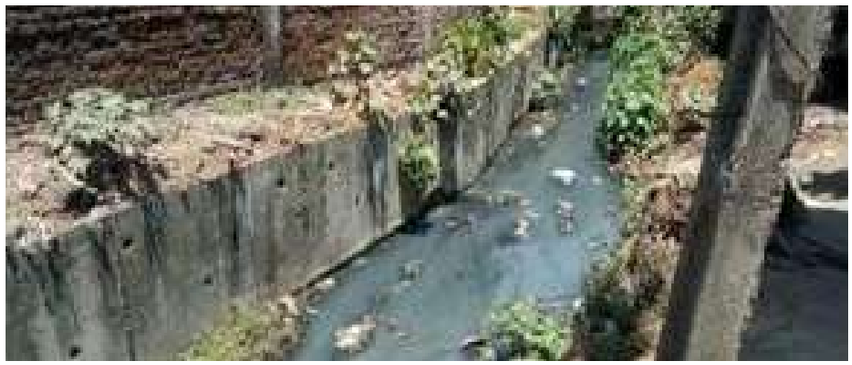


Image 6.5: Pollution in the storm water drains.

Source: T.C.E.

Image 6.6: Existing storm water drain

Source: T.C.E.

Thus, below objectives are proposed:

- **Identification of water-logged areas**.
- Identification of **areas where no drains or inadequate drains** are observed.

Possible Projects:

- **Up gradation of existing drain** to adequate sizing.
- **Construction of new drains** in left out areas.
- **Ensuring no water logging** in any of the area.

Proposed Strategies

Thus, the overall strategies proposed for Integrated water management are as given below:

S17.100% Access to 24 hours tap water supply

To ensure **availability and accessibility of good quality water** to all households in Silvassa. Also, Smart metering, **SCADA for water supply and waste water** should be installed for efficient management of water resource.

S18. Waste water reuse and recycle

To **reduce fresh water demand**, it is important to **reuse treated waste water** and hence **necessary infrastructure** for this should be provided.

S19.100% Storm Water & Waste Water Network

Ensuring **100% storm and waste water network** n the city. And help **mitigate instances of water logging and pollution** in storm water drains.

Project Identification

P24 –100% Storm water & sewerage Network
P25 –SCADA for water supply & Sewerage
P26 –Wastewater recycling network
P29 –CETP for industries
P23 –Smart public Toilets

6.6.4 Solid waste management

Present scenario

The city has been **successful in implementing an effective solid waste management system** across the entire city. It has **achieved the basic service level CPHEEO benchmarks**[48] for 100% coverage, segregation, collection, treatment and scientific disposal as shown below:

Figure 6.11: CPHEEO Benchmarking Assessment for Solid Waste

Source: Ecofirst

But till the above SWM system became effective, the **city used to dump its waste in 2 landfill sites** - Binanji 8km to the west and Khadoli 14km to the south of the city. Although **dumping has been stopped** in both these sites today, **to reduce it negative impacts on environment and health** of residents staying in nearby areas i.e. risk from polluting ground water due to leaching and air pollution due to emission released from dumpsite, it is important to scientifically close these dump sites.

Also, an **Integrated Solid Waste Management policy**[49] was formulated for Dadra and Nagar Haveli (DNH) by Department of Urban Development, DNH in 2018. Silvassa city adheres to the provisions given in this **policy to become a clean and zero waste city.**

Issues and Challenges

- **Negative health and environmental impacts** of existing legacy weight/ dump sites
- 100% HH level segregation of waste
- **Increase resource recovery**

Out of the above identified issues, in near future the city has plans in place to **increase segregation at source, process 100% of its waste at Kharapada site** to enhance streamline resource recovery and also implement a **smart technology-based collection and transportation system**. It does have a potential to be showcased as **model city with an effective solid waste management system** in future.

The potential for intervention under smart city program in this sector is for **reducing the negative impacts of existing legacy waste** i.e. the dump sites.

Proposed Strategies

Below are the proposed strategies to address the issues mentioned above:

S20. Ensuring Clean and healthy city environment

To **ensure clean and healthy environment** it is not only important to have an **effective solid waste management system** in the city, but also important to mitigate the negative impacts caused by the dumping practice carried out till toady. For this **scientific closure/ bio-mining** of these legacy waste sites is proposed.

Project Identification from S20

P30 – Bio-mining of existing landfills

[48] Ministry of Urban Development, GoI, Handbook of Service Level Benchmarking. Link: http://cpheeo.gov.in/upload/uploadfiles/files/Handbook.pdf [Accessed on 10th April, 2020]

[49] Department of Urban Development, Dadra and Nagar Haveli Solid Waste Management Policy, 2018. Link: http://dnh.nic.in/Docs/19Sep2018/SWM_Policy.pdf [Accessed on 9th April,2020]

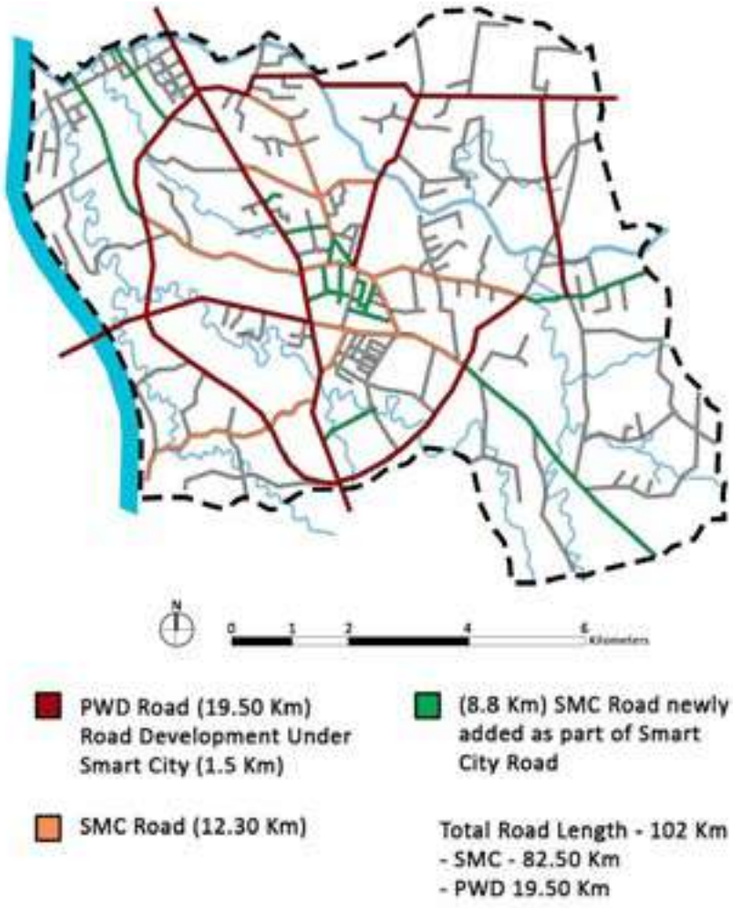
6.6.5 Roads and Transport

Present scenario

The **road transport is the most convenient way** of transportation within the city and in intercity. Daman is 30 km away from Silvassa on National Highway-8. There is a **bus stand built in the city** which is owned and operated by Government of UT.

As per the data there is **108 kms of road length network in the city**. **SMC is in charge of 82.60 kms** of road and remaining **19.50 kms is managed by PWD** Department. The roads falling under SMC are of various widths and being constructed as per the city got its expansion.

The roads widths are varying as well as the elements of the road. At some locations footpaths are present, but **most roads were without footpaths** with **no separate tracks for non-motorized vehicle**. The s**tandard elements** of the road like zebra crossing, road markings, signaling system, street furniture are **limited to very few locations.** There are **numerous road junctions** in the municipal limits which are **very critical from traffic management and safety aspects**. Bus stop or municipal **bus stop for intra city transport are absent** in the current system.



Map 6.3: Silvassa Road Network
Source: Ecofirst

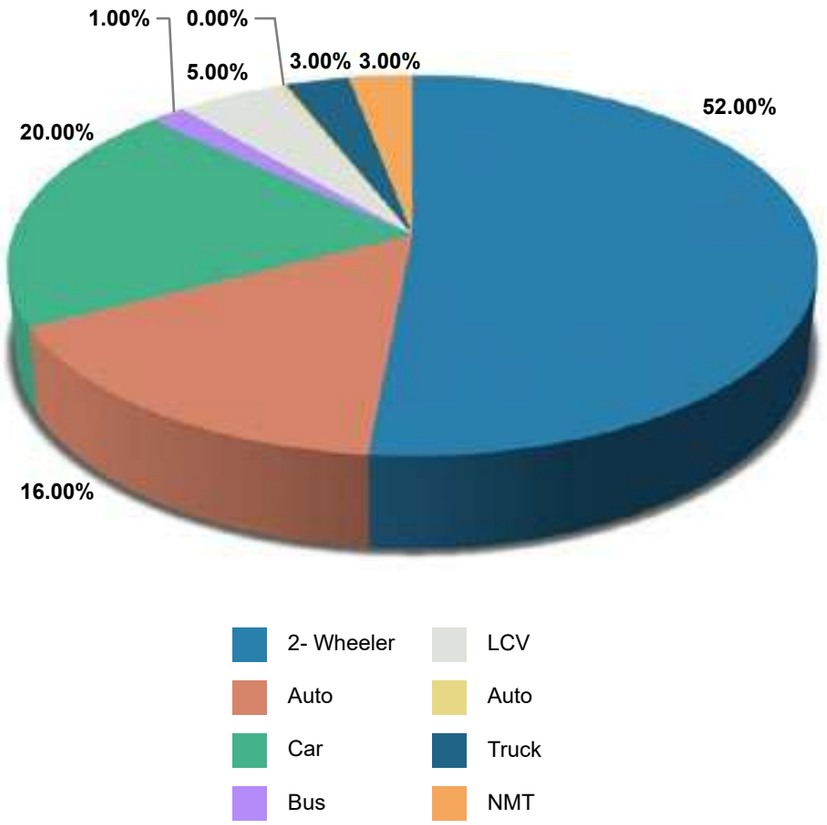


Figure 6.12: Mode share
Source: Ecofirst

This above pie-chart represent road occupancy mostly occupied by 2-wheeler traffic (52%) while the car passenger shares only 20% of the overall traffic.

Issues and Challenges

- As per record there is only **22% of the road area with footpath.**
- About **60 % of the road network is powered with street lights** and rest of the road network is in dark.
- **No separate track for non-motorized vehicle** provisioned in the road network.
- The **current design** of the road network is **lacking the disabled friendly and child friendly provisions** and include place making.
- The **road pavement condition is in worse state** and potholes, alligator cracks, undulated pavements.
- The **junctions need significant upgradation** due to **emerging traffic as point of confluences** are increasing.
- There is a **lack of Traffic signaling system** in the city.
- Due to increase in industrial activities in the outskirts, public intra city transport is the need of hour. As of now there is **no public transport system**, no bus stops and allied services area existing. This needs to be added.

Proposed Strategies

S21.Low carbon Footprint

To **promote sustainable transport.** This includes **safe pedestrian infrastructure** like footpaths, street lights, safe junctions and crossings, etc. and **provide public bus system** through e-buses and smart bus-stops. This will **reduce the transport carbon footprint** of the city.

Project Identification from S21
P22 – Silvassa Bus Terminal
P28 – Enhance Ring road character

6.6.6 Smart Governance & Public Administration

Present scenario

Under Smart Governance Module of Smart City program, the city has started working on the following initiatives to **integrate technology in governance and public service delivery**. Here are a few smart city applications envisaged for Silvassa:

Figure 6.13: Technology Applications for Smart City Silvassa

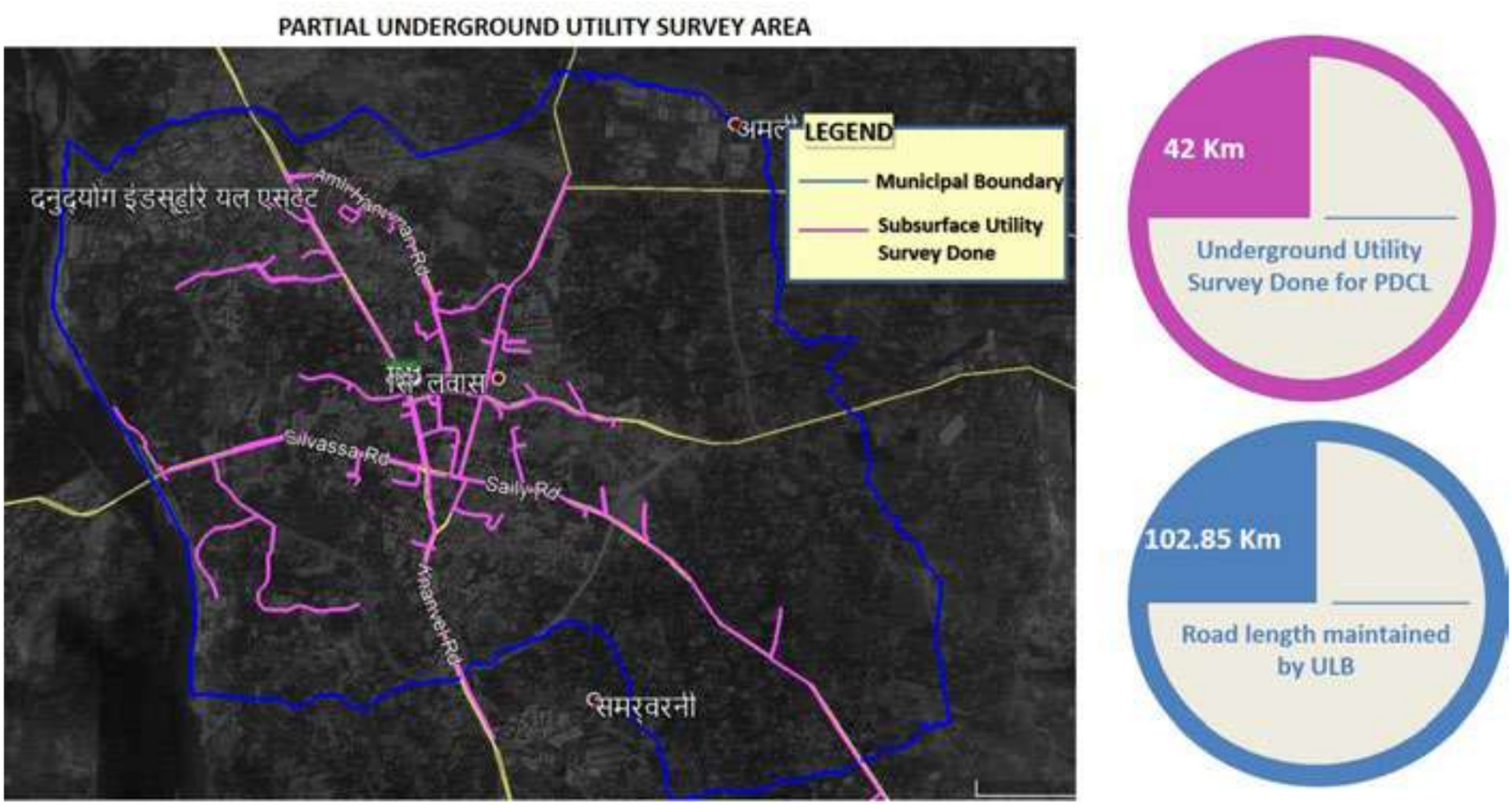
Source: PWC

I. Smart Governance

Smart governance is a strategy to **aid in better planning and decision making**, thereby providing **effective, efficient citizen-centric services**. Here SMART means governances that is – Simple, Moral, Accountable, Responsive and Transparent[50]. These include Incorporation of **ICT and GIS based mapping system** to **improve the efficiency and accountability of services** provided. For this Silvassa is undertaking comprehensive digital mapping in GIS.

The total road length of Silvassa is 102.85Km. The underground utility survey of 42Km has been done for PDCL and ~60.85Km is remaining for subsurface utilities. PDCL with its third party is undertaking the underground utility services survey for water, waste water, storm water lines, etc. While PWC is in process of surveying electrical line, gas lines, etc. to have a comprehensive GIS Map for city. Also, a **GIS platform will be developed.** This will assist for unified common decision making / planning of city in the future.

Thus, GIS mapping and platform will helps **improve decision making, ensure precise management** of the resources and increase transparency and efficiency in the public procedures.



Map 6.4: Status of Underground Utility survey done to develop Comprehensive GIS Map for the city

Source: PWC

[50]GRIHA Cities Manual, New Delhi, 2019

II. Smart Enterprise Resource Planning (ERP)

At present the **service delivery by SMC is done manually** and according to the IPSOS Ease of Living Index 2019, Silvassa Ranks 90 in Governance out of 118 cities considered. Hence, there **technology intervention is required** to automate the processes to improve the service delivery. For this, **efforts** are made to have **more services delivered through online platforms** for both G2C and G2B services. The service delivery includes above applications as well as **grievance redressals, tax collection, expenditure, public participation**, etc.
This will be done by creating online platforms, MIS systems, mobile apps and web portals.
This will help to improve the following:

- **Improved citizen engagement and experience**
- **Automated Business processes**
- **Decrease lead time** of service delivery
- **Increased Operational efficiency**
- **Availability of Information** in few clicks
- **Improve Inter-departmental co-ordination**
- **Eliminate Data and Knowledge silos**
- **Improve decision making**

Avg. No. of Days for Processing Application			
	Birth and Death Certificate*	7	
	Construction Permission*	60	
	Occupancy Certificate*	45	
	Electricity Connection**	Domestic	7
		HT	30
		EHT	180

Figure 6.14: Present Service Delivery scenario in Silvassa

Source:* IPSOS Ease of Living Index 2019
**,PDCL Website

III. Smart Traffic Management and other ICT components

Presently, many **road accidents have been recorded** in Silvassa as shown below. Road injured and fatalities data for last 3 years shows that, the **road injuries have increased** from 23% to 33% for 2-wheelers and the road fatalities has increased for 5% to 18% for pedestrians. Few of the reasons for this are - **Over speed, Wrong way driving, lack of functional signals, No helmets, other traffic rules violations**. So, there is a **need of Traffic Enforcement.**

Figure 6.15: Road Injuries and Fatalities in Silvassa and reasons responsible

Source: PWC

Further, as per the crime records of Silvassa Police Station (2018 – 2019), the v**iolent crimes, kidnapping & abduction and crime against women have majorly been recorded**. Hence, there is a **need of system for Crime prevention and Quick response** from stakeholders. To increase the safety and security of the city, under smart city Mission the city is presently **increasing its surveillance and installing smart/intelligent systems** on roads and public areas like gardens. Few Surveillance Cameras are already deployed by Police dept, but there are many other locations/ areas where surveillance is required **to ensure safety of citizens.**

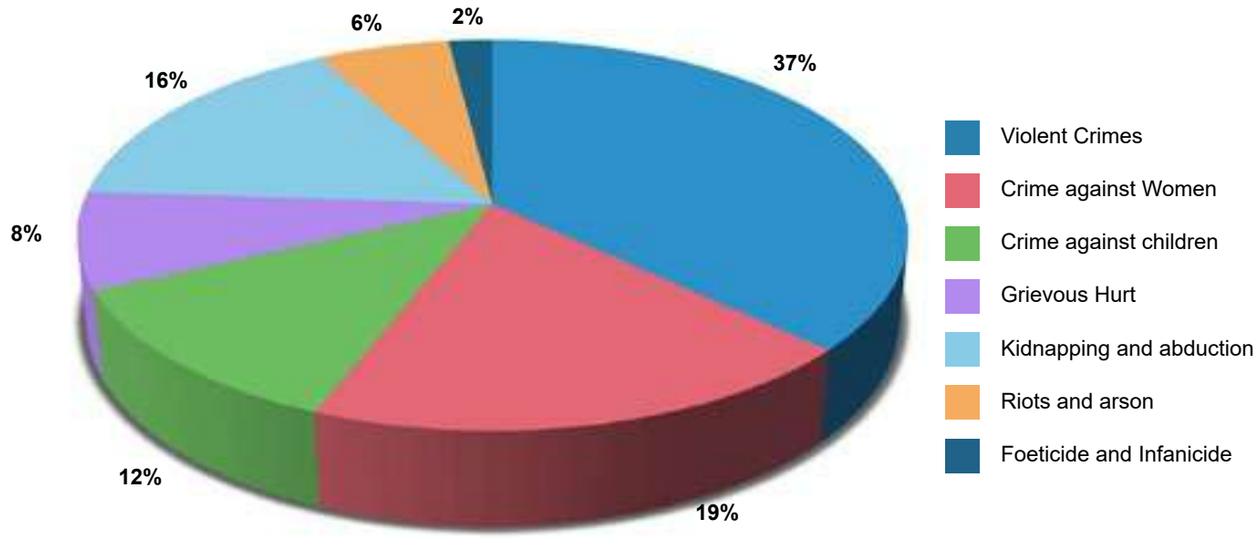


Figure 6.16: Instances of Crimes recorded in Silvassa

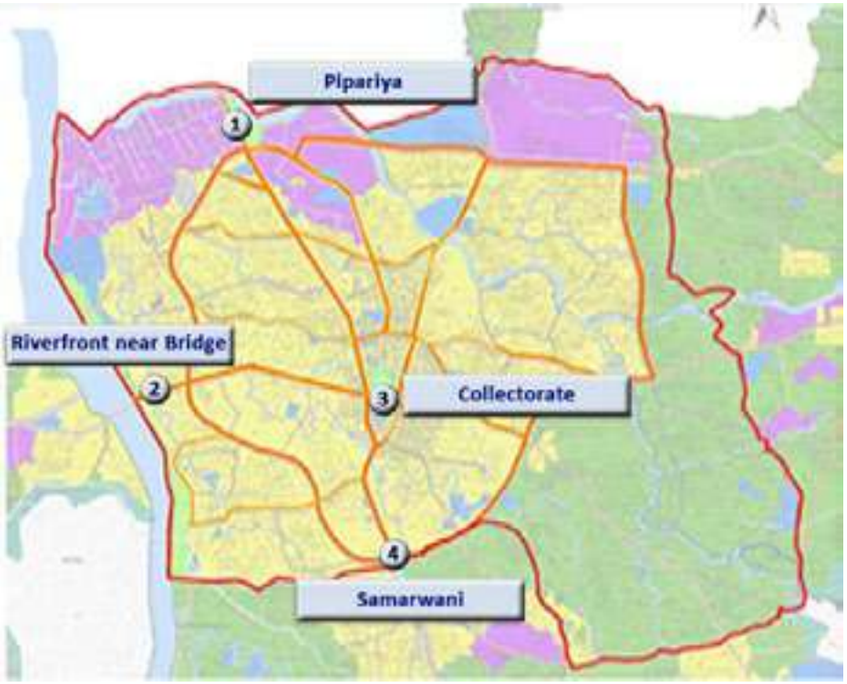
Source: PWC

JUNCTIONS	TOTAL 31 JUNCTIONS OUT OF WHICH ONLY 01 JUNCTION HAS FUNCTIONAL SIGNAL
SURVEILLANCE	26 EXISTING CITY SURVEILLANCE LOCATIONS
STREET LIGHTS	~ 54KM ROAD LENGTH IS COVERED WITH STREET LIGHTS
PARKS	8 NO'S PARKS & 2 NO'S OF MUSIC, DANCE & DRAMA CENTERS/ THEATRES

Hence, apart from 26 surveillance locations, CCTV cameras are been installed other location. Also, cameras to capture speed violations, signal cuts, parking, no helmet, etc. This will **help in traffic enforcement and help increase safety** in future.
Traffic enforcement for Signal cuts, speed delay, Speed violation- e-challan are issued. This will help in **smooth traffic movement**.
The total number of junctions are 31 in Silvassa and 4 are with Traffic signals, out of which only 1 junction has functional traffic signals at Shahid Chowk. **ATCS- Automatic traffic control system has also been installed** to monitor traffic density.
Current **LED Street lights cover a road length of 54Km, and remaining road length should be illuminated**. Streetlights are monitored to lit them for increased safety during night time.
Also, **Variable Messaging Display has been provided** at around 11 location.
Further, **Environmental sensors are installed** at 4 location which will periodically capture the data given below. This will help **monitor the environmental quality** in Silvassa and it will alarm if any parameter exceeds the prescribed limit so that necessary measures can be taken **to maintain a good environmental quality**. To monitor and control all of the above ICT interventions an **ICCC center have been formed**.

Figure 6.17: Parameters for Environmental Sensor

Source: PWC



Map 6.5: Environmental Sensors location in Silvassa

Source: PWC

IV. For Secured Digital Communication System (SDCS)

Smart City has many integrated Smart segments/ sections, but there is **no Smart and Resilient Technology Infrastructure/ Communication Network** for Disaster and Public Safety organizations.

Ministry of Home Affairs (MHA) has **defined the guidelines for Modernization of Communication System**.

Resilient Communication Network is the integral part of any mission critical operational requirement for Public Safety Organization like Police, Fire, Disaster Management team etc. communication system plays an important role during the emergency situations. For E.g. Terrorist attack, Flood etc.

Silvassa being a tourist destination there should be **updated resilient communication System for Public safety and Disaster management.**

Issues and Challenges:

- **Improve governance** by integrating technology-based GIS mapping and public service delivery.
- Using **ICT to improve the safety and security of citizens** –i.e. for smart traffic management and enforcement.
- **Improvement of communication network for public safety organizations.**

Proposed Strategies

Below are a few strategies proposed

S22.Enhancing Citizen Safety

To use technology to **improve the road safety and security** by **increasing surveillance** through installation of CCTV, smart **intelligent traffic management systems**,etc. and also ensure no dark spots are present in the city that will attract crimes by providing sufficient lighting in public areas and streets

S23. Establishing Resilient Technology Infrastructure

To **increase preparedness** of Silvassa during disasters like floods, terrorism attack, etc. by providing a **resilient communication system** for its Public Safety Organizations.

S24. Smart Governance

To aid **better planning and unified decision making** a comprehensive GIS map is to be developed for the city and also to **improve the citizen service delivery (ERP) online platforms** for both G2C and G2B services.

S25. Improving the Livability

To provide **safer urban spaces, good quality infrastructure** and **citizen centric service delivery** and **governance to improve present livability conditions** of the citizens.

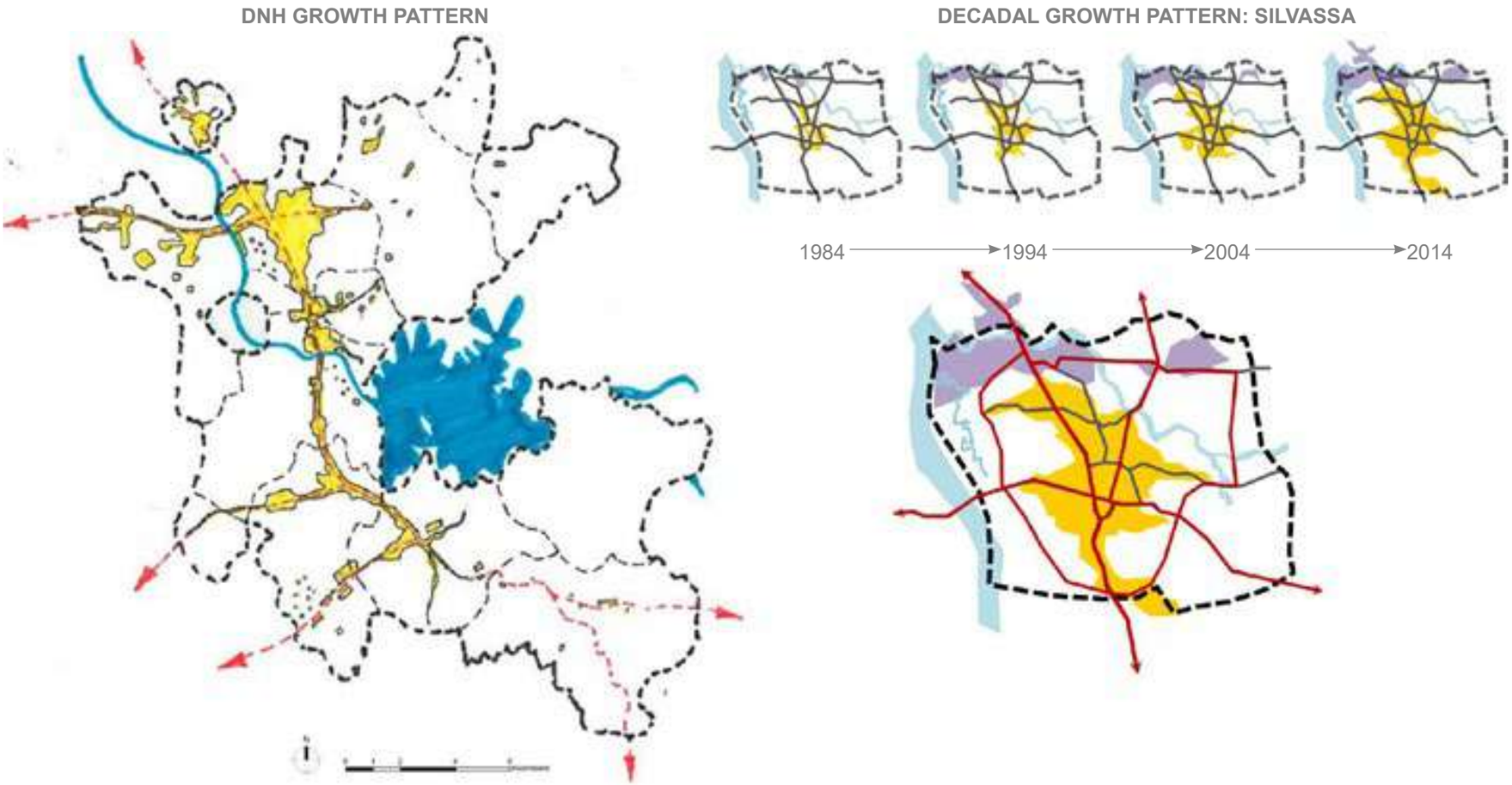
Project Identification from S22, S23, S24 and S25

P27- Surveillance, Connectivity and ICCC
P31- ITMS including traffic enforcement
P32- ERP, Mobile App & Web portal
P33- GIS Mapping
P34- Smart Signals & Pelican signals
P35- E-Challan system
P36 - Smart LED street lights

6.7 Institutional Reforms

Present Scenario

The DNH Planning Development Authority has **formulated an outline Development Plan** for entire DNH area but there is **no plan specifically for the urban areas** within DNH. This ODP has **no provisions made for land apportioning, city expansion and road alignment.** Usually when development plans are made for outskirts of a city a proper layout is defined, land geometry is decided, plot layouts are developed to guide the upcoming development. But presently **no such tool or mechanism is present to guide the expansion** of Silvassa city. In absence of these right now the **city is growing on its own, resulting in haphazard growth** and due to the residential development pressure, the development is of this nature as shown in the figure below:



Map 6.6: DNH and Silvassa growth pattern

Source: SCP Report, Ecofirst

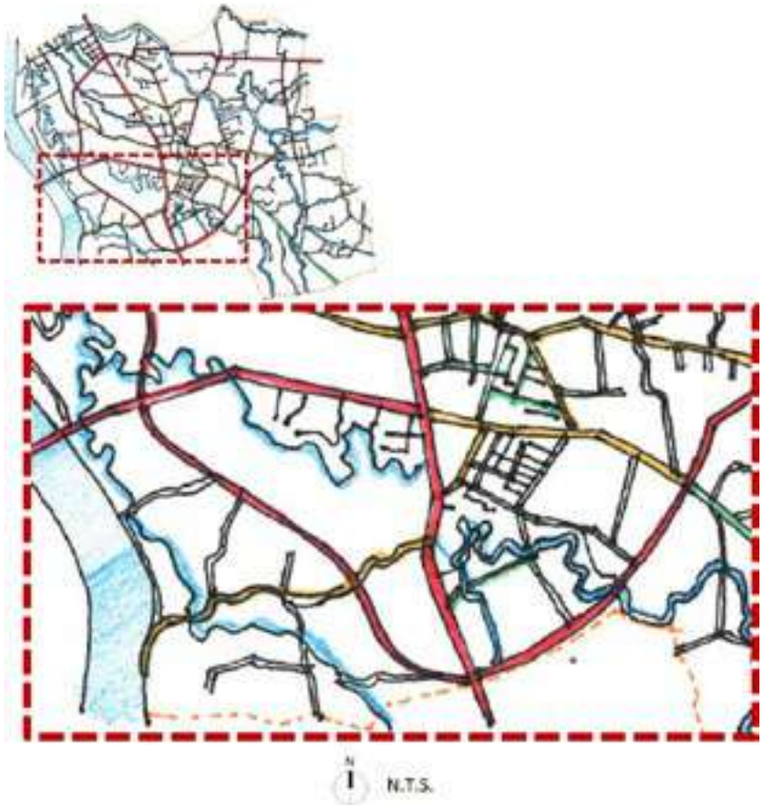
As observed in the maps above for DNH the **development is primarily along the central axis** which connects Dadra, Silvassa, Rakholi and Down south and **Entire Urbanization is along this axis in the form of Ribbon** which is **cost intensive for provision of effective infrastructure.**

Hence, here it would be **prudent to create compact and urbanized serviceable zones** where **growth could be in planned manner**. These developments are in close proximity of nature and hence **need to be planned sensitively**.

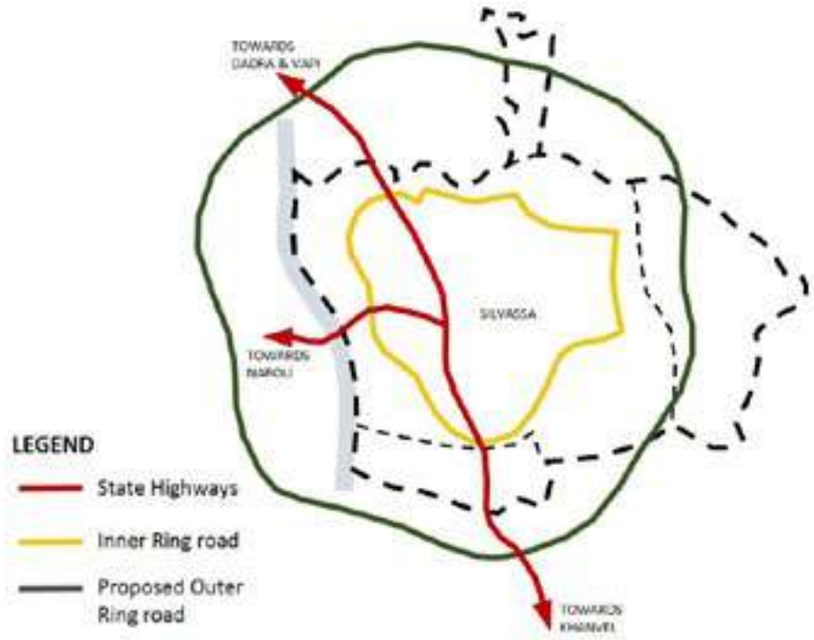
While Silvassa being the first town and previous capital of UT its **urbanization has spread rapidly from center to north.** It is observed that the **development of institutional buildings outside the municipal limit** on Sailly road **may attract the development of city outside municipal limits**.

Also, it is seen that the newer growth is due to rise in housing demand for LIG and MIG section and on large tracts of land which are **creating gated community**. Due to this the continuous track of **land along road are getting locked** as a product. The objective is to **create inclusive societies** in the city with proper access for overall development. The gated community doesn't create amenity for city and hence it would be recommended to regulate all large parcels of land to be **developed under TP scheme for equitable growth** and create **land bank for city level green and social, physical Infrastructure**. So, the city government needs to look at more **comprehensive development strategies and DCR** for development for urban areas which could focus on regulated city extension, apportioning, of land, creating amenities and green spaces and not just the gated communities. The **TP schemes will also help in proper alignment of road.** As there is no proper alignment and proper definition of roads today, the **city is struggling with the layout of infrastructure**. The **meandering road** which were the village road have been **converted into the DP road which will pose a threat to the city** in the later date. Also, there is **no strategy for internal roads** to access the lands between feeder roads.

SILVASSA ROADS



Map 6.7: No proper definition of roads in Silvassa
Source: Ecofirst



Map 6.8: Proposed Outer Ring Road Plan
Source: CTTS Report, 2015.

At the same time, **50% of the ring road is converted into National highway**. Based on the National Highway the **adjacent plot cannot be directly accessed** from the national highway[51]. So in future one also needs to think about **converting the outer ring road in to the national highway** as it could be dangerous for the citizens of Silvassa when the national Highway would be passing through the part of the city and because of this there will be **huge amount of land which will be land locked around the edge** of the national highway buffer on both sides.

Image 6.7: Ring Road/NH Does Not Have Service Roads. Land Parcels Adjacent To The Ring Road Cannot Have Direct Access

Source: Ecofirst

Image 6.8: Locked Land Parcels

Source: Ecofirst

Image 6.9: Internal Road Marked as 15m wide Road in ODP

Source: Ecofirst

Key Map of Images

[51] https://morth.gov.in/sites/default/files/circulars_document/ROW-2013.04.12-Guidelines,%20Norms%20for%20Access%20Permission%20to%20Fuel%20Stations,%20Private%20Properties,%20Rest%20Area%20Complexes%20and%20Such%20Other%20Facilities%20Along%20National%20Highways.pdf

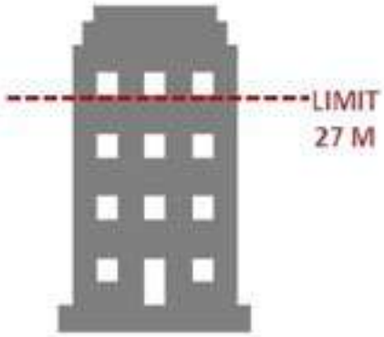
Planning Development Authority has also **developed DCR (Development control regulations), 2014** to **regulate the built development** in DNH. It can be further **updated to promote the compact growth** of Silvassa.

For example, according to the present DCR the FSI is 2 along 18 m wised road, the **height cap of 27 meters** which **doesn't allow the full utilization of FSI**. Also, the present density of Silvassa is 5732 persons per sq.km which is very less. Thus, the **city has a potential to grow in compactness** and this compactness can be achieved by **increasing/ removing the cap of building height**. This will give compact structure to the city growth.

Due to this haphazard growth, the **city lacks community spaces** at neighbourhood level. Presently **no neighbourhood level planning** is done. It is recommended that a **1 x 1 sq.km or 800 x 800 m neighbourhood blocks be defined** and should be **planned to provide** for all **social amenities** such as schools, colleges, markets, recreational –neighbourhood level **organised green spaces**, etc. at walkable distances (i.e 200-300m) within this block. This will give **imageability to the city,** make daily amenities accessible for citizens, **provide for an administered growth** and also make **infrastructure provision more appropriate**.

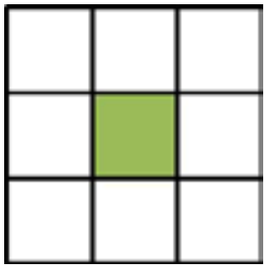
The **land between Sayali and Ring road** on the south west end is **marked Green zone** which could be an **opportunity to create the image of future city** with planned Business and Administrative district, with green avenues, promenades, large parks and best services with government and private housing and offices and sport/ recreation complex.

NO FULL UTILIZATION OF F.S.I.



HEIGHT RESTRICTIONS

EMERGING GATED COMMUNITIES



LAND LOCKED AREAS

MISSING URBAN GREEN/ AMENITIES

DIFFICULTY TO PROVIDE SERVICES IN NEWER DEVELOPMENT

Figure 6.18: Issues and Challenges for urban development in Silvassa

Source: Ecofirst

Thus, there is need for a much **more robust development plan** for the city with a **robust DCR for urban areas** which will help guide and **regulate a more equitable, sustainable and compact planning** for future Silvassa. This could be done through **various institutional reforms** proposed below in strategies and identified projects.

Issues and Challenges:

- **Absence of city level planning tool or mechanism** to guide the expansion of the city. TPS should be introduced
- A **strategic development guideline required** to control growth within serviceable urbanized zones
- No definition of roads, **need a street design and development guideline.**
- **Lack of Neighbourhood planning** thus -No reservation of green within walking distance of 200 meter and No reservation for amenities and social housing and city level parks.
- **DCR can be updated** to guide a compact growth in the city

Proposed Strategies

Below are a few strategies proposed:

S26.Preparation of Development Plan

To provide a road-map for **guided planned development of the city** for the horizon of around 20 years in line with ODP. It will provide a framework and vision specific for the city, strategies and projects for all urban sectors.

S27. City extension through TP Scheme

This will help to **regulate the expansion of the city for equitable and defined growth**. It will include regulation through land apportioning, road alignments, plot definitions, distribution of amenities and green spaces, etc.

S28. DCR Updation and Digitization

To **update the present DCR provision** to help bring a **compact and structured growth** in Silvassa and also to digitize the **Auto-DCR to facilitate fast-track and transparent system** of project approval.

S29. Urban Street Design Guidelines

This will help in providing a **mechanism to establish a street system** within Silavssa and act as a **set of design guidelines for present and proposed streets**. It will include standard street section and design for developing complete streets with safety elements, equitable distribution for all users, guidelines to create Multi Utility zones and safe intersections.
Refer: Urban Street Design Guidelines, Pune (By Pune Municipal Corporation)
Link: https://pmc.gov.in/en/urban-street-design-guidelines-usdg

Project Identification from S26, S27, S28 and S29

P37- Land for Industries, Warehouses, Education, finished goods market
P38- TPS City expansion scheme
P39- DCR and its Digitization
P40- Street Guidelines formulation
P41- Development Plan formulation

ONE
SILVASSA

CHAPTER 7
PROJECT INTEGRATION

Chapter 07: Project Integration

7.1 Strategic Mapping

Below is the **mapping of all the Strategies and Projects** identified under each Objective:

OBJECTIVES	STRATEGIES	PROJECTS
 **Objective 1** **Protecting Natural Sysytems**	S1 - Conserve natural rivers & drains S2 - Form eco-sensitive zones	P1- Pipariya river conservation P2 - Natural drains protection program P3 - Quick forestation drive (Miyawaki Method) P4 - Natural Trails P5 - Central Park
 **Objective 2** **Enhance Indigenous Economy**	S3 - Promote art and culture S4 - Develop community centres S5 - Skill development/ Trainings	P6 - Varli Village P7 - Local Markets P8 - Skill development centre P9 - Civic & cultural centre
 **Objective 3** **Boost Industries**	S6 - Education hub to enhance technical skills S7 - Infrastructure (Physical & Digital) S8 - Labor accomodation	P10 - Transportation hub P11 - EWS housing
 **Objective 4** **Promote DNH as Tourist hub**	S9 - Integrate tourism and forest department S10 - Branding & Marketing S11 - Quality bed & breakfast facilities S12 - Operational 365 days event calendar	P12 - Infrastructure for tourism (Physical & Digital) P13 - Silvassa Haat P14 - Tourist information & experience centre (VR & Digital) P15 - Water based events - Daman Ganga

OBJECTIVES	STRATEGIES	PROJECTS
 **Objective 5** **Urban Development of Silvassa**	S13 - Develop character of roads S14 - Develop landmark areas S15 - Accessible green with first/last mile connectivity S16 - Affordable Housing	P16 - Streetscape - Equal streets P17 - Green covered walkways P18 - Revitalizing landmarks P19 - Public bicycle scheme P20 - Sports complex extension (SIlvassa Gymkhana) P21 - Affordable housing developent
 **Objective 6** **Quality Infrastructure and Transportation**	S17 - 100% access to 24 hours tap water supply S18 - Waste water reuse and recycle S19 - 100% storm water & waste water network S20 - Ensuring clean and healthy city environment S21 - Low carbon footprint S22 - Enhancing citizen safety S23 - Establishing Resilient technology infrastructure S24 - Smart governance S25 - Improving the livability	P22 - Silvassa Bus Terminal P23 - Smart public toilets P24 - 100% SW & sewerage network P25 - SCADA for water supply & sewerage P26 - Wastewater recycling network P27 - Surveillance, Connectivity & ICCC P28 - Enhance Ring road character P29 - CETP for industries P30 - Biomining of existing landfills P31 - ITMS including traffic enforcement P32 - ERP, Mobile App & Web portal P33 - GIS mapping P34 - Smart signals & Pelican signals P35 - E-challan system P36 - Smart LED street lights
 **Objective 7** **Institutional Reforms**	S26 - Preparation of development plan S27 - City extension through TP Scheme S28 - DCR updation and digitalization S29 - Urban street guidelines	P37 - Land for industries, warehouses, education, finished goods market P38 - TPS city expansion scheme P39 - DCR and its digitalization P40 - Street guidelines formulation P41 - Development Plan Formulation

Figure 7.1: Objective-wise Strategic Mapping all the identified strategies and projects

Source: Ecofirst

7.2 Convergence of existing and proposed projects

Each project identified requires **different skill set, expertise and cross-sectoral collaboration** for its implementation. Thus, for the ease of project implementation **projects under similar category have been clubbed and structured into specific modules** as given in the **Silvassa SCP –RFP document**. In total there are **9 modules** defined in Silvassa SCP- RFP document.

In this visioning exercise **fresh set of projects were identified** to help the city achieve its vision. Few of the **projects overlap** with the already **existing projects identified in RFP** of Silvassa smart city proposal while few are **newly identified**.

Below diagrams showcases the **convergence of projects existing in RFP and proposed projects under Vision Silvassa** exercise. They have been **segregated into the Modules** given in Smart City proposal. The present status of the project and its **finances have also been stated** in the module diagrams:

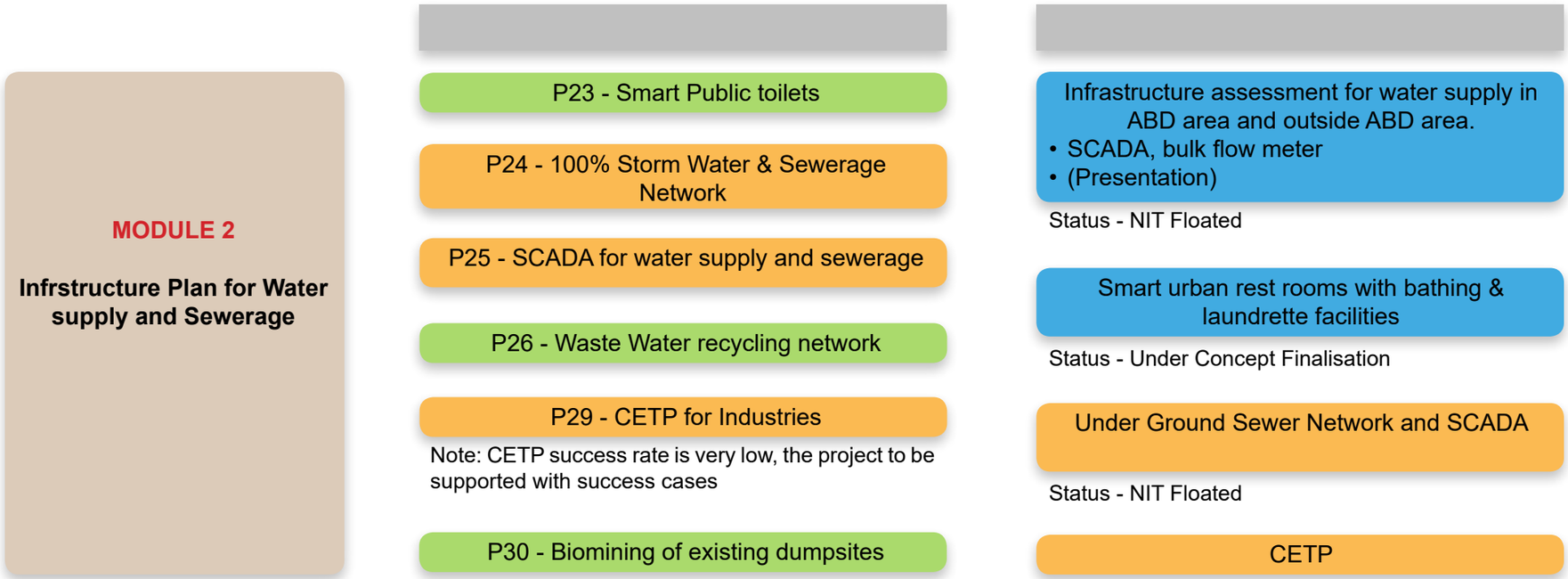
Module 1: Institutional development of SPV52

This module includes **Institutional development of the SPV** to **facilitate timely implementation** of the ABD & Pan City components identified in the Smart City proposal. It includes **formulation of 4 plans – Inception report, HR and staffing plan, Project scheduling plan and SPV business plan**.

Smart city SPV has been formed with the required plans in-place. This module has already been implemented and hence **no modifications are proposed under this module** in the visioning exercise.

Module 2 Infrstructure Plan for Water Supply and Sewerage

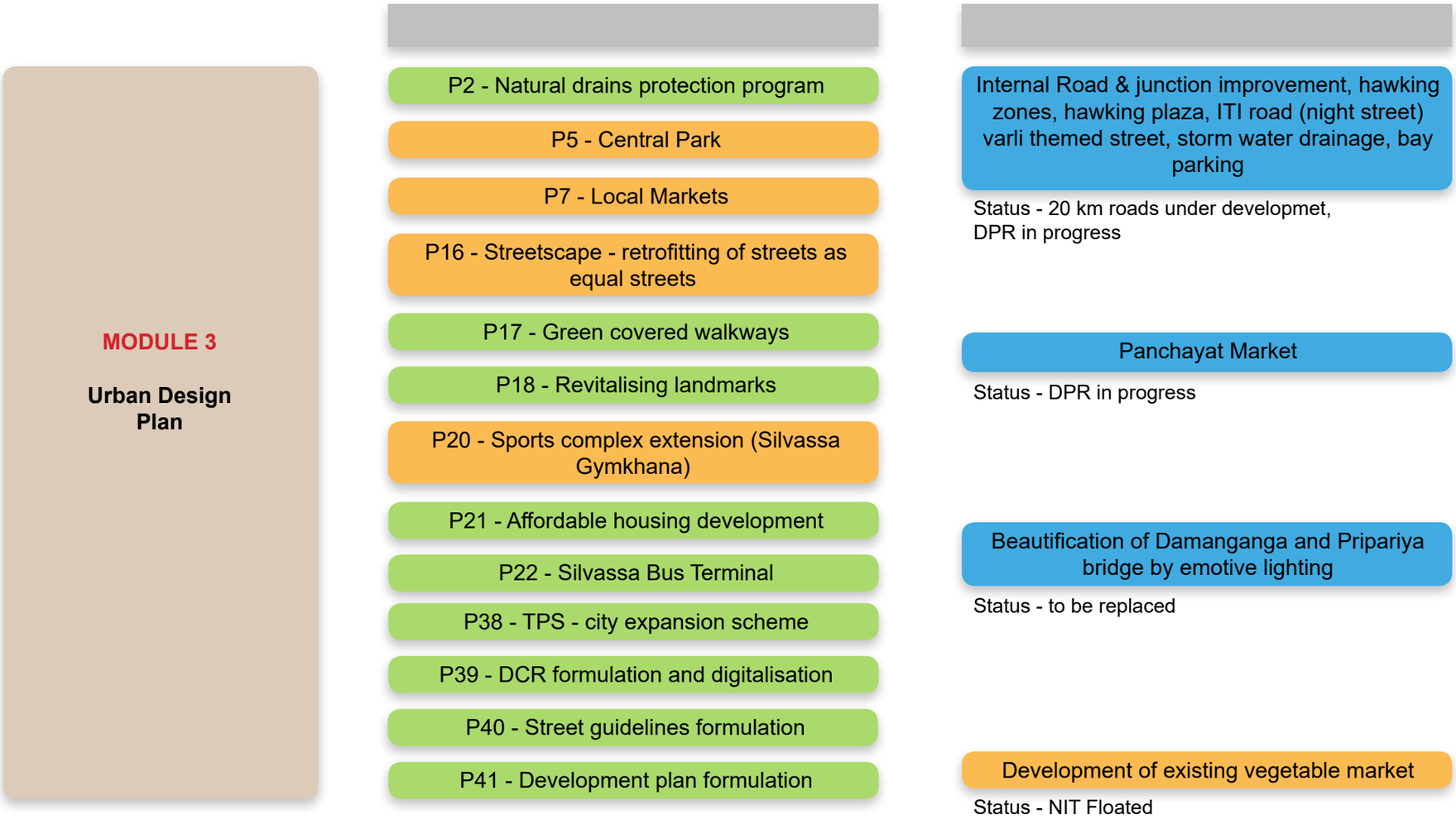
Two new projects have been identified under this module, which are **P26- Waste Water Recycling network and P30-Biominig of existing landfills**. Also, provision **CETP for industries project is overlapping project**.



[52]Silvassa Smart City limited (SSCL), Request for proposal, RFP No.: 02/2018-2019/SSCL/Silvassa, 2018.

Module 3: Urban Design

Many potential **urban projects have been newly identified** under this module to meet the vision of Silvassa city. These include institutional reforms such as: **P41- Development Plan formulation, P38- TPS –city expansion scheme, P39- DCR updation and digitization and P40- Street guidelines formulation**. It also includes projects such as **P21 –Affordable housing development, P22- Public e-bus & Smart bus stops, P18- Revitalizing landmarks, P17- Providing green covered walkways and P1- Protecting natural drains system**. Apart from these new projects, the **smart road- equal street projects, sports complex extension and retrofitting of ring road has been retained from RFP projects**.



Legend:
- Projects As per RFP - Not overlaping with projects under Vision Silvassa
- Overlapping Projects (As per RFP & Projects under Vision Silvassa)
- New identified projects

Module 4: Well Serviced Industrial Hub

Under this module o**ne new project P37-land for industries, warehouse, education, finished goods market has been identified** to help boost industries in Silvassa in future. While **chawl housing has been converted to EWS housing** aiming to provide a better quality of living environment for labourers.

MODULE 4

Well Serviced Industrial Hub

P10 - Transportation Hub

Transport Nagar truck terminus

Status - under concept stage

Bus-bays on Important roads

Status - Reframed as bus bays on city roads, part of Road tender

P11 - EWS Housing

Chawl housing is one of the typology identified in SCP list (Convergence with ARHS scheme of GOI)

Chawl Housing

Status -

Labour hostel

Status - Cancelled

P37 - Land for industries, warehouses, education, finished goods market

Multi Purpose Business Centre (MPBC)

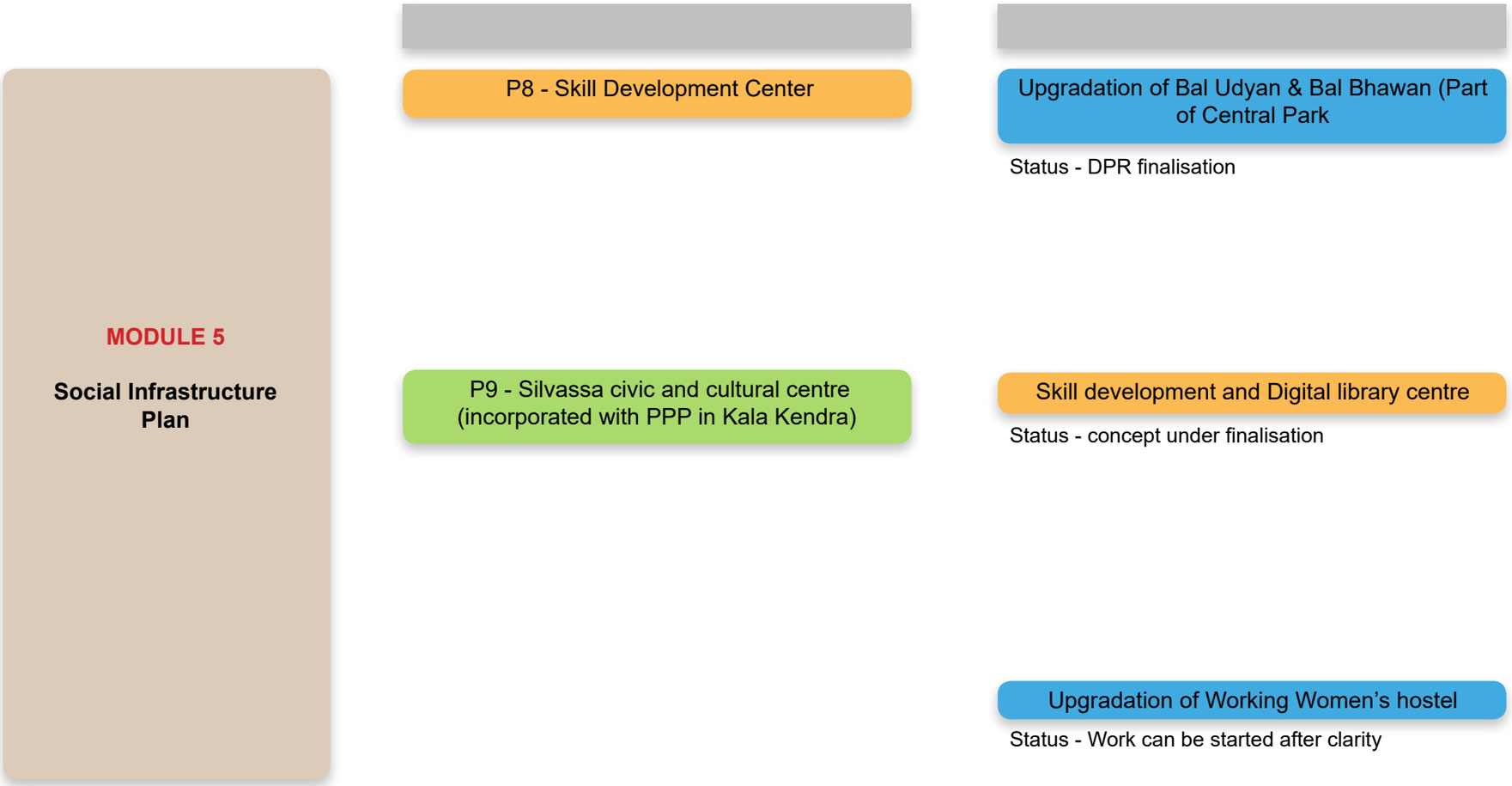
Status - Replacement project by E bus

Legend:

- Projects As per RFP - Not overlaping with projects under Vision Silvassa
- Overlapping Projects (As per RFP & Projects under Vision Silvassa)
- New identified projects

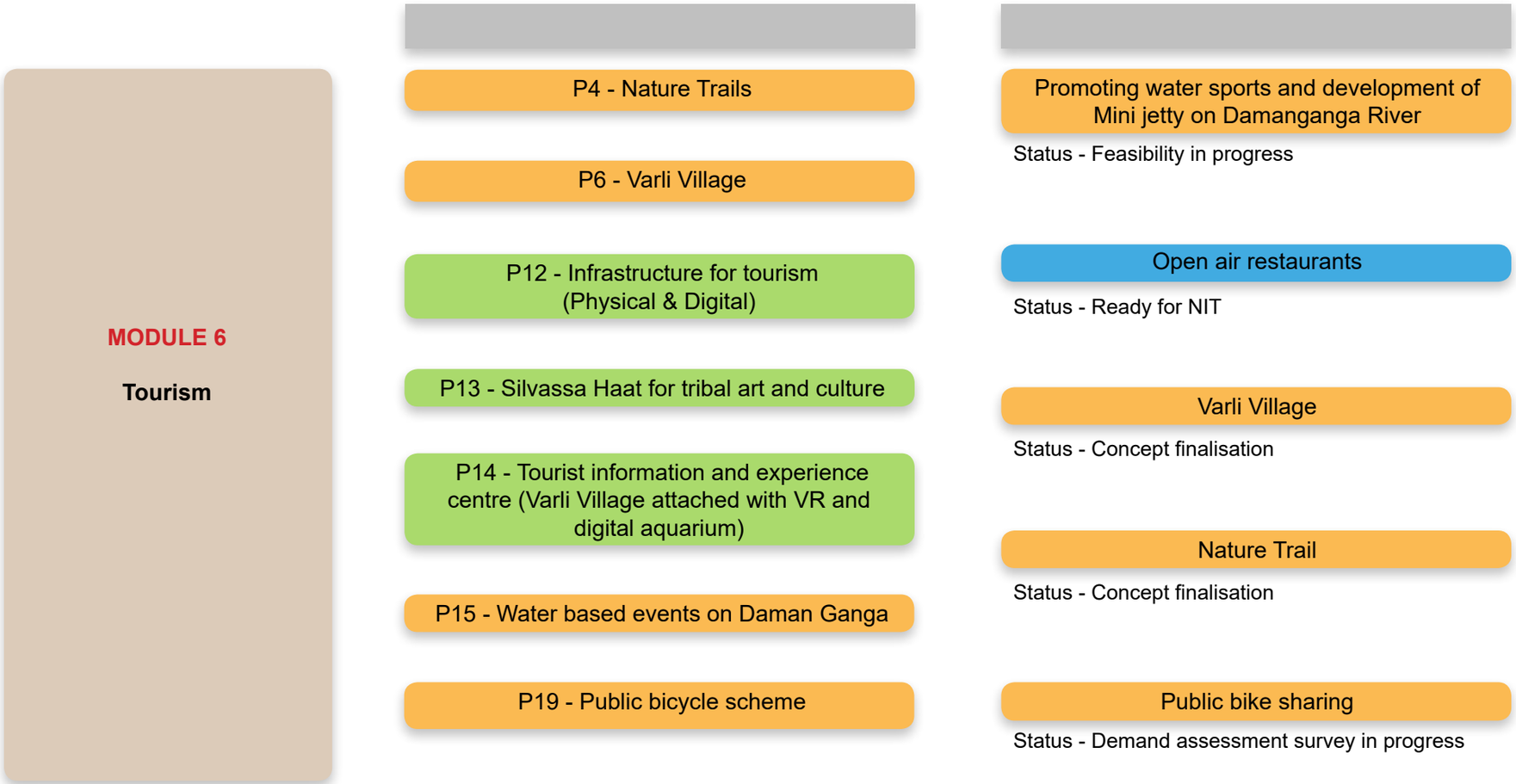
Module 5: Social Infrastructure Plan

Under this module a **new project P9-Silvassa Civic and cultural center has been identified** which can be used to host conventions, as exhibition center, etc.



Module 6: Tourism

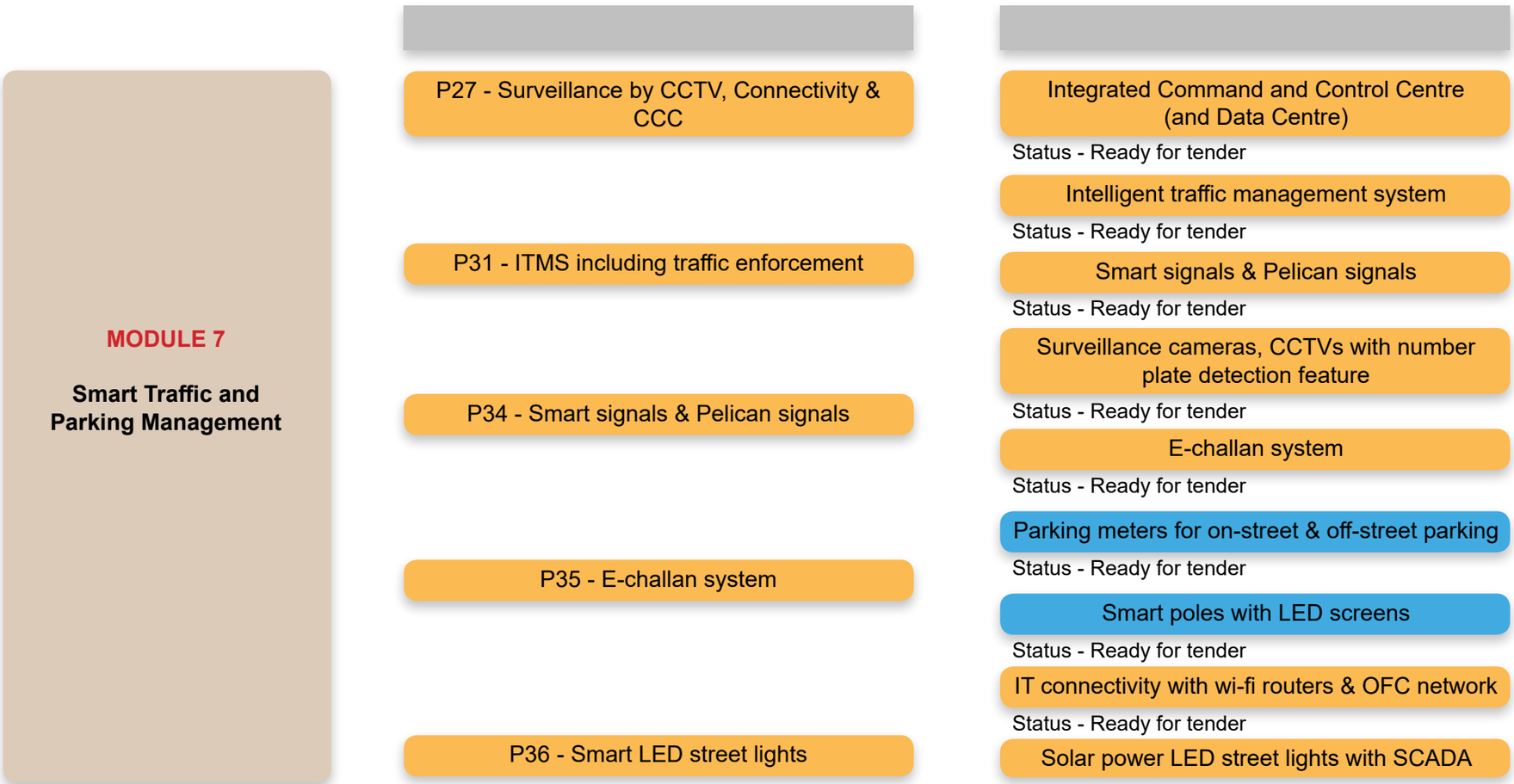
Under this module **3 new projects have been identified; P12 –Infrastructure for Tourism (both physical and Digital), P13- Silvassa Haat for tribal art and culture and P14 –Tourist Information and experience center (VR and digital aquarium)** to compliment efforts made under D&D and DNH tourism policy 2019-2024 and help pin Silvassa on National as well as global tourism map. Hence, these **new projects will add-on to RFP projects** by providing quality accommodation facility/ dine options for tourist, improve connectivity between tourist destinations, provide them various experience-based tourism opportunities to explore and digital platforms to assist them to plan their own flexible itinerary, etc.



Legend:
- Projects As per RFP - Not overlaping with projects under Vision Silvassa
- Overlapping Projects (As per RFP & Projects under Vision Silvassa)
- New identified projects

Module 7: Smart Traffic and Parking Management

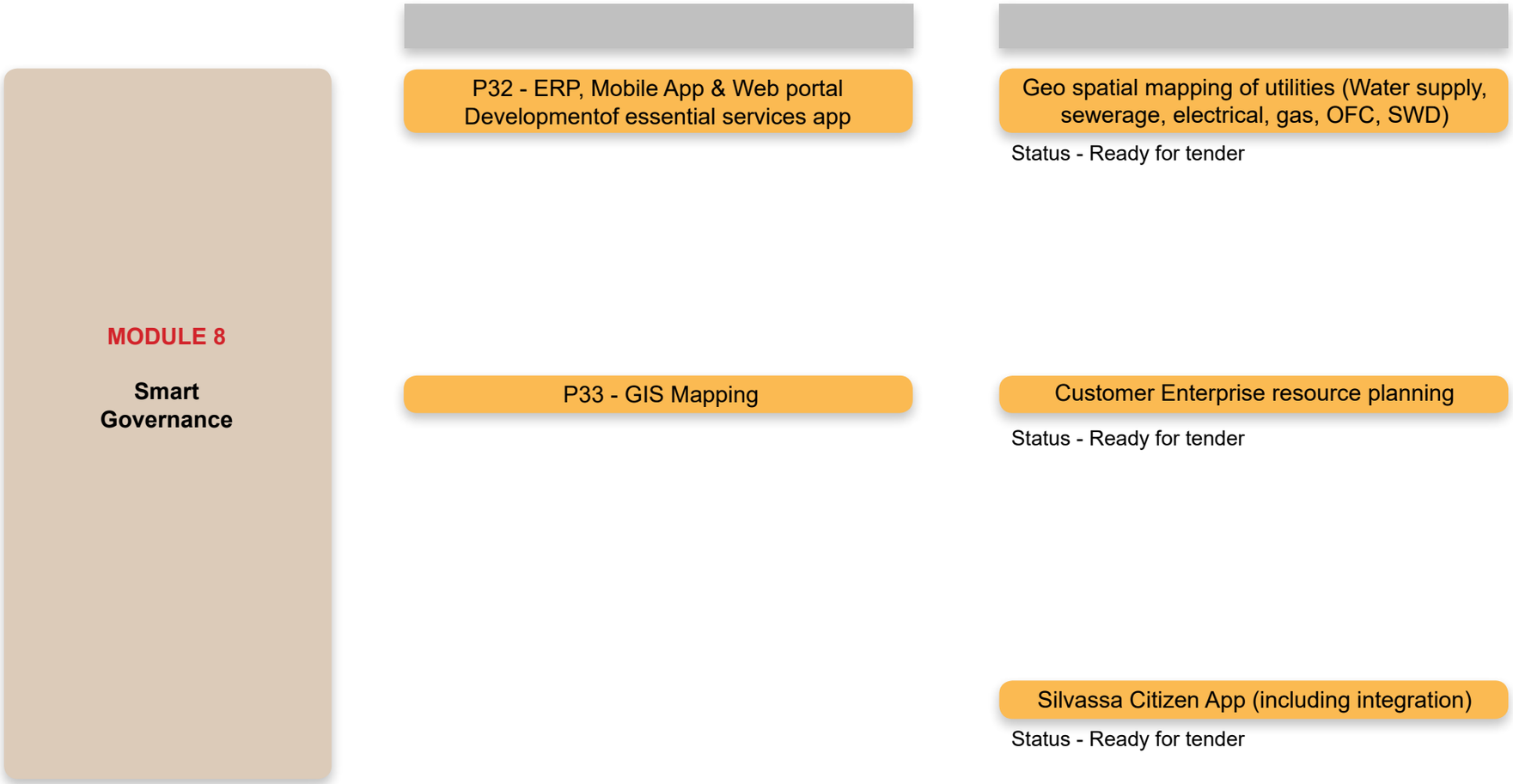
Under this module **no new project has been identified**. But all the projects have been retained, **few of them over-lapping with the identified projects** under RFP. Such as –**P27 Surveillance by CCTV, Connectivity and ICCC, P31- ITMS including traffic enforcement, P34- Smart and Pelican signals and P36 – Smart LED street lights to improve traffic safety in Silvassa**. Presently, all these projects are under tendering stage.



Legend:
- Projects As per RFP - Not overlaping with projects under Vision Silvassa
- Overlapping Projects (As per RFP & Projects under Vision Silvassa)
- New identified projects

Module 8: Smart Governance

Under this module **no new project has been identified**. All **projects under RFP have been retained**. These include **P32- ERP, mobile Application and Web portal** for improving service delivery. **P33- GIS mapping** of utilities for integrated decision – making and optimal utilization of resources. Presently, all these projects are under tendering stage.



Module 9: Environmental Management

Under this module **one new project was identified; P3- Quick forestation drives through Miyawaki forestation technique** to create green buffers. While **the project on Pipariya River conservation has been retained**.

Thus, **the total cost and visibility of the projects as per SCP for all the modules is around 692.50 Cr.**

MODULE 9

Environment Management

P1 - Pipariya river conservation

Pipariya river conservation

Status - Concept in progress, water sampling and lab testing completed

P2 - Natural drains protection program

Solar rooftop on all Government buildings

Status - Completed under convergence

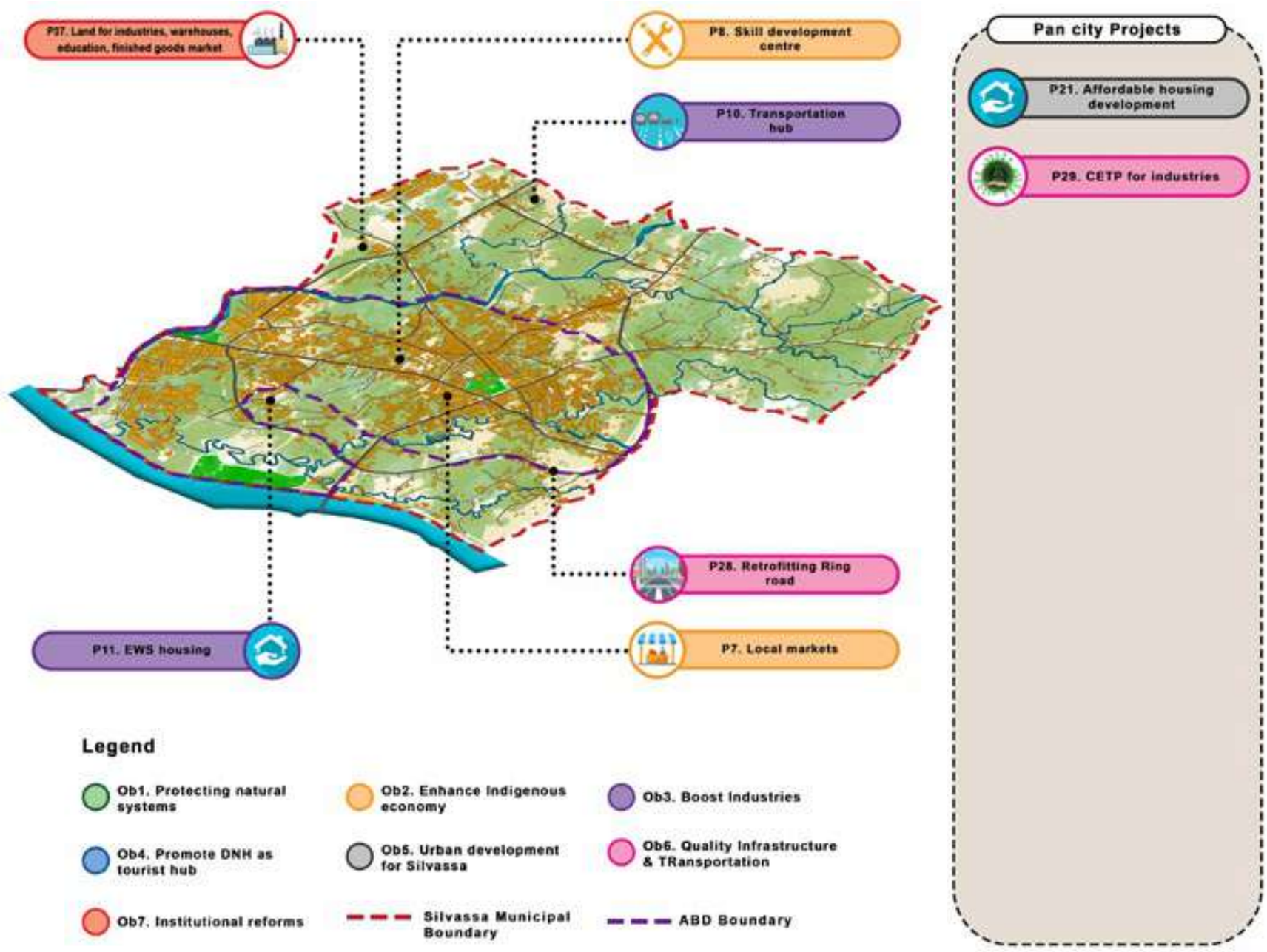
P3 - Quick forestation drive (Miyawaki Method)

Sensors for detecting air and noise pollution & flood line monitoring

Status - Ready for tender

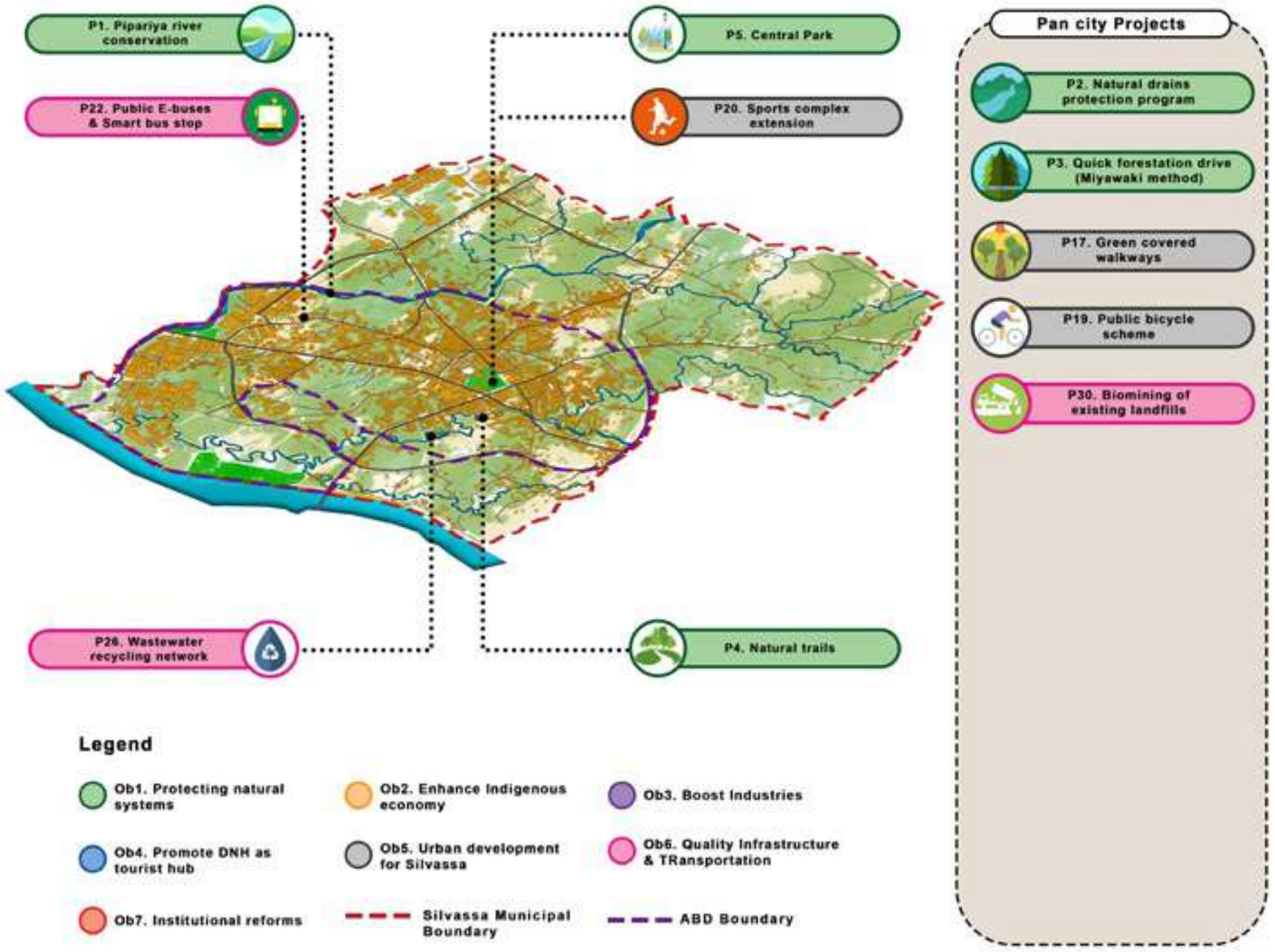
Legend:
- Projects As per RFP - Not overlaping with projects under Vision Silvassa
- Overlapping Projects (As per RFP & Projects under Vision Silvassa)
- New identified projects

7.3 Mapping of Projects



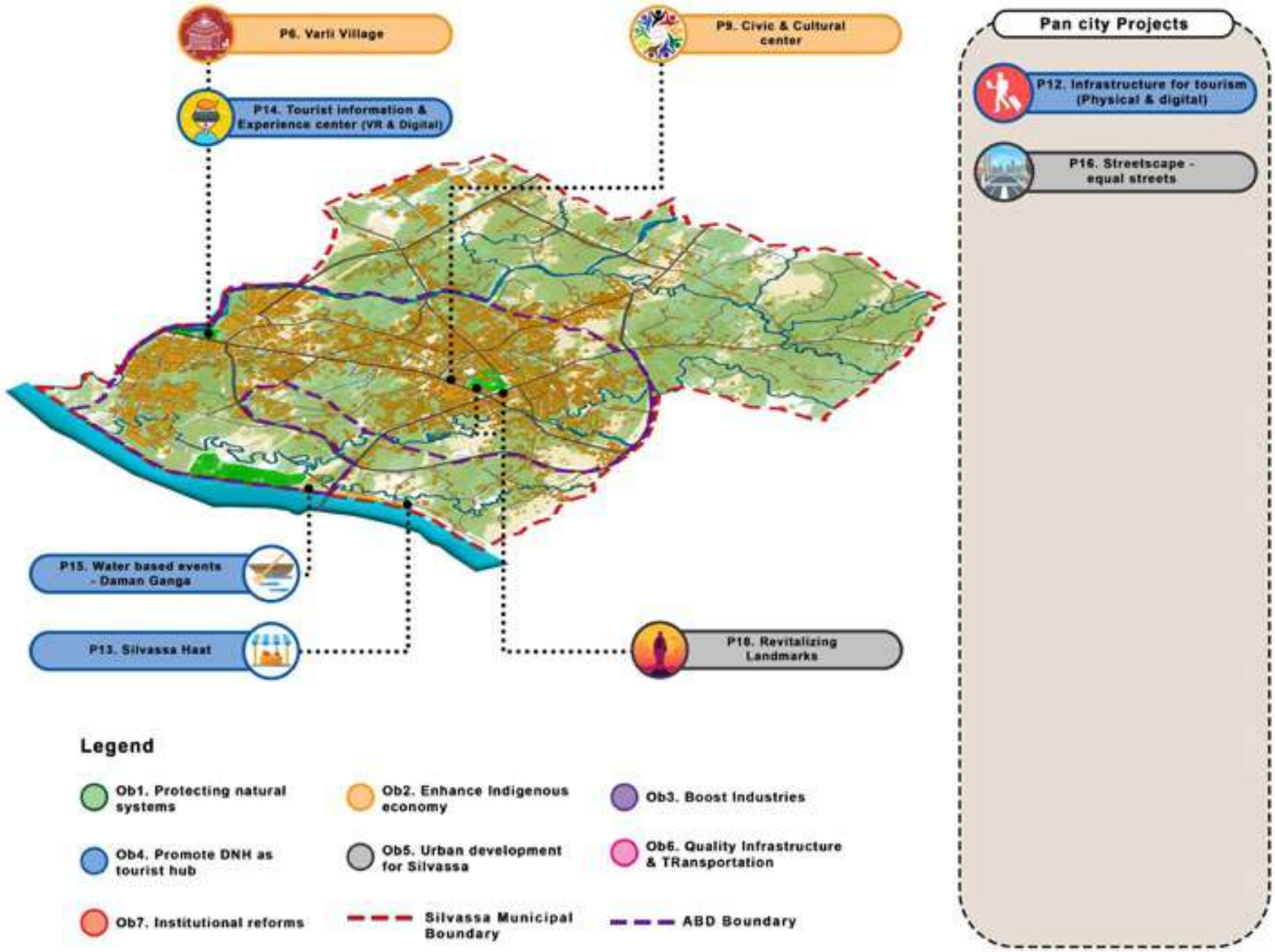
Map 7.1: Mapping of Identified Projects (Economy & Industrial Development)

Source: Ecofirst



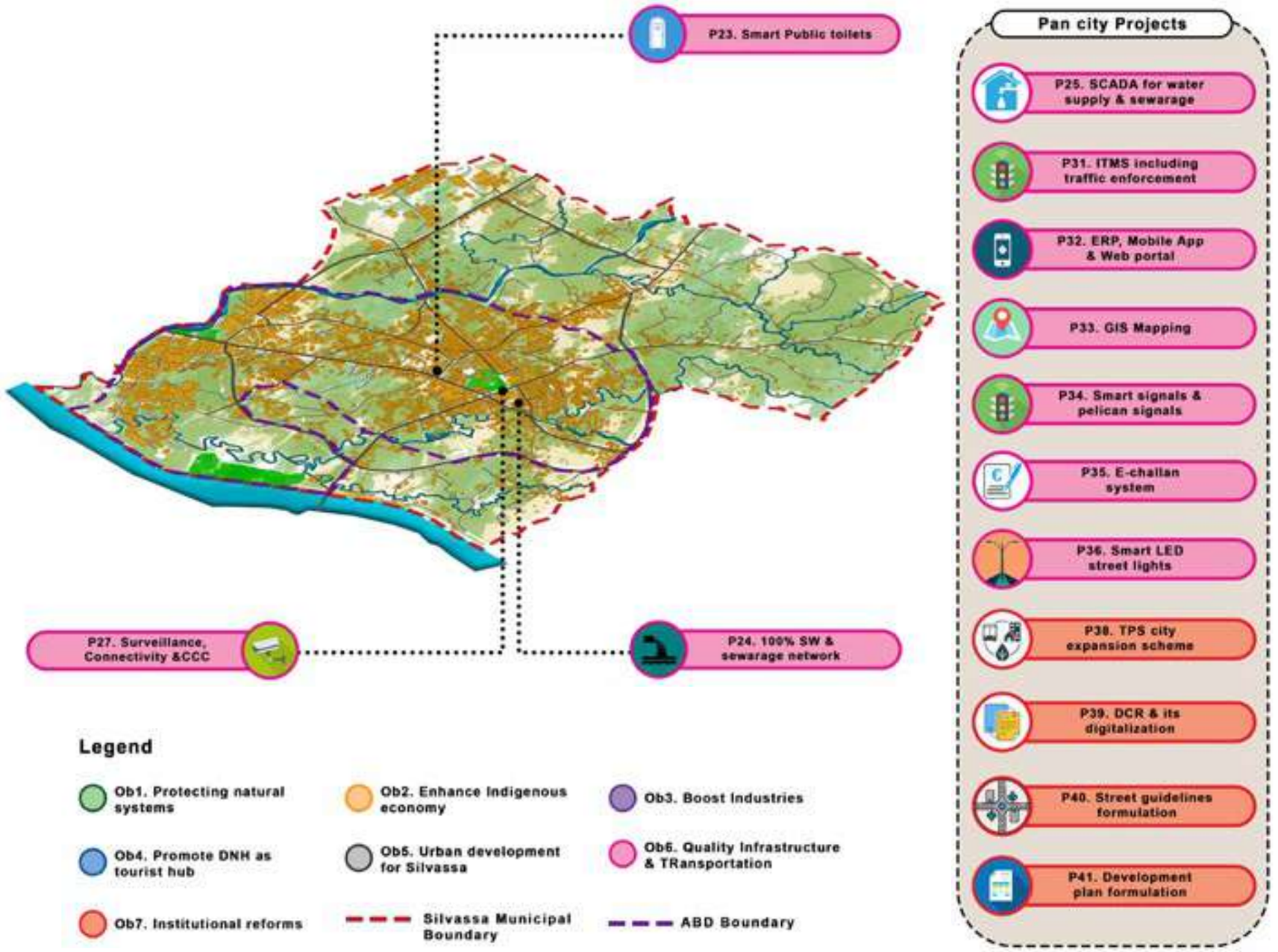
Map 7.2: Mapping of Identified Projects (Sustainable development)

Source: Ecofirst



Map 7.3: Mapping of Identified Projects (Tourism & Silvassa Identity)

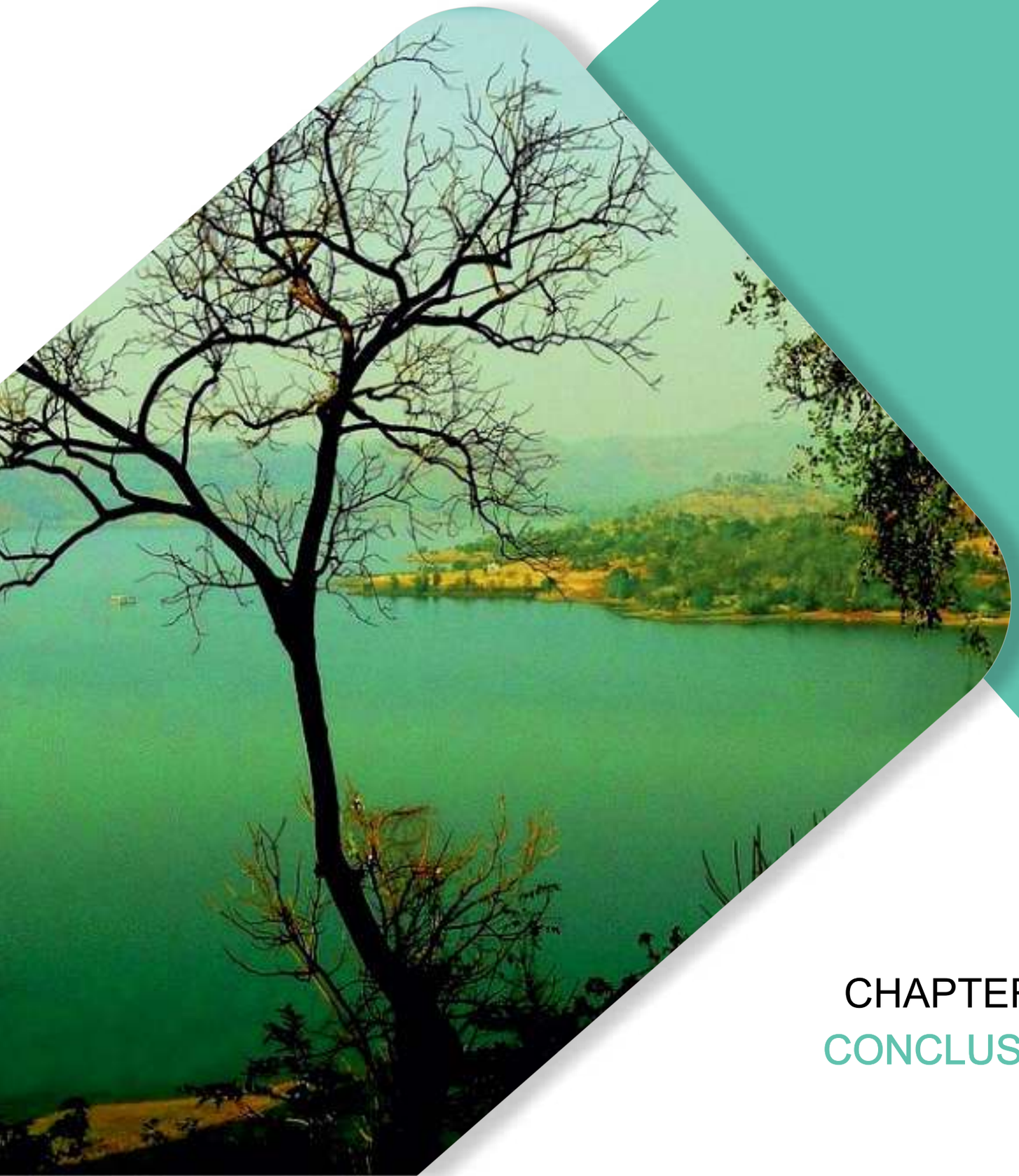
Source: Ecofirst



Map 7.4: Mapping of Identified Projects (Infrastructure & ICT)

Source: Ecofirst

ONE
SILVASSA



CHAPTER 8
CONCLUSION

Chapter 08: Conclusion

The visioning exercise included a **rapid assessment of Silvassa cities baseline scenario** and mapped the findings with the projects/proposals envisaged under Smart city program. The approached adopted for this study went **beyond SMC jurisdiction** and provided the bigger picture – **Regional perspective** and influence to **identify the potentials** for **development of Silvassa** city as a **gateway to DNH**.

A thorough **analysis** was conducted through both **primary and secondary data**. It included **cognitive mapping, stakeholder consultations, field visits** to understand citizen's perspectives, their issue and needs. **Review** of all **Policy document** was done to understand the provisions made, its influence and opportunities. Also, the challenges faced while implementation of the Smart city projects were studied. Based on all the city and regional level analysis a new vision was formulated with strategies and objectives. **Projects were identified** under each objective and mapped with the **RFP projects for convergence**.

These projects will help in developing **Silavssa as a model urban centre of DNH**, which will help in further development of the entire UT. With the **upcoming tourism hub** and the **emerging industries** it would also help in creating better job opportunities for the **economic development** of the region. While through providing quality infrastructure services and by increasing the green in the city it will provide a better quality or life to its citizens. Thus, it will not only act as a **gateway to DNH** but also to the **nearby cities like Daman, Vapi**, etc.

As the **study was conducted in a limited time**, we recommend that it should continue further. As **urban planning/growth is a dynamic process**, driven by market and citizens needs , influenced by regional triggers, an **iterative process** should be adopted to **timely monitor and upgrade** the projects envisaged for the city to address its changing needs.

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