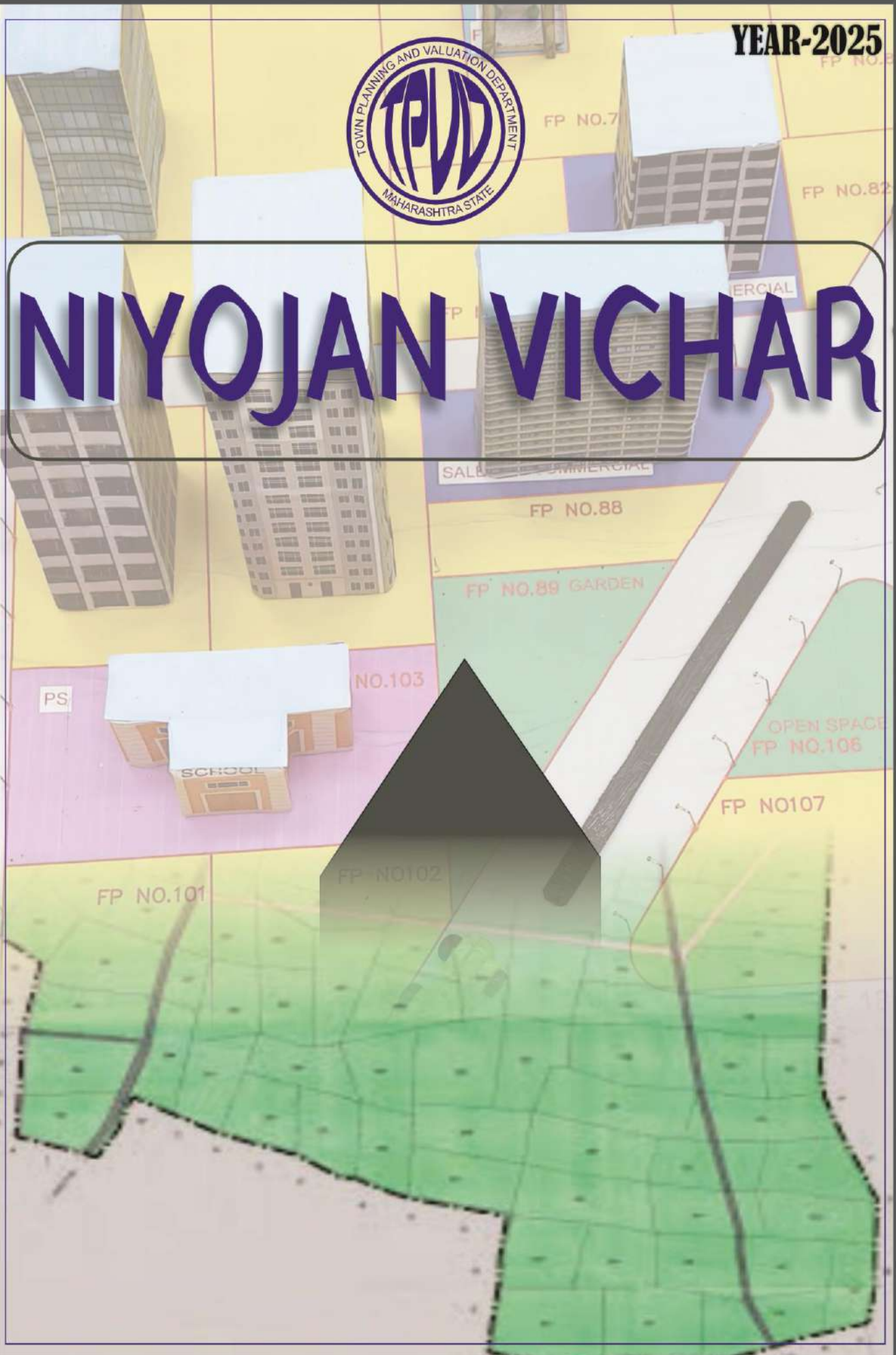




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संपादकीय

नगर रचना आणि मूल्यनिर्धारण विभागाचा वर्धापन दिन दरवर्षी दि. ३० जानेवारी रोजी साजरा करण्यात येतो. या निमित्ताने गतवर्षी आयोजित नगर रचना परिषदेवेळी नियोजन विचाराचा अंक, अद्ययावत एकत्रिकृत विकास नियंत्रण व प्रोत्साहन नियमावली (UDCPR) यांचे प्रकाशन करण्यात आले.

आता यावर्षी नगर रचना व मूल्यनिर्धारण विभागाचा १११ वा वर्धापन दिन साजरा करण्यात येत आहे. त्यानिमित्ताने नागरी संशोधन घटकाच्या स्तरावरून राज्यातील विविध कार्यालयात कार्यरत नगर रचना विभागाचे आजी / माजी अधिकारी यांनी विविध स्तरावर केलेल्या कामकाजातील अनुभव, लेख स्वरूपात नियोजन विचार अंकात प्रसिध्द करणेसाठी संचालनालयास सादर करण्याची विनंती करण्यात आली होती. यांस विभागातील सहायक नगर रचनाकार ते संचालक, नगर रचना पदावरील कार्यरत अधिकाऱ्यांनी प्रतिसाद दिला. यंदा प्राप्त झालेल्या लेखांपैकी विभागामध्ये नव्याने रुजू झालेल्या आणि विविध कार्यालयांमध्ये / प्राधिकरणांमध्ये काम करणाऱ्या अधिकाऱ्यांनी त्यांचे अनुभव विचारात घेऊन व त्यांवरील त्यांची मते लेख स्वरूपात सादर केली असून, नवीन विचारांच्या लेखांना नियोजन विचाराच्या या ३३ व्या अंकात प्रसिध्दी देण्यात येत आहे. तसेच दि.३० जानेवारी, २०२५ पर्यंतच्या अद्ययावत एकत्रिकृत विकास नियंत्रण व प्रोत्साहन नियमावली (UDCPR) ची पुस्तिका उपसंचालक, नगर रचना, नागरी संशोधन घटक व नागरी संशोधन कार्यालयातील अधिकाऱ्यांनी तयार केली असून या दोन्हीचे प्रकाशन मा.मुख्यमंत्री महोदय व इतर मान्यवरांच्या हस्ते करण्यात येत आहे. देशात सर्वप्रथम आपल्याच विभागाने डिजिटल प्लॅनिंग सेलची स्थापना केली असून तर तंत्रज्ञानाचा आधार घेऊन गतिमान मार्गदर्शक व अचूक निर्णयक्षम प्रशासनाकडे वाटचाल केलेली आहे. त्यानुषंगाने यावर्षीच्या नियोजन विचार पुस्तिकेमध्ये प्रामुख्याने नवीन माहिती तंत्रज्ञान व त्याचा नगर नियोजनमधील वापर यावर भाष्य करणारे लेख प्राप्त झालेले आहेत.

नियोजन विचाराच्या या अंकामध्ये श्री. अविनाश पाटील, मा. संचालक, नगर रचना, म.रा., पुणे व श्रीमती. रेश्मा देशकर, सहायक संचालक नगर रचना, यांनी नगर नियोजनात Decision Support System (DSS) च्या सहाय्याने भौगोलिक माहिती प्रणाली (GIS) उपलब्ध माहिती एकत्रित करते, जेणेकरून स्थानिक, संख्यात्मक आणि धोरणात्मक निर्णयांना उत्तम नियोजनाच्या प्रक्रियेत सहाय्यभूत ठरेल, याबाबत लेखात विवेचन केले आहे. तसेच नगर रचना व मूल्यनिर्धारण विभाग DSS च्या सहाय्याने विकास योजना आराखड्यातील सुधारणा / बदल, जमिन वापर नियोजन तसेच बांधकाम परवाना अशा कामांचे व्यवस्थापन कसे करता येईल, याचे सविस्तर वर्णन लेखात विषद केले आहे. GIS Based Modules च्या सहाय्याने माहिती गतिमानपणे एकत्रित आणि अद्ययावत करून कामातील पारदर्शकता, कार्यक्षमता आणि निर्णय घेण्याची अचूकता वाढवता येईल, याबाबत लेखामध्ये माहिती दिली आहे.

तद्नंतर मा.संचालक, महाराष्ट्र राज्य रस्ते विकास महामंडळ, श्री. जितेंद्र भोपळे यांनी नवीन महाबळेश्वर हिल स्टेशन क्षेत्र विकास योजना तयार करतांना भारतातील सर्वात पर्यावरणीयदृष्ट्या संवेदनशील प्रदेशांपैकी एक अशा पश्चिम घाटामध्ये, शाश्वत विकासाला चालना देण्याच्यादृष्टीने आलेल्या आव्हानांबाबत लेखात विषद केले आहे. तसेच, सातारा, जावळी, पाटण आणि महाबळेश्वर तालुक्यातील २३५ गावांचा समावेश असलेली ही विकास योजना भौगोलिक माहिती प्रणालीच्या सहाय्याने सविस्तर जनसांख्यिकी आणि पर्यावरणीय विश्लेषण एकत्रित करते. आर्थिक विकासाला चालना देणारा, जैवविविधता टिकवून ठेवणारा आणि

स्थानिक समुदायांसाठी जीवनमान सुधारणारा संतुलित विकास साधणे हा सदर योजनेचा उद्देश असल्याचे लेखात नमूद केले आहे. सदरचा लेख हा महाराष्ट्र प्रादेशिक नियोजन व नगर रचना अधिनियम, १९६६ केंद्र शासनाच्या अमृत योजनेतील मार्गदर्शक तत्वे व महाराष्ट्र राज्य सरकारच्या ठरावाचे पालन करण्यासाठी Data Driven Approaches with Participatory Planning वर प्रकाश टाकतो. सदर लेखात प्रदेशातील अद्वितीय भौगोलिक वैशिष्ट्ये आणि तेथील लोकसंख्या, सामाजिक व आर्थिक स्तरांचा अभ्यास करून तेथील समस्या समजून घेऊन प्रस्तावित केलेल्या शिफारशींवर ऊहापोह केलेला आहे.

नंतरच्या लेखात श्री. दीपक वराडे, उपसंचालक नगररचना आणि श्री. दिव्यांक सोनवणे नगररचनाकार यांनी त्यांच्या नगर नियोजन व व्यवस्थापन हे सध्याच्या नवीन तंत्रज्ञानाचा वापर चांगल्या शाश्वत नगर रचनेच्या कामकाजात कशाप्रकारे आवश्यक आहे, याबाबत ऊहापोह केलेला आहे.

श्रीमती. सारीका बोधनकर, उपसंचालक यांनी त्यांच्या लेखात, नागपूर-मुंबई समृद्धी महामार्ग हा पूर्व व पश्चिम महाराष्ट्र यांना अखंडपणे जोडणारा महत्त्वाचा दुवा असल्याचे नमूद करून, तेथे सातत्याने होणाऱ्या दुर्घटनांच्या पार्श्वभूमीवर द्रुतगती, मार्गावरील अपघातांचे विश्लेषण / कारणमिमांसा शोधणे हे रस्ता सुरक्षा सुधारण्यासाठी आणि मृत्युदर कमी करण्यासाठी एक महत्त्वाचा पैलू असल्याचे लेखात नमूद केले आहे. तसेच सदर लेखात, त्यादृष्टीने रस्ता सुरक्षा सुधारण्यासाठी आवश्यक अशा महत्त्वाच्या मुद्द्यांचा, महामार्गावर झालेल्या अपघातांची संख्या आणि कशाप्रकारे झाली त्या पद्धतीचे विश्लेषण करण्याचा प्रयत्न केलेला आहे.

सध्या जगात नवीन तंत्रज्ञानाच्या पार्श्वभूमीवर, कृत्रिम बुद्धिमत्ता (Artificial Intelligence) व त्याचा भविष्यातील वापर हा सर्व जगभर चर्चेचा विषय आहे. यावर श्री.अभिजीत केतकर, सहाय्यक संचालक नगर रचना यांनी कृत्रिम बुद्धिमत्ता (Artificial Intelligence) व त्यातील ॲप्लिकेशनची काही उदाहरणे देऊन विभागात विविध नगर नियोजन आराखडे करताना आर्टिफिशियल इंटेलिजन्सच्या साहाय्याने, प्राप्त माहितीच्या आधारे योग्य प्रकारे निर्णय घेण्यास सक्षम करून पर्यावरणाचा शाश्वत विकासात सुधारणा करणे यात निश्चितच क्रांतिकारी ठरेल, असा भविष्याचा वेध घेणारा माहितीपर लेख लिहीला आहे.

श्रीमती दिपाली बसाखेत्रे-सरोदे, सहाय्यक संचालक नगर रचना यांनी त्यांच्या लेखात नागरिकरणामुळे शहरातील वाढीला चालना देणारे घटक आणि त्या विकासाचा सभोवतालच्या परिसरावर होणारा बदल याचा शोध घेतलेला आहे.

नगरपालिकेतील वित्त व्यवस्था, त्याचे महत्त्व तेथील महसुलाचे वर्गीकरण, स्रोत, नगरपालिकेचे खर्च, अनुदान व सहाय्य याबाबतचा श्री रजय साबळे, नगररचनाकार यांनी त्यांच्या लेखाद्वारे वेध घेतलेला आहे. त्यासाठी यवतमाळ नगरपरिषदेची तपशीलवार माहिती दिलेली आहे.

विकास आराखड्याच्या पार्श्वभूमीवर डॉक्टर सानिव शोमे, सहाय्यक नगर रचनाकार व प्रितेश भावे सहाय्यक नगर रचनाकार यांनी त्यांच्या लेखांमध्ये विकास आराखड्याचे परिणामवाचक मूल्यमापन (Performance Evaluation of D.P.) करण्यासाठी नगर नियोजन निर्देशांक (Town Planning Index) बाबत सविस्तर माहिती दिलेली आहे. पुढे लेखात नगर नियोजन निर्देशांक आरक्षणाच्या परिणामकारतेवर आधारित निकषांची माहिती दिलेली आहे. हा लेख विकास आराखड्यांचे लेखी मूल्यमापन आणि नियोजन प्राधिकरणांचे विकास योजना अंमलबजावणीचे यश मोजण्याचे एक साधन असल्याचे विषद करतो.

नागरीकरणाच्या अनुषंगाने श्री. सुरेश राऊत, सहाय्यक नगर रचनाकार यांनी त्यांच्या लेखात सन २००१ ते २०११ या वर्षातील महाराष्ट्रातील जिल्हानिहाय नागरिकरणाची तुलना केलेली आहे. तदनंतर नगर नियोजनाची प्रचलित आव्हाने आणि सकारात्मक वाटचालीवर श्री. सागर मोगरे, सहाय्यक नगर रचनाकार यांनी त्यांच्या लेखात भाष्य केलेले आहे.

सध्या नवीन तंत्रज्ञानाच्या पार्श्वभूमीवर विभागाचे निवृत्त उपसंचालक, नगर रचना, श्री संजय सावजी यांनी GIS चे नगर नियोजनातील फायदे, त्याचा वापर व त्याचे महत्त्व यावर भाष्य केलेले आहे. नागरिकरणातील महत्त्वाचा मुद्दा म्हणजे वाहतूक व परिवहन. “वाहतूक परिवहन-समस्या व समाधान” या लेखात श्री संजय बारई, निवृत्त सहाय्यक संचालक, नगर रचना यांनी महाराष्ट्रातील सन २०१६ मधील प्रमुख जिल्ह्यातील प्रति हजार व्यक्ती वाहन संख्या, सन २०१९ ते २०२३ मधील वाहन नोंदणी संख्या व लोकांचा वाहन वापर कल, वाहतूक कोंडी व त्यावरचे उपाय यावर माहिती विषद केली आहे.

तसेच विभागातील श्रीमती. माधुरी जामखेडकर, अधीक्षक यांनी त्यांच्या लेखामध्ये प्रवासवर्णन तसेच प्रवासामध्ये आलेले अनुभव विषद केलेले आहेत.

सदर अंकात लेख प्रसिध्द करण्यासाठी मोठया संख्येने दिलेल्या प्रतिसादाबद्दल तसेच सदर विशेषांक प्रसिध्द करण्यासाठी विशेष करून उपसंचालक, नगर रचना, नागरी संशोधन घटकामधील सर्व अधिकारी कर्मचारी तसेच नगर रचना संचालनालयातील प्रशासकीय विभागातील अधिकारी / कर्मचारी तसेच ज्या सर्वांनी हातभार लावला त्या सर्वांचे आभार.....!

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PART - I

લેખ



“Decision Support system in Urban planning”



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Abstract

A Decision Support System (DSS) is a real-time tool integrating data, models, and software to support efficient, semi-structured, and unstructured decision-making. It features interactive interfaces, data integration, flexibility, and tools like what-if analysis, improving decision quality and reducing uncertainty. DSS is categorized into model-driven, data-driven, document-driven, knowledge-driven, and communication-driven systems, each tailored to specific needs.

In urban planning, DSS integrates Geographic Information Systems (GIS) to support spatial, numerical, and policy decisions, enabling iterative and collaborative processes for optimal planning. The Town Planning and Valuation Department (TPVD) is planning to leverage DSS to manage tasks like development plan modifications, land use planning, and building permissions. GIS-based modules will enhance transparency, efficiency, and decision-making accuracy by dynamically integrating and updating data.

These modules are proposed to simplify processes through standardized formats, role-based responsibilities, and checklists, reducing redundant efforts. Public access to online applications and seamless integration with other departments will ensure efficient service delivery. The system is aimed to promote accountability and informed decision-making, leveraging accurate, real-time data for rational, error-free outcomes.

1. Introduction

a. What is decision support system (DSS)

Decision Support System (DSS) is a real-time decision-making tool where data, models, and software are used in partnership with individuals to generate efficient solutions. It combines numerous data inputs and offers methodological approaches to evaluation, modelling and display of the information to facilitate decision-making in case of the system's challenging issues. DSS facilitates semi-structured and unstructured decision-making and can improve the quality, speed and efficiency of the decisions since new information. Prognoses that would be hard to produce manually are also available through DSS.

b. Characteristics of a Decision Support System

- **Interactive Interface:** The graphical user interface is also user friendly hence users can interact with DSS easily in inputting their data and get the desired output.
- **Data Integration:** It gets information from various sources like DBMS, data marts, Data warehouses and even data feeds to have complete data when processing data.
- **Support for Semi-structured and Unstructured Decisions:** DSS on the other hand is intended for usage in cases where the decision-making process is not highly routinized as in the case of traditional management information systems.
- **Analytical Models and Tools:** DSS also has tools for analysing data and making recommendations; these tools range from statistical analysis, forecasting, optimization, and simulation models.
- **Flexibility and Adaptability:** The system can be applied to any type of decision-making environment and is versatile in the sense that it can be modified in exact conformity with the needs of the users or the organization.

- **What-if Analysis:** It helps in what-if analysis where the assumptions or the values of the input variable can be varied to determine the impact of change on the result.
- **Timely and Relevant Information:** DSS thus supplies timely and relevant information that can be used by the decision-makers to respond appropriately to requisite and volatile environments.
- **Support for Group Decision Making:** Most of the available DSS have group support systems, where more than one person is involved in the decision-making process.

c. The need of DSS

- **Improving Decision Quality:** DSS assists in improving the quality of the decision based on information and analysis that is accurate, comprehensive, pertinent, and timely, therefore making better decisions possible.
- **Handling Complex Problems:** This analytic resource is helpful when dealing with assignments that are structured and unstructured since other approaches may not be efficient in handling these issues by the application of analytical and modelling instruments.
- **Facilitating Rapid Decision Making:** DSS facilitates speedy formation of the decision by first automating the process of data collection and analysis.
- **Supporting Strategic Planning:** Strategic support is well provided by DSS since all organisations need to make long-run forecasts and planning and for this, DSS offers tools in the form of scenarios, forecasts, and simulations.
- **Enhancing Efficiency:** DSS reduces the time and efforts needed to amaze the decision information, assemble data and analyze it, thus enhancing organizational productivity at the operation stage.
- **Encouraging Collaboration:** As has been seen many DSSs make it possible to make collaborative decisions this makes it possible for many people to share information and come up with agreed decisions.
- **Providing Customizable Solutions:** DSS is flexible in a way that it can be designed for an organization to suit the variance needs of the users or departments, hence the solutions developed will fit the organization's needs in the particular context.
- **Reducing Uncertainty:** DSS can be categorized to provide complete prognosis data and thereby contribute towards the decrease of risk in the decision-making maximising the decision-maker's confidence level.

d. Types of DSS

Model-Driven DSS:

- **Description:** These DSSs stress the existence of access to or capability to manipulate a mode or algorithm that enables users to assess decision variables and options.
- **Functionality:** They apply optimisation models, simulation models, and forecasting models in the decision-making processes within the organisation.
- **Example:** A model-driven decision support system in urban planning could be a software application that uses complex mathematical models to simulate different urban development scenarios, allowing planners to evaluate the potential impacts of proposed projects on factors like traffic congestion, air quality, housing affordability, and land use before making final decisions, such as deciding the optimal location for a new transit line or the best zoning regulations for a developing area

Data-Driven DSS:

- **Description:** These DSSs stress the aspects of data access and modification, where users obtain and transform data into a form that enables them to produce reports and carry out queries.
- **Functionality:** They give capacities for populating databases, processing and creating reports and analyses out of historical and current data for decision making.

- **Example:** A data-driven decision support system in urban planning could be a GIS-based platform that analyzes real-time traffic data, population density, and land use patterns to identify optimal locations for new public transportation stops, allowing planners to make informed decisions about infrastructure development based on current usage patterns and predicted future needs

Document-Driven DSS:

- **Description:** These DSSs stress the availability and the capability for changing the documents and other non-structured information assets.
- **Functionality:** They assist decision-making by offering methods for the retrieval, processing and manipulation of text and graphics documents and/or multimedia documents stored in documents, web pages, multimedia databases etc.
- **Example:** A document-driven decision support system in urban planning could be a digital platform that allows planners to access and analyze a large collection of documents like zoning regulations, historical maps, environmental impact studies, public feedback reports, and meeting minutes, enabling them to make informed decisions about land use development based on the readily available information within these documents through search and filtering functionalities

Knowledge-Driven DSS:

- **Description:** These DSSs highlight the availability and ability to change the expert knowledge and heuristic rules that embody human expertise.
- **Functionality:** They assist in decision-making because they connect the user to knowledge or rule-based information in specific areas to help the user decide.
- **Example:** A knowledge-driven decision support system in urban planning could be a software platform that leverages geographic information systems (GIS) data, demographic information, and expert-coded rules to identify optimal locations for new community facilities like schools, parks, or healthcare centers, taking into account factors like population density, accessibility, and environmental considerations, essentially simulating "what-if" scenarios based on a built-in knowledge base of best practices in urban planning

Communications-Driven DSS:

- **Description:** These DSSs concentrate on communication, cooperation, and information and knowledge exchange among users in the course of a particular task or decision.
- **Functionality:** They accommodate group decision-making by offering the tools, details and ways of passing and sharing information in support of the teams in their decision-making process.
- **Example:** A communication-driven decision support system in urban planning could be a web-based platform that allows various stakeholders like residents, developers, planners, and city officials to access and contribute to real-time data on proposed development projects, enabling interactive feedback, discussions, and collaborative decision-making through features like online forums, comment sections, and interactive maps, essentially facilitating open communication throughout the planning process

2. DSS in the context of urban planning

a. DSS and spatial planning

DSS required for spatial planning are basically combination of GIS and one of the DSS model based on the problem statement.

- Spatial planning incorporates working across social, economic and environmental issues across multiple spatial scales and between different sectors of policy.

- The decision making process in SDSS is iterative, integrative and participative. It is iterative because a set of alternative solutions is generated which the decision-maker evaluates, and the insights gained are used to define further analysis.
- Location planning in the current context entails identifying optimum location(s) for adding a given amenity based on predefined cost and return parameters.

3. Use of DSS in Town Planning and valuation Dept (TPVD)

a. Concept

Urban and regional development is a multidisciplinary field, which involves planning for a region taking into consideration all the varying factors which are involved in the functioning of that region such as demographics, physical characteristics of the place, climate, economy, social factors, environment, industry and commerce, infrastructure etc. Since all these fields are of multidimensional, decisions taken by planners are invariably based on various multitudes of parameters. The urban planner must take into consideration various socio-economic, ecological, cultural, technical, and ethical perspectives with respect to the planning region. The urban planning process has multiple actors, many and often conflicting values and views, a wealth of possible outcomes, and a high degree of uncertainty.

With the above context, decision support system becomes a necessity to ensure more accurate, data-driven, rational, informed decision-making, timely problem-solving, and improved efficiency in dealing with issues or operations, planning, and even management.

b. Application of DSS in various processes – DP, RP, TPS, Building permissions etc.

Following broad types of decisions need to be taken by planners in TPVD -

- Spatial decisions—location decision for Zoning and/or Reservations, Preparation/verification of Existing Land Use Planning, Preparation/verification of Proposed Land Use Planning, Road Network etc.
- Numerical decisions—Population Projections, Area of reservation based on population as per planning standards
- Policy decisions—Preparation of planning Norms/standards, methodology for implementation of various plans, evolution of state-specific policies based on global/national trends and practices
- Scrutiny- scrutiny of various Suggestions/Objections, Scrutiny on various sections

c. Methodology

The framework of DSS includes: a.People b.Technology c.Development Approach

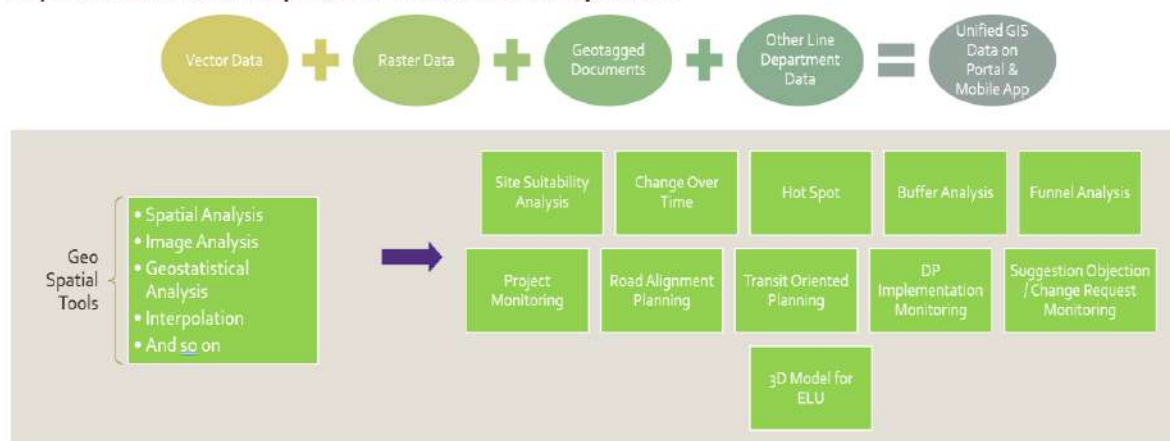
Framework of DSS includes 4 phases -

- 1.Intelligence—Searching for conditions that call for decision;
- 2.Design—Developing and analysing possible alternative actions of solution;
- 3.Choice—Selecting a course of action among those;
- 4.Implementation—Adopting the selected course of action in decision situation

Development of modules –

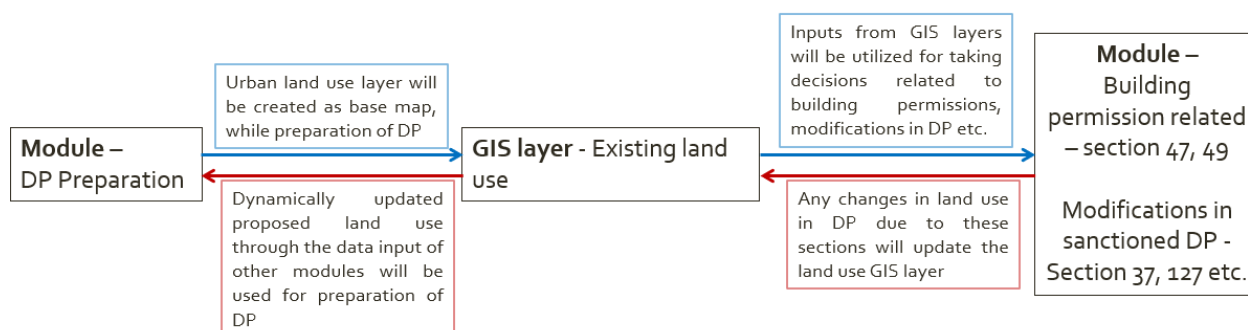
The TPVD department requires to take decisions on various proposals, eg. under sections 47, 49, 50, 127 of MRTP Act, which are related to various processes of urban planning such as modification in Development plans, appeal against the building permissions conditionally granted or refused, Town planning schemes, regional plans etc. Apart from these, technical consultation to govt. on various town planning matters is required to be done by the department. To carry out above tasks with the aid of computerization, with speed and efficiency, and to create a decision-support system for the above functions of the dept., Supervisory modules are being developed with integration of GIS in the department. The methodology adopted for leveraging these GIS based modules for the decision support system is as below –

Proposed Solution for the Requirement – Unified Portal for Department



Administrative supervisory Development – Interlinkage with GIS layers

Example –Existing land use GIS layer



d. Outcomes envisaged

The modules are being developed with an aim to ease the working of the office personnel by creation of a decision support system, so as to ensure accurate, transparent decisions are taken by the officials in timely manner. These are also aimed at providing efficient and timely service delivery to the public.

Features of these modules -

- In-house development of the modules on the GIS platform by the TPVD planners
- Training master-trainers, subsequently training by master-trainers to others in dept.
- Integration with various departments for seamless services
- Access to public to submit the applications online under various sections
- User-based Access to Mantralaya and to other line departments

Key benefits envisaged –

- Transparency and Accountability – This is ensured by the provisioning of Representative Dashboard and Timely update to stakeholders
- Efficiency - Timely Response, Ready to use Draft / Note will help improve the efficiency in the working of the professionals.
- Process Re-Engineering – Features in the modules such as Format Standarization, Role based Responsibility, Mandatory Checklist for quick decision and will reduce unnecessary efforts and time on redundant processes.
- Informed Decision making – The modules will enable officials to take decisions based on accurate GIS based Data which will be dynamically updated through the modules as

all current processes will function through these modules on real-time basis. Interlinkage with other modules will ensure data integration and availability of all data/information on a single platform at the same time leading to dynamic database creation. This will result in rational, timely and error-free decision making.

4. References

Decision Support System – Geeks for Geeks

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Sustainable Development Planning for New Mahabaleshwar Hill Station Area of Mahabaleshwar, Jaoli, Satara & Patan Taluka's in Satara District, Using Geospatial Technology

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Abstract

The New Mahabaleshwar Hill Station Area Development Plan addresses the challenges of promoting sustainable development in one of India's most ecologically sensitive regions, the Western Ghats. Spanning 235 villages in Satara, Jaoli, Patan, and Mahabaleshwar talukas, the plan integrates Geographic Information System (GIS)-based methodologies with detailed demographic, economic, and environmental analyses. The objective is to achieve balanced development that fosters economic growth, preserves biodiversity, and improves the quality of life for local communities.

The plan identifies existing issues such as deforestation, human-wildlife conflicts, inadequate infrastructure, and tourism pressures. It proposes sustainable solutions through strategic land-use zoning, infrastructure development, and environmental conservation. Key focus areas include improving connectivity through innovative transportation systems, addressing housing and socio-economic needs, and leveraging the region's tourism potential while adhering to eco-sensitive norms. The plan also emphasizes disaster management strategies to mitigate risks from earthquakes, floods, and landslides.

Tourism is positioned as a driver of inclusive growth, with proposals for community-based eco-tourism, heritage conservation, and carrying capacity assessments to ensure sustainable visitor management. Environmental preservation is prioritized through initiatives like protected zones, green infrastructure, and renewable energy projects.

This paper highlights the integration of data-driven approaches with participatory planning to ensure compliance with the Maharashtra Regional and Town Planning (MRTP) Act, 1966, AMRUT guidelines and Maharashtra State Government Resolution. The proposed development strategies aim to create a blueprint for sustainable progress that safeguards the region's unique ecological and cultural heritage.

Keywords: Aerial Survey, Cluster-based Approach, DGPS, GIS, LiDAR Technology, Remote Sensing, Sustainable Development, Tourism Development, Western Ghats Eco-Sensitive Area.

1. Introduction

The New Mahabaleshwar Hill Station Area Development Plan represents a critical initiative to address the challenges of sustainable growth in an ecologically sensitive region. Located in the Western Ghats of Maharashtra, this area encompasses 235 villages in Satara, Jaoli, Patan, and Mahabaleshwar talukas, in Satara District covering approximately 1,153 sq.km. Renowned for its biodiversity, cultural heritage, and tourism potential, the region faces pressing issues such as environmental degradation, human-wildlife conflicts, inadequate infrastructure, and socio-economic disparities.

As per the Maharashtra Regional and Town Planning (MRTP) Act, 1966, aligned with Atal Mission for Rejuvenation and Urban Transformation (AMRUT) guidelines and Maharashtra State Government Resolution, the development plan employs Geographic Information System (GIS) technologies to integrate spatial and attribute data for effective decision-making. The objective is to balance conservation priorities with economic and infrastructural development, ensuring long-term sustainability.

The plan envisions addressing core challenges, including deforestation, unplanned urbanization, hilly area and strained resources, by promoting sustainable land-use practices, eco-friendly infrastructure, and community-based tourism. It emphasizes participatory planning to engage local stakeholders and foster inclusive growth. Key components include upgrading connectivity, enhancing socio-economic conditions, preserving natural and cultural heritage, and implementing robust disaster management strategies.

This paper delves into the region's unique geographic and demographic profile, outlines existing issues, and discusses proposed interventions. The overarching goal is to create a blueprint for development that respects the region's ecological fragility while enabling progress. By integrating technology, policy, and community participation, the plan aims to secure a sustainable future for the New Mahabaleshwar Hill Station Area.

2. Literature Review

The Mahabaleshwar region, located in the Western Ghats of Maharashtra, has been the focus of numerous studies and reports examining its socio-economic development, environmental conservation, and potential for sustainable tourism. These studies emphasize the unique biodiversity of the area, the pressures of urbanization, and the opportunities for enhancing local livelihoods through responsible development.

Ecotourism in Mahabaleshwar and Panchgani (Woods, 2005) Woods (2005) examines the potential for establishing ecotourism in Mahabaleshwar and Panchgani, two of the region's most popular hill stations. Ecotourism is seen as a means of promoting conservation while simultaneously supporting the local economy. The study advocates for responsible tourism practices that minimize environmental impact while allowing visitors to appreciate the region's unique natural beauty and cultural heritage. Ecotourism can create a sustainable economic model by involving local communities in tourism activities, creating jobs, and generating revenue that can be reinvested in conservation efforts.

Environmental Sensitivity and Regional Planning (UDD, GoM, 2015) The Government of Maharashtra (GoM) has taken steps to ensure that Mahabaleshwar and Panchgani are preserved as ecologically sensitive zones (ESZ), as outlined by the UDD, GoM (2015). The declaration of these areas as ESZs aims to protect the biodiversity and natural resources from the adverse effects of unregulated development. The Regional Planning Board's role in developing plans that integrate conservation and development is essential in maintaining the delicate balance between growth and environmental preservation. This policy is vital for ensuring that tourism, agriculture, and other industries do not compromise the environmental integrity of Mahabaleshwar, allowing for sustainable development in the region.

Socio-Economic Development in Mahabaleshwar and Jaoli Tehsil (Suryawanshi, 2017) Suryawanshi (2017) explores the socio-economic dynamics of Mahabaleshwar and the adjacent Jaoli Tehsil. The study highlights the role of agriculture, tourism, and local industries in shaping the livelihoods of residents. Agriculture, particularly the cultivation of strawberries, is a key economic activity, while tourism also plays an important role in the economy of the region. However, the rapid urbanization and growing population in Mahabaleshwar have created challenges related to infrastructure development, resource management, and the provision of services to a diverse population. The research underscores the need for balanced development strategies that preserve the ecological integrity of the region while addressing the demands of a growing population.

Spatio-Temporal Perspectives of Wind Power in Satara (Pawar et al., 2020) In recent years, the region's potential for renewable energy, particularly wind power, has become a subject of study. Pawar et al. (2020) focus on the spatio-temporal aspects of wind energy in Satara, which encompasses Mahabaleshwar. The study identifies areas with high wind potential, which could support the development of wind farms. The development of wind power in the region is crucial as it provides an alternative to traditional energy sources, supports sustainable development, and reduces the region's carbon footprint. This shift towards renewable energy can also contribute to the local economy by creating job opportunities and reducing dependency on fossil fuels.

Evaluation of orchid species from Mahabaleshwar Plateau of Western Ghat (DS Kadam, M. S. 2022) Evaluation of orchid species from Mahabaleshwar Plateau of Western Ghat, conducted a detailed evaluation

of orchid species from the Mahabaleshwar Plateau, located within the Western Ghats. Their study highlights the rich biodiversity of the region, focusing on the identification and classification of various orchid species found in this ecologically sensitive area. The research contributes to understanding the floral diversity of the plateau, emphasizing the importance of preserving these species in the face of growing developmental pressures. This work is significant for conservation efforts, as orchids are vital indicators of environmental health in the Western Ghats ecosystem.

Koyna Dam and Its Impact on the Region (Wikiwand, 2023) The Koyna Dam, located in the vicinity of Mahabaleshwar, plays a significant role in the region's water supply and energy generation. According to Wikiwand (2023), the dam has provided vital irrigation and drinking water to the surrounding areas and is a critical source of hydroelectric power. However, the dam's construction and its impact on local ecosystems, including changes in water quality and availability, are points of concern. Balancing the benefits of the Koyna Dam with the need to preserve the natural environment, particularly the wildlife in the Sahyadri Tiger Reserve and surrounding forests, remains an ongoing challenge.

Flora and Fauna of Mahabaleshwar (Deshpande, N.D.) The biodiversity of Mahabaleshwar is a key feature of its ecological and cultural importance. Deshpande (n.d.) in *Flora of Mahabaleshwar and Adjoining's* provides an extensive catalog of the plant species found in the region, focusing on the unique flora that thrives in the area's diverse ecosystems. The region is home to numerous species of medicinal plants, orchids, and other endemic species, many of which are critical to maintaining the region's ecological balance. The preservation of this biodiversity is integral not only to environmental conservation but also to local socio-economic development, as many of these plants contribute to local economies through tourism and traditional medicine.

3. Regional and Geographic Context

The New Mahabaleshwar Hill Station Area, spanning 235 villages across Satara, Jaoli, Patan, and Mahabaleshwar talukas, is situated in the ecologically sensitive Western Ghats, a UNESCO World Heritage site. This region's strategic location in the Deccan Plateau, lies between longitudinal extent 73° 33' 52.11" to 73° 56' 48.25" and latitudinal extent 17° 54' 28.16" to 17° 8' 42.82" with proximity to major national highways NH-66 (Mumbai-Goa-Kanyakumari) and NH-48 (Delhi-Chennai), enhances its connectivity to urban centers while offering significant potential for eco-tourism and regional development.

The area is characterized by diverse geographical features, including rugged terrain, dense forests, rivers, waterfalls, and plateaus. It lies within the Krishna and Koyna river basins, supporting rich biodiversity and vital ecological functions. The agro-climatic conditions range from temperate to tropical, providing opportunities for agriculture, horticulture, and agro-tourism. However, this diversity also makes the region susceptible to environmental degradation and natural disasters like floods, landslides, and earthquakes.

The delineated area is part of several eco-sensitive zones, including the Sahyadri Tiger Reserve, Koyna Wildlife Sanctuary, and Chandoli National Park, underscoring the need for stringent environmental safeguards. The Western Ghats' flora and fauna are irreplaceable, with endemic species and critical habitats requiring conservation.

Demographically, the region hosts a predominantly rural population engaged in agriculture and allied activities. Its natural and cultural heritage—encompassing forts, sacred groves, and waterfalls—provides immense tourism potential. Yet, limited infrastructure, poor connectivity, and socio-economic challenges hinder growth. This regional and geographic analysis highlights the dual necessity of preserving the area's ecological richness while addressing its development needs. The development plan proposes strategic interventions to balance growth with sustainability, leveraging GIS tools and participatory planning to ensure inclusivity and resilience.

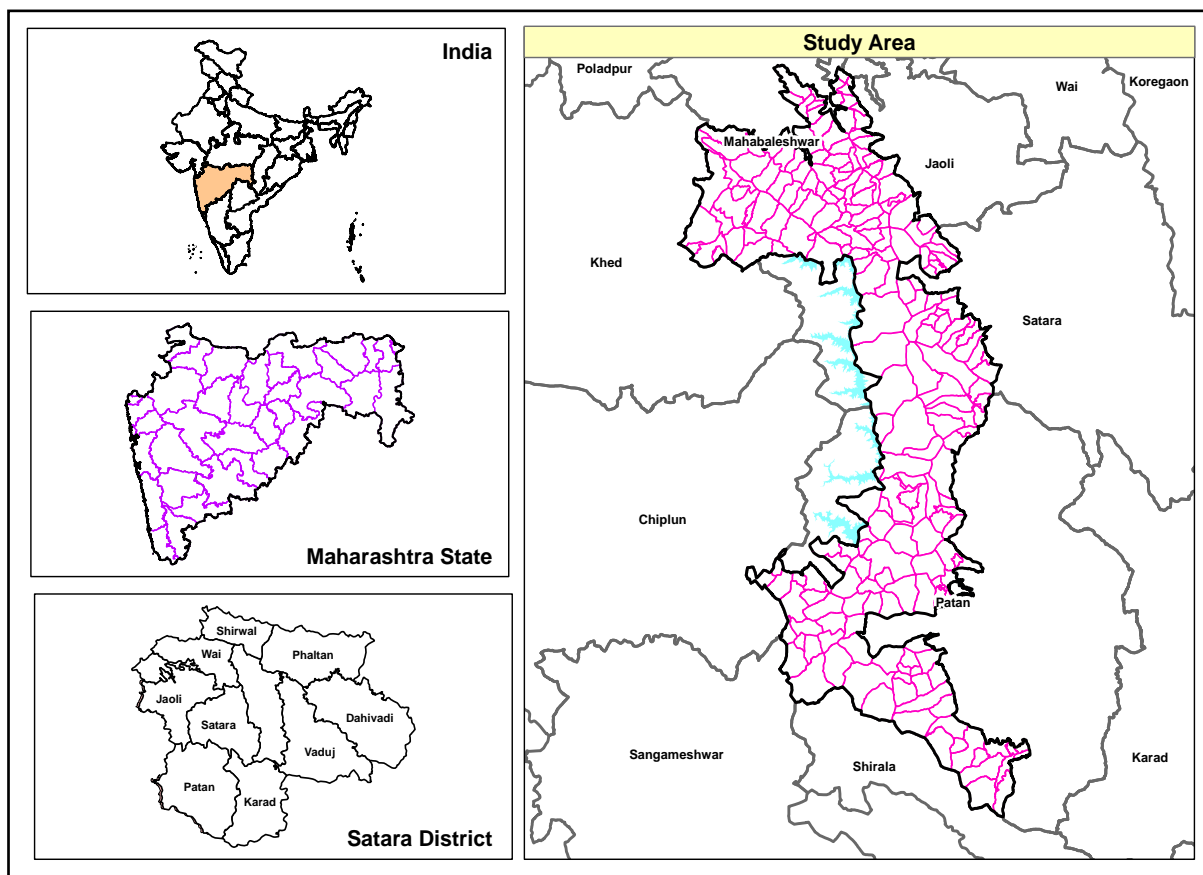


Fig. No. 1 Location map of Study Area

4. Database and Methodology

Data Collection and Integration

The focuses on collecting and integrating data to preparation of development plan includes:

- The process begins with the collection and analysis of primary, secondary, and tertiary data. Primary data is gathered through field surveys, Socio-economic surveys, public consultations, and stakeholder meetings, focusing on land use, infrastructure, and socio-economic conditions.
- Remote Sensing / Aerial Imagery: High-resolution satellite imagery / aerial surveys, supported by LiDAR technology, are used to capture the topography, landuse and land cover, and other spatial attributes of the region.
- Revenue Data: Mapping administrative boundaries, land ownership information through the integration of cadastral / village maps, and land revenue records.
- Secondary data collection include data that is already available with various governmental organizations/agencies at the state and local level. This data included in the forest data, road network information and irrigation/ waterbody data and published reports, statistical abstracts, census reports, information from various line departments, etc.

Methodology

The development of New Mahabaleshwar as a greenfield project is guided by a comprehensive methodology that integrates geospatial technologies, ensuring an innovative, sustainable approach to urban and regional planning. The methodology focuses on creating a balance between ecological preservation, infrastructure development, and socio-economic growth. Geospatial technologies such as Geographic Information Systems (GIS), Remote Sensing, Light Detection and Ranging (LiDAR), Panoramic Imagery are used to map, analyse, for the demographic analysis we are considered the Linear Regression method for the population projection, and plan the development in line with the strategic goals outlined in the vision. The preparation process complies with the Maharashtra Regional and Town Planning (MRTP) Act, 1966, and aligns with AMRUT guidelines and Maharashtra State Government Resolution, emphasizing modern urban planning tools.

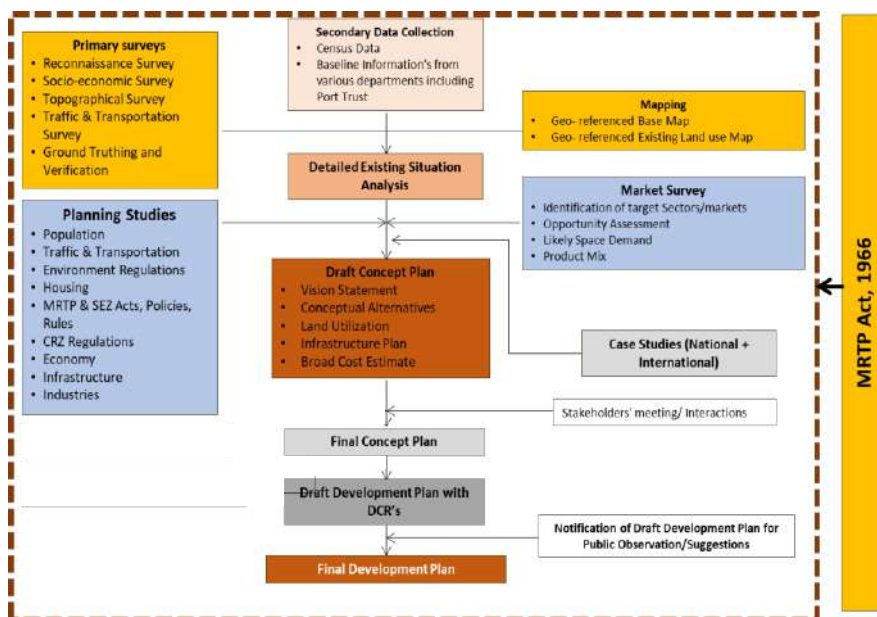


Fig. No. 2 Methodology

5. Result and Discussion

5.1 Socio-Economic and Demographic Insights

The socio-economic and demographic profile of the New Mahabaleshwar Hill Station Area provides a critical foundation for its development plan. As per the 2011 Census, the region has a population of 95,362 distributed across 235 villages in Satara, Jaoli, Patan, and Mahabaleshwar talukas. The population density is relatively low, reflecting the rural and ecologically sensitive nature of the region.

• Demographics

The area has witnessed moderate population growth, influenced by migration patterns and natural growth rates. The sex ratio is favorable, with approximately 988 females per 1,000 males. Literacy levels are high, although disparities exist among different villages. The majority of the workforce is engaged in agriculture, followed by small-scale industries and tourism-related activities.

• Socio-Economic Insights

Agriculture dominates the economy, with a significant emphasis on horticulture and cash crops such as strawberries and sugarcane. Emerging opportunities in agro-tourism are gaining tourist attraction. Housing in the region predominantly comprises semi-permanent structures, reflecting rural and resource-constrained settings. Demand for affordable housing is expected to grow in tandem with population increases. Limited access to healthcare, education, and other basic amenities hampers socio-economic development. Connectivity and transport issues further isolate many villages, restricting access to markets and services.

5.2. Land Use and Infrastructure Planning

The study area adopts a strategic approach to land use and infrastructure planning, aiming to balance sustainable growth with environmental conservation. The plan covers 115,330 hectares of land, integrating zoning regulations and infrastructure proposals to address current challenges while preparing for future demands.

5.2.1 Existing Land Use (ELU)

The region's existing land use primarily includes agriculture, forests, and settlements. Residential zones are concentrated in village clusters, while significant portions are dedicated to eco-sensitive areas, including forests, water bodies, and conservation zones. The ELU analysis identifies gaps in basic amenities, unplanned expansions, and encroachments into protected areas.

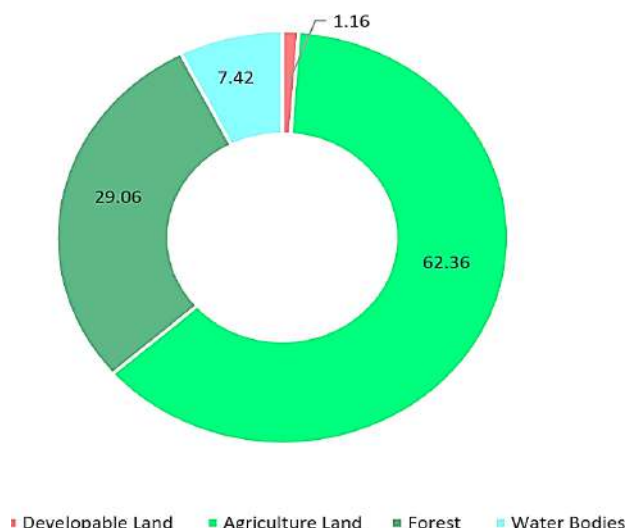


Fig. No. 3 Existing Landuse

5.2.2 Proposed Land Use (PLU)

The proposed land use plan emphasizes:

- **Residential Development:**

The proposed residential zone spans 6.02% of the total area, covering 69.47 sq. km. Residential development will focus on expanding existing settlements, especially near gaothans, with buffer zones of 200-500 meters to protect the environment. This expansion aims to accommodate the growing population while minimizing ecological impact, ensuring sustainable growth that integrates with the region's natural landscape.

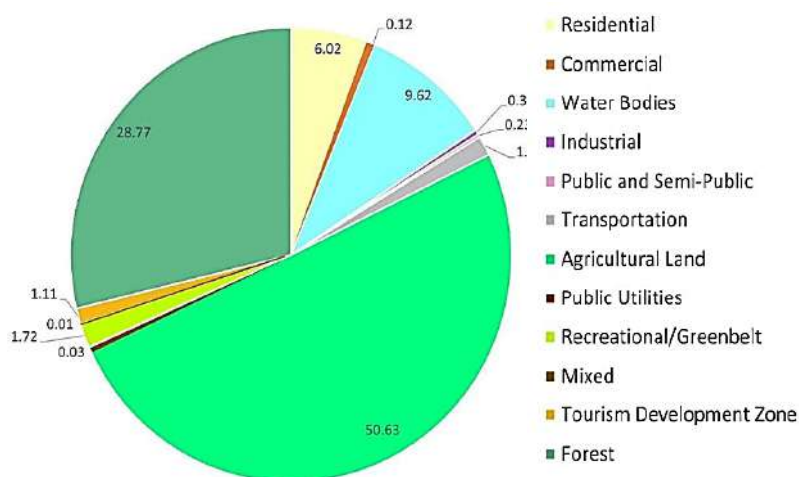


Fig. No. 4 Proposed Landuse

- **Commercial and Industrial Expansion (EPC):**

Commercial areas are proposed to cover 1.37 sq. km (0.12% of the total area), expanding along major roads like NH 166 and SH 58, including adventure tourism, resorts, and home stays. Industrial areas will grow to 3.70 sq. km (0.32%), with a focus on agro-processing, cottage industries, and eco-production centers. These expansions are designed to support both local economies and tourism development while considering environmental constraints.

- **Transportation Infrastructure:**

Transportation areas are expanded to 16.15 sq. km (1.40% of the total area), which includes the development of new roads, cycle tracks, and electric vehicle-friendly infrastructure. This expansion is key to improving accessibility and connectivity for both residents and tourists, with a focus on sustainable transport options, such as eco-friendly last-mile connectivity and green corridors.

- **Recreational and Tourism Development:**

Recreational spaces will grow to 19.88 sq. km (1.72% of the total area), introducing nature trails, hilltop gazebos, and agro-tourism activities like strawberry farms. This initiative aims to enhance the tourism experience, creating spaces for outdoor activities while preserving the region's rich biodiversity. These recreational areas are designed to blend conservation with tourism, creating a sustainable model for the region's future.

- **Utilities and Services:**

Public utility areas will cover 0.40 sq. km (0.03% of the total area), reflecting the significant need for improvements in essential services like water, sanitation, and waste management. Proposed developments include water treatment plants and bio-toilets to address existing infrastructure gaps. The goal is to ensure a reliable supply of basic services to meet the demands of a growing population and support sustainable urban development.

- **Social Infrastructure:**

Social infrastructure, covering areas such as health, education, and community services, will increase significantly, with new facilities like 36 health centers (including hospitals and dispensaries) and educational hubs spread across 77.93 hectares. These developments aim to improve the quality of life for both residents and visitors, ensuring equitable access to healthcare, education, and cultural services in line with population growth.

- **Environmental Conservation:**

Forest areas remain a significant portion, with 331.86 sq. km (28.77% of the total area) designated for conservation, including the Sahyadri Tiger Reserve. Additionally, water bodies are allocated 110.97 sq. km (9.62%) with buffer zones to protect water quality. These conservation measures ensure the preservation of critical ecosystems, balancing development with ecological sustainability.

- **Proposed Traffic & Transportation:**

A comprehensive development plan for traffic and transportation in the study area, emphasizes the importance of enhancing connectivity through various modes of transportation, including roadways, railways, airways, and waterways.

Road Connectivity: The plan proposes the widening of existing roads and the introduction of new routes to improve access to remote areas. A total of 378.27 kilometers of new roads are proposed, along with non-motorized transit routes such as cycle tracks and nature trails, aiming to promote sustainable tourism while respecting the ecological sensitivity of the region.

Rail Infrastructure: Currently lacking a functional railway station, Mahabaleshwar will benefit from the establishment of two new stations along a proposed Chiplun-Karad railway line. This initiative aims to facilitate smoother travel for residents and tourists alike, with additional narrow gauge rail routes connecting significant tourist attractions.

Air Connectivity: To boost tourism, expanding air access through new helipads and an airstrip in Baje Village. A seaplane base at Urmodi Dam is also planned to enhance connectivity via waterways, providing a unique travel experience while supporting local economies.

Innovative Transportation Options: The various innovative transportation options such as zip lines and ropeways to enhance the tourist experience while promoting eco-friendly travel. These initiatives aim to connect unexplored destinations within the region, making it more accessible for visitors.

5.3. Tourist Paradise

"Tourist Paradise," outlines a comprehensive development plan for the study Area, focusing on enhancing tourism through a structured "Hub & Spoke" model. This model aims to create Tourism Growth Centres (TGCs) and Tourist Paradises (TPs) that provide seamless travel experiences and promote sustainable tourism.

- **Tourism Growth Centres (TGCs)**

TGCs serve as hubs equipped with modern facilities including theatres, eco-tourism businesses, museums, and eco-restaurants. Initial mobility within TGCs will be restricted to parking areas, promoting pedestrian movement and the use of electric vehicles or animal-based transport.

- **Tourist Paradises (TPs)**

TPs are designed to enhance tourist experiences by providing essential amenities such as registration facilities, safety gear, restrooms, and information. They will ensure connectivity to TGCs through various transport modes including roads, ropeways, and nature trails. The distribution of TPs across several sectors:

Kandat Valley Focuses on pilgrimage circuits and adventure activities like hot air ballooning and ropeways.

Tapola Emphasizes connectivity through narrow-gauge rail and water activities on the Koyna reservoir.

Solashi Valley Proposes ropeways and water activities to enhance accessibility and tourism.

Raj Vaibhav Highlights adventure sports like ziplining and augmented reality nature walks at Kas Lake.

Bamnoli A water-centric sector with eco-resorts and wellness retreats.

Urmodi Combines adventure sports with scenic landscapes, including water-plane landings.

Thoseghar Known for its waterfalls and adventure tourism like bungee jumping.

Bharsakhale Focuses on eco-tourism with activities like rappelling near waterfalls.

Aral Integrates eco-tourism with astronomy-based tourism in a Dark Sky Park setting.

A strategic approach to developing the New Mahabaleshwar Hill Station Area as a premier tourist destination.

By integrating sustainable practices with modern amenities and diverse tourist activities, the plan aims to enhance visitor experiences while preserving the natural environment.

The proposed infrastructure not only facilitates accessibility but also promotes cultural engagement and adventure tourism, making it a holistic development initiative for the region.

5.4. Protection and Conservation of Eco-Sensitive

New Mahabaleshwar Hill Station Area focuses on the critical strategies for the protection and conservation of eco-sensitive areas. It emphasizes the importance of adhering to regulations and restrictions outlined in relevant notifications, particularly those from the Kasturirangan report regarding sacred groves. The study area highlights the need to mitigate human-animal conflicts and environmental damage, aiming for a balanced approach to development that respects ecological integrity. One of the key issues addressed is the fragmentation of tiger movement corridors due to infrastructure developments, such as the NH166 E and the proposed Karad-Chiplun Railway line. This

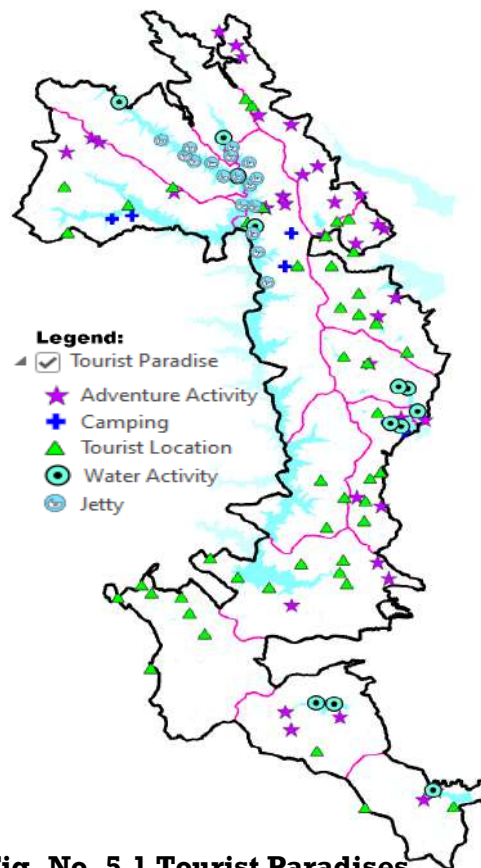


Fig. No. 5.1 Tourist Paradises

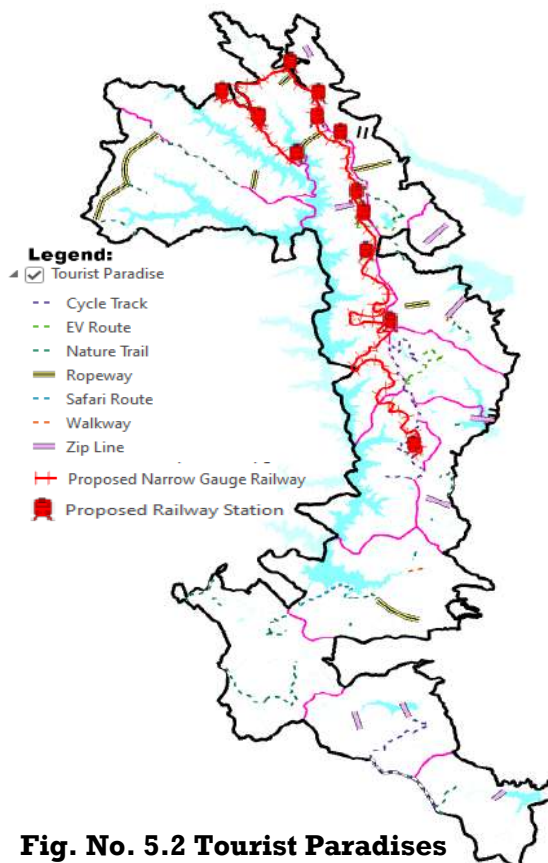


Fig. No. 5.2 Tourist Paradises

fragmentation threatens wildlife populations by isolating them from essential habitats. To counteract these impacts. The study area strategies for protecting eco-sensitive areas, including the relocation of settlements from critical habitats, the establishment of clear zoning regulations, and the restriction of major tourism activities to buffer zones. Ecotourism initiatives are encouraged to preserve biodiversity while accommodating human needs. Furthermore, the introduction of Non-Motorized Transport (NMT) circuits within Tourist Growth Centres (TGCs) aims to reduce pollution and enhance the tourist experience while protecting the natural environment. A comprehensive framework for the protection and conservation of eco-sensitive areas, balancing development with ecological sustainability and community involvement.

Environmental and Disaster Management

The New Mahabaleshwar Hill Station Area, part of the ecologically sensitive Western Ghats, faces significant environmental challenges. The region's biodiversity, hydrology, and forest cover are under pressure from deforestation, human encroachment, and unplanned development. Additionally, the area is prone to natural disasters such as earthquakes, floods, landslides, and necessitating a robust environmental and disaster management framework.

- **Environmental Management**

Eco-Sensitive Zoning the plan emphasizes protecting eco-sensitive areas, including the Sahyadri Tiger Reserve, Koyna Wildlife Sanctuary, and Chandoli National Park. Strict zoning regulations prevent unplanned expansion and encroachment. Biodiversity Conservation strategies include reforestation, habitat restoration, and the conservation of endemic species. Sacred groves and natural habitats are prioritized for preservation. Waste Management sustainable solid waste and sewage management systems are proposed to prevent pollution of rivers and soil.

- **Disaster Risk Management**

Earthquake Mitigation given the region's seismic activity, construction regulations are proposed to ensure earthquake-resistant buildings and infrastructure. Flood Control mapping of flood-prone areas and the construction of drainage systems aim to mitigate flood risks. The preservation of wetlands and water bodies is integral to managing excess rainfall. Landslide Prevention slope stabilization techniques, afforestation, and careful planning of road alignments are key measures to reduce landslide occurrences. Balancing development needs with ecological conservation and addressing the vulnerability of remote areas to disasters. The region's natural resources can be leveraged for eco-tourism and renewable energy, promoting sustainable livelihoods while preserving the environment.

6. Conclusion and Recommendations

The New Mahabaleshwar Hill Station Area Development Plan represents a holistic effort to balance ecological preservation with sustainable development in one of India's most sensitive and scenic regions. By integrating Geographic Information System (GIS) and Remote Sensing (RS) tools, demographic analyses, and participatory planning, the plan addresses critical challenges, including environmental degradation, inadequate infrastructure, and socio-economic disparities. It seeks to create a roadmap for inclusive growth, ensuring that development aligns with the region's unique ecological and cultural characteristics.

The study area emphasis on eco-sensitive zoning, sustainable tourism, renewable energy, and disaster risk reduction underscores its commitment to long-term sustainability. Proposed land-use changes and infrastructure upgrades are designed to enhance regional connectivity, improve quality of life, and stimulate economic diversification, particularly through agro-tourism and heritage conservation. By incorporating community participation and adhering to regulatory frameworks such as the MRTTP Act, the plan ensures inclusivity and compliance with environmental standards.

Recommendations

- **Strengthen Eco-Conservation Efforts**

Implement stricter monitoring and enforcement of eco-sensitive zoning regulations to protect biodiversity and prevent deforestation. Encourage community-led conservation programs to foster local ownership of environmental protection.

- **Promote Sustainable Tourism**

Regulate tourist inflows through carrying capacity analyses to prevent over-tourism and resource depletion. Develop eco-tourism infrastructure, such as nature trails, ropeways, and eco-resorts, with minimal environmental impact.

- **Enhance Infrastructure and Connectivity**

Prioritize road widening, new transport modes, and renewable energy projects to improve accessibility while reducing carbon footprints. Invest in public transport networks and electric vehicle infrastructure to ensure equitable and eco-friendly mobility.

- **Support Local Economies**

Establish agro-processing centers and promote agro-tourism to provide sustainable livelihoods for local communities. Facilitate skill development programs to enable residents to participate in emerging sectors like tourism and renewable energy.

- **Strengthen Disaster Resilience**

Develop comprehensive disaster management frameworks, including early warning systems and resilient infrastructure. Conduct regular community awareness programs on disaster preparedness and mitigation.

- **Foster Transparent Governance**

Establish mechanisms for regular monitoring, evaluation, and public reporting on the plan's progress. Encourage stakeholder engagement to ensure that development aligns with community needs and aspirations.

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“Urban Planning and Management through New Age Technologies”



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During last decade, new age technology has changed the script of urban planning and management. As demonstrated by various initiatives taken up by Government of India (Ministry of Housing and Urban Affairs - MoHUA), the new technology is vital for delivery with speed, scale and skills. The ICT (Information and Communication Technology), Artificial Intelligence, Big Data Analytics, Machine learning, Deep learning, Block chain Analytics, GIS, GPS, etc. are revolutionizing the urban processes by intelligent and smart planning, infrastructure and services, transport systems, land management and enforcement.

The Unified Digital Infrastructure – ICT Reference Architecture Standards (IS 18000:2020) is a comprehensive document for digitalization of urban practice. It defines the “Unified Digital Infrastructure” as the sensors, data systems, IoT systems and platforms. Unified Data Exchange Standards layout the architecture for instituting data exchanges or market places. The ICT can be a path breaker in transition towards a green and clean economy, resilient, smart planning management systems. This needs specialized inputs in urban planning by domain experts in GIS, GPS, Enterprise information architecture (EIA), big data analytics, Enterprise resource planning (ERP) solutions, digital dashboards, block chain, AI, etc. Bots, such as Chat GPT are conversational and can be useful in improving governance in cities by deployment of smart intelligent machine. Various alternative technologies, based on the use of IT, simulation, block chain and automation can make the services smart and intelligent.

The breakthrough in digital technology and informatics has multiplied space, energy and time. Integration of land use, utilities, transport and building on a common network helps optimize space efficiency use and configurations, eliminating unused or underperforming space. The ICT can help in the integration of citizen participation, governance and online consultation over plans and programmes of local development. The urban processes need to be compatible to circular economy by adoption of new technologies, such as automation, digital block chain, combinational and discrete optimization, algorithms, complexity theory, artificial intelligence, robotics and the ubiquitous cloud.

An intelligent geo-portal can bring together various line departments and communities on a platform for e-service delivery. The system is mobile and internet based, dynamically scalable. It helps in technology enabled management of land and infrastructure, planning and development. This yields better co-ordination and exchange of information, cost and time management. Citizen engagement becomes much easier and viable by virtual common platforms. Global positioning systems and satellite-guided GPS devices are increasingly being used for urban surveys, planning and laying of services. By data analytics, the planners can plan and implement the projects with precision and accuracy. To enhance capacity, efficiency and transparency in urban sector, various portals such as India Urban Data Exchange, National Urban Learning Platform and Smart Code have been launched while the National Urban Governance Platform is under development under National Urban Development Mission.

The NITI AAYOG has built National Data Analytical Platform which provides data sets in machine readable formats. This can be used for planning and policy making such as Inspirational District Programme. The Ministry of Housing and Urban Affairs (MoHUA) in February – 2021 launched the National Urban Digital Mission (NUDM), which aims to push for the digitalization of urban planning and governance by the Urban Local bodies (ULBs). Data focus of this mission envisages a move towards outcome-based planning and governance.

The National Urban Innovation Stack (NUIS) is part of the agenda of digitalization and datafication by creating certain design principles, defining digital components, platforms and standardization. The creation of a “shared digital infrastructure” aims at systematically organizing India’s urban data and employing it for a variety of purposes. The NUIS is a collection of cloud-based services, which provide single capability across multiple urban services, accessible through simple, open APIs compatible with global standards and specifications. Data registries enable decision makers across organizations to have access to common sets of data as a shared source to improve collaboration and decision making. The strength of the micro service-based stack approach is that each new program creates reusable services for future programs, increasing the speed of delivery.

National Geospatial Policy, 2022 notified by Ministry of Science and Technology, seeks to boost geospatial sector by high resolution topographical survey & mapping, high accuracy Digital Elevation Model (DEM) for the entire country, high resolution geospatial data of water and topography and geospatial features and Advance Application Programming (API) that allows software to talk to each other and develop digital solutions.

Blockchain is emerging as a new age technology for urban development and management, real estate, title transfer, etc. Transformative new paradigms, such as Web 3.0, DeFi and NFTs Web 3.0, integrate with AI enabled user tailored content. Non-fungible tokens (NFTs) are unique digital assets with distinct properties on a blockchain ledger. The technology has drastically changed the way to manage land management for land pooling, planning and land transactions. Its digital ownership is powered by shared ledger and tokenization. Digital Blockchain system for land registration is indispensable for land pooling schemes.

Land Administration Domain Model (LADM) is an International Standard (IS) of the International Organization for Standardization. It covers basic information related to components of land administration and includes agreements on administrative and spatial data, land rights and source documents (e.g. deeds or survey plans) and various forms of tenure. LADM is capable of depicting the Land Administration System defines the Spatial Units and different forms of property ownership. The differentiation is valid for converting private lands for public use (roads, infra services, facilities, parks, etc.) by taking over contiguous parcels of lands and readjustment of ownerships of remaining private lands (say 60% of original extent). It assigns the class and contains the Rights, Restrictions and Responsibilities, which are the basis of land adjustment, registration and land pooling. The LADM can be best used in Maharashtra for formulating Town Planning Schemes and preparation of Development Plan / Master Plan of cities.

An institutional edifice comprising of design and regulation of the uses of space that focus on the physical form, economic functions, and social impacts of the urban environment and on the location of different activities within it. As urban planning draws upon engineering, architectural, and social and political concerns, it is variously a technical field, an endeavor involving political will and public participation, and an academic discipline in giving shape to Urban Planning in India. Planning of development and use of land in the State of Maharashtra is primarily governed by Maharashtra Regional and Town Planning Act, 1966.

In order to meet the requirements triggered by technological change and to capitalize on the opportunities generated, Directorate of Town Planning & Valuation has envisioned ‘Computerization of the TPVD’ in all aspects. By embracing technology whole-heartedly, the Directorate of TPVD is working towards promoting transparency, accountability and ease of doing business in the governance, while improving the overall efficiency of delivery of services. This change is already visible with initiatives like Building plan management system (BPMS), Online Zone Certificates and Part plans etc. Also the Directorate of TPVD has envisioned the creation of ‘Digital Planning Cell (DPC)’. Digitization of system allows citizens to access government information and services instantly, conveniently, from everywhere, by use of multiple channels.

In order to achieve sustainable, resilient system such concepts reinforce the need to engage urban planning with new technologies, i.e., India Urban Data Exchange, National Urban Learning Platform, Smart Code, etc. Thus, leveraging New Age Technologies for Urban Planning and Management is need of the day good sustainable urban practice.

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“Accident Analysis on the Nagpur-Mumbai Samruddhi Expressway”

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1. Introduction

The Nagpur-Mumbai Samruddhi Expressway, often referred to as the Maharashtra Samruddhi Mahamarg, is a 701-kilometer-long expressway designed to connect Maharashtra's eastern and western regions seamlessly. It is a vital project aimed at reducing travel time, boosting economic activity, and improving connectivity between Nagpur, the state's important Metropolitan city having MIHAN (Multi modal international cargo hub & airport), and Mumbai, the financial capital of India.

The expressway is not unique in facing these challenges; similar safety concerns have been addressed on other Indian expressways like the Yamuna Expressway and the Mumbai-Pune Expressway. Drawing lessons from these projects while tailoring them to the specific conditions of the Samruddhi Expressway is critical to improving safety and reducing fatalities.

Accident analysis on expressways is a crucial aspect of improving road safety and reducing fatalities. Here are some key points from recent studies that guides us improving road safety.

1. **Speed and Crash Analysis:** Speed is a significant risk factor for traffic safety. Studies have shown that higher speeds increase the likelihood and severity of accidents.
2. **Common Causes:** The most frequent causes of accidents on expressways include over-speeding, driver fatigue, and vehicle out of control. Rear-end collisions and head-on collisions are common types of accidents.
3. **Accident Data Collection:** Collecting and analyzing accident data is essential for identifying patterns and implementing effective safety measures. This includes examining factors such as road design, vehicle conditions, and driver behavior.
4. **Human Factors:** Human error, such as distracted driving and impaired driving, plays a significant role in accidents. Proper education and enforcement of traffic rules can help mitigate these issues.
5. **Infrastructure Improvements:** Enhancing road infrastructure, such as adding better signage, improving road surfaces, and implementing effective speed control measures, can significantly reduce accident rates.
- 6.

The Present paper discusses the accidents caused on Nagpur Mumbai Expressway and attempts to analyse their patterns. The Nagpur-Mumbai Samruddhi Expressway is a critical infrastructure project designed to connect Maharashtra's eastern and western regions. Despite its modern design and engineering, the expressway has seen a significant number of accidents since its opening.

2. Objectives of the Study

1. Analyze accident frequency and trends.
2. Examine causes, including human, vehicular, and infrastructural factors.
3. Propose actionable recommendations to reduce accidents.

3. Methodology

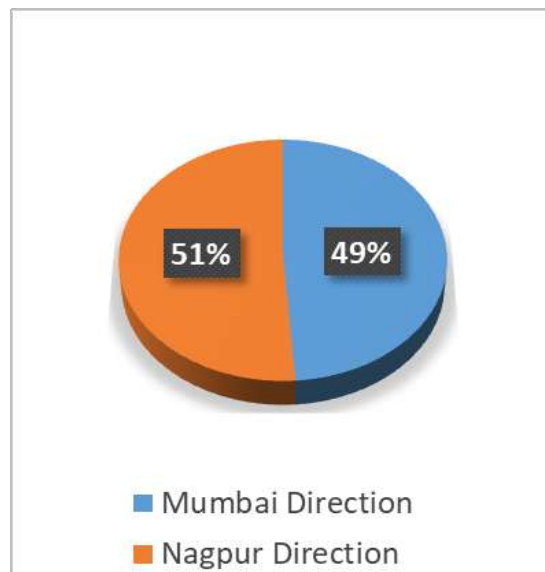
The methodology includes analysis of the secondary data collected from Maharashtra State Road Development Corporation (MSRDC), accident mapping, , and case studies of the Yamuna and Mumbai-Pune expressways. Data on accident frequency, causes, and patterns were analyzed to identify actionable solutions.

As reported through Accident Data received through MSRDC, The Maximum Number of accident occurred in the Month of November 2024 with a Total of 1304 accidents, therefore, this study is limited to the analysis for month of November 2024 data.

4. Accident Trends and Statistics

Directional Incidences

Directional incidences of accidents on expressways refer to the patterns and locations where accidents are more likely to occur based on the direction of traffic flow. The accident patterns (as reported in November 2024) reveal that it is uniformly distributed on both the corridors (the Nagpur Corridor and the Mumbai Corridor). This suggests that there is no skew in the geometrics of the alignment on both corridors. Thus, it can be concluded the aspect of directional incidences is insignificant. The data further reveals that the response time to reach the incident is within 5 minutes on both the sides. This signifies the strong incident management system along the expressway.



Accidents by Chainages (chainage 0 is at Nagpur)

The chainage with the maximum percentage of accidents is in the 500-600 Km range, accounting for almost 45% of the accidents. The drivers fatigue caused because of continuous stretch could be one of the reasons, for accidents not accounted in the data besides the tyre burst and punctures caused due to friction.

Figure 1

Source : MSRDC Accident data Nov.2024

Chainage (Kms)	Mumbai Corridor	Nagpur Corridor	Total
0-100	8.0%	11%	10%
100-200	12.1%	14%	13%
200-300	14.3%	11%	13%
300-400	14.9%	19%	17%
400-500	20.7%	18%	19%
500-600	25.3%	21%	23%
600-700	4.7%	5%	5%
700-800	Stretch yet to commence its operations		

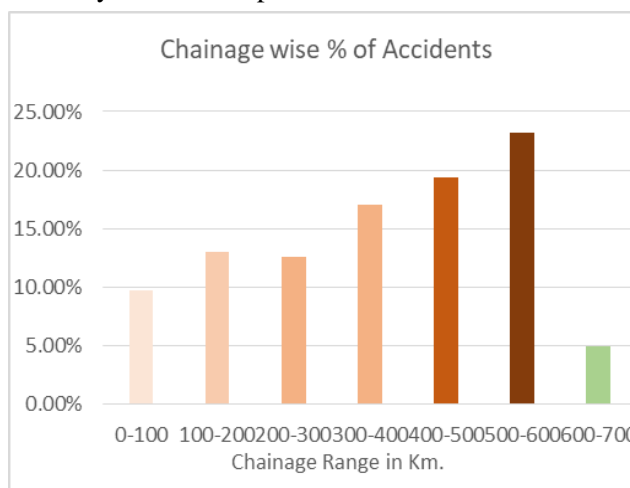


Figure 2

Source : MSRDC Accident data Nov.2024

Temporal Distribution of Accidents

The hour with the highest number of accidents is between 10:00 -11:00 AM, accounting for almost 6% of the total accidents. However, the pattern appears to be uniform throughout with morning peak on Nagpur corridor and evening on the Mumbai corridor. An analysis needs to be carried out between the chainage and the temporal variation of the accidents to exactly pin point the hot spots on the expressway. However, keeping in view of the time and data constraint, the analysis is restricted in the present paper.

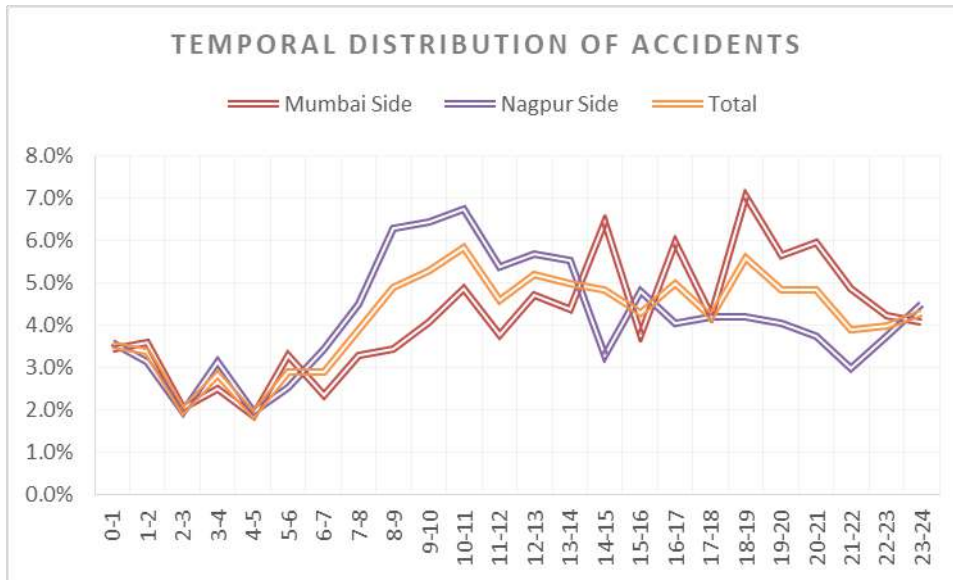


Figure 3

Source : MSRDC Accident data Nov.2024

Types of Accidents:

The most frequent type of accident is Mechanical Failure, with 69% occurrences. Other notable types include Minor Accidents, Major Accidents and Out of Fuel accounting to 30 percent of occurrences.

Sr.No.	Accident Type	Percentage of Accidents
1	Fire	0.23%
2	Major	3.30%
3	Major Fire	0.08%
4	Mechanical Failure	69.10%
5	Minor	17.33%
6	Minor Fire	0.08%
7	Other	0.15%
8	Out of Fuel	9.74%
Total		100.00%

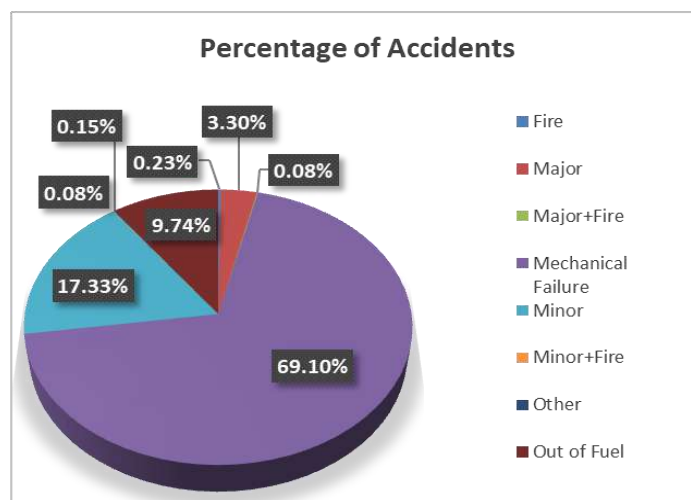


Figure 4

Source : MSRDC Accident data Nov.2024

Reasons of Accidents

The most common reason for accidents is Tyre Puncture, accounting for 46 percent of incidents. Other significant reasons include Tyre Burst (27% incidents) and Loss of Control (12% incidents).

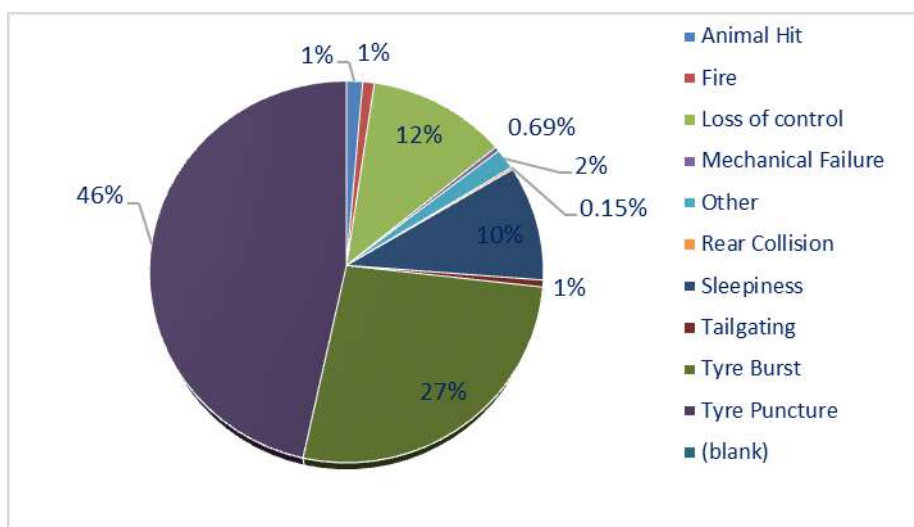


Figure 5

Source : MSRDC Accident data Nov.2024

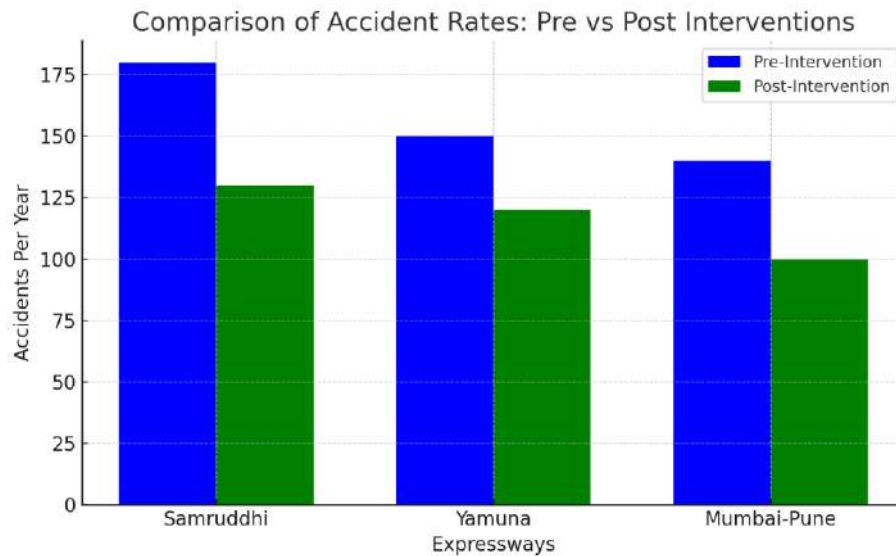
5. Literature Review - Case Studies of Similar Expressways

Expressway safety is a critical concern for road planners and authorities worldwide. Previous research and studies have highlighted common trends and factors contributing to accidents on modern highways.

Studies on the Yamuna Expressway (Singh et al., 2020) identified that fatigue, over speeding, and poor road signage contributed to nearly 45% of accidents. Successful interventions included speed cameras and rest areas. Similarly, research on the Mumbai-Pune Expressway (Gupta & Joshi, 2018) showed that sudden braking due to sharp curves, poor signage and weather-related conditions was a significant cause of accidents. Successful interventions included banking adjustments and trauma care centers.

Global literature also shows that expressway accidents are often the result of a combination of engineering issues, driver behavior, and environmental factors. Research by Zhao et al. (2016), in China highlighted the importance of integrating AI-based traffic management systems to reduce accidents, particularly in high-risk zones. Similarly, the European Union's Road Safety Action Programme (2018) advocates for the development of better signage, road markings, and the use of smart systems to monitor driver behavior.

Figure 6 below compares accident rates on the Samruddhi, Yamuna, and Mumbai-Pune expressways before and after implementing safety measures. (Based on secondary data & news reports)



As regards to Nagpur Mumbai Smmruddhi Expressway, initial reports from newspapers, such as The Times of India and Hindustan Times, have highlighted several incidents linked to human error, over speeding, and vehicle failures, especially tyre bursts. In just its first year of operation, over 900 accidents were reported, leading to public concern over the safety measures implemented during its design and operation phases. Additionally, long uninterrupted stretches have been found to cause fatigue, contributing to accidents. This highlights the need for an evidence-based investigation into accident causes and a robust framework for mitigation.

6. Recommendations

1. Engineering Solutions:
 - a. Introduce wildlife underpasses, improve signage, and implement dynamic speed management systems.
 - b. Rest areas and Medical facilities should be provided at every 50- 60 kms to reduce driver fatigue.
 - c. Geofencing to adjust speed limits during adverse weather.
 - d. Rumble strips before sharp curves and accident prone zones.
2. Technology Integration
 - a. Use AI for driver monitoring and develop apps for real-time alerts.
 - b. Use AI to monitor CCTV footage for erratic driving patterns
 - c. Automated alert triggers and fines for over speeding
3. Awareness Campaigns
 - a. Conduct workshops for drivers for adherence to speed limits, fatigue management and promote tyre maintenance awareness.
 - b. Preventive Measures: Addressing tyre-related issues and mechanical failures could significantly reduce accident rates, given their prevalence as leading causes.
4. Emergency Response
 - a. Establish trauma care centers every 50 km along the expressway.
 - b. Rapid response system: Deploy well –equipped teams to manage accidents effectively. Provision of emergency help with geo location based tracking.

7. Conclusion

The Nagpur-Mumbai Samruddhi Expressway holds great promise for Maharashtra's economic development, but its safety challenges must be addressed. Through targeted engineering, technology, and policy interventions, the expressway can set a benchmark for road safety in India.

8. Limitations of the study

One limitation of this study is that the data analysis is based on historical accident reports, and there may be underreporting or gaps in the data for certain periods. Future studies should incorporate real-time data from connected vehicles and smart systems to obtain a more accurate picture of accident trends.

Further, extensive spatial analysis using GIS such as generation of Heat Maps showing Accident Hotspots, high risk zones using overlays for wildlife crossing areas and High speed segments prone to tyre bursts, are required to validate the findings. As mentioned earlier, this analysis is done for this study is limited to the analysis for month of November 2024 data.

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“Artificial Intelligence in Urban and Regional Planning”

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Planning is a continuous process, it takes years to prepare plans, and decades to implement and execute them. Since ancient times the history of settlement shows the adaptability of human with nature and build environments. The stages of formation of earlier hamlets were obviously intended to search for food and protection from natural elements to the people within. Subsequently with the evolution of simple basic machines and captive production of basic forms of energy, the process of further development in human life started. This development was not at all defined and focused to a specific direction, but it was following all aspects of human life and livelihood. Increase in population and migration to areas under more and more development was same as today's context. Therefore it was obvious that the basic settlements turned into a community that was ruled by some authority. Such authority was expected to rule the community and run the administrative affairs. It was also expected that the authority should plan for future needs of the people who are part of the community. This introduced the process of planning for economic development with consideration of available resources, natural barriers or constraints, forecasts of future needs and timelines. This also introduced the need of planning for different communities in a specific way which is suitable to that particular area or region. Today's principles of urban and regional planning have roots in the above historical instances.

After the industrial revolution in the world, the employment generation in industrial production has substantially increased over the agricultural production. Due to which there was migration of people towards urban areas in a consistent manner. This lead to the increased pressure of natural and induced development on urban and peri-urban areas resulting in regional imbalance in terms of population, facilities, infrastructure and services in both urban as well as rural areas due to the reason that urban areas were always in a shortfall of provisions whatever planned for them, whereas rural areas were given secondary priority for the provisions. Therefore the need of balanced approach to planning by way of regional, nodal or sector level planning emerged and lot of research is done across the world.

Every country developed its own methodology, legal framework and implementation strategies to face the challenges in Urban and Regional Planning. However the common theme for it was to achieve the balanced development of a particular planning area, which can be a district, sub-district, large or small city, town, village or even a small neighborhood. Planning area itself indicates the type of development within it. Sometimes a small village may carry substantial activities within it, and on the other hand a large town may get involved in limited activities. This is entirely depending on the basis of formation of that specific village or town and important developments around it during the course of years. Similarly the planning of a district or region is primarily the coordination among the planning areas within it where, some form of planning is already ongoing or such plan is in force, and secondarily its identification of further scope of development across other fringe areas. The process of planning starts with the surveys of existing land use and future aspects those are likely to be considered as development indicators in and around the planning areas.

For Maharashtra state, the legal framework for all these processes is given by "Maharashtra Regional & Town Planning Act- 1966" and amendments thereof. We have established and amended provisions for Regional plan, Development plan, Sector plan in form of Town Planning Schemes etc. The said act also gives provisions for vital allied factors of planning like Land acquisition, Levy of charges, New town development, Area development etc. All these provisions are being used to form a progressive state of a developing country with balance in urban and regional planning at all levels. However this also requires strong implementation policies for prepared and sanctioned plans. Implementation of regional plans requires

strong district planning authority with budgetary provisions, whereas implementation of development plans requires strong urban local body with allocation of funds for implementation of components of development plan. Some part of budgetary provisions can be catered through several revenue models like development charges, development premium, compounding charges etc. but the more challenging part is the procedural aspects of planning and implementation. All the legal procedures under acts and regulations are truly people centric and therefore very important to protect the democratic rights of the inhabitants. However it becomes time consuming and lengthy when it comes to actual stages of working.

Broadly there are following stages involved in preparation of any plan :-

- Declaration of intention
- Surveys (Physical, Social, Mapping)
- Analysis of data
- Preparation of proposals
- Coordination of any existing plans / schemes
- Publication & Printing (Interim and Final)
- Incorporation of suggestions by people as per rules
- Submission to Statutory approval
- Sanction to plan by Govt./ Authority
- Revision after due period

Nowadays, there is an era of computerization & use of advanced technology in every field of human life. The planning for cities and towns became comparatively easy for surveys, partial analysis and media publication/ printing. The collection of data through surveys can be handled with a number of software applications depending on the expected use and output. This data can be partially analyzed to form actual proposals for planning, but we still need manual intervention at every stage of it. Similarly after preparation of certain plan, the components of that plan like noting, reports, maps, models needs to be prepared/ printed in the globally acceptable appearance, which is also to be preserved for long time as a record. We need to look for the solution which will cater all above stages with least human intervention and using optimal technological solutions. This is the future of urban and regional planning.

Artificial Intelligence (AI) is a vital tool which has already started pushing us to that future we are looking for. From simple interactive chat bots to auto driven cars, from auto sensing cleaning agent to most advanced Robot, from auto sensing traffic lights to climate control techniques, all these AI models make our life easier.

So why not we make our planners work easier? Artificial Intelligence models (AI models) can perform wide range of applications during the process of planning. Although it is impossible to replace human functions of interpretation, analysis and creativity, it is definitely going to bring ease in the overall process. From Declaration of a plan to its final sanction, with all types of physical, social and economic planning principles, we get the solutions in most precise way with accuracy in mathematical analysis.

Following are the possible applications of AI models which can revolutionize urban and regional planning by enabling data-driven decision-making, optimizing resource allocation and improving environmental sustainability during stages of preparation of plans.

1. Predictive Analysis for Growth:

- Approach to planning: AI can analyze historical data and trends to forecast future growth patterns. This helps in better land-use planning, determining the most suitable areas for development, and anticipating infrastructure needs in these growing areas.
- Land-Use Optimization: AI models can assess land suitability for residential, commercial, or industrial use.
- Automated mapping: AI tools can generate optimized city layouts based on parameters like population density, land use, trends of development, traffic generation and environmental impact.

- Phasing for plans: AI can assess and prioritize the components of plan in phased manner to achieve optimal implementation.

2. Urban Models and Planning:

- AI-driven simulation models can help planners visualize and test different urban planning applications in different conditions. This can include evaluating how changes in land use or transportation networks will affect traffic flow, pollution levels, and overall livability.
- AI can also assist in zoning decisions by analyzing the compatibility of proposed developments with existing land use and infrastructure observing demographic trends.
- AI can help urban planners for handling & analysis of large amount of data, such as census information, existing land use, base maps, physical surveys, economic trends, and social behavior pattern etc. to arrive at policy decisions. This ensures that decisions are based on evidence rather than information alone.
- AI tools can engage citizens by collecting feedback through chat-bots or online platforms that assess public opinion on proposed developments even before the formal publication of any plan or scheme. This makes urban planning more inclusive, participatory and people centric.
- AI can make use of GIS platform to coordinate spatial data with real time updates like notification, publication, interim stages and sanction of any plan.

3. Transportation and Mobility

- Traffic Management: AI-powered systems optimize traffic signals, reduce congestion, and improve public transportation efficiency.
- Self-driving vehicles: AI enhances route planning, reducing travel times and emissions.
- Public Transport Planning: AI predicts demand and optimizes bus/train schedules to improve accessibility.
- AI supports the development of self-driving vehicles and ridesharing apps, which can reduce the need for personal car ownership, reduce traffic, and lower pollution.
- Smart transportation networks powered by AI also help in planning and operating more efficient transit systems.

4. Environmental Sustainability:

- AI models can observe or predict air quality index, monitor water usage and track energy consumption in real-time. This helps urban planners implement measures to reduce emissions, manage resources efficiently, and make cities more sustainable.
- AI can also aid in optimizing waste management by predicting collection patterns, identifying recycling opportunities, and reducing landfill use.
- AI predicts climate risks such as floods, wildfires, and heat waves, which helps the administration to act accordingly.
- AI models optimize energy grids and support the integration of renewable energy sources.
- AI-driven smart bins and waste collection routing reduce costs and environmental impact.
- AI can model the impacts of natural disasters like floods, earthquakes, and hurricanes, helping cities develop resilient infrastructure and disaster preparedness plans. It can also aid in quick recovery post-disaster by managing resources effectively.

5. Building and Infrastructure Design & Development

- AI can be used in designing energy-efficient buildings through simulations and optimization models. It can also monitor the condition of existing infrastructure (roads, bridges, etc.) using sensors, identifying potential issues before any major problems.
- AI can assess property prices based on various factors.

- AI can help identify areas suitable for affordable housing projects and allocation of housing stock as per inventory.
- AI can handle automation in design and construction with use of robotics to streamline construction planning and execution.
- AI can identify patterns in housing demand, assess where affordable housing is most needed, and suggest optimal locations for new developments. It can also help reduce costs by optimizing construction processes and materials.

6. Geographic Information Systems (GIS) & Remote Sensing

- Satellite Data Analysis: AI can process remote sensing data to provide base maps for urban planning and implementation.
- Disaster Management: AI can improve early warning systems and rapid response planning.
- Infrastructure Monitoring: AI-powered drones can inspect roads, bridges, and buildings for maintenance.

7. Smart Governance and decision making

- Easy accessibility to administration
- Citizen Engagement in all activities
- Urban control for streets
- Controlled use of public spaces
- Crime Prediction and Safety
- Challenges and Ethical Considerations
 - Data Privacy: AI systems require vast amounts of data, raising privacy concerns.
 - Unstructured bias: Biased models can create wrong planning practices.
 - Integration with Policy: AI must align with existing urban policies, legal constraints and human decision-making.

Above aspects of AI are just for the beginning of this era. The optimal use of AI models can be effectively done only after the preparation of base data portal at Govt. level. This portal must be coded and configured with AI model and their programming languages. For actual preparation and use of an AI model intended to use for urban planning, requires lots of data overlay and statutory/ regulatory inputs. All planning areas (ULBs, RPs and others) should be configured with basic relevant information of all Govt. departments/ concerned authority on the above mentioned common portal. This portal can be created by nodal dept. of Govt. (Say urban Development) with access to all relevant Govt. depts. Such data will include administrative information, geographical information, land records data, historical data, and socio-economic data. At a primary stage, all types of raster data should be compiled and before using as planning AI model it should be attributed to GIS based spatial interface. Combination of both data groups will just initiate the actual process of planning.

Let's call it a future of Urban Planning along with the coordinated Regional Planning approach and hope for the revolutionary outcome.

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“Peri Urban Dynamics of Million Plus Cities”

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ABSTRACT

Urbanization is a powerful, global trend influenced by our need for resources like agriculture and trade, as well as by population growth, policies, and economic shifts. This expansion is especially notable in million-plus cities, where rapid growth affects not only the city itself but also the surrounding areas. Million-plus cities experiencing intense development, now stretching into peri-urban areas, those spaces on the city's outskirts that lie just beyond its official boundaries. These fringe areas are becoming centers of change, influencing land use, local livelihoods, the economy, environment, and infrastructure. This study explores the factors driving growth in these cities and how this development is transforming its surroundings.

In India, the percentages of population living in cities are continuously rising. India is estimated to have 68 cities with a population of more than 1 million by 2030, an increase from 53 cities in 2010 as per census data. Among these, there will be 13 cities with more than 4 million and 6 cities with more than 10 million inhabitants (McKensy Global Institute 2010). The factors involved in urbanisation are based on the important demographic factors such as normal population growth, migration from rural to urban and reclassified rural areas as urban. Growth of the cities is influenced by changes in demography which are linked with the density of the population in cities.

1. Understanding the changing trend of urban space in India

Responsibility for sustainable urban management has been radically redefined since decentralization reforms were launched in India at the beginning of 1990s. Most of the focus has so far on Metropolitan cities: however reforms taken place in order for smaller urban areas where more than half of the urban population is living. Future of rapidly changing small towns in the global south. India today remains one of the least urbanized regions in the world (over two-thirds of the population still lived in rural areas in 2011). However, at the same time, however, in the country, a number of million strong metropolis, a multitude of small and medium-sized non- metropolitan urban areas as towns and cities undergoing rapid changes and which are worthy of attention that have sprung up since the last census.

The complexity of an urban system that consisted of 7,933 towns and cities in 2011 cannot be defined by analysis of the few cities in India with over a million inhabitants alone. A brief review of the country's urban hierarchy shows that the distribution of the urban population (only 27.92% in 2001 and 31.16% 2011) is far more complex than the simple urban / rural dichotomy would suggest.

1.1 Breakdown of India's Urban Population since 1971(% based on Census Data)

State	1971	1981	1991	2001	2011
Maharashtra	31	35	39	42	45
India	20	23	26	28	31

1.2 Number of towns in each census of India category in 2001 and

	Total	Category I	Category II	Category III	Category IV	Category V	Category VI
		+100,000 inhab	Between 50,000 to 99,999 inhab	Between 20,000 to 49,999 inhab	Between 10,000 to 19,999 inhab	Between 5,000 to 9,999 inhab	Fewer than 5,000 inhab
Number of Towns in 2001	4,378	393 (35 of which have over 1 million inhab)	401	1,151	1,344	888	191
Number of Towns in 2011 (provisional)	7,933	505	605	1,905	2,233	2,187	498

1.3 Class – wise distribution of Cities / Towns in Maharashtra

	Category-I (over 100,000 inhab.)	Category-II (from 50,000 to 99,999 inhab.)	Category-III (from 20,000 to 49,999 inhab.)	Category-IV (from 10,000 to 19,999 inhab.)	Category-V (from 5,000 to 9,999 inhab.)	Category-VI (fewer than 5,000 inhab.)	Total
1961	15	13	44	82	71	12	237
1971	19	24	58	88	48	9	246
1981	28	27	73	85	35	6	254
1991	31	28	109	85	25	4	282
2001	37	46	141	118	100	48	490
2011	44	54	168	129	114	27	536

Source: Compiled by researcher based on Census 2011

The analysis of the size-class structure in the Maharashtra state furnishes an important diagnostic clue for investigation of the trend of urbanization, the nature, organization and mode of functional relationship between a major urban centers and rural populace. Over all, the Category III and IV cities are more than the other Categories.

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R. de Bercegol, Small Towns and Decentralization in India,

Exploring Urban Change in South Asia, DOI 10.1007/978-81-322-2764-9_1 This is a ten-year census. Full and detailed results of the last census, conducted in 2011, were made available in March 2014.

2. Growth rate and the Changes in Infrastructure in Major cities and peri urban areas.

The changes in land use, infrastructure, planning and distribution of the population in major cities in India, the variation in growth of various cities and know the effects of the same on various aspects of town planning and the spatio temporal land use. The rapid growth of population and the procedure of urbanization have resulted in rising demand for land in urban settlements. A city grows by population as well as by changes in spatial measurements. The prime components of expanding spatial element of the city are also the population growth and related requirements of urban life, for example, improvement of transport and communication and others infrastructure facilities. The jumble between the supply and demand of land prompts the degradation of environmentally fragile land, occupation of hazard prone areas, and loss of

cultural resources, open space and prime agrarian land. Inside the current built-up areas of urban communities uncontrolled growth of population and insufficient infrastructure may cause irreversible urban spread out and negative impact on air quality, energy utilization and aesthetic quality. The change of prime farming area to urban use may increase costs for locating, storing and purchasing food. The pattern of city growth and its spatial structure are determined by different historic, financial, social and environmental forces that impact urban land-use. The improper utilization of urban land poses major issues in all nations simply because the supply of extra land is inadequate and focuses too many challenging claims.

3. Peri Urban Areas

The findings from some of the previous research have suggested that the periurban space consists of two main zones, the inner peri-urban zone and the outer peri-urban zone (Firoz and Laxmi, 2016). The inner periurban areas are mainly driven by the expansion of urban areas as well as by the conversion of non-urban into urban land. Hence compared to both rural and urban areas, these areas exhibit higher levels of socioeconomic diversity. On the other hand, the outer periurban areas are less dynamic in terms of land-use change and exhibit lower building densities, and compared with rural areas that hold stronger links to the city related to the movement of people and goods. It has been revealed by the help of spatial analysis that periurban areas develop mainly along major transport corridors across administrative divisions, as well as in the form of peri urban islands in the rural zone (Haase, 2019).

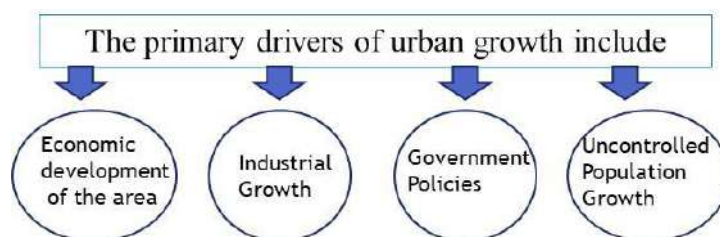


Major Drivers of Peri urban Growth_ million plus cities

In the view of the peri urban areas, the local population and migrants in peri-urban territories get different advantages from their proximity to cities. Be that as it may, the unfavorable effects of urbanization are additionally obvious in peri-urban. In this manner, it might be valuable that alongside developing India's villages and small/medium towns—which will help in reducing migration to megacities /urban agglomerations and guarantee a fair appropriation of the nation's population immediate efforts must be made to comprehend and deal with the change happening in peri-urban territories. Such efforts will help in making better living and working conditions in peri-urban territories.

Peri-urban areas are regions in flux, often caught between the expanding boundaries of cities and the more stable rural hinterlands. This transition leads to a governance conundrum, where multiple administrative bodies may have overlapping responsibilities but lack the cohesion needed for efficient management. This fragmentation can lead to weak institutional relationships and a lack of clear accountability for the development and governance of these areas (Adriana, L. A. da Silva, & Corubolo, 1999). As these regions evolve rapidly, driven by both urban expansion and rural migration, there is a need

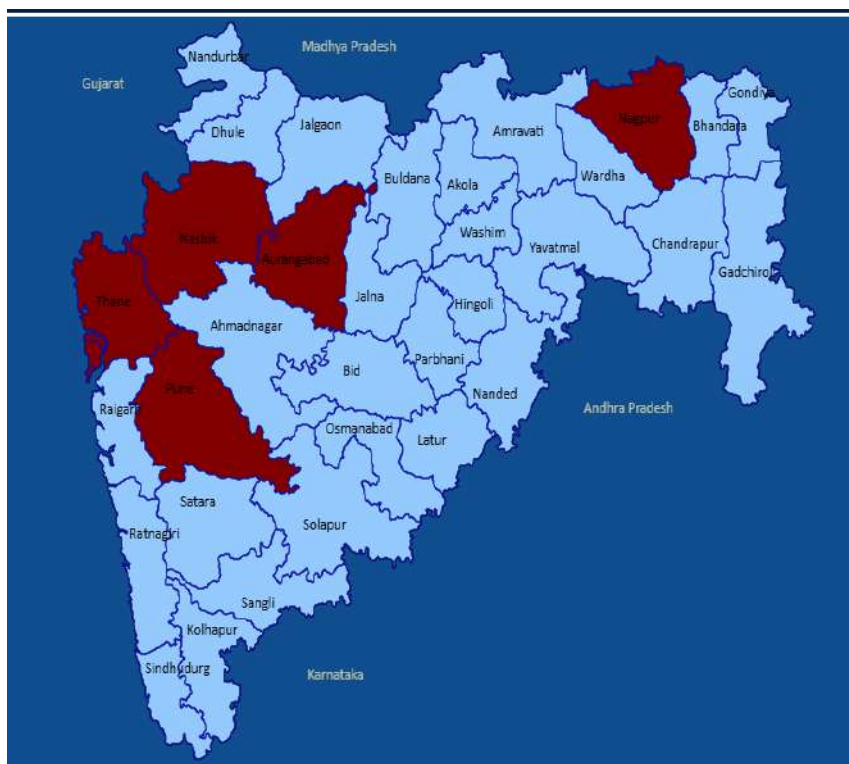
for focused research to understand their dynamic nature and its impact on both land use and socio-economic structures.



- i. **Defining Peri-Urban:** - The definition of peri-urban areas has remained elusive in academic and policy discussions due to the varying nature of these spaces across different geographies. Countries often define "urban" and "rural" based on specific criteria such as population density, administrative boundaries, or infrastructural development (White et al., 2013). However, Allen (2003) identifies peri-urban areas as spaces where governance is uncertain and poorly defined. These are often "in-between" areas, not fully urban but no longer rural, leading to challenges in terms of planning and development. Suhas (2014) argues that peri-urban areas should not be seen as mere transition zones but rather as distinctive regions with unique patterns of growth and interaction. A study by Stott et al. (2015) further describes peri-urban areas as a "heterogeneous mosaic" of land use and settlement types, driven by both rural migration and urban sprawl. The "peri-urban interface" concept has expanded over time to include not only physical land use patterns but also the flow of materials, energy, and resources between urban and rural zones (Baker & Rees, 2006).
- ii. **Land Use and Land Cover (LULC):**- Monitoring land use and land cover changes in peri-urban areas is essential for sustainable development. These areas serve as crucial buffers between urban and rural environments, supporting diverse economic activities. Rapid urbanization, however, often leads to the conversion of agricultural land into residential or industrial use, placing immense pressure on local ecosystems. Regular monitoring through remote sensing technology and GIS mapping allows for tracking these changes, which is essential for resource management, infrastructure development, and ensuring that growth is aligned with both population increases and available resources.
- iii. **Pattern of Urban Growth:** - Urban growth in peri-urban areas is driven primarily by population pressures and economic opportunities, leading to the conversion of rural land into urban settlements. This growth, however, is not uniform; it often follows a complex, non-linear pattern influenced by both planned infrastructure projects and informal settlements. Remote sensing and GIS technologies have become indispensable in tracking urban growth patterns, allowing for detailed spatial analysis of how urbanization is altering these peri-urban landscapes. Studies like those of Reyers et al. (2013) have shown that the growth of peri-urban areas often leads to environmental degradation, particularly the loss of agricultural land, increased pollution, and strain on water resources.
- iv. **Pattern of Population Growth:** - Population growth in peri-urban areas is both a cause and a consequence of urban expansion. As cities grow, they attract rural populations seeking better economic opportunities, but this influx also contributes to the spread of urban infrastructure into surrounding rural areas. The peri-urban zones thus experience a demographic shift, often characterized by a more heterogeneous population with diverse socio-economic backgrounds. This population growth poses challenges in terms of providing adequate infrastructure, public services, and housing, especially since many peri-urban areas lack the formal governance structures of fully urbanized regions.
- v. **Economy:** The tangible and intangible impacts of large scale infrastructure projects on the human habitats are not clearly understood, as the studies often address the dominant issues leaving the others. Many studies have addressed the socio-economic aspects; however the evolution of the policies is very

scanty. The risk characterization vis-à-vis different land use patterns over a period of time is also not carried out in the previous studies.

Hence there appears a need to examine the role of informal sector activities in shaping the urban fringe local landscape with a view to fill the gaps in the areas of urban policy development, governance and planning in developing cities. Recent contributions from economists to the development of spatially explicit models are also questionable due to their low reliability, which evident from the economic structural models proposed by them, especially with respect to the land use decisions. It is apparent that a more comprehensive and focused study be carried out to determine the impacts of large infrastructure intense projects on the local area, especially the peri-urban area.



Source: Census 2011_million plus cities_Maharashtra

4. Challenges

Looking at the existing pattern of growth and development of urban centers in India, it has been observed that “peri-urban” areas have profound influence and major implications for core urban areas in terms of their planning, development and management. Major drivers for such implications have been found to be absence of any legal framework, absence of any planning and development agency to define, promote, regulate and manage the pattern of development in the area. Considering the valuable contribution of the peri-urban areas in terms of providing day-to-day needs, employment, shelter, economy and sustainability to the mother city, their planned development assumes importance. Accordingly, strategies shall have to be formulated in order to ensure that peri-urban areas contribute effectively to the sustainability, growth and development of the mother city rather than becoming a parasite on its resources. Such a strategy should essentially revolve around following aspects:-

- i. **Rational legal frame work** -It has been observed that planning legislation has profound implications for urban development because it defines the system of urban development, establishes the system of urban planning and regulation of land development. It also defines and delimits the role of urban planners and managers. All urban laws also define and provide for basic procedures which have to be followed in the plan preparation and plan approval before they are made operational. It also includes the penalties to be imposed in case of the violation of the provisions of the plan. Therefore, in all

civilized and democratic societies, existence of a well-defined legal framework is a prerequisite to regulate the growth and development of urban centers. Unfortunately in India very few states have dedicated legal framework which addresses the need of planned development in the peri-urban areas. Most of the laws are framed with a focus to take care of the planned development of the mother city in the shape of master plans or development plans. These laws do not recognize the peri-urban areas as the area requiring planned development. In the absence of this, these areas are not subjected to any planning and development mechanism. However, in certain cases, concept of planning areas, urbanisable areas are followed in the preparation of master plan but in most of the cases these areas are marked for uses other than urban and are outside the framework of implementation. Accordingly it becomes essential that a rational legal framework must be put in place to effectively regulate the development outside the urban areas. Once legal framework is put in place, proper management of peri-urban areas would be much simpler, effective and efficient.

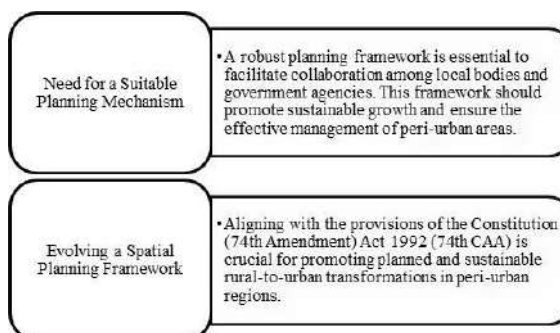
- ii. **Peri- Urban areas made Integral Part of Planning Process-** Despite the fact that pre-urban areas have important role and enormous potential to contribute to the rational growth and development of urban areas; they have not been duly recognized by planners. Accordingly peri-urban areas have no recognition in the parlance of the planning process. In fact most of the existing problems of urban areas have their genesis in the mismanagement of the peri –urban areas. Accordingly, for rationalizing and promoting planned development of the urban centers, it would be critical to make the peri-urban areas as integral part of city planning and development process. Considering their proximity and future growth and development of the city, these areas need to be planned as an extension of the mother city, so that the services/infrastructure /road net-work of both these areas are effectively integrated. Once this is done, achieving the objective of planned and integrated development of peri-urban areas would be much easier, simpler and quicker.
- iii. **Designating Agency for the Regulating Growth and Development-** Most of the growth of peri-urban areas in the Indian context has been found to be both haphazard and unplanned. Major cause for this malady can be attributed to the absence of any agency designated to regulate the growth in the area. Accordingly, it will be important that an appropriate agency must be designated to regulate the development in the peri-urban areas. It could be a regional level authority in the case of a regional plan which should be entrusted with the task of managing all identified peri-urban areas in the region. Task could also be entrusted to District Planning Committee /Metropolitan Planning Committees, provided these committees have necessary level of planning, development and management input. However, in case of peri-urban areas of an individual settlement, the task of management should invariably be entrusted to the city level agency. Multiplicity of agencies with overlapping areas of operation needs to be invariably avoided for minimizing conflicts, wastage, conserving and preserving resources and promoting focused planned development. For proper development, it should be ensured that local authority must prepare plans, allocate funds for infrastructure development and deploy effective machinery for regulating development within the Peri-Urban areas
- iv. **Defining Development Controls/Building Bye-Laws-** In order to ensure that built environment of appropriate quality and order is created, it will be essential to put in place proper system of developmental control within the peri-urban areas. All building plans must conform to those regulations and controls and all plans should be got approved from competent authority before construction in the area is undertaken. Since peri-urban areas are future urban areas, accordingly, it will be important that bye-laws applicable in the city should also be extended to the peri-urban areas, so that construction in area is regulated on the pattern of the mother city.
- v. **Regulating Sub- division of Land-** It has been observed that peri-urban areas are subjected to massive unplanned and haphazard sub-division of land which leads to large number of growth

maladies in these areas. Accordingly, it becomes critical that unplanned sub-division of land in the area is effectively regulated. This would call for evolving appropriate layout plan, defining clearly the road network/amenities/services, defining shape and size of the individual parcels of land, laying down clearly set-back lines, ground coverage, height and FAR, so that growth and development of the area is orderly and rational. All sub-division of land should be subjected to a pre-defined planning framework and approval from the designated Authority so that haphazard growth is minimized. A well-defined framework containing appropriate planning and developmental norms for sub-division and provision of amenities would be essential and critical to achieve the objective.

- vi. **Regulating Conversion of Land Use-** In order to minimize land speculation and emergence of non-conforming land uses, conversion of land from agricultural to non- agricultural uses should be effectively and efficiently regulated. It should be made more objective and focused and processed in accordance with the provision of Master Plan. Proposals meeting provisions of master plan should only be approved.
- vii. **Levying Charges-** For permitting sub-division, change of land use and development within the peri-urban areas, it would be critical to levy charges for land conversion and provision of infrastructures. Both internal and external developmental charges should be levied in order to generate resources for providing trunk services in the area. Charges for change of land use from agricultural to non-agricultural land use on a pre-defined scale should be levied in order to raise resources for the rational development of the peri-urban areas. The charges should be on different scale considering the nature of converted land use, intensity of development and location of the converted land. The charges collected should be credited to a dedicated fund exclusively for development of Peri-Urban areas. No diversion of funds should be permitted in order to ensure its rational development.
- viii. **Creating Appropriate Enforcement Machinery-** In order to rationalize the growth of peri-urban areas, it will be critical not only to put a proper planning framework, but equally important would be to create a well-equipped enforcement machinery in order to check any violation, haphazard & unplanned development, unauthorized sub-division of land, change of land use and creation of slums. Such machinery must include manpower of the appropriate order with enough authority, equipment and resources, to meet any contingency. Separate fast-track courts should be created to deal with cases of violation in the peri-urban areas in order to ensure their quick disposal. This would help in minimizing violation in the peri-urban areas.

5. Way Forward

1. Preparation of Plans and Policies for Peri-Urban.



2. Proposed Strategies for Sustainable Development

Integrated Planning Approaches	• Develop strategies for cohesive planning that involve local communities, ensuring their needs and concerns are addressed.
Regulating Urban Sprawl	• Implement policies to control illegal and unorganized developments, thereby managing urban growth sustainably.
Environmental Protection	• Advocate for land use policies that protect ecological zones, ensuring that development does not compromise the environment.

The planned development of peri-urban for million plus cities is vital for achieving sustainable urban growth by integrating effective policies and engaging local communities, we can create a framework that addresses the challenges of urbanization while promoting environmental sustainability and social equity.

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“Municipal Finance”

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1. Definition Of Municipal Finance

Municipal finance is about the revenue and expenditure decisions of Municipal Governments. It covers the sources of revenue, ways of financing infrastructure through the use of operating revenues and borrowing. It also covers use of some innovative techniques like PPP, BOT to raise the revenue in terms of creating Municipal assets. Municipal finance also addresses issues of expenditures at the local level. It also covers the accountability for expenditure and revenue decisions, including the municipal budgetary process and financial management. Municipal finances consist of systems which establish how funds are to be spent and also ensure its expenditure in lieu of its allocating purpose.

2. Importance Of Municipal Finance

It would be recognised that urbanisation is a natural importance of economic development. Cities have more contribution to economic growth as compared to their share in total population. So, cities would have the effective provision of infrastructure and services within their jurisdiction. The role of Municipal finance is so vital in this regard. Status of Municipal finance directly influence the welfare of the people by providing services and facilities in Municipal areas. We cannot afford to ignore the fiscal situation of Municipal areas. Civic infrastructure and services in most cities and towns are in miserable condition. They are inadequate even for the existing population. It is observed that there is a growing mismatch between their responsibilities which are allotted in lieu of Twelfth Schedule of the 74th Constitutional Amendment Act, 1992 and revenues. In consideration of expectation of the public regarding good quality of the civic infrastructure and services financing for the same has critical importance socially, economically and politically.

3. Structure Of Municipal Finance

Municipal Finance is generally structured in two main categories namely Municipal Revenue and Municipal Expenditure. Subcategories of Municipal Revenue and their sources are stipulated in following table as shown below.

Municipal Revenue		
Sr. No.	Category	Source
1	Tax Revenue	Property Tax, Fire Brigade Tax, Advertisement Tax, Vacant Land Tax, etc.
2	Non-Tax Revenue	User Charges, Municipal Fees, Sale & Hire Charges, Lease Amounts, Rents from Municipal Property, Development Charges, Premium Charges, Ancillary FSI Charges.

3	Shared Revenue	Entertainment Tax, Surcharge on Stamp duty, Profession Tax, Motor Vehicles Tax.
4	Grants-In-Aid	(a) Plan grants made available through planned transfers from the upper tier of government under various projects, programmes and schemes (b) non-plan grants made available to compensate for the loss of income and some specific transfers.
5	Loans	Loans borrowed by the local authorities for capital works, etc. – HUDCO, LIC, State and Central Government, Banks and Municipal Bonds.
6	Other Receipts	Scrutiny fees, Sundry receipts, law charge costs recovered, lapsed deposits, fees, fines & forfeitures, rent on tools & plants, miscellaneous sales, etc.

Subcategories of Municipal Expenditure and their reasons are stipulated in following table as shown below.

Municipal Expenditure			
Sr. No.	Category	Sub-Category	Reasons
1	Revenue expenditure	Establishment Expenditure	Staff salaries, Allowances, Wages, Pensions & Retirement benefits etc.
2		Administrative Expenditure;	Rents, Rates & Taxes, Office maintenance, Communications, Books & periodicals, Printing & Stationary, Travel Expenditure, Law Charges etc.
3		Operations And Maintenance Expenditure	Power & Fuel, Bulk Purchases, Stores, Hire Charges, Repairs & Expenditure.
4		Interest Payments on Loans.	Maintenance and Interest payments made on loans.
5	Capital expenditure	Expenditure On Capital Formation	Buildings, Water Supply & Sewerage, Energy/ Lighting, Solid Waste Management, Roads, Bridges, Culverts, Causeways, Health & Sanitation, Parks and Recreation Spaces, Furniture & Fittings, Tools & Plant, Equipment etc., Principal repayments of loans.
6		Other expenditure	Principal repayments of loans, Miscellaneous expenses not accounted for in the above.

4. Limitations of Municipal Revenue

Limitations of Municipal Revenue under the various subcategories and their sources are described here as under: --

4.1 Tax revenue

(a) Property tax—

1. Collection efficiency of property tax has been reduced due to shortage of qualified and trained man power.

2. Collection efficiency of property tax has been reduced due to use of man-to-man (conventional) survey method which would result no expansion of tax base.
3. Method of tax assessment is used annual rent base method instead of capital value-based assessment.
4. Ceiling imposed by the state Act in terms of percentage for property tax on the basis of class and population of Municipal Council.
5. Compulsory exemption given in property tax in lieu of guidelines of state Government.
6. Political will is not totally supportive for regular revisions of property tax.
7. Central and state Government properties are assessed service charges instead of property tax which was assessed in other cases.
8. Reviewing of tax value by adjudication under the section of 169 of Maharashtra Municipal Act 1965.

(b) Fire brigade tax –

1. Height restriction Norms (more or equal to 15.0M) are necessary to consider while imposing the fire brigade tax.

(c) Advertisement tax and other taxes –

1. Introduction of GST which has subsumed local taxes such as octroi, local body tax, entry tax and advertisement tax, without any provision for compensation at the municipal level.

4.2 Non-Tax Revenue

- (a) User Charges, Municipal Fees, Sale & Hire Charges, Lease Amounts,
 1. Upper cap for User Charges and various Municipal Fees for public services does not come up to recover the operation and maintenance costs from beneficiaries.
 2. Municipal councils have a limited autonomy to fix the rate of user charges, fees, hire charges and lease amount.
 3. Imposing new sources or increasing tax or user fee rates require approval of the elected municipal council and/or state government, a cumbersome and time-consuming process.
- (b) Development Charges, Premium Charges, Ancillary FSI Charges.
 1. Upper cap in terms of percentage of land value rate which would require to calculate Development Charges (0.5% for land, 2.0% for built up area), Premium Charges (35%), Ancillary FSI Charges (10%) has been decided by the state Government. There is no freedom for Municipal council to fix the appropriate rate. Determination of Land value is also under the control of state Government.

4.3 Shared Revenue

Shared Revenue which accumulates to the Municipal Councils as a certain percentage of a tax levied and collected by the State Government within the area of Municipal Council area. Description regarding the same are stipulated as under.

1. **Additional Stamp Duty:** - As per section 147A of the Maharashtra Municipal councils, Nagar Panchayats and Industrial Townships Act 1965 one per cent Additional Stamp Duty levied on certain transfers of immovable properties in the Municipal area. It is compulsory and mandatory to the state Government shall every year after due appropriation pay to the

respective Municipal council in terms of a grant-in-aid. But actual scenario does not cope up the same.

The state Government develop the mechanism for direct credit of additional stamp duty to the Municipal council as it was recommended time to time by the Fifth State finance commission.

2. **Land revenue and Non-agricultural Assessment:** - In march 2016, The state Government is decided to allocate the fund of 15 per cent of the land revenue and 75 per cent of the non-agricultural assessment to the respective municipal councils.

But the state Government does not have appropriate sufficient data in this regard, so for this reason Municipal councils would not allocate the fund in this regard.

3. **Compensation for the loss of income due to abolition of Octroi:** - The loss of income due to abolition of Octroi is combined with existing Dearness Allowance Grant which is availed to the Municipal Council. Combined grant is given to the Municipal Council in terms of the amount of 'Nagarpalika Sahayak Anudan'. The amount is to be increased by 10 per cent every year.

Recently most of Municipal Councils increased their jurisdiction area so the increment given to the precedent amount does not match with the actual scenario and it results loss of shared revenue to the Municipal Council.

4. **Road Grant:** - The Road Grant was released for construction and maintenance of roads in municipal area. 10 per cent of Motor Vehicle Tax collected during preceding year was to be transferred to the Municipal Councils in the subsequent year as road grant for construction and maintenance of roads in Municipal areas.

The actual experience in this regard that the state Government transferred short payment of Nagarpalika Sahayak Anudan, Road Tax was due to budgetary constraints.

4.4 Grants-In-Aid

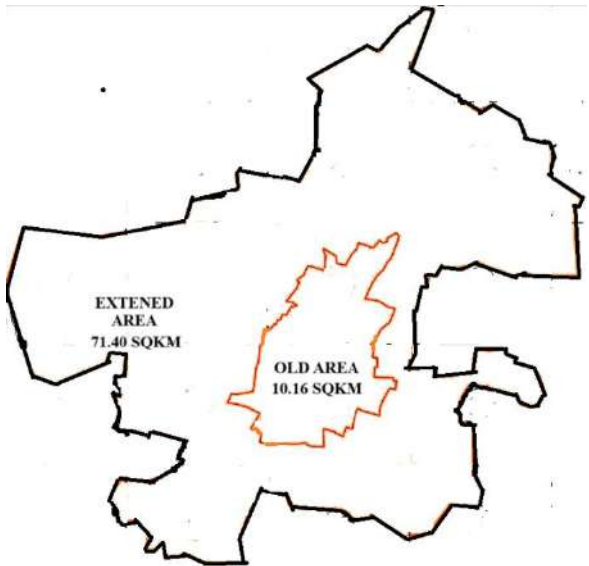
Municipal Councils is received fund in terms of grants-in-aid from the state Government and central Government. It has two types plan and non-plan. The 74th Constitutional Amendment Act had provisions for a Creation a fiscal devolution framework in the form of State Finance Commissions for reviewing the financial position of municipal bodies. It is also made the recommendation regarding—

- (1) The distribution between the state and the municipal bodies of the net proceeds of the taxes, duties and fees leviable by the state.
- (2) The grants-in-aid to municipal bodies from the consolidated fund of the state.

From the above fact Centre and State Government release the fund in terms of grants-in-aid. But actual fact about this grant-in-aid is that grant is not uniform and continue, the nature of disbursements grants is purely on ad hoc basis and unpredictable nature of funds flowing from the State Government.

5.0 Case study to discover the Municipal Finance: -

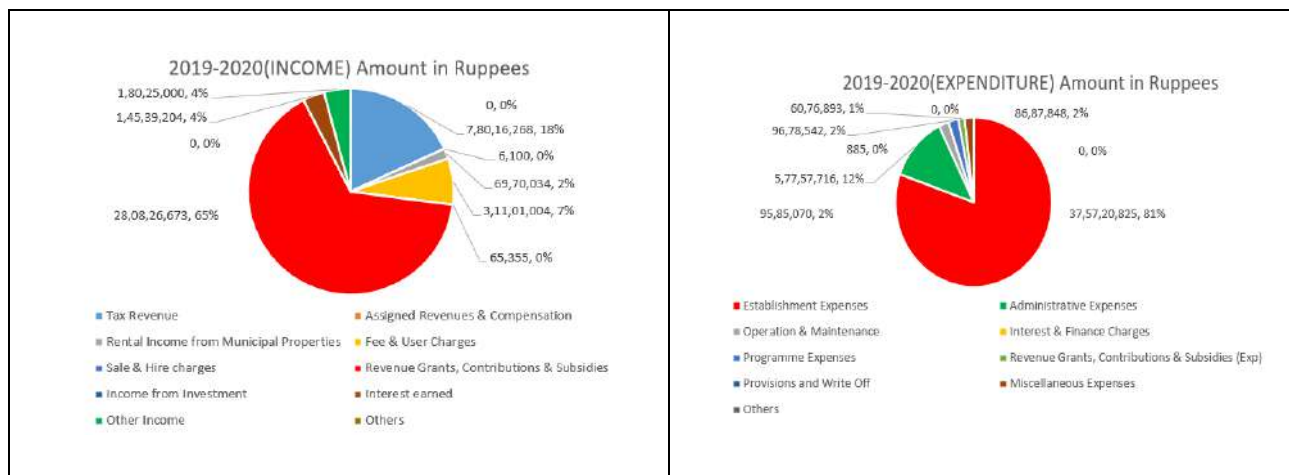
Yavatmal Municipal Council in Yavatmal district is selected to study of Municipal finance including its structure, pattern and role of both tier of Government in this regard. Study also extends the constraints faced by YMC in lieu of the Municipal governing state Act and 74th Amendment Act 1992. Study also discuss on the remedies to improve the financial condition of YMC.

PROFILE OF YAVATMAL TOWN		
Establishment	1894	
Class Of Municipal Council	“A” Class	
Area Of Municipal Council	8156.10 Hectors	
No. of Wards	59	
Average Rainfall	946 Mm	
Maximum Temperature	Summer: 43° – 45°C Winter: 10° – 12°C	
Minimum Temperature	Summer: 43° – 45°C Winter: 10° – 12°C	
National And Regional Settings	19°-26' North Latitude 77°-18' East Longitude.	
Mean-Sea Level	445 M	
Population Of Municipal Council (Census 2011)	251124	
Male Female Ratio	Male-127558 Female-123566	
Number Of Household	58182	
Literacy Level	83.62%	
Developed area within Municipal area	1894.22 Hectors	
Net Density in Souls/Hect	133 souls/Hect.	
Gross Density in Souls/Hect	31souls/Hect	

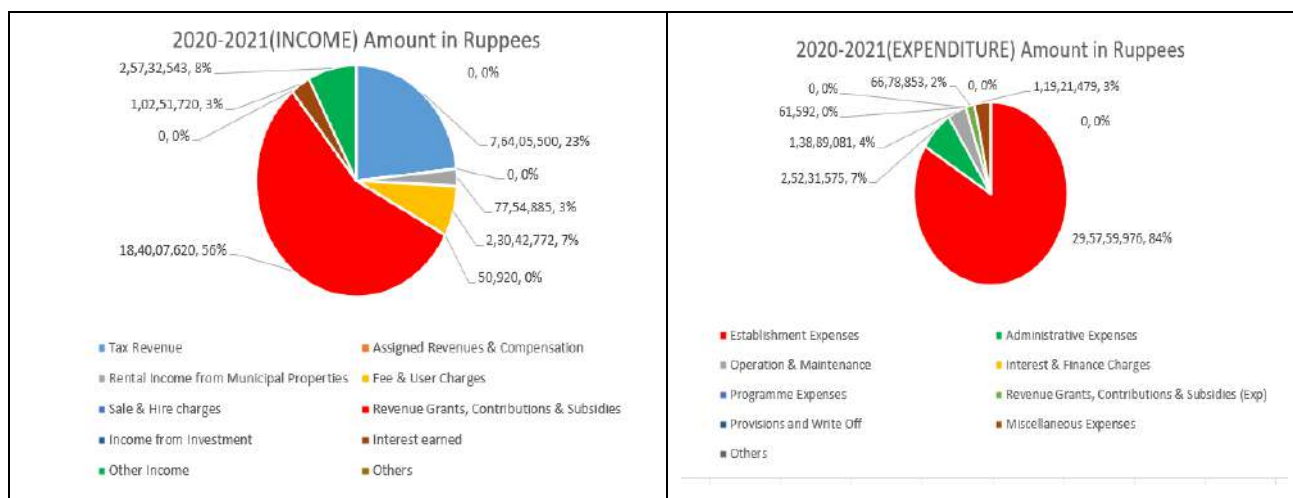
Details of financial statements are as follows: -

2019-2020 INCOME AND EXPENDITURE			
Category of income	Amount in Rupees	Category of expenditure	Amount in Rupees
Tax Revenue	7,80,16,268	Establishment Expenses	37,57,20,825
Assigned Revenues & Compensation	6,100	Administrative Expenses	5,77,57,716
Rental Income from Municipal Properties	69,70,034	Operation & Maintenance	95,85,070
Fee & User Charges	3,11,01,004	Interest & Finance Charges	885
Sale & Hire charges	65,355	Programme Expenses	96,78,542
Revenue Grants, Contributions & Subsidies	28,08,26,673	Revenue Grants, Contributions & Subsidies (Exp)	60,76,893
Income from Investment	0	Provisions and Write Off	0
Interest earned	1,45,39,204	Miscellaneous Expenses	86,87,848

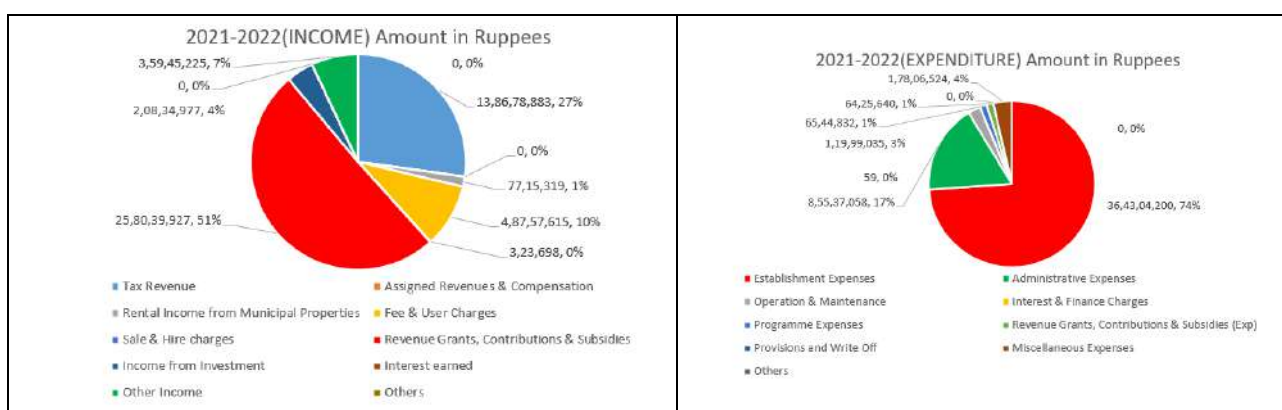
Other Income	1,80,25,000	Others	0
Others	0	-	-
Total	42,95,49,638	Total	46,75,07,779



2020-2021 INCOME AND EXPENDITURE			
Category of income	Amount in Rupees	Category of expenditure	Amount in Rupees
Tax Revenue	7,64,05,500	Establishment Expenses	29,57,59,976
Assigned Revenues & Compensation	0	Administrative Expenses	2,52,31,575
Rental Income from Municipal Properties	77,54,885	Operation & Maintenance	1,38,89,081
Fee & User Charges	2,30,42,772	Interest & Finance Charges	61,592
Sale & Hire charges	50,920	Programme Expenses	0
Revenue Grants, Contributions & Subsidies	18,40,07,620	Revenue Grants, Contributions & Subsidies (Exp)	66,78,853
Income from Investment	0	Provisions and Write Off	0
Interest earned	1,02,51,720	Miscellaneous Expenses	1,19,21,479
Other Income	2,57,32,543	Others	0
Others	0	-	-
Total	32,72,45,960	Total	35,35,42,556

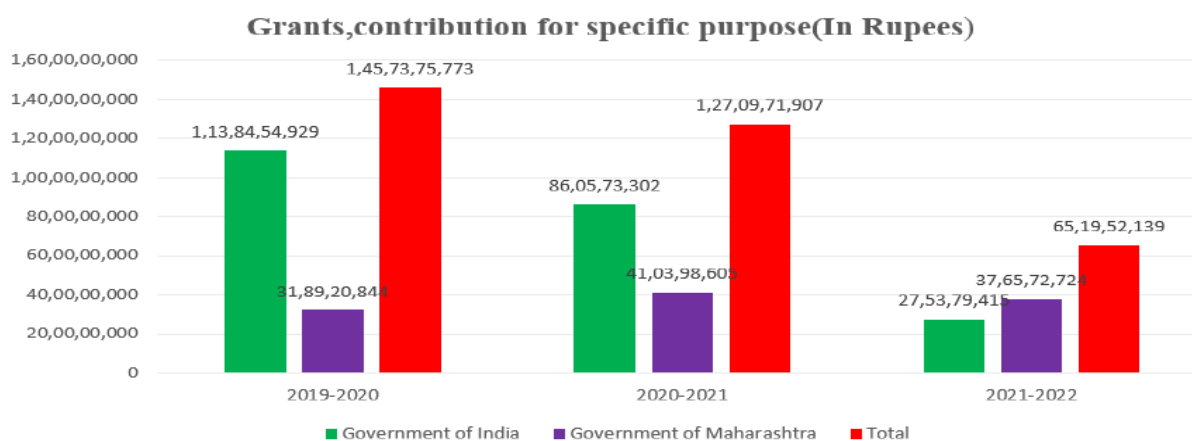


2021-2022 INCOME AND EXPENDITURE			
Category of income	Amount in Rupees	Category of expenditure	Amount in Rupees
Tax Revenue	13,86,78,883	Establishment Expenses	36,43,04,200
Assigned Revenues & Compensation	0	Administrative Expenses	8,55,37,058
Rental Income from Municipal Properties	77,15,319	Operation & Maintenance	1,19,99,035
Fee & User Charges	4,87,57,615	Interest & Finance Charges	59
Sale & Hire charges	3,23,698	Programme Expenses	65,44,832
Revenue Grants, Contributions & Subsidies	25,80,39,927	Revenue Grants, Contributions & Subsidies (Exp)	64,25,640
Income from Investment	2,08,34,977	Provisions and Write Off	0
Interest earned	0	Miscellaneous Expenses	1,78,06,524
Other Income	3,59,45,225	Others	0
Others	0	-	-
Total	51,02,95,644	Total	49,26,17,348



Details of financial statements regarding Grants, contribution for specific purpose are as follows: -

Grants, contribution for specific purpose (In Rupees)			
Grants given by	2019-2020	2020-2021	2021-2022
Government of India	1,13,84,54,929	86,05,73,302	27,53,79,415
Government of Maharashtra	31,89,20,844	41,03,98,605	37,65,72,724
Total	1,45,73,75,773	1,27,09,71,907	65,19,52,139



It is seen from the statements of income in the financial year 2019-2020 of YMC is that, source of major income is coming from Revenue Grants, Contributions & Subsidies (65%) followed by the Tax Revenue (18%) of the total income of the YMC. In the financial year 2020-2021 source of major income is reduce by 9%, comes up to 56% of total income. It is further reduced by 4% comes up to 51% of total income in the financial year 2021-2022 of YMC. Findings from this scenario that YMC is highly depend on Revenue Grants, Contributions & Subsidies which would receive from the state Government. It is also reveals that no consistency in the amount received from the State Government and State Government does not adopt any particular definite formula or process to transfer the amount to the YMC.

YMC has not sufficiently tried to generate its own revenue sources, as only 18% income comes from various taxes i.e. property tax, advertisement tax and 7% income comes from Fee & User Charges in the year 2019-2020. It is slightly increase by 5% from various taxes and remains the from Fee & User Charges in the year 2020-2021 also It is slightly increase by 4% from various taxes and 3% from Fee & User Charges in the year 2021-2022. These own sources of YMC such as taxes and charges can collect under the provisions of Maharashtra Municipalities, Nagar Panchayats and Townships act, 1965. This can be illustrated by property tax, YMC levies the property tax as a percentage of annual ratable value of the property which was decided by the state Government appointed officer i.e. Authorized valuation officer, and ceiling are laid down by the above said Act.

Expenditures by YMC is basically for providing various services to citizens. It is seen from the statements of Expenditure in the financial year 2019-2020 of YMC that 81% of total Expenditure falls under Establishment Expenses. It is slightly increase by 3% in subsequent year. It is satisfactory reduce in the year 2021-2022 by 10% of the previous year. It is largely hampered the priorities of expenditure for the basic services. so it is necessary review the staffing pattern and mobilize them in optimum manner.

Apart from above income and expenditure statements YMC has receive Grants, contribution for specific purpose from both tier of Governments as State and Central. Specific Data regarding (i) Municipal area-wise details of land revenue and non-agriculture assessment (ii) exempted stamp duty cases on behalf of State Government (iii) specific number of vehicles in Municipal area are not suitably assessable so correct appropriation of various taxes collected under the aegis of both Governments is not possible. But consolidate data regarding Grants, contribution for specific purpose is analysed.

YMC has received in terms of Grants, contribution for specific purpose from Governments is Rs.145.74 crores in the year 2019-2020 and there is 13% and 56% reduction in the year 2020-2021 and 2021-2022 respectively. If we go through Government wise central Government devolved Rs.113.84 crores in the year 2019-2020 and there is 26% and 76% reduction in the year 2020-2021 and 2021-2022 respectively. State Government devolved Rs.31.89 crores in the year 2019-2020 and there is 29% and 18% increase in the year 2020-2021 and 2021-2022 respectively.

From above analysis the nature of disbursements grants from both Governments is purely ad hoc without any authentic right of the YMC. The uncertainty in received grants affects the planning of expenditure strategies by the YMC.

6. Discussion: -

The structure of Municipal Finance includes own revenue of Municipal Council was property tax. As per the provisions of Maharashtra Municipalities, Nagar Panchayats and Townships act, 1965, property tax could be levied on the basis of the rateable value of the property (land and building). It is difficult for Municipal Council to switch over to capital value method of

assessing property tax. Whether the property tax is levied instead of Charges on Central and State Government properties which was not levied in existing circumstances.

It is necessary that at least user charges recover the operational and maintenance charges of delivering services and perhaps more.

In the field of non-tax regime control of State Government in terms of procedure, period of lease etc while fixing the rent on Municipal properties shall be minimized.

Shared Revenue which accrues to the Municipal Council as a certain percentage of a tax levied and collected by the State Government for example stamp duty, motor vehicle tax etc. Certain mechanism shall be fixed by the state Government to transfer the entire collected proceeds to the Municipal Council.

Grants and contributions from state and central governments form the other source of revenue income for Municipal Council. But The nature of disbursements grants is purely ad hoc and the distributive principles are not uniform. Each type of grant is often disbursed at varying rates to different Municipal Council.

7. Conclusion: -

1. Functional devolution which was assigned by CAA 1992 to the Municipal Council has not been matched by supporting financial devolution.
2. Grants and assigned revenues, as long as they are predictable in quantum and timing and derived from clearly laid down established processes by the central and state Government may serve Municipal Council equally well.
3. Increase in own revenue of Municipal Council is possible by making property tax reform and periodical revision of tax rates and broadening the tax base through extending coverage adopting GIS technology.
4. Provisions in Maharashtra Municipalities, Nagar Panchayats and Townships act, 1965 related to Revenue sources of Municipal Council such as taxes and charges are revisited and it would be correlate to increasing population, area of Municipal Council, updated technology and mechanism for appropriation of various taxes collected by central and state Government.

References: --

1) <https://cityfinance.in/dashboard/city?cityId=4dd28d83e9af860395bf2ece>

2) Various state and centre finance commission reports

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“Development Of Town Planning Index (TPI) For Performance Evaluation Of Development Plans ”

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Abstract

The aim of a Development plan (**DP**) for city/town/ metropolitan region is to systematically develop it in such manner so as to sustain its growth as well as nurture the same for future. A development plan incorporates essential services such as provision of roads, schools, hospitals, cremation ground as per projected population of a city. The essential amenities are for survival and wellbeing of the populace that are intended for settlement. A Development Plan prepared according to the relevant section of Maharashtra Regional Town planning Act, (MRTP Act) 1966 is a document for the future. However, the evaluation of Development Plan has not yet been quantified. This has subsequently created gaps in providing services for the populace and hampered the planned growth of the city/town/ metropolitan region. In this paper, a Town Planning Index is developed for quantifiable evaluation of Development Plan. The Index uses a scoring criteria based on the efficacy of reservations intended for the region. The paper is a theoretical evaluation of the Development plan and also a tool for self-reflection of planning Authority.

Keywords: - Development Plan (**DP**), Town Planning Index (**TPI**), Maharashtra Regional & Town Planning Act (1966)

1.0 Introduction

Researchers and planners worldwide have emphasized the need for a better planning in an urbanizing world. The expansion of urbanized areas has increased people's access to modern facilities and urban infrastructures but deviations from planning have decreased the quality of life in large cities¹. The quality of urban Planning by using the proposed Town Planning Index (**TPI**) can be used as an indicator for evaluating how the plans that were envisioned in the planning document are ensured while implementing. Our study proposes the assessment of urban planning using TPI for mapping the extent of Implementation of a Development plan within a city/town. The methodology suggested for calculating TPI is based on matrix evaluation of scoring criteria that have been found essential for sustaining planned growth of the city.

While working on field, the Planning Authority (**PA**) is often unable to implement reservations under development meant for critical service delivery. This situation explicitly gives rise to notices under **sec-127** and **sec-37** of the MRTP act leading often to lapses and modification of reservation respectively. The Town Planning Department officials working with the concerned PA hence faces excessive load of documentation and judicial procedures while processing these proposals. This leads to wasteful consumption of human resource. For common people to understand the performance of PA with respect to implementation of DP & for Town Planning Department an indicator as well guide while preparing future DP for the same PA; this paper suggests the development of TPI in the Methodology section for assessing the performance of DP.

2.0 Methodology

As discussed in the introduction, the **TPI** is devised by using a matrix form of evaluation on certain criteria. A total of 8 classes of reservations are included for calculation of the index. In order to make the index objective, Stakeholder opinion and other arbitrary judgements are eliminated for arriving at weightage

criterion as opposed to other similar decision making methodologies such as **AHP** (Saaty,1980)². The proposed Reservations as per the sanctioned DP are categorized as following:-

- 1) Public-Semi Public buildings
- 2) Playground
- 3) Hospital
- 4) DP roads
- 5) Cremation/ Burial Ground
- 6) Commercial/market
- 7) Sewage Treatment Plant
- 8) Solid waste Management Plant

The aforementioned **8 classes** of reservation are considered as essential for serving the public at large. Therefore the implementation of the following reservations by the planning authority is expected within stipulated time following stipulated norms. However Implementation is not possible in singularity. This leads to stratification in different stages. This has led to the development of Stage wise scoring as devised and elaborated under **Table 1**.

Table 1: Stage-Score Decision

Sr. No.	Stage	Score	Code
1	Yet to Begin	-1	P0
2	Under Process by Planning Authority	0.5	P1
3	Completed	1	P2

Hence Three Stages for implementation of reservation is considered. The scoring and code is allotted against each stage which is further applied in TPI in order to score the overall performance against the aforementioned classes of reservation.

To understand the hypothesis in a clear connotation a hypothetical DP, which is in operation as per sec-31 of MRTTP Act 1966 under the jurisdiction of a Nagar Parishad is considered. A study case is detailed below: -

DP of **Nagar Parishad** was sanctioned in the year 1st April, 2014. There were a total of 46 Reservations sanctioned in the DP for various classes. A brief of which is stated as:-

- 1) Public-Semi Public buildings **-20** no
- 2) Playground **-5** no
- 3) Hospital **-3** no
- 4) DP roads **-10** no
- 5) Cremation/ Burial Ground **-1** no
- 6) Commercial/market **-5** no
- 7) Sewage Treatment Plant **-1** no
- 8) Solid waste Management Plant **-1** no

The performance of the DP is based on the effective execution/implementation of its reservations which are meant for the benefit of the general population. In the Sample example of a PA the above mentioned reservations are placed with conditions of either to begin, under process or completed. The Hypothesis for index development is explained by demonstrating calculations applied to the problem assumed.

2.1 Calculation of Scoring for Proposed Reservations

The preparation of an Index requires a detailed analysis of dominant components in order to validate a hypothesis. The succeeding sections elaborate the calculation of an overall score for each reservation proposed in the Hypothetical DP.

2.1.1 Public-Semi Public Buildings

If number of Public-Semi Public Building Reservation as proposed is 20, and completed are 15 and under process are 2 and yet to begin are 3, then Scoring Matrix is developed under **Table 2** as following.

Table 2: Public -Semi-public Building Reservations Calculation

	In Numbers	Score component		
Total	20	P0	P1	P2
Yet to begin	3	$(-1 \times 3) = -3.00$	0.00	0.00
Under Process	2	0.00	$(0.5 \times 2) = 1$	0.00
Completed	15	0.00	0.00	$(1 \times 15) = 15$
Summation		$\sum P0 = -3.00$	$\sum P1 = 1$	$\sum P2 = 15$
Overall Score $[\sum (P1+P2 +P0)/ (\text{Total No of Proposed Reservation})] =$ $(-3+1+15)/20$				0.65

2.1.2 Playground

The sanctioned DP for the Nagar Parishad has incorporated a total of 5 no of proposed playground. Different stages of implementation of the proposal are elaborated under **Table 3** of the study.

Table 3: Playground Reservations Calculation

	In Numbers	Score component		
Total	5	P0	P1	P2
Yet to begin	2	$(-1 \times 2) = -2.00$	0.00	0.00
Under Process	1	0.00	$(0.5 \times 1) = 0.5$	0.00
Completed	2	0.00	0.00	$(1 \times 2) = 2$
Summation		$\sum P0 = -2.00$	$\sum P1 = 0.5$	$\sum P2 = 2$
Overall Score $[\sum (P1+P2 +P0)/ (\text{Total No of Proposed Reservation})] =$ $(-2+0.5+2)/5$				0.10

2.1.3 Hospital

The sanctioned DP for the Nagar Parishad has incorporated a total of 3 no's of proposed Hospitals. Different stages of implementation of the proposal are elaborated under **Table 4** of the study.

Table 4: Hospital Reservations Calculation

	In Numbers	Score component		
Total	3	P0	P1	P2
Yet to begin	1	$(-1 \times 1) = -1.00$	0.00	0.00
Under Process	1	0.00	$(0.5 \times 1) = 1$	0.00
Completed	1	0.00	0.00	$(1 \times 1) = 1$
Summation		$\sum P0 = -1.00$	$\sum P1 = 0.5$	$\sum P2 = 1$
Overall Score $[\sum (P1+P2 +P0)/ (\text{Total No of Proposed Reservation})] =$ $(-1+0.5+1)/3$				0.167

2.1.4 DP roads

The sanctioned DP for the Nagar Parishad has incorporated a total of 10 no's of proposed DP Roads. Different stages of implementation of the proposal are elaborated under **Table 5** of the study.

Table 5: DP roads Reservations Calculation

	In Numbers	Score component		
Total	10	P0	P1	P2
Yet to begin	2	(-1 X 2) = -2.00	0.00	0.00
Under Process	3	0.00	(0.5 X 3) =1.5	0.00
Completed	5	0.00	0.00	(1 X 5) =5
Summation		$\sum P0 = -2.00$	$\sum P1 = 1.5$	$\sum P2 = 5$
Overall Score $[\sum (P1+P2 +P0)/ (\text{Total No of Proposed Reservation})] =$ $(-2+1.5+5)/10$				0.45

2.1.5 Cremation/Burial Ground

The sanctioned DP for the Nagar Parishad has incorporated a total of 1no's of proposed **Cremation/Burial Ground**. Different stages of implementation of the proposal are elaborated under **Table 6** of the study.

Table 6: Cremation/Burial Ground Reservations Calculation

	In Numbers	Score component		
Total	1	P0	P1	P2
Yet to begin	0	(-1 X 0) = 0.00	0.00	0.00
Under Process	0	0.00	(0.5 X 0) =0.00	0.00
Completed	1	0.00	0.00	(1 X 1) =1
Summation		$\sum P0 = 0.00$	$\sum P1 = 0.00$	$\sum P2 = 1$
Overall Score $[\sum (P1+P2 +P0)/ (\text{Total No of Proposed Reservation})] =$ $(0+0+1)/1$				1

2.1.6 Commercial/market

The sanctioned DP for the Nagar Parishad has incorporated a total of 5 no's of proposed **Commercial/market Reservation**. Different stages of implementation of the proposal are elaborated under **Table 7** of the study.

Table 7: Commercial/market Reservations Calculation

	In Numbers	Score component		
Total	5	P0	P1	P2
Yet to begin	1	(-1 X 1) = -1	0.00	0.00
Under Process	1	0.00	(0.5 X 1) =0.5	0.00
Completed	3	0.00	0.00	(1 X 3) =3
Summation		$\sum P0 = -1$	$\sum P1 = 0.5$	$\sum P2 = 3$
Overall Score $[\sum (P1+P2 +P0)/ (\text{Total No of Proposed Reservation})] =$ $(-1+0.5+3)/5$				0.5

2.1.7 Sewage Treatment Plant

The sanctioned DP for the Nagar Parishad incorporated a total of 1 no's of proposed **Sewage Treatment Plant**. Different stages of implementation of the proposal are elaborated under **Table 8** of the study.

Table 8: Sewage Treatment Plant Reservations Calculation

	In Numbers	Score component		
Total	1	P0	P1	P2
Yet to begin	1	$(-1 \times 1) = -1$	0.00	0.00
Under Process	0	0.00	$(0.5 \times 0) = 0.00$	0.00
Completed	0	0.00	0.00	$(1 \times 0) = 0$
Summation		$\sum P0 = -1$	$\sum P1 = 0.00$	$\sum P2 = 0$
Overall Score $[\sum (P1+P2 +P0)/ (\text{Total No of Proposed Reservation})] =$ $(-1+0+0)/1$				-1

2.1.8 Solid waste Management

The sanctioned DP for the Nagar Parishad has incorporated a total of 1 no's of proposed **Solid waste Management Plant**. Different stages of implementation of the proposal are elaborated under **Table 9** of the study.

Table 9: Solid waste Management Plant Reservations Calculation

	In Numbers	Score component		
Total	1	P0	P1	P2
Yet to begin	1	$(-1 \times 1) = -1$	0.00	0.00
Under Process	0	0.00	$(0.5 \times 0) = 0.00$	0.00
Completed	0	0.00	0.00	$(1 \times 0) = 0$
Summation		$\sum P0 = -1$	$\sum P1 = 0.00$	$\sum P2 = 0$
Overall Score $[\sum (P1+P2 +P0)/ (\text{Total No of Proposed Reservation})] =$ $(-1+0+0)/1$				-1

2.1.9 General Assumptions

Assumptions for the Following calculations are explained below :-

1. The maximum value or score for a reservation is calculated as **1**.
2. Minimum Value criterion for score of a Reservation is not defined.

Now each of the Reservations is calculated as per the above devised methodology. The Hypothesis of the Town planning index is elaborated under **Table 10** in tabular format where in the overall score derived using score components are added up and divided by total classes of reservation and then multiplied by a factor of 100. The factor of 100 is used to convert the index value into the multiple of 10 and is for simple identification and categorization of values even by general public.

2.2 Town Planning Index(TPI)

The scores calculated using above tables are further used and operated as explained earlier. **Table 10** presents Town planning Index:-

Table 10: Town Planning Index (TPI)

Reservations	Total Number	P2	Overall Score
Public-Semi Public Buildings	20	15	0.65
Playground	5	2	0.10
Hospital	3	1	0.167
DP roads	10	5	0.45
Cremation/ Burial Ground	1	1	1
Commercial/market	5	3	0.5
Sewage Treatment Plant	1	0	-1
Solid waste Management Plant	1	0	-1
TOWN PLANNING INDEX (Overall Score/Classes of Reservation)*			(0.867/8)*100=10.83
100			

The above mentioned index thus can indicate the performance of the Planning Authority with regards to execution of the Reservations proposed under Development plan. Maximum Value of TPI can be **100**. The categorization of the TPI Index is stated as under in **Table 11**:

Table 11: Categorization of TPI

TPI Value	Comment
0-25	Unsatisfactory
25-50	Satisfactory
50-75	Good
75-100	Excellent

Based on the above categorization the Value of the sample DP analysis falls in the range of **Unsatisfactory**. The Index therefore is a tool for decision makers for assessing the performance of a Planning Authority with respect to a Development Plan.

4.0 Limitation of the Study

In the current research, the index is prepared based on the implementation of the DP. Though the research is indicative of the effective implementation of the DP, there are few limitations which are listed below:-

- Stratification of the stages is not defined clearly in the study.
- Statistical analysis can be incorporated to check confidence limit which in turn leads to higher accuracy.
- A database of Town Planning Index can be created and that can help in the ranking various Planning authorities, which can be a future scope of this research.

5.0 Conclusion

The developed index- TPI is formulated based on the stages of completion of reservations. The index if applied throughout Maharashtra would help to quantify the implementation of the DP and will help authorities in Financial Planning while implementing DP. **The index can therefore be a tool for Planning Authorities to identify lapses in Development Plan implementation and hence improve the processes with time.** Furthermore, the town planning department can identify the strength and weakness of a particular

Planning authority while preparing a new DP. Thus it can be concluded that the TPI, if implemented can be helpful for all concerned Stakeholders.

6.0 References

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“Districtwise Comparison of Urbanization in Maharashtra For the Year 2001 and 2011”

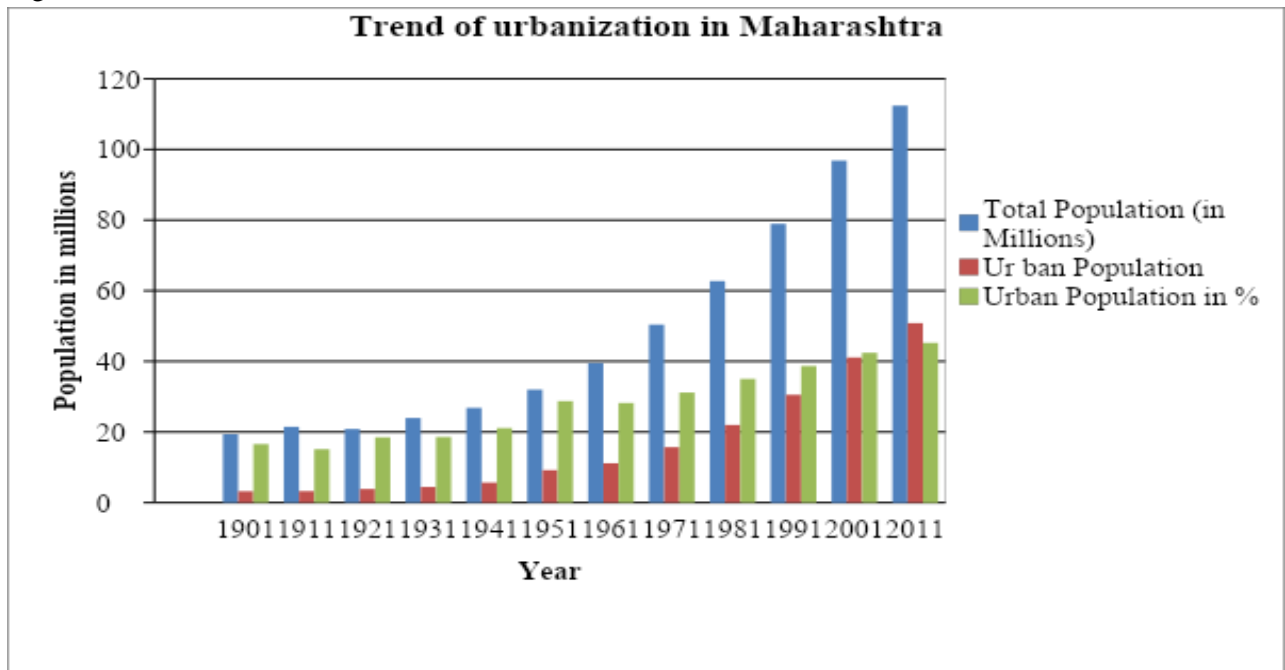
Shri. Suraj Suryakant Raut,
Assistant Town Planner, ADTP, Branch Office Solapur

The process of increasing urban population in the region is called urbanization. After independence the rate of urbanization increased in all states in India. In 1960, the Maharashtra state came into existence. is one of the most prominent states in India since its existence. Rate of urbanization is greater in Maharashtra as compared to other states. Currently Maharashtra has the largest number of urban population in India.

1.1 Trend of urbanization in Maharashtra

Following fig shows how the urbanization is increasing in Maharashtra. In 1911 only 8.8% of urbanization was present and it becomes 45.23% in 2011. Maharashtra is the third most urbanized state in India but according to urban population Maharashtra stood with the first rank in the list.

Fig. Trend of urbanization in Maharashtra



Source- Census of India 1991-2011

Following table shows the percentage of urban population in Maharashtra from 1911 to year 2011. In 1901 total population of Maharashtra was only 19.39 million and in that year percentage of urban population was 16.59%. In 2011 total population of Maharashtra was 112.37 million and percentage of urban population was 45.23%.

From 1901 to 2011 the urban population is always increasing except in the decade of 1951-61. In that decade urban population growth rate was -1.84. Percentage of urbanization was greatest in the 1941-51 decade. It was 36.19 % growth rate. In 2001-2011, urbanization growth rate was 6.59.

Table- Trend of urbanization in Maharashtra

Census Year	Total Population (in Millions)	Urban Population (in Millions)	Urban Population in %	% Growth Rate
1901	19.39	3.22	16.59	*
1911	21.47	3.25	15.13	8.80048
1921	20.85	3.86	18.5	22.2736
1931	23.96	4.46	18.6	0.54054
1941	26.83	5.67	21.11	13.4946
1951	32	9.2	28.75	36.1914
1961	39.55	11.16	28.22	-1.84348
1971	50.41	15.71	31.17	10.4536
1981	62.78	21.99	35.03	12.3837
1991	78.94	30.54	38.69	10.4482
2001	96.88	41.1	42.43	9.66658
2011	112.37	50.83	45.23	6.5991

Source- Census of India 1991-2011

1.2 District wise Level of Urbanization in Maharashtra

For better understanding urbanization is categorized as,

1. Very low percentage of urbanization
2. Low percentage of urbanization
3. Moderate percentage of urbanization
4. High percentage of urbanization
5. Very high percentage of urbanization

1.2.1 Very low percentage of urbanization

If the percentage of urbanization is less than 20%, it is categorized under very low category. According to census of India, 2001 there were 14 districts falling in this category. Lowest urbanized district was Garchiroli which was 6.96% of urbanized. According to census of India, 2011 there were 12 districts falling under this category. Lowest urbanized district was Garchiroli which was 11% of urbanized.

1.2.2 Low percentage of urbanization

If the percentage of urbanization is between 20 – 40%, it is categorized under low category. According to census of India, 2001 there were 16 districts falling in this category. According to census of India, 2011 there were 16 districts falling under this category.

1.2.3 Moderate percentage of urbanization

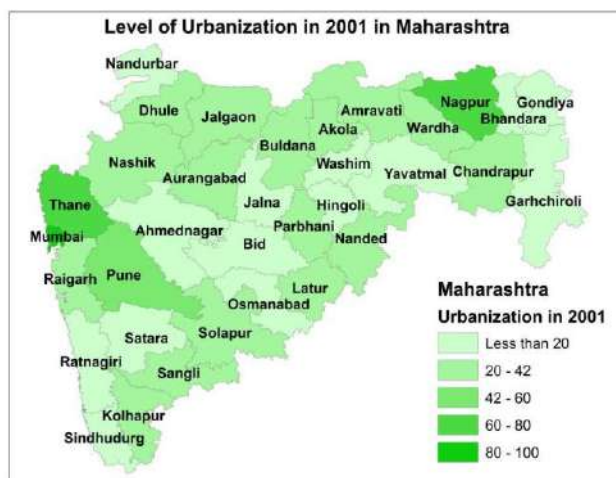
If the percentage of urbanization is between 40 - 60%, it is categorized under moderate category. According to census of India, 2001 there was only one district falling in this category which was Pune having 58.08% Of urbanization. According to census of India, 2011 there were 2 districts Nashik and Aurangabad falling under this category having level of urbanization 42.53% and 43.74% respectively.

1.2.4 High percentage of urbanization

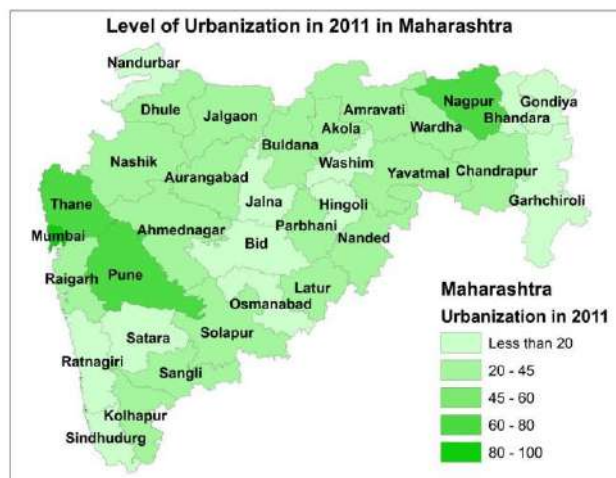
If the percentage of urbanization is between 60 - 80%, it is categorized under high category. According to census of India, 2001 there were two districts Nagpur and Thane falling in this category having level of urbanization 64.25% and 72.57% respectively. According to census of India, 2011 there were 3 districts Pune, Nagpur and Thane falling under this category having level of urbanization 60.89%, 68.3% and 76.92% respectively.

1.2.5 Very high percentage of urbanization

If the percentage of urbanization is between 80 - 100%, it is categorized under high category. According to census of India, 2001 and Census of India 2011 there were two districts Mumbai and Mumbai suburban falling in this category having level of urbanization 100% in both years.



Source- Census of India, 2001



Source- Census of India, 2011

1.3 Location Quotient (L.Q.)

Location quotient is used to find the concentration of urban population in any district. It is calculated by the following formula,

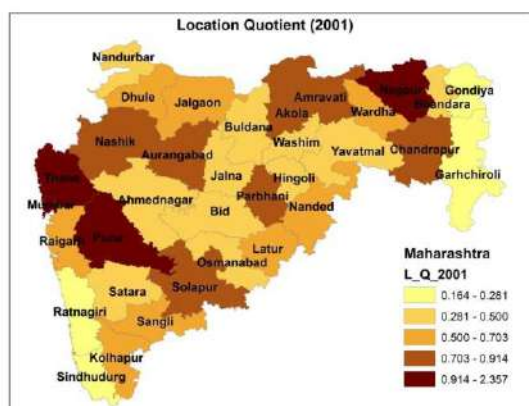
$$L.Q. = \frac{\text{Level of urbanization in district}}{\text{Level of urbanization in State}}$$

Following **figures** show location quotient of districts in Maharashtra for the year 2001 and 2011 respectively. For better understanding location quotient is categorized in five categories such as,

1. Very low location quotient having value
2. Low location quotient
3. Moderate location quotient
4. High location quotient
5. Very high location quotient

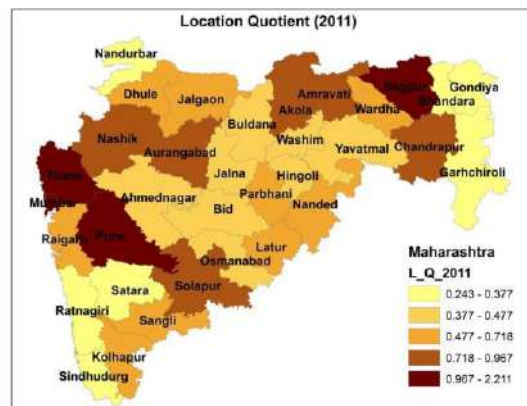
Districts such as Mumbai, Thane, Nagpur and Pune have High value of location quotient for both the years 2001 and 2011. Districts such as Gondia and Garchiroli have lowest value of location quotient for both years 2001 and 2011.

Fig. Location quotient in 2001



Source- Author's calculations

Fig. Location quotient in 2011



Source- Author's calculations

Following **table** shows the location quotient of districts in Maharashtra. From the table, the value of location quotient in Mumbai, Thane, Nagpur, Pune and Nashik has decreased from year 2001 to 2011 though these districts top the list whereas value of location quotient for most of the district has increased in the year 2011. This also shows that urbanization is increasing in Maharashtra. The value of location quotient for districts Mumbai, Mumbai suburban, Thane, Pune is greater than 1 this indicates that these districts have greater urbanization level than the average urbanization level of Maharashtra. This table also shows that there is a large urban disparity within districts in Maharashtra.

Table- location quotient of (year 2001)

Sr. No	District	Urbanization in %	L.Q. 2001
1	Mumbai	100	2.357
2	Mumbai suburban	100	2.357
3	Thane	72.57	1.710
4	Nagpur	64.25	1.514
5	Pune	58.08	1.369
6	Nashik	38.79	0.914
7	Akola	38.49	0.907
8	Aurangabad	37.52	0.884
9	Amravati	34.5	0.813
10	Chandrapur	32.11	0.757
11	Solapur	31.82	0.750
12	Parbhani	31.75	0.748
13	Kolhapur	29.81	0.703
14	Jalgaon	28.58	0.674
15	Wardha	26.28	0.619
16	Dhule	26.1	0.615
17	Sangli	24.5	0.577
18	Raigarh	24.22	0.571
19	Nanded	23.95	0.564
20	Latur	23.56	0.555
21	Buldana	21.2	0.500
22	Ahmadnagar	19.89	0.469
23	Jalna	19.08	0.450
24	Yavatmal	18.59	0.438
25	Bid	17.9	0.422
26	Washim	17.49	0.412
27	Osmanabad	15.69	0.370
28	Hingoli	15.601	0.368
29	Bhandara	15.46	0.364

Table- location quotient of (year 2011)

Sr. No	District	Urbanization in %	L.Q. 2011
1	Mumbai	100	2.211
2	Mumbai suburban	100	2.211
3	Thane	76.92	1.701
4	Nagpur	68.3	1.510
5	Pune	60.89	1.346
6	Aurangabad	43.74	0.967
7	Nashik	42.53	0.940
8	Raigarh	36.91	0.816
9	Akola	36.69	0.811
10	Amravati	35.9	0.794
11	Chandrapur	35.08	0.776
12	Wardha	32.47	0.718
13	Solapur	32.4	0.716
14	Jalgaon	31.8	0.703
15	Kolhapur	31.75	0.702
16	Parbhani	31.04	0.686
17	Dhule	27.91	0.617
18	Nanded	27.23	0.602
19	Sangli	25.51	0.564
20	Latur	25.47	0.563
21	Yavatmal	21.59	0.477
22	Buldana	21.23	0.469
23	Ahmadnagar	20.1	0.444
24	Bid	19.9	0.440
25	Bhandara	19.5	0.431
26	Jalna	19.26	0.426
27	Satara	18.98	0.420
28	Washim	17.69	0.391
29	Gondiya	17.07	0.377

30	Nandurbar	15.45	0.364
31	Satara	14.17	0.334
32	Gondiya	11.94	0.281
33	Ratnagiri	11.32	0.267
34	Sindhudurg	9.47	0.223
35	Gadchiroli	6.96	0.164

Source- Census of India, 2001 & Author's calculations
calculations

30	Osmanabad	16.96	0.375
31	Nandurbar	16.72	0.370
32	Ratnagiri	16.35	0.361
33	Hingoli	15.17	0.335
34	Sindhudurg	12.6	0.279
35	Gadchiroli	11	0.243

Source- Census of India, 2011 & Author's

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“नगर नियोजनाची प्रचलित आव्हाने आणि सकारात्मक वाटचाल”

सागर किशोरराव मोगरे

सहायक नगर रचनाकार (सहायक संचालक नगर रचना गोंदिया शाखा)

भारतातील नगर नियोजनाला हजारो वर्षांचा समृद्ध आणि वैविध्यपूर्ण इतिहास आहे. भारतातील नगर नियोजनाची उत्क्रांती देशाचा समृद्ध सांस्कृतिक वारसा, वसाहती प्रभाव आणि समकालीन आव्हाने प्रतिबिंबित करते. भारताचे शहरीकरण होत असताना, नाविन्यपूर्ण, शाश्वत आणि सर्वसमावेशक शहरी नियोजन पद्धतींची वाढती गरज आहे. देशाचे जलद शहरीकरण, वाढती लोकसंख्या आणि पायाभूत सुविधा आणि संसाधनांवर वाढता दबाव यामुळे भारतामध्ये नगर नियोजन आवश्यक आहे. शहरांच्या जीवनमानाचा दर्जा, शाश्वतता आणि लवचिकतेवर परिणाम करणाऱ्या अनेक आव्हानांना शहर नियोजनावेळी तोंड द्यावे लागते. येथे काही प्रमुख आव्हाने आहेत.

पर्यावरणीय आव्हाने

१. **हवामान बदल:** वाढते तापमान, समुद्राच्या पातळीत वाढ आणि तीव्र हवामान घटनांसाठी अनुकूल शहरी नियोजन आवश्यक आहे.
२. **हवा आणि जल प्रदूषण:** वाहतूक, उद्योग आणि कचऱ्यापासून होणारे प्रदूषण व्यवस्थापित करणे सार्वजनिक आरोग्यासाठी महत्वाचे आहे.
३. **शहरी उष्णता बेट (Urban Heat Island) परिणाम:** पायाभूत सुविधा (Green Infrastructure) आणि स्मार्ट शहरी डिझाइनद्वारे शहरी उष्णता बेट (Urban Heat Island) परिणाम कमी करणे.

सामाजिक आव्हाने

१. **शहरी उष्माघात आणि पृथक्करण:** वाढीचे व्यवस्थापन, मिश्र-वापर विकासाला प्रोत्साहन देणे आणि सामाजिक पृथक्करण दूर करणे.
२. **परवडणारी गृहनिर्माण:** कमी उत्पन्न असलेल्या रहिवाशांसाठी परवडणाऱ्या घरांचे पर्याय प्रदान करणे.
३. **सामाजिक असमानता आणि सेवांमध्ये प्रवेश:** शिक्षण, आरोग्यसेवा आणि रोजगाराच्या संधींमध्ये समान प्रवेश सुनिश्चित करणे.

आर्थिक आव्हाने

१. **शहरीकरण आणि आर्थिक वाढ:** जलद शहरीकरणाचे व्यवस्थापन करणे, आर्थिक वाढीला चालना देणे आणि रोजगार निर्मिती करणे.
२. **पायाभूत सुविधांसाठी वित्तपुरवठा:** वाहतूक आणि सार्वजनिक सेवांसारख्या शहरी पायाभूत सुविधा प्रकल्पांसाठी निधी मिळवणे.
३. **शहरी गरिबी आणि अनौपचारिक अर्थव्यवस्था:** शहरी गरिबी, अनौपचारिक अर्थव्यवस्था आणि औपचारिक रोजगाराची उपलब्धता नसणे यावर उपाय.

तांत्रिक आव्हाने

१. **स्मार्ट सिटी तंत्रज्ञान:** आयओटी सेन्सर्स, डेटा ॲनालिटिक्स आणि एआय सारख्या स्मार्ट सिटी तंत्रज्ञानाचे एकत्रीकरण.
२. **सायबर सुरक्षा:** सायबर धोक्यांपासून शहरी पायाभूत सुविधा आणि सेवांचे संरक्षण करणे.
३. **डिजिटल विभाजन:** डिजिटल विभाजन दूर करणे आणि डिजिटल तंत्रज्ञानाची समान उपलब्धता सुनिश्चित करणे.

संस्थात्मक आव्हाने

१. **शासन आणि संस्थात्मक क्षमता:** शहरी प्रशासन, संस्था आणि प्रभावी नियोजनाची क्षमता मजबूत करणे.
२. **समन्वय आणि सहकार्य:** सरकार, खाजगी क्षेत्र आणि नागरी समाजासह भागधारकांमध्ये समन्वय आणि सहकार्य वाढवणे.
३. **सार्वजनिक सहभाग आणि सहभाग:** शहरी नियोजन प्रक्रियेत सार्वजनिक सहभाग आणि सहभागाला प्रोत्साहन देणे.

या आव्हानांना तोंड देण्यासाठी प्रत्येक शहराच्या विशिष्ट गरजा आणि संदर्भ लक्षात घेऊन शहरी नियोजनासाठी एक व्यापक, समावेशक आणि शाश्वत दृष्टिकोन आवश्यक आहे. चांगल्या शहरी नियोजनासाठी काही उपाय पुढीलप्रमाणे आहेत:

I. समावेशक आणि सहभागी नियोजन

१. **सार्वजनिक सहभाग:** नियोजन प्रक्रियेत नागरिक, भागधारक आणि समुदाय गटांना सहभागी करून घेणे आवश्यक आहे.
२. **सहयोगी प्रशासन:** सरकार, खाजगी क्षेत्र आणि नागरी समाज यांच्यातील भागीदारी वाढवाणे आवश्यक आहे.
३. **समावेशक झोनिंग:** मिश्र-वापर विकास, परवडणारी घरे आणि विविध जमिनीच्या वापरांना प्रोत्साहन देणे आवश्यक आहे.

II. शाश्वत आणि लवचिक डिझाइन

१. **पायाभूत सुविधा:** शहरी उष्ण बेटाचा प्रभाव कमी करण्यासाठी उद्याने, हिरवी छप्पर आणि हिरवीगार जागा समाविष्ट करणे आवश्यक आहे.
२. **चालण्यायोग्य आणि सायकल चालवण्यायोग्य:** सक्रिय वाहतुकीला प्रोत्साहन देण्यासाठी पादचाऱ्यांसाठी अनुकूल आणि सायकल चालवण्यायोग्य रस्ते डिझाइन केले पाहिजे.
३. **हवामान-लवचिक:** पूर संरक्षण आणि उष्णता कमी करणे यासारख्या हवामान लवचिक धोरणांचा समावेश केला पाहिजे.

III. कार्यक्षम आणि समतापूर्ण वाहतूक

१. **एकात्मिक सार्वजनिक वाहतूक:** कार्यक्षम, विश्वासार्ह आणि परवडणारी सार्वजनिक वाहतूक व्यवस्था विकसित करणे आवश्यक आहे.
२. **मोटार नसलेली वाहतूक:** चालणे, सायकलिंग आणि इतर मोटार नसलेली वाहतूक पद्धतींना प्रोत्साहन दिले पाहिजे.
३. **स्मार्ट ट्रॅफिक मॅनेजमेंट:** वाहतूक प्रवाह अनुकूल करण्यासाठी बुद्धिमान वाहतूक व्यवस्था लागू केली पाहिजे.

IV. परवडणारी आणि सुलभ गृहनिर्माण

१. **समावेशक गृहनिर्माण धोरणे:** समावेशक झोनिंगसारख्या परवडणाऱ्या गृहनिर्माणांना प्रोत्साहन देण्यासाठी धोरणे लागू करणे आवश्यक आहे.
२. **मिश्र-उत्पन्न विकास:** सामाजिक विविधतेला प्रोत्साहन देण्यासाठी मिश्र-उत्पन्न विकासाला प्रोत्साहन देणे आवश्यक आहे.
३. **सुलभ गृहनिर्माण:** अपंग लोकांसाठी घरे सुलभ आणि अनुकूलनीय आहेत याची खात्री करणे आवश्यक आहे.

V. नाविन्यपूर्ण आणि तांत्रिक उपाय

१. **स्मार्ट सिटी तंत्रज्ञान:** शहरी नियोजन वाढविण्यासाठी आयओटी, डेटा विश्लेषण आणि एआय सारख्या तंत्रज्ञानाचा वापर केला पाहिजे.
२. **शहरी डेटा प्लॅटफॉर्म:** शहरी कामगिरीचा मागोवा घेण्यासाठी, प्रगतीचे निरीक्षण करण्यासाठी आणि निर्णय घेण्याची माहिती देण्यासाठी डेटा प्लॅटफॉर्म विकसित करणे आवश्यक आहे.
३. **इनोव्हेशन जिल्हे:** उद्योजकता, नवोपक्रम आणि आर्थिक वाढीला चालना देण्यासाठी नवोपक्रम जिल्हे तयार करणे आवश्यक आहे.

VI. प्रभावी प्रशासन आणि संस्थात्मक चौकट

१. **मजबूत संस्थात्मक चौकट:** सरकारी संस्थांमध्ये स्पष्ट भूमिका, जबाबदाऱ्या आणि समन्वय यंत्रणा स्थापित करणे आवश्यक आहे.
२. **क्षमता बांधणी:** शहरी नियोजक, धोरणकर्ते आणि इतर भागधारकांसाठी क्षमता बांधणी आणि प्रशिक्षणात गुंतवणूक केली पाहिजे.
३. **पारदर्शकता आणि जबाबदारी:** शहरी नियोजन आणि निर्णय प्रक्रियेत पारदर्शकता आणि जबाबदारी सुनिश्चित करणे आवश्यक आहे.

आनंदी आणि शाश्वत शहर तयार करण्यासाठी बहुआयामी दृष्टीकोन आवश्यक आहे ज्यामध्ये नागरिक, सरकारी संस्था, व्यवसाय आणि समुदाय संस्थांसह विविध भागधारकांचा समावेश आहे. वरील उपाययोजनांची अंमलबजावणी करून, शहरे त्यांच्या नागरिकांसाठी अधिक समावेशक, शाश्वत, लवचिक आणि राहण्यायोग्य वातावरण निर्माण करू शकतात. वरील आव्हानांना सामोरे जाण्यासाठी प्रत्येक शहराच्या विशिष्ट गरजा आणि संदर्भ लक्षात घेऊन शहरी नियोजनासाठी एक व्यापक, समावेशक आणि शाश्वत दृष्टीकोन आवश्यक आहे.

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“Unlocking Gis In Urban Planning Benefits, Application”

Shri. Sanjay Saoji

Deputy Director Town Planning (Retd)

Why is GIS Important in Urban Planning?

The pace of urbanization is speeding up in India with an expectation of better facilities and living conditions. Ministry of Urban Development (MoUD) initiated the much laudable national programme for urban India – ‘Smart Cities’, to match the pace of urbanization and further drive economic development. Smart planning, transparency in governance, smart energy, smart infrastructure, smart buildings, smart security, public safety, smart traffic management, smart waste disposal and smart service delivery mechanisms are some of the key components of any smart city. Geographic Information System (GIS) integrates all aspects of city planning and management providing a common operating picture to all. The geographic information system (GIS) offers advanced and user-friendly capabilities for urban planning. Geographic Information Systems (GIS) is a technology that captures, stores, analyzes and visualizes spatial data that has become indispensable in the urban planning toolkit. While initially used for plotting “hard” data, the recent application of GIS in urban planning has extended even into community engagement. There are different dynamic role of GIS in planning, its far-reaching benefits, and a variety of spheres where spatial data enables planners to create smarter, more sustainable, and inclusive cities. Urban planning is all about spaces, and GIS combines geographical features with a wealth of information about these places to reveal patterns, relationships, and trends. That’s why GIS enables planners to truly understand the needs of the city. This technology goes beyond stacking maps on top of each other. It’s a dynamic decision-making tool for urban planners.

Urban Planning is about places. Whether you are trying to understand the current build-up of a certain area or prepare a proposal for the city’s future development, GIS is a perfect system to work in. You can analyze information about the city’s current state, land-use pattern, environmental issues, and residents’ attitudes in one single system. It allows for incorporating spatial data into their decision-making processes, resulting in more informed choices. Determining suitable areas for development, optimizing transportation networks, or assessing environmental impacts, GIS is the key to unlocking actionable insights about spaces. Geographic information systems (GIS) are important in urban planning because they help planners understand the needs of a city and develop plans to meet those needs. GIS can be used to analyze data from satellite images, aerial photography, and remote sensors. This data can help planners make decisions about transportation, infrastructure, and development

BENEFITS OF GIS FOR URBAN PLANNING

1. Seamless data integration from various sources

GIS enables Planners to integrate diverse data sources seamlessly into one location-based system. In urban planning, this means combining geographical data with socio-economic, demographic, and environmental information, as well as engagement data that can get from community engagement platforms ie collecting and analyzing public opinion on planning. Such integrations enable complex spatial analysis, helping planners make sense of urban dynamics. GIS can be used to analyze mobility patterns and identify areas for improvement based

2. Easier communication & collaboration

GIS conveys complex spatial information through visual maps and graphics. Visual representations are more accessible and comprehensible to a wider audience, including non-experts. What's more, maps with layered information can be used to tell a story when communicating with residents about upcoming plans and asking for their feedback. This way, planning becomes more transparent and approachable. A related benefit is that GIS can be accessed remotely, enabling planners to collaborate with colleagues, experts, and community members regardless of their physical location. Collaboration becomes more streamlined when the data is shared across the teams and is available in the same format.

3. More efficient decision-making

Decisions that planners make have far-reaching consequences for communities. Data and community-centricity must be at the heart of the decision-making process and GIS excels in providing evidence-based insights. By combining various sources of data (especially community-sourced Public Participation GIS or PPGIS), visualizing it on maps, and modeling the consequences of their decisions, Planners can better understand the impact of their decisions.

4. Enhance engagement and co-creation

Community involvement has become an essential process for urban planning throughout its stages: starting from data-collection to proposal evaluation to project maintenance feedback. GIS enables planners to collect resident and stakeholder feedback, experiences, and ideas in a location-based format. This way, planners can treat engagement data as one of their GIS layers without spending days on data cleaning and formatting. Planners can create digital map-based on these surveys.

GIS APPLICATION IN URBAN PLANNING

a) Site Selection & Land Acquisition:

GIS can combine and integrate different types of information to help making better decisions and also provides high quality visualization tools that can improve the understanding and enhance decision making capability w.r.t to site identification, valuation and finally selection. By analyzing location data – proximity to road network, fertility of soil, land use, soil bearing capacity, ground water depth, and vulnerability to disasters such as floods, earthquakes - the real estate organizations can arrive at the right property valuation. By analyzing, mapping, and modeling the merits of one site or location over another can be evaluated. In addition, this can also be used for arriving at appropriate market linked compensation to owners based on valuation parameters and in rehabilitation and resettlement planning.

b) Land use planning and management:

GIS plays a pivotal role in land use planning and zoning. By exploring existing infrastructure, environmental constraints, and population density within the same interface, planners can make informed decisions about where to allocate resources for development. GIS can help planners to analyze and visualize data, as well as probe their drafts to meet the needs of all businesses and residents alike. In this way GIS useful for spatial distribution of land use and zoning , Determining future developments , Analyzing land use trends and distribution etc. GIS considerably simplifies territorial planning operating analyzing necessary data concerning their spatial relationship that allows carrying out complex assessment of the situation and creates a basis for adoption of more exact and scientifically reasonable decisions in the course of land use. To assess the current land use situation and the possibility of modeling possible future changes associated with complex of adopted measures - GIS allows the integration of diverse spatial data, for example, data about soils, climate, vegetation, and other and also to visualize available information in the form of maps, graphs or charts, 3D models. For the purposes of land use- GIS allow using data of remote sensing, which allows to make monitoring of anthropogenic influence in a particular area and estimate scales and rates of degradation of green cover, flora and fauna. Assessment of land use can be made in complex or component wise, indicating the test sites depending on the goals. GIS make it easy to model spatial distribution of various types of pollution of stationary and mobile sources in soil, atmosphere and the hydrological network. Based on results of the analysis made by GIS choose the optimal solutions of land use that provide the minimum impact on environment, make optimal decisions of conflict associated with land use and control of

their using. One of the major advantages of using GIS is possibility of the complex analysis in concrete existential aspect. Analytical opportunities of GIS define conditionality of spatial distribution of objects and interrelation communication between them.

c) Spatial planning, analysis & modeling

Spatial analysis refers to studying entities by examining, assessing, evaluating, and modeling spatial data features such as locations, attributes, and relationships that reveal data's geometric or geographic properties. It uses a variety of computational models, analytical techniques, and algorithmic approaches to assimilate geographic information and define its suitability for a target system. With GIS, planners can perform complex calculations and modeling. For example, they can analyze the accessibility of all public amenities/ facilities to underserved communities or assess the impact of a new development on property values. GIS is also integral to managing and optimizing various systems, including traffic management, energy distribution, and waste management. GIS in spatial planning can used for Analyzing urban spaces, Modeling future scenarios, Operating smart city systems and so on.

d) Infrastructure and transportation planning

The use of GIS for transportation applications is widespread. Typical applications include highway maintenance, traffic modelling, accident analysis, and route planning and environmental assessment of road schemes. A fundamental requirement for most transportation GIS is a structured road network. GIS is indispensable in optimizing transportation and mobility networks. Especially in the context of net-zero goals, making transportation sustainable and beneficial for well-being comes as one of the solutions. Planners can use GIS to analyze traffic patterns, plan routes for public transportation, and identify areas prone to congestion. GIS for transportation planning can used for Asset management, Planning and optimizing transportation routes, Walkability studies, Developing supporting infrastructure, Waste management, Mobility and traffic analysis, Improving accessibility. The application of GIS has relevance to transportation due to the essentially spatially distributed nature of transportation related data, and the need for various types of network level analysis, statistical analysis and spatial analysis and manipulation. Most transportation impacts are spatial. At GIS platform, the transport network database is generally extended by integrating many sets of its attribute and spatial data through its linear referencing system. Moreover, GIS will facilitate integration of all other socio-economic data with transport network database for wide variety of planning functions.

e) Resilience planning

Environmental considerations are at the heart of modern urban planning. GIS aids planners in conducting environmental impact assessments, managing green spaces, and empowering resilience within the communities. GIS in resilience planning can used for economic restoration, assessing and improving conservation actions, mapping biodiversity, analyzing and acting upon community feedback. Geographic information systems (GIS) can help with resilience land use planning by providing data and tools to evaluate the environmental impact of land use decisions. This information helps planners make decisions that balance development with environmental protection. GIS can help with resilience land use planning for assessing Environmental impact assessment, developments on natural resources, wildlife habitats, and ecosystems. GIS can also help planners identify suitable areas for development, conservation, and agriculture. GIS can help planners model and simulate the future land use changes and their effects on the natural and human systems. GIS can help planners identify vulnerable areas and develop evacuation routes and emergency response systems. GIS can help planners make complex data accessible, contributing to more sustainable planning processes.

f) Community engagement & communication

Effective community engagement is essential for shaping spaces that reflect a community's diverse needs. When thoughtfully integrated as a core part of the planning and design process, it is consistently proven to strengthen public trust and yield more successful outcomes.

Community includes not only key stakeholders but anyone with legitimate interest in the site, city, or region being planned. *Community* often refers broadly to an area's residents, workers, visitors, and general public—and *public engagement* also works in these cases. *Community* can sometimes refer to a portion of the

public, like citizens (in *citizen engagement*), or even project-specific groups, like public transit users or university students. *Stakeholders* or *key stakeholders* likewise bring different perspectives to the planning process. They are usually select community members, like decision-makers, interest groups, and community leaders. Focused stakeholder engagement often goes hand-in-hand with broader community engagement. *Engagement*, like *participation*, aims to sufficiently represent a broad range of people and groups in a decision-making process. Bringing spatiality into digital community engagement enables planners not only to reach previously excluded groups but also to locate their experiences and ideas in a physical space. GIS for community engagement can be used for Pre-planning data collection, Walkability study, Community mapping, Perceived safety study, Needs Assessment, Project feedback collection, Public hearing, Voting and budget allocation.

The future of GIS in urban planning is even more exciting. The integration of AI will advance predictive modeling and potentially, enable better real-time data gathering and analysis. All in all, smart cities already rely heavily on GIS technologies, from planning and analysis to communicating with locals. As GIS continues to evolve, it will play an even more prominent role in shaping the built environment and our lives.



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“वाहतूक, परिवहन समस्या व समाधान”

श्री. संजय व. बारई

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सचिव, आय.टी.पी.आय.,एम.आर.सी., नागपूर.

महाराष्ट्र हे भारतातील दुसऱ्या क्रमांकाचे सर्वाधिक लोकसंख्या असलेले राज्य आहे, हे भारतातील दुसरे सर्वात दाट लोकसंख्या असलेले राज्य देखील आहे. महाराष्ट्र हे देशातील तिसऱ्या क्रमांकाचे शहरीकरण असलेले राज्य आहे. शहरी लोकसंख्या ही एकूण लोकसंख्येच्या ४५.२३ टक्के आहे. भारताची जनगणना २०११ नुसार राज्याची एकूण लोकसंख्या ११,२३,७२,९७२ आहे. २०२१ मध्ये महाराष्ट्राची लोकसंख्या अंदाजे १२९,८७७,५४१ होती. मागील वर्षाच्या तुलनेत जवळपास १,४१०,६२० लोकांची ही वाढ झाली आहे.

महाराष्ट्र परिवहन पायाभूत सुविधा - आरटीओ, २०१६ नुसार महाराष्ट्रातील दशलक्षाहून अधिक शहरांमधील वाहनांची लोकसंख्या पुणे जिल्ह्यात प्रति हजार व्यक्तींच्या वाहनांचे जास्तीत जास्त प्रमाण आहे म्हणजेच ३९७, त्यानंतर नागपूर-३३७, कोल्हापूर-२३०, रायगड-२२३, ठाणे-२२२, मुंबई शहर-२१५, नाशिक-२१४, अहमदनगर-२११ आणि सांगली-२०४.

राज्य परिवहन विभागाने सामायिक केलेल्या आकडेवारीनुसार, २०१९ मधील १९.२३ लाखांच्या तुलनेत २०२२ मध्ये महाराष्ट्रात किमान २३.७४ लाख वाहनांची नोंदणी झाली असून नोंदणीत २३.४६ टक्क्यांनी वाढ झाली आहे, तर २०२३ मध्ये महाराष्ट्रात २५,६३,४९१ नवीन वाहनांची नोंदणी झाली, मागील वर्षी २३,७४,५९१ वाहनांची नोंदणी झाली होती, जी ७.९१ टक्क्यांनी वाढली आहे. विशेष म्हणजे, गेल्या वर्षी नोंदणी झालेल्या नवीन वाहनांपैकी जवळपास १७.६१ लाख दुचाकी वाहने असल्याचे आकडेवारीवरून समोर आले आहे.

२०२३ मध्ये २५ लाखांहून अधिक नवीन वाहने महाराष्ट्राच्या रस्त्यांवर आली आणि डिजिटल नोंदणीकृत वाहनांची संख्या ३.५८ कोटी आहे.

महाराष्ट्रातील मोटारीकरणाचा कल :

१ मार्च, १९७१ रोजी महाराष्ट्र राज्यात एकूण नोंदणीकृत मोटार वाहनांची संख्या ३,०७,०३० वरून १ मार्च, २०१६ पर्यंत २,७८,६९,८६६ पर्यंत वाढली. एकूण वाहनांच्या लोकसंख्येमध्ये मागील ४५ वर्षांत सुमारे ७७% वाढ दिसून आली. १ मार्च, १९७१ मध्ये दुचाकींचा वाटा २८.२५% वरून वाढून २०१६ मध्ये ७३.०४% झाला आहे, तर कार, जीप आणि टॅक्सीचा भाग अनुक्रमे ४४.५५% वरून १४.९९ % वर घसरला आहे तर शेअर बसेस २.९३% वरून ०.४७% पर्यंत खाली आल्या आहेत. एकंदरीत वाढीच्या दृष्टीने १ जानेवारी २०१८ रोजी २०१७ या वर्षाच्या तुलनेत एकूण वाहनांमध्ये ७.६% इतकी वाढ झाली आहे.

२०२३ मध्ये भारतातील उपलब्ध असलेल्या सर्वात अलीकडील डेटानुसार, महाराष्ट्रात नोंदणीकृत वाहनांची संख्या सर्वाधिक आहे, ज्याची एकूण संख्या ३० दशलक्ष ओलांडली आहे. विविध वाहन श्रेणींमध्ये खालीलप्रमाणे नोंदणीकृत वाहने आहेत.

१. दुचाकी (मोटरसायकल आणि स्कूटर) : महाराष्ट्रातील बहुतांश नोंदणीकृत वाहने ही दुचाकी आहेत, जी एकूण वाहनसंख्येच्या सुमारे ६५-७०% आहेत.
२. कार (चारचाकी) : एकूण वाहनांपैकी सुमारे २०-२५% कार आहेत.
३. बसेस आणि व्यावसायिक वाहने : यांचा वाटा अंदाजे ५-१०% आहे.

४. ट्रक आणि लॉरी : अवजड मालाच्या वाहनांची देखील लक्षणीय उपस्थिती आहे, जे सुमारे ५% आहेत.
५. इतर वाहने : यामध्ये ऑटो-रिक्षा, टेम्पो आणि इलेक्ट्रिक वाहने यासारख्या इतर श्रेणींचे मिश्रण समाविष्ट आहे.

वाहतूक :

वाहतूक म्हणजे काय तर रस्ते, वाहने, गाड्या, विमान, जहाजे इत्यादी रीतींचा वापर करून एका ठिकाणाहून दुस-या ठिकाणी जाणे. एकात्मिक वाहतूकीमध्ये वापरकर्त्यासाठी वेळ, किंमत, आराम, सुरक्षा, प्रवेश योग्यता आणि सोयीच्या दृष्टीने जास्तीत जास्त सुलभता आणि कार्यक्षमता वाढविण्यासाठी वाहतुकीच्या वेगवेगळ्या पद्धती समाविष्ट करणे आवश्यक आहे.

लोकसंख्येची वाढ, विशेषतः शहरांमध्ये, विकासासाठी आणि वाहतुकीची मागणी या दोहोंवर परिणाम होत आहे आणि विद्यमान वाहतुकीच्या जाळ्यावर वाढते ओझे आहे. आता आणि भविष्यात आमच्या समुदायाच्या गरजा विचारात घेता, आम्हाला स्मार्ट, एकात्मिक आणि सक्षम वाहतूक प्रदान करण्याची आवश्यकता आहे.

स्थानिक आणि मोक्याच्या ठिकाणी रस्त्याचे जाळे, महामार्ग सुरक्षितता आणि पर्यावरणावर विकासाचा महत्वपूर्ण परिणाम होऊ शकतो. याकरीता, विभागवार अनेक रणनीती, तंत्रज्ञान, मॉडेल्स आणि सिम्युलेशन तयार करणे आवश्यक झाले आहे. ज्यामुळे लोकांना कार्यक्षमतेने, सुरक्षितपणे आणि कमी उर्जा वापरण्यात मदत होईल.

परिवहन :

परिवहन नियोजन, अभियांत्रिकी सल्ला आणि सेवा, मास्टर-प्लॅनिंग पासून, व्याप्तीपर्यंतच्या सेवा आणि एकात्मिक परिवहन प्रणाली आणि प्रवासाच्या योजनांचा व्यवहार्य अभ्यास आणि सुधारणांच्या योजनांचे डिझाइन करण्यापर्यंत अनेक प्रकारच्या परिवहन नियोजन आणि अभियांत्रिकी सल्ला आणि सेवा प्रदान केली जाते.

योग्य पर्याय विकसित करण्यासाठी आणि सल्लामसलत करण्यासाठी नियोजक, विकसक, अभियंता, आर्किटेक्ट आणि ऑपरेटर यांचे सह कार्य करणे, यात प्रारंभिक संकल्पना टप्प्यापासून डिझाइन आणि अंमलबजावणीपर्यंत सर्व टप्प्यांना योजनांमध्ये सामील करणे आवश्यक आहे.

प्रकल्पाची व्यवहार्यता दर्शविण्यासाठी पर्यायाने संबंधित जागेची विकास क्षमता वाढविण्यासाठी ट्रान्सपोर्टच्या समस्या सोडवणे ब-याच वेळा गंभीर असते. रस्त्यांचे जाळे व चौकांचे सक्षमीकरण/ सुधारणा यांचा प्रकल्पांमध्ये तातडीने सहभाग, योजनेच्या रचनेवर प्रभाव टाकण्यास सक्षम करतो आणि व्यावसायिक लक्ष केंद्रीत करण्यास मदत करतो. ज्यामुळे गर्दी कमी होते, कार्बन उत्सर्जन कमी होते आणि सुरक्षितता सुधारते.

वाहतूक कोंडी :

वाहतूक कोंडी ही ५० च्या दशकापासून शहरी रस्ते नेटवर्कवरील रहदारीची वाढती समस्या बनली आहे. जेव्हा रहदारीची मागणी इतकी मोठी असेल, तेव्हा वाहनांमधील परस्पर संवादांमुळे वाहतुकीचा वेग कमी होतो, याचा परिणाम वाहतूक कोंडी होवून काही प्रमाणात वाहतूक संथ होते. मुंबई, पुणे आणि नागपूर सारख्या शहरांमध्ये विशेषतः पीक अवसर्मध्ये, जलद शहरीकरण आणि रस्त्यांच्या अपुन्या पायाभूत सुविधांमुळे तीव्र वाहतूक कोंडी होते.

जादा रहदारीच्या रस्त्याच्या क्षमतेकडे किंवा रस्त्याच्या कडेला असलेल्या चौकांच्या जवळ येताच, अत्याधिक रहदारीची कोंडी होते. काही काळासाठी वाहने पूर्णपणे थांबविली जातात, त्यास ट्रॅफिक जाम किंवा ट्रॅफिक स्नॅल-अप म्हणून ओळखले जाते. वाहतुकीची कोंडी झाल्यामुळे वाहनचालक निराश होऊ शकतात आणि रस्त्याच्या कोंदणात अडकतात.

महाराष्ट्रातील वैयक्तिक मोटार वाहनांची संख्या झपाट्याने वाढत आहे, परिणामी वाहतुकीची कोंडी आणि वाढती प्रदूषण पातळी, वेळेचा अपव्यय इत्यादी शहरी भागातील समस्या असून वाहने बरीच जागा वापरत असल्याने पार्किंगसुद्धा मोठी समस्या बनली आहे.

रहदारीची कोंडी कमी करण्यासाठी सर्वसाधारणपणे काही उपाय सूचवावेसे वाटतात ते पुढील प्रमाणे आहेत.

❖ **तात्काळ व काहीही खर्च न करता करावयाची उपाययोजना**

- मुख्य रस्त्यांवरील सिग्नल सिंक्रोनाईज करणे आवश्यक आहे, जेणेकरून एकदा एका बिंदूपासून वाहतूक सुरू झाली असता, प्रत्येक सिग्नलवर थांबू नये. यामुळे गर्दी कमी करण्यास मदत होऊ शकते.
- प्रत्येक सिग्नलवर डावीकडून वळा नेहमीच खुले असावे. जेणेकरून, सिग्नलवर डावीकडे जाणारी रहदारी थांबविली जाणार नाही आणि कोणतीही कोंडी होणार नाही.
- विद्यमान रस्त्यांच्या रुंदीचा परिपूर्ण वापर करणे.
- रस्त्याच्या कडेला पार्किंग (Road Side Parking) करण्याची परवानगी देऊ नये. ग्राहक/पर्यटकांच्या पार्किंगसाठी केवळ संबंधित व्यावसायिक संकुल किंवा सोसायटीच्या आवारातच परवानगी असावी.
- शहर बसस्थानक बहुतेक रस्त्यांच्या डाव्या बाजूला आहेत. म्हणून सिटी बस फक्त रस्त्याच्या डाव्या बाजूने चालवाव्यात. यामुळे वाहतुकीस किमान अडथळा निर्माण होऊ शकतो.
- मोटार सायकल आणि ऑटो रिक्शा मध्यम लेनवरून चालविली जाणे आवश्यक आहे. रहदारीतून कार व इतर वाहनांसाठी अत्यंत उजवीकडील बाजूची लेन वापरली जावी.
- शाळांची वेळ अनुक्रमे सकाळी ७ किंवा ८ वा., अशासकीय / खाजगी कार्यालये सकाळी ९ वा. आणि शासकीय कार्यालये सकाळी १० वाजता असावी. संध्याकाळीही सकाळच्या वेळेनुसार बदल होतील. यामुळे गर्दी कमी होण्यास निश्चितच मदत होऊ शकेल.
- सार्वजनिक वाहतुकीचा जास्तीत जास्त वापर करणे आवश्यक आहे.
- कारपूलिंगला प्रोत्साहन देणे आणि राइड-शेअरिंग प्लॅटफॉर्मचा वापर केल्याने रस्त्यावरील वाहनांची संख्या कमी होऊ शकते, ज्यामुळे गर्दी कमी होवू शकेल.
- विद्यमान रस्ता रहदारी कायद्याची कठोर अंमलबजावणी आवश्यक आहे.

❖ **किमान खर्चात करावयाची उपाययोजना**

- लोकांना वाहतूक नियम, रस्ता सुरक्षा आणि जबाबदारीने वाहन चालवण्याबद्दल शिक्षित करण्याच्या मोहिमांमुळे अपघात कमी होण्यास आणि वाहन चालवण्याच्या चांगल्या वर्तनास प्रोत्साहन मिळू शकते.
- इंटेलिजेंट ट्रान्सपोर्ट सिस्टमचा वापर.
- रस्ता वापरकर्त्यांना सल्ला देण्यासाठी रेडिओ, जीपीएस, नॅव्हिगेशन सिस्टम, स्वयंचलित रहदारी आणि मोबाइल ॲप्स चा वापर करण्यावर भर देणे आवश्यक आहे.
- रस्ते वापरकर्त्यांस सल्ले देण्यासाठी व्हेरिएबल, मेसेज, चिन्हे इ. रोडवेवर स्थापित करण्यात यावी.
- पार्किंग मार्गदर्शन आणि वाहनतळांना पार्किंगसाठी डायनॅमिक सल्ला देणारी माहिती प्रणालीचा वापर.
- सर्व बीआरटी मार्गांमध्ये सातत्य नसते, त्यामुळे सिटी बस ह्या कधी मधे तर कधी कडेनी जात असल्याने संपूर्ण रहदारी नेहमी विस्कळित होत असते. त्यामुळे असे बीआरटी मार्ग बंद करणे आवश्यक आहे.
- बीआरटी मार्गांमध्ये प्रवाशांना सुरक्षिततेची खबरदारी नसते. बसमधून उतरल्यानंतर रस्ता क्रॉस करणे म्हणजे जीव मुठीत घेवूनच करावा लागतो याकडे लक्ष पुरविणे आवश्यक आहे.
- बीआरटी मार्गांच्या संकेतांमुळे वाहतुकीची कोंडी होते. बीआरटी मार्ग सिग्नल नेहमीच लोकांना गोंधळात टाकतात.
- वाहतूक जनजागृती अभियान वेळोवेळी आयोजित केले जाणे आवश्यक आहे. वर्तमानपत्रांद्वारे प्रत्येक घरात रहदारीच्या नियमांचे पत्रके वाटप केले जाणे आवश्यक आहे.
- मुख्य रस्त्यांवर मुळात स्पीड ब्रेकर नसावेत. स्पीड ब्रेकरची संख्या अत्यंत कमी असावी. स्पीड ब्रेकर हे मुख्य रस्त्यांऐवजी अंतर्गत रस्ते / जोड रस्त्यावर देणे जादा संयुक्तिक होईल.

❖ दिर्घकालीन करावयाची उपाययोजना

- पादचारी-अनुकूल रस्ते डिझाइन करणे, योग्य पायवाट, ओव्हरपास आणि पादचारी सिग्नलसह, पायी प्रवाशांसाठी सुरक्षित प्रवास सुनिश्चित करेल.
- मिश्र-वापर विकासाची अंमलबजावणी करणे आणि निवासी, व्यावसायिक आणि औद्योगिक क्षेत्रांमधील कनेक्टिव्हिटी सुधारणे दीर्घ प्रवासाची गरज कमी करू शकते.
- वाहतूक व्यवस्थांचे एकीकरण: वाहतूकीच्या विविध पद्धती (उदा. बस, ट्रेन आणि मेट्रो) यांच्यात अखंड एकीकरण केल्याने प्रवास करणे सोपे आणि अधिक कार्यक्षम होईल.
- मुख्य रस्त्यांवरील पदपथांची रुंदी कमी करणे आणि रस्ते रुंदीकरण करणे.
- पदपथांवर अतिक्रमण करण्यास परवानगी नाही. मात्र पदपथांवर सतत होणारे अतिक्रमण थांबवणेबाबत नियमित कारवाई करणे आवश्यक आहे.
- रहिवासी / व्यावसायिक पार्किंग झोन वाढविण्यात यावेत.
- दररोज बीआरटी मार्गावर एकतरी वाहन ब्रेकडाउन झालेले असते यामुळे तासंतास वाहनांची गर्दी होते. त्यामुळे बीआरटी मार्गावरील सर्व रस्ता दुभाजक काढले जाणे आवश्यक असून लवचिक रस्ता दुभाजक वापरले जावेत. जेणेकरून ब्रेकडाउन अथवा अपघातजन्य परिस्थितीमध्ये संपूर्ण वाहतूक दुस-या लगतच्या रस्त्यापासून वळविणे शक्य होवून गर्दी टाळण्यास मदत होईल.
- सार्वजनिक बसेसची सतत देखभाल व दुरुस्ती आवश्यक असून त्या नेहमी स्वच्छ व निटनेटक्या ठेवणे आणि बस सेवा सुधारणे आवश्यक आहे.
- लवचिक दुभाजकांचा वापर गर्दीच्या वेळी जास्त रहदारीच्या मार्गावरील गर्दी कमी करण्यास मदत करू शकेल.

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લલીત લેખન



“माणसातला देव”

श्रीमती माधुरी जामखेडकर

अधिक्षक , मुख्य कार्यालय, पुणे.

आपण शहरात राहाणारी लोकं झापड लावलेलं, साचेबद्ध गुळगुळीत आयुष्य जगतो. यातून सुटका म्हणून आपण अधूनमधून वेगवेगळी गावं, प्रदेश, देश पाहायला, भटकंतीला जातो. काठाकाठाने पोहोत जमेल तेवढा नावीन्याचा आस्वाद घेतो आणि नेहमीपेक्षा काहीतरी वेगळं अनुभवलं या भ्रमात न्हाऊन निघतो. यामुळे नवीन ठिकाणं पाहायला मिळाल्याचं समाधान तर मिळवतो पण या नवीन ठिकाणी राहाणारी खरीखुरी माणसं, त्यांच्यात झुळझुळणारे माणुसकीचे झरे मिळतात का अनुभवायला? माझं भाग्य म्हणून अशा माणुसकीच्या झऱ्यामध्ये मला चिंब भिजून जायला मिळालं. त्याचीच ही लेखमाला. नव्हे अनुभवमाला. माणसातलं देवपण तुमच्यापर्यंत पोहोचविण्याचा माझा एक छोटासा प्रयत्न. आशा आहे या झऱ्यातील निर्मळ पाण्यात तुम्ही देखिल चिंब व्हाल.

आपल्या आयुष्यात फार काही रोमहर्षक, चित्तथरारक घडत नाही याचं कालपर्यंत फार वैषम्य वाटायचं मला. वाटायचं किती हे सरधोपट जीवन. त्यात काही खाचखळगे नाहीत, चढउतार नाहीत. सगळं कस एकसुरी. माझं हे वाटणं, त्या अज्ञात शक्तीकडून इतकं मनावर घेतलं जाईल आणि आजपर्यंत न अनुभवलेले सगळे थरार अनुभवायला मिळतील असं मात्र अजिबात वाटलं नव्हतं.

रत्नागिरी जिल्ह्यातील आणि गुहागर तालुक्यातील समुद्रकिनारी वसलेलं वेळणेश्वर हे माझ्या माहेरचं नितांतसुंदर छोटंसं गाव. तिथून, जागृत देवस्थान म्हणून मान्यता पावलेला, नवसाला पावणारा हेदवीचा गणपती फक्त १० कि.मी. अंतरावर. समुद्रकिनारी मंदिरात वास करून असलेल्या शंकराला लघुरुद्र करून पुण्याला लगेच परत यायला निघायचं हा गेलं १५ वर्षांपासून चालत आलेला आमचा क्रम. यावर्षी देखिल श्रावण लागल्या लागल्या आई, वडिल आणि भावाच्या ४ जणांच्या कुटुंबासह आम्ही चौघं असे १० जण शनिवार दि.३ ऑगस्ट रोजी वेळणेश्वरला जायला निघालो.

शुक्रवारपासून पुण्यात पाऊस सुरू झाला होता आणि शनिवार रविवार २ दिवस कोकणासह सर्व ठिकाणी मुसळधार पावसाचा हवामान खात्याचा अंदाज होता. पूर्वानुभवामुळे हवामान खात्याचे असे अंदाज सामान्यतः ज्याप्रकारे आपण दुर्लक्षित करतो तसच करून दुसऱ्या दिवशी छान रिमझिमत्या पावसात आमचा कोकणाच्या दिशेने प्रवास सुरू झाला. कोयनानगरमार्गे कुंभार्ली घाटातून कोकणात चिपळूणला उतरलो. आता दरवर्षीप्रमाणे तिथून ५० कि.मी. वर असलेल्या गुहागरला जाऊन व्याडेश्वराचं दर्शन घ्यायचं आणि तिथून वेळणेश्वरला पोहोचायचं इतकं आमच्या मते सगळं साधं सोपं होतं. इथूनच कहानीमे ट्विस्ट सुरू झाला. मोडका आगार गावातून गुहागरला पोहोचायचं तर मोडका आगार मधला पूल गावाच्या नावाला सार्थ ठरवत खरच मोडला आहे आणि वेगळ्या बायपास मार्गे गुहागरला पोहोचायचं तर वाटते झाड पडल्यामुळे बायपासला जायला अजून अर्धा तासाचा जास्तीचा अवधी लागेल असं कळल्यामुळे गुहागरमध्ये जायचं रद्द करून आमच्या दोन्ही गाड्या मार्ग ताम्हाणी गावातून वेळणेश्वरला जाण्यासाठी त्या मार्गाला लागल्या. तोपर्यंत अंधार पडायला तासाचाच काय तो अवधी शिल्लक होता आणि आधी रिमझिम वाटणारा पाऊस मुसळधार रुप धारण करून आमची सोबत करायला तत्परतेने हजर होत होता.

कोकणाच एक वैशिष्ट्य आहे. कोकण भूमीवरून प्रवास करताना वाटेतली गाव वगळता मैलोनमैल तुम्हाला माणूस दिसत नाही. दिवसाउजेडी निदान एखाद्या ठिकाणी तरी तुम्हाला माणूस दिसेल. त्याला तुम्ही रस्ता विचारू शकालं. पण एकदा का अंधार पडला की निर्मनुष्य रस्ते, आजूबाजूची घनदाट झाडी आणि किर् अंधार तुम्हाला जणू गिळंकृत करून टाकायला धावून येत आहेत असं वाटतं राहातं. मार्ग ताम्हाणेवरून पुढे आल्यावर आम्हाला उजवीकडे जाणारा वेळणेश्वराचा फाटा

दिसला. पण काय बुद्धी झाली! वेळणेश्वरला जाण्याआधी त्याच्यापुढे १० कि.मी. वर असलेल्या हेदवी गावी जाऊन गणपतीचं दर्शन घेऊन मग उलट वेळणेश्वरला याव अस आम्ही ठरवलं. त्यासाठी वेळणेश्वरच्या फाटयाला न वळता सरळ रस्त्याने पुढे प्रवास सुरु केला आणि रस्ता साफ चुकलो. रस्ता भरकटल्यावर वाटेतल्या एका माणसाने सांगितल्याप्रमाणे हेदवीला जाऊन पोहोचण्यासाठी उजवीकडच्या एका कच्च्या रस्त्यावर वळलो. अर्धा कि.मी. पुढे गेलो तर झाड उन्मळून रस्त्यात आडव पडल्याने पुढचा मार्ग बंद झालेला. दोन्ही गाड्या तशाच उलट स्थितीत मागे घेत मुख्य रस्त्यावर आणल्या आणि त्या क्षणी तिथून पास होणाऱ्या एका दुचाकी स्वाराला रस्ता विचारला. तो बिचारा भला होता. त्याने आम्हाला पुढच्या मुख्य फाटयापर्यंत आणून पोहोचवलं आणि आता या फाटयावरून पुन्हा मागे जाऊन तुम्ही हेदवीला पोहोचाल याची खात्री दिली. त्याने दाखविलेल्या मार्गाने परत जाताना आमच्या लक्षात आलं की अशा प्रकारे रस्ता चुकून आम्ही हेदवीच्याही पुढे जवळ जवळ २२ कि.मी. जाऊन पार जिंदाल च्या प्रकल्पापर्यंत पोहोचलो होतो. त्या रस्त्याने परत जाताना आजपर्यंत न दिसलेला कोकणचा एक अत्यंत सुंदर समुद्रकिनारा नजरेस पडला. सततच्या पावसाने इथे समुद्राच्या गढूळ पाण्याने लालभडक रंग घेतला होता. मावळतीला टेकलेल्या सूर्यकिरणात सगळा समुद्र रक्तरंजित झाला आहे असा भास होत होता. अचानक नजरेस पडलेलं निसर्गाचं हे रूप मनात साठवत अर्ध्या तासात आम्ही हेदवीला जाऊन पोहोचलो. विघ्नहर्त्याचं दर्शन घेतलं आणि दरवर्षी संध्याकाळी ४ पर्यंत वेळणेश्वरला पोहोचणारे आम्ही ७.३० वाजता तिथे पोहोचलो. इथून पुढे आपल्याला काय काय अनुभवायला मिळणार आहे याची पुसटशी देखिल कल्पना तोपर्यंत नव्हती.

रविवारचा दिवस उजाडला. दरवर्षीप्रमाणे याहीवेळेस वेळणेश्वराच्या मंदिरात सकाळी ८ वाजता गुरुजींकडून लघुरुद्राला सुरुवात होईल आणि कार्यक्रम पार पडून नैवेद्याची जेवण उरकून दुपारी १ पर्यंत आपण वेळणेश्वर सोडू याची खात्री होती. पण पावसामुळे चिपळूणवरून येणारे गुरुजी वेळेत पोहोचले नाहीत आणि लघुरुद्र सुरु व्हायलाच १० वाजले. लघुरुद्र पार पडला आणि त्याक्षणी वेळणेश्वराला कोकणातल्या तुफान मुसळधार पावसाचा अभिषेक सुरु झाला. त्यामुळे आमच्या पुढच्या सगळ्या नियोजनाची पार वाट लागली.

घाईघाईत जेवण उरकली आणि २ ते २.३० च्या सुमारास परतीची वाट धरली. गुहागरवरून चिपळूणला जायचा रस्ता बंद असल्याने पुन्हा (यावेळी अजिबात रस्ता न चुकता) मार्ग ताऱ्हाणी मार्गे चिपळूण रस्त्याला लागलो. इथे एक गोष्ट आवर्जून सांगायची वाटते. आम्ही कोकणात यायला निघाल्यापासून माझा फेसबुक मित्र श्री.योगेश काटदरे माझ्या सतत संपर्कात होता. वेळणेश्वरवरून चिपळूणला जायला निघाल्यावर वाटेतल्या रस्त्यांचे ताजे अपडेट्स नकाशाद्वारे त्यानेच आम्हाला पुरवले. वाटेत ठिकठिकाणी नेटची रेंज नसल्याने ते आम्हाला अत्यंत उपयुक्त देखिल ठरले. चिपळूणला पोहोचल्यावर आम्ही आवर्जून त्याची भेट घेतली. चिपळूणला बाजारपेठेत पाणी शिरून शहरातला रस्ता बंदच होता आणि त्यातच चिपळूणवरून मुंबई आणि खेडी मार्गे पुणे अशा दोन्ही दिशांना जाणारे रस्ते अतिवृष्टीमुळे बंद झाल्याची बातमी चिपळूण पोलिसांनी देउन आमची गाडी अडवली. आम्ही सर्वजण २ दिवसांच्या प्रवासाच्या तयारीनेच निघाल्याने आणि बरोबरच्या सर्व मंडळींना दुसऱ्या दिवशी आपापल्या उद्योगांना जाणे अत्यावश्यक असल्याने या परिस्थितीत जो दुसरा मार्ग होता तो आम्ही पत्करला. गाड्या विरुद्ध दिशेने म्हणजे रत्नागिरीच्या दिशेने वळवल्या आणि मुंबई-गोवा महामार्गाने रत्नागिरीच्या अलिकडे ४० कि.मी. वर संगमेश्वर फाटयाला वळलो. तोपर्यंत सगळ्यांचीच मने निश्चित होती. मजेत आजूबाजूच्या हिरवाईचा, खळाळत्या पाण्याचा, मधूनच मुसळधार बरसणाऱ्या पर्जन्यसरींचा आस्वाद घेत वर्षासहल सुरु होती. संगमेश्वरवरून देवरुखला पोहोचलो. आणि साखरण्यावरून दोन्ही गाड्यांनी एकमेकींच्या साथीने अंबा घाट चढायला सुरुवात केली. तोपर्यंत संध्याकाळचे सहा-सव्वासहा वाजले होते. अंबा घाटात प्रवेश केला मात्र, ढगांमुळे २ फुटांवरचे देखिल काही दिसेना.

माणसाचं मन ही मोठी विचित्र गोष्ट आहे. एकाचवेळी त्यात अनेक वृत्ती वास करतात. देवत्वाबरोबर राक्षसी वृत्ती देखिल कमी अधिक प्रमाणात मनात नांदते आणि त्याचवेळी हे कमी म्हणून की काय मनातली भूतं त्याला सतत घाबरवून टाकतात. अंबा घाट जसजसा चढायला सुरुवात केली तसतसं आत्तापर्यंत आल्हाददायक वाटणाऱ्या आणि रोमांचकतेचा अनुभव देणाऱ्या निसर्गाने विक्राळ रूप धारण केलं. सतत बडबड करणाऱ्या मुली, आई-वडील एकदम शांत झाले. मी आणि आईने रामरक्षा, भीमरूपी, शिवस्तुतीसह आठवतील ती देवाची सगळी स्तोत्र म्हणायला सुरुवात केली. अगदी गीतेच्या १३ व्या

अध्यायाला देखिल सोडलं नाही. 😊 घाटाच्या रस्त्याचा अजिबातच अंदाज येत नव्हता. गाडीचे फॉग लाईट सुरु असुन देखिल एकही वळण नीट कळत नव्हत. खाली उतरलेल्या ढगांमुळे साडेसहा वाजताच घाटात पूर्ण अंधार झाला होता. तीव्र वळणांवर काही ठिकाणी असलेल्या रिफ्लेक्टर्सच्या मुळेच काय तो वळणांचा थोडाफार अंदाज येत होता. आमची गाडी पुढे होती आणि भावाची गाडी आमच्या मागून येत होती. घाटरस्त्यावर अनेक ठिकाणी वाहणारे धबधबे पार करत, अक्षरशः ढगांमधून तरंगत आमची गाडी एकदाची अंबा गावात पोहोचली आणि इतका वेळ कोंडलेले श्वास एकदाचे मोकळे झाले. सगळ्यांच्याच चेहऱ्यांवर जरा टवटवी आली. एका खूप मोठ्या परीक्षेतून पार पडल्यासारखी मनाची अवस्था झाली. त्या मनस्थितीत आमच्या पुन्हा हसत खेळत गप्पा गोष्टी सुरु झाल्या.

अंबा गावं सोडलं. आता मलकापूर मार्गे कराड फाटयावरून हायवेला लागायचं एवढच काय ते बाकी होतं. अंधार पूर्णपणे दाटून आला होता. तोपर्यंत अंबा घाटात विश्रांती घेतलेल्या पर्जन्यराजाने पूर्ण ताकदीनिशी कोसळायला सुरुवात केली होती. एका बाजूला सलग डोंगर, दुसऱ्या बाजूने पाण्याने भरलेली शेतां. पुण्यासारख्या शहरात जन्म घालवलेल्या आणि पुणेरी नाजूक पावसाची सवय असलेल्या आम्हा पुणेकरांना पावसाचे हे रूप भयचकित करून टाकणारं होतं. मलकापूरच्या अलिकडे ४ कि.मी. अंतरावर वाटेत रस्त्यावर पुढे पाणी आलेलं दिसलं. पाणी नक्की किती आहे याचा अजिबातच अंदाज येत नव्हता. मिस्टरांनी आमची डिझेल इरटीका गाडी रेझ करून त्या पाण्यात घातली मात्र, कोसळत्या पावसात, पाण्याखाली गेलेल्या त्या रस्त्यावर बरोबर मध्यभागी गाडी बंद पडली.

भर पाण्यात गाडी बंद पडल्यानंतर माझ्या नवऱ्याच्या चेहऱ्यावर दाटून आलेले असहायतेचे, हतबलतेचे भाव जे मी यापूर्वी २६ वर्षांच्या संसारात कधीच पाहिले नव्हते ते भाव मी जन्मात विसरणार नाही. यापूर्वी कधी संकटं आली नाहीत अशी परिस्थिती नव्हती. पण यावेळी गाडीमध्ये माझ्या दोघी मुली, वयोवृद्ध आई आणि वडील होते. चहुबाजूंनी काळोख गिळायला येत होता आणि भण्ण वाहणारा वारा आणि कोसळता पाऊस परिस्थितीला आणखी अवघड बनवत होता. कोठून काही मदत मिळण्याची सुतराम शक्यता नव्हती. गाडी बंद पडल्याच्या ताणापेक्षा आमच्या सुरक्षिततेच्या काळजीने मिस्टरांच्या चेहऱ्यावर दाटून आलेलं ते मळभं होतं. तोपर्यंत आमच्या मागे असलेल्या भावाने त्याची गाडी पाण्यात घातली मात्र, त्याची गाडी देखिल बंद पडण्याच्या आशंकेने हा ताण सहन न होऊन माझे वडिल जोरात ओरडले. कोणत्याही संकटाच्या प्रसंगी माझ्यातली सुप्त शक्ती जागृत होते आणि मला त्या प्रसंगाला खंबीरपणे तोंड द्यायचं बळ देते हा मला स्वतःबद्दल सार्थ अभिमान आहे. पण वडिलांच्या ओरडण्याचा आवाज ऐकला आणि या अभिमानाच्या चिंधड्या उडाल्या. माझ्या सर्वांगाचा थरकाप उडाला आणि थंडीपेक्षा भीतीने मी अक्षरशः कापू लागले. दरम्यान भावाची गाडी वाटेतलं ते पाणी पार करून पलिकडे जाऊन थांबली होती. थरथरणाऱ्या शरीराला कोसळत्या पावसातून आणि झोडपणाऱ्या वाऱ्यातून कसबस सावरत मी आणि नवऱ्याने मिळून गुडघाभर पाण्यातून ढकलत गाडी पलिकडे नेली. माझ्या शरीराचा कंप काही केल्या थांबेना. यावेळी माझ्या लेकी आणि भाची माझी आई झाल्या. मला दोन्ही बाजूंनी कवेत घेऊन आई / आत्या काही होणार नाही म्हणून मला धीर देऊ लागल्या.

बंद पडलेली गाडी सुरु करण्याचे सर्व प्रयत्न थोड्याच वेळात निष्फळ ठरले. माझा भाऊ, भावजय दोघजण कोसळत्या पावसात पुन्हा पुन्हा गाडी ढकलत होते, मिस्टर गाडी योग्य वेळेत उचलण्याचा प्रयत्न करीत होते आणि गाडी काही केल्या त्यांच्या प्रयत्नांना दाद देत नव्हती. थोड्याच वेळात आता काही गाडी सुरु होत नाही हे वास्तव स्वीकारण्यावाचून पर्याय उरला नाही. तो क्षण, ती वेळ, तो काळ खरोखरच असा होता की सर्वांचीच मती कुंठीत झाली होती. गाडी सुरु करण्याचे प्रयत्न सुरु असताना मी थरथरत्या हाताने १०० नंबर डायल करण्यास सुरुवात केली.

कंट्रोल रुमवरून फोन उचलला गेला. आम्ही कोणत्या परिस्थितीत अडकलो आहोत, माझ्याबरोबर चौघी तरुण मुली आणि वृद्ध आई वडिल आहेत आणि आम्हाला कोणतीही मदत मिळण्याची शक्यता नाही हे सांगितल्यावर मला पलिकडून शाहुवाडी पोलिस स्टेशनचा फोन नंबर दिला गेला. दुर्दैवाने हा नंबर बंद होता. पुन्हा १०० नंबरला फोन केला. यावेळी मात्र मला श्री.सावंत यांचा मोबाईल नंबर देण्यात आला आणि त्या क्रमांकावर संपर्क साधण्याबाबत सांगण्यात आलं. मी त्यांना फोन केला. सावंत साहेबांनी एकूण परिस्थितीचा अंदाज घेऊन शाहुवाडी पोलिस स्टेशनचे सहायक पोलिस अधीक्षक श्री.देशमुख यांना फोन केला. त्यानंतरच्या घटना वेगाने घडत गेल्या. १५ मिनीटांच्या आत सहायक पोलिस अधीक्षक श्री.देशमुख त्यांच्या सहकाऱ्यांसह दोन पेट्रोलिंग जीपमधून आमच्या मदतीला देवासारखे धावून आले. आमची बंद पडलेली इरटीगा चालू

करण्यासाठी पुन्हा एकदा प्रयत्न केला गेला जो अयशस्वीच ठरला. दोन्ही गाड्यांमध्ये मिळून आम्ही ७ बायका आणि ३ पुरुष आहोत, त्यात २ ज्येष्ठ नागरिक आहेत आणि या परिस्थितीत यावेळी कुठेतरी आसरा घेण्याखेरीज आम्हाला गत्यंतर नाही हे पाहून श्री.देशमुख यांनी सूत्र हाती घेतली. आमच्या मदतीसाठी धावलेल्या तेथील निळे गावचे रहिवासी श्री.रमेशभाऊ भोसले यांच्या घरी आजच्या रात्री तुम्हा सर्वांची राहाण्याची सोय केली जाईल हे श्री.देशमुखांनी आम्हाला सांगितलं. रमेशभाऊंचे घर या ठिकाणापासून १ कि.मी. पुढे भोसलेवाडीमध्ये डोंगर उतारावर होतं. त्या ठिकाणी पोहोचण्यासाठी भावाने त्याची गाडी सुरु केली पण ती देखिल चालू होत नसल्याचं लक्षात आलं. अखेर दोन्ही गाड्या तिथेच रस्त्याच्या कडेला उभ्या करुन दोन्ही पोलिस व्हॅननी आम्हा १० जणांना त्या ठिकाणी डोंगराच्या पायथ्यापाशी सोडलं. तिथली परिस्थिती अजूनच गंभीर होती. त्या जागेपासून थोड्याच अंतरावर पुढे रस्त्यावर जवळजवळ ५ फूट पाणी साठल होतं आणि त्या पाण्यातून पुढे जाऊ शकत नसल्याने रस्त्याच्या कडेला १० ते १५ ट्रक्सची रांग लागलेली होती. रस्त्याच्या कडेला एक खोपटं होतं ज्यात २-३ माणसं पिऊन तर्रं होती.

माझ्या आईच्या दोन्ही गुडघ्यांची ऑपरेशन्स झाली असल्याने ती डोंगर चढून वर येऊ शकत नव्हती. या परिस्थितीत आई आणि तिच्याबरोबर एकाने डोंगर पायथ्याशी असलेल्या एका बंद घरात रात्री मुक्कम करावा व बाकीच्यांनी वर रमेशभाऊंच्या घरी राहावं अशी सूचना रमेशभाऊंनी केली. पण आईने त्यास साफ नकार दिला आणि सर्वांबरोबर डोंगर चढून वर येण्याची तयारी दर्शविली. रमेशभाऊ आणि आणखी एकानी आईला दोन्ही बाजूंनी आधार दिला आणि आम्ही सर्वांनी डोंगरावरून धबाधबा खाली येणाऱ्या पाणलोट्यातून, दगडधोंड्यातून, कोसळणाऱ्या सर्रीमधून टॉर्चच्या उजेडात जीवाच्या आकांताने डोंगर चढायला सुरुवात केली.

त्या वेळची ती सर्व परिस्थिती अजूनही डोळ्यांपुढे जशीच्या तशी उभी आहे. एरवी रमेशभाऊंना त्यांच्या घरी पोहोचायला ५ मिनीटं देखिल जास्त वाटतील एवढेच त्यांच्या घरापर्यंतच अंतर पार करुन तिथपर्यंत जाताना आम्हाला मात्र आपण युगानुयुगं झाली हे अंतर कापत आहोत असं वाटत होतं. काळ जणू गोठून गेला होता. पण रमेशभाऊंच्या घरी पोहोचलो आणि एक प्रकारची सुरक्षिततेची, उबदारपणाची भावना मनात निर्माण झाली. वास्तु बोलते हेच खरं. आणि शेवटी वास्तु तरी काय, तिथे राहाणाऱ्या लोकांमुळेच तर तिला घरपण लाभत. नाही का! रमेशभाऊ, त्यांची सरपंच असलेली ३४-३५ वर्षांची हसतमुख अर्धांगिनी, रेश्मा वहिनी. त्यांची १८ आणि २० वर्षांची अलंकार आणि ओंकार ही २ मुलं आणि रमेशभाऊंचे वडिल असं ५ जणांच कुटुंब घरामध्ये होतं. रमेशभाऊंची आई काही दिवसांसाठी दुसऱ्या मुलाकडे कोल्हापूरला गेली होती. हे कुटुंब आमचं कोणत्या जन्मीचं देणं लागतं होतं देव जाणे. त्या परिस्थितीत अडकून पडलेलो आम्ही पुढे ३ दिवस त्यांच्याकडे राहिलो. त्यांनी आमच्यासाठी काय केल नाही? रविवारी रात्री ११ वाजता त्या माऊलीने आम्हाला गरम गरम ताजा पिठलं भात करुन खाऊ घातला, रमेशभाऊंनी ओले कपडे वाळत घालायला बैठकीच्या खोलीत दोऱ्या बांधून दिल्या, अलंकार आणि ओंकारने अंधरायला पांघरायला उबदार पांघरुणं पुरविली, आंघोळीसाठी कडकडीत गरम पाणी काढून दिलं, दोन वेळचा चहा, नाश्ता (त्यांच्यात नाशत्याची पद्धत नसून देखिल केवळ आमच्यासाठी) दोन वेळचं चुलीवरचं गरमगरम जेवण (जे जेवायला आमच्यासारखी शहरातली लोकं पैसे मोजून एखाद्या हॉटेलवर जातात) कश्याकश्याची कसर त्यांनी बाकी ठेवली नाही. आजोबांनी आमच्यासाठी शेतातली मक्याची कणसं आणून, भाजून प्रेमळ आग्रह करुन गरम गरम कणसं आम्हाला खायला दिली. आईचा पाय दुखत होता तिला लावायला स्वतःजवळची औषधाची ट्यूब काढून दिली. रमेशभाऊंचं घर आम्हा १० जणांना सामावून घेईल एवढ मोठं होतं यात काही शंका नाही. पण त्यापेक्षा मोठं होत ते त्या कुटुंबाचं मन. त्यांच्यातल्या माणुसकीने आम्ही पार दिपून गेलो. नकळत मनात विचार येऊन गेला, आम्हा शहरात राहाणाऱ्या लोकांकडे अचानक न सांगता सवरता जवळची सख्खी माणसं राहायला आली तरी आमच्या रुटीनमध्ये करावी लागणारी तडजोड आम्ही सहजपणे स्वीकारत नाही. आणि इथे तर पूर्णपणे परक्या असणाऱ्या आमच्यासारख्या लोकांना भोसले कुटुंबानी कोणत्या श्रद्धेने स्वतःच्या घरात सामावून घेतलं असेल. माणुसकीच्या या दर्शनाने आम्ही नतमस्तक झालो.

दिवसं रात्र पडणारा पाऊस अजूनही थांबायचं नाव घेत नव्हता. कधीही आभाळाकडे नजर टाका, गच्च भरलेलं आभाळ स्वतःच जडपण सहन न होऊन अंगावर कोसळेल असा भास होई. साधारणपणे जोराचं वारं आणि पाऊस एकत्र आला की वारं पावसाला पिटाळून लावतं हा आम्हा शहरवासियांचा अनुभव. त्याच्या उलट प्रकार इथे होता. डोंगरावरून

घोंगावत वाहाणार वारं पावसाला अजून कोसळण्यासाठी उत्तेजित करत होतं. रमेशभाऊंच्या घराच्या बैठकीच्या खोलीवर पत्रे होते आणि उर्वरीत भागावर कौलं. रात्री वारं आणि पावसाचं एकत्र तांडव सुरु झालं की पत्र्यावर कोसळणाऱ्या पावसाच्या आवाजाने काळजाचा ठोका चुकत होता. रात्र रात्र झोप लागतं नसे. मंगळवारी रात्री माझ्या मनात आलं, अरे हा तर प्रलय आहे. हा पाऊस यापुढे कधीच थांबण शक्य नाही.

रोज सकाळी उठल्यावर आणि दिवसभरात अनेकदा, वाटेतले पाणलोट ओलांडून डोंगरावरून खाली उतरून रस्त्यावरचं पाणी हटल आहे की नाही हे पाहायचा आमचा उद्योग सुरुच होता. रविवारी रात्री बंद पडलेली भावाची गाडी सोमवारी सकाळी प्रयत्न केल्यावर सुरु झाली होती. दरम्यान मंगळवारी संध्याकाळी मलकापूर वरून वाटेतल्या पाण्यातून चालत आलेल्या मेकॅनिकने आमची बंद पडलेली गाडी देखिल सुरु करून दिली होती. जी गाडी टोचन करून पुण्यापर्यंत आणायच्या गोष्टी आम्ही करत होतो ती चालू झालेली बघून आमच्या आनंदाला पारावार राहिला नसता तरच नवल. गाडी काय सुरु झाली, मने आशेने प्रज्वलित होऊन उठली. हे दिवस लौकरच संपतील असा विश्वास वाटू लागला. बुधवारी सकाळी उठल्यावर रोजच्याप्रमाणे माझी मोठी लेक आणि भाऊ रस्त्याची परिस्थिती पाहायला गेले. परत आले ते आनंदाने ओरडतचं. पाणी गेलं. रस्ता रिकामा झाला आहे. कडेला थांबलेले ट्रक देखिल रात्रीत हलले आहेत. मग काय! एकच धांदल उडाली. सकाळचा चहा घेतला. रविवारी पावसात भिजून ओले झालेले कपडे अद्यापही वाळले नव्हते. ते तसेच बॅगेत कोंबले. २ दिवसांसाठीच घराबाहेर पडलो असल्याने कपड्यांचा एकेकच जास्तीचा सेट काय तो बरोबर ठेवला होता आणि त्याच्यावरच आजचा चौथा दिवस होता.

सामानं गोळा करून निघताना सर्वात कठीण प्रसंग होता तो भोसले कुटुंबियांचा निरोप घेण्याचा. उणापुरा ३ दिवसांचाच काय तो सहवास. पण जन्मजन्मांचे स्नेहबंध, ऋणानुबंध जुळले गेले. स्नेहाच्या त्या रेशीमगाठी आता सहजपणे तुटणार नाहीत. अतिशय जड अंतकरणाने सर्वांचा निरोप घेतला. भोसले वाडीतल्या त्या देवमाणसांनी माझ्या आईला खुर्चीत बसवून खाली आणलं. दोन्ही ठिकाणचं रस्त्यातलं पाणी हटल होतं आणि रस्ता मोकळा झाला होता. वाटेतले प्रचंड मोठे खड्डे पाहून मनात आलं, गाडी अलिकडेच बंद पडली ही किती चांगली गोष्ट घडली. नाहीतर पुढच्या पाण्याचा आणि त्यात बुडालेल्या खड्ड्यांचा अंदाज आला नसता आणि खूप काहीतरी विपरीत घडून गेलं असतं.

पुढच्या प्रवासाला सुरुवात झाली. वाटेतं शाहुवाडी पोलिस स्टेशनला जाऊन सहायक पोलिस अधीक्षक, श्री.देशमुख यांचे मनापासून आभार मानले. आणि कराड फाट्याला वळलो. पण परिस्थिती अजून पूर्ण निवळली नव्हती.

शाहुवाडी पोलिस स्टेशनमधून बाहेर पडलो. सगळ्यांचीच मनं आता निर्धास्त झाली होती. वाटेत वारणानगरला हॉटेल त्रिवेणी मध्ये नाश्ता करायला थांबलो. सांगली आणि कोल्हापूरला आलेल्या महापुरामुळे दोन्ही जिल्हे पाण्याखाली असल्याची बातमी मंगळवारी समजली होती. पण त्या बातमीतली भीषणता वारणानगरवरून हायवेला वळताना समजली. कराड फाट्यावरून हायवेला वळलो. किणी टोल नाक्यापाशी गाडी अडविली गेल्यावर कळलं की गेले चार दिवस सांगली कोल्हापूरला आलेल्या महापुराने सगळीकडे हाहाकार माजवला आहे. किणी टोल नाक्यापुढचा रस्ता पुढे दोन ठिकाणी पूर्ण पाण्यात आहे आणि तिथून पुढे जाणं अशक्य आहे. मग काय, पुन्हा मागे फिरलो. वाटेत वडगावला लॉजची चौकशी केली. पण आमच्यासारख्याच अडकलेल्या प्रवाशांमुळे तेथील लॉज फुल असल्याच कळलं आणि वारणानगरला माघारी येऊन हॉटेल त्रिवेणीमध्ये मुक्काम ठोकला.

इथे हॉटेल त्रिवेणीचे मालक श्री.प्रवीणदादा पाटील या व्यक्तिमत्त्वाशी ओळख झाली. श्री.पाटील हे पत्रकार आहेत, 'वारणेचा वाघ' या साप्ताहिकाचे संपादक आहेत आणि त्याचबरोबर समाजसेवक देखिल ही माहिती त्यांच्याकडून कळली. महापुरामुळे पुणे-बैंगलोर हायवेला जे हजारोनी ट्रक गेले कित्येक दिवसांपासून अडकून पडले होते त्या अडकलेल्या लोकांना औषधे, जेवण पुरविण्याचं काम सध्या श्री.पाटील यांच्या वारणेचा वाघ फाँडेशनकडून केलं जातं होतं. किणी टोल नाक्यावरून गाड्या सोडायला सुरुवात केली की तुम्हाला लगेच कळवतो असं सांगून श्री.पाटील यांनी आम्हाला निश्चित केलं.

चमत्कार तर घडतचं असतात. भोसलेवाडीचा रस्ता मोकळा झाला म्हणून आम्ही घाईघाईने निघालो त्याचं जणू सार्थक झालं. वारणानगरवरून आम्ही रमेशभाऊंना फोन केला आणि कळलं की आम्ही तिथून हाललो आणि पावसामुळे २ तासांच्या आत तो रस्ता पुन्हा पाण्याखाली गेला आहे. हे ऐकल आणि त्या जगत् नियत्याचे पुन्हा पुन्हा आभार मानले.

बुधवारचा आख्खा दिवस पुन्हा रस्ता सुरु होण्याची वाट बघत टंगळ-मंगळ करण्यात घालवला. रोजच आयुष्य जगताना क्वचितच वाटयाला येणारा निवांतपणा इथे असा अवचित समोर येऊन ठाकला होता. गुरुवारी सकाळी छोट्या गाड्या किणी टोल नाक्यावरून पुढे सोडत असल्याची बातमी समजली. किणी टोल नाका ओलांडून पुढे जाताना हायवेच्या दोन्ही बाजूच दृष्य मन विदिर्ण करणारं होतं. दोन्ही बाजूंची शेतं १० ते १५ फूट पाण्याखाली होती. घरांची केवळ छपरच काय ती दिसत होती. महापूराच्या भीषणतेची एक झलकच इथे पाहायला मिळाली. गुरुवारचा दिवस आमच्यासाठी चांगला ठरला आणि पुराच्या परिणामस्वरूप जवळ जवळ मोकळ्या असलेल्या कराड-पुणे महामार्गावरून संध्याकाळपर्यंत आम्ही सुखरूप घरी पोहोचलो.

मंडळी जे घडल ते सगळ कथारुपात तुमच्यापर्यंत पोहोचविण्याचा हा एक प्रामाणिक प्रयत्न होता. यातून मला काय साध्य करायचं होत विचारालं तर मी अनुभवलेला हा माणुसकीचा झरा तुमच्यापर्यंत पोहोचविणं. या सगळ्या प्रसंगातून तरून जाताना अनेक हातांनी आम्हाला मदत केली. आमचे सगे-सोयरे, मित्र-मैत्रीणी, जे प्रत्यक्ष आमच्याबरोबर उपस्थित नव्हते पण मानसिक पातळीवर सतत आमच्या सहवासात होते. आम्हाला पदोपदी धीर देत होते, हे दिवस लवकरच संपतील याची खात्री देत होते, त्यांचे आभार कसे मानू? आणि तस करून मला देखिल त्यांना परकं करायच नाहीये. त्यांचे अशीर्वादाचे हात, शुभेच्छा सतत आमच्याबरोबर अशाच राहोत ही मात्र विनंती आहे. या जगात जगताना वार्डेट अनुभव तर पदोपदी येतच असतात. अनेक माणसं आपलं खच्चीकरण करण्याचा, आपल्याला मागे खेचण्याचा प्रयत्न करतात. पण सगळीकडे अंधार दाटला आहे असं वाटत असताना एखादी दिपशलाका आपलं आयुष्य उजळवून टाकते. माणसावरचा, त्याच्यातल्या माणुसकीवरचा विश्वास दृढ करते.

लहानपणी हुजुरपागेत शिकत असताना इयत्ता ६ वी किंवा ७ वी मध्ये वाळींबे बाई शिकवायला होत्या. त्यांचं एक वाक्य कायमच लक्षात राहिलं आहे. त्या म्हणायच्या, माणसाचं मन एखाद्या टिपकागदाप्रमाणे हव. जे जे चांगल वाटयाला येईल ते मनात शोषून घ्यायचं आणि अंतरंगात साठवून ठेवायचं. बाईच हे वाक्य मी अजून विसरलेले नाही. आयुष्य जगताना येणारे चढउतार कोणालाच चुकलेले नाहीत. पण या जगण्यात कधीकधी अनपेक्षितपणे काही आनंदाचे कण तुमच्या वाटयाला येतात. ते वेचून, साठवून त्याचा आनंदाचा खळाळता झरा बनविण्याची किमया ज्याला साधली त्याच्यासाठी जगणं हे आनंदयात्रा बनलं म्हणायला हरकत नाही.

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“PA/ATP in न.प.”

श्री. ओम लहाने,

सहायक नगर रचनाकार, छ.संभाजीनगर महानगर प्रदेश विकास प्राधिकरण.

दबकत दबकत गेलो आत
वाटलं join होऊन करूया थाट
पण, इथं पाहीलं तर भानगडी साठ
त्यातच वर केले CO नीं हात
बसायला नव्हती तेबल खुर्ची
नगर अभियंत्याला लागली मिर्ची

आला अंगावर नगरसेवक धाऊन
येतानाच आला दात खाऊन
त्याचं म्हणनं आपल्याला कळना
बाजूच्या टेबलवाला काही मदतीला पळना

धडपडत धडपडत शिकाय लागलो
येणाऱ्या जनतेसमोर वाकाय लागलो
आल्यावर अडचण मार्गदर्शन मागवले
आपल्या स्थरावर बघून घ्या , असे म्हणून भागवले

GB ला उपस्थित अध्यक्ष आमदार
उभे करून झापले दमदार
ऐकून त्यांची मधुर वानी
डोळ्यात मावेना साठलेलं पाणी

दिवस काही जाता जाईना
इथं, पगार बी वेळेवर होईना
त्यात अजून एक Tension
मिळेल की नाही DCPS Pension

एकामागून एक बदलले CO
कोणासोबत लिंक तयार होईल काहो
लिंक तयार होण्यासाठी लागते विशेष तंत्र
काम करताना आपल्याला जमेल का? तो मंत्र

विचार करून डोकं झालं आहे जाम
त्यातचं आले कर वसुली चे काम

March ending ला असते Target Completion ची घाई
म्हणून बाजारात फिरतो आहे बनून वसुलीभाई

कामांची सुरू असताना रीमझीम
मध्येच उगवली TP scheme

नविन असल्याने त्यातलं काही कळना
आणि Area Distribution च गणित काही जुळना

गोळा करताना stake holders फुटत आहे घाम
कोणास ठाऊक जीवाला कधी मिळेल आराम

येऊद्या कीतीही काम प्रत्येकाला देऊ अंजाम
कितीही पडलं ओझं , तरी दबला नाही एकही इंच
Department च नाव नेहमी करत राहू ऊंच

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PART – II

प्रशासकीय विभाग

नगर रचना संचालनालयातील सन २०२४ मध्ये पदोन्नत झालेल्या अधिकारी / कर्मचारी यांचा तपशिल

सन — २०२४

अ.क्र.	नांव	पदनाम	वर्ग
१	श्री.सु.पुं.मरळे	संचालक, नगर रचना	अ
२	श्री.जि.ल.भोपळे	संचालक, नगर रचना	अ
३	श्री.ह.चं.बाविस्कर	सहसंचालक, नगर रचना	अ
४	श्रीमती ज.बा.सुर्वे	सहसंचालक, नगर रचना	अ
५	श्रीमती सु.प्र.थुल	सहसंचालक, नगर रचना	अ
६	श्री.आ.टि.बागुल	सहसंचालक, नगर रचना	अ
७	श्री.अ.बा.पाटील	सहसंचालक, नगर रचना	अ
८	श्री.श्री.मा.देशमुख	सहसंचालक, नगर रचना	अ
९	श्री.ध.शि.खोत	सहसंचालक, नगर रचना	अ
१०	श्री.वि.बा.शेंडे	सहसंचालक, नगर रचना	अ
११	श्री.न.भा.नागरगोजे	सहसंचालक, नगर रचना	अ
१२	श्री.प्र.रा.ठाकुर	सहसंचालक, नगर रचना	अ
१३	श्री.वि.ल.वाघमोडे	सहसंचालक, नगर रचना	अ
१४	श्री.ओ.ए.मोमीन	सहसंचालक, नगर रचना	अ
१५	श्री.नं.उ.मोरे	उप संचालक, नगर रचना	अ
१६	श्रीमती अ.यो.कुलकर्णी	उप संचालक, नगर रचना	अ
१७	श्रीमती छा.श्री.भणगे	उप संचालक, नगर रचना	अ
१८	श्री.सं.जं.माने	उप संचालक, नगर रचना	अ
१९	श्री.दि.आ.कदम	उप संचालक, नगर रचना	अ
२०	श्री.स.खु.चाफळे	सहायक संचालक, नगर रचना	अ
२१	श्री.र.उ.तनपुरे	सहायक संचालक, नगर रचना	अ
२२	श्रीमती श्वे.गो.पवार	सहायक संचालक, नगर रचना	अ
२३	श्रीमती स्ने.चं.यादव	सहायक संचालक, नगर रचना	अ
२४	श्री.ग.कृ.चिल्लाळ	सहायक संचालक, नगर रचना	अ
२५	श्री.प्र.भि.सोनवणे	सहायक संचालक, नगर रचना	अ
२६	श्री.सु.सु.मोरावकर	सहायक संचालक, नगर रचना	अ
२७	श्री.सं.अ.जोशी	सहायक संचालक, नगर रचना	अ
२८	श्रीमती भा.शं.ढवळसंक	सहायक संचालक, नगर रचना	अ
२९	श्री.के.ज.शिंदे	सहायक संचालक, नगर रचना	अ
३०	श्रीमती ह.धों.पाटील	नगर रचनाकार	अ

३२	श्री.तु.ज.मदने	नगर रचनाकार	अ
३३	श्रीमती अ.रा.ढाकणे	नगर रचनाकार	अ
३४	श्री.वि.वि.ढेंगळे	नगर रचनाकार	अ
३५	श्री.ज्ञा.भि.माने	नगर रचनाकार	अ
३६	श्री.ल.व.राठोड	नगर रचनाकार	अ
३७	श्री.सो.मा.गोडसे	नगर रचनाकार	अ
३८	श्री.यु.प्र.चव्हाण	नगर रचनाकार	अ
३९	श्री.व्यं.दे.कामत	नगर रचनाकार	अ
४०	श्री.रो.ल.गायकवाड	नगर रचनाकार	अ
४१	श्री.रु.वि.छुटाणी	नगर रचनाकार	अ
४२	श्री.सं.म.बुरड	नगर रचनाकार	अ
४३	श्री.ध.ब.साळुंखे	नगर रचनाकार	अ
४४	श्री.प्र.ना.मोरलवार	नगर रचनाकार	अ
४५	श्री.अ.चं.खैरनार	नगर रचनाकार	अ
४६	श्री.प्र.अं.चव्हाण	नगर रचनाकार	अ
४७	श्री.रा.रा.दनाने	नगर रचनाकार	अ
४८	श्रीमती नि.स.देवकते	नगर रचनाकार	अ
४९	श्री.वि.कि.चव्हाण	नगर रचनाकार	अ
५०	श्री.पां.कि.कोंढवळे	नगर रचनाकार	अ
५१	श्री.ह.र.घुले	नगर रचनाकार	अ
५२	श्रीमती स्वा.स.अहिरे	नगर रचनाकार	अ
५३	श्री.अ.अ.गडगे	नगर रचनाकार	अ
५४	श्रीमती स्मि.सं.काजळे	नगर रचनाकार	अ
५५	श्रीमती अं.उ.पवार	नगर रचनाकार	अ
५६	श्रीमती ज्ञा.डि.तरार	नगर रचनाकार	अ
५७	श्री.कौ.वि.भावे	नगर रचनाकार	अ
५८	श्री.श.म.निकम	नगर रचनाकार	अ
५९	श्रीमती सा.ल.कदम	नगर रचनाकार	अ
६०	श्री.अ.अ.महामुनी	नगर रचनाकार	अ
६१	श्री.प्र.अ.डोळे	नगर रचनाकार	अ
६२	श्री.म.द.पाटील	नगर रचनाकार	अ
६३	श्रीमती अं.श्या.नेरकर	नगर रचनाकार	अ
६४	श्री.सु.अ.भवते	नगर रचनाकार	अ

६५	श्रीमती सौ.रा.पायधन	नगर रचनाकार	अ
६६	श्री.ग.सु.जाधव	नगर रचनाकार	अ
६७	श्री.वि.बा.वडाळ	नगर रचनाकार	अ
६८	श्री.ग.तु.शिरसाठ	नगर रचनाकार	अ
६९	श्री.म.सा.जाधव	नगर रचनाकार	अ
७०	श्री.ना.वा.जोशी	नगर रचनाकार	अ
७१	श्री.दे.म.मानतकर	नगर रचनाकार	अ
७२	श्रीमती मं.सं.हुपरे	स्वीय सहायक	ब
७३	श्री.पं.सं.बेंडे	उच्चश्रेणी लघुलेखक	ब
७४	श्री.र.बा.विसपुते	उच्चश्रेणी लघुलेखक	ब
७५	श्री.सं.ना.टिळेकर	अधीक्षक	ब
७६	श्रीमती मा.मो.जामखेडकर	अधीक्षक	ब
७७	श्रीमती सं.अ.कांबळे	अधीक्षक	ब
७८	श्रीमती अ.सो.बगाडे	अधीक्षक	ब
७९	श्रीमती सु.सं.कदम	अधीक्षक	ब
८०	श्री.स्व.गो.पवार	अधीक्षक	ब
८१	श्रीमती ज्यो.म.सिंहासने	प्रथम लिपिक	क
८२	श्री.वि.शि.जाधवर	प्रथम लिपिक	क
८३	श्री.कि.मे.बिल्ला	प्रथम लिपिक	क
८४	श्रीमती शु.प्र.घेवडे	प्रथम लिपिक	क
८५	श्रीमती रु.प्र.पाटील	प्रथम लिपिक	क
८६	श्रीमती रि.रा.सलगर	प्रथम लिपिक	क
८७	श्रीमती गौ.सं.पोरे	प्रथम लिपिक	क
८८	श्रीमती सा.र.काशिद	प्रथम लिपिक	क
८९	श्रीमती छा.रा.भालेराव	प्रथम लिपिक	क
९०	श्रीमती अ.श्री.गायधनी	प्रथम लिपिक	क
९१	श्री.भा.रा.गायकवाड	प्रथम लिपिक	क
९२	श्री.सु.प्र.मोहिते	प्रथम लिपिक	क
९३	श्री.ज्ञा.मा.आसोले	प्रथम लिपिक	क
९४	श्री.ग.गो.मेश्राम	प्रथम लिपिक	क

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सन २०२४ मध्ये नियत वयोमानानुसार शासकीय सेवेतून सेवानिवृत्त अधिकारी कर्मचारी यादी

अ.क्र.	नाव, पदनाम	कार्यरत कार्यालय
१	श्री.राजेंद्र दामोदर लांडे, सहसंचालक, नगर रचना	नागपूर महानगर प्रदेश विकास प्राधिकरण, नागपूर
२	श्री.दत्तात्रय निवृत्ती पवार, उपसंचालक, नगर रचना	पुणे महानगर प्रदेश विकास प्राधिकरण, पुणे
३	श्री.प्रदिप लक्ष्मीदास गोहील, उपसंचालक, नगर रचना	उपसंचालक, नगर रचना, क्लस्टर सेल, ठाणे महानगरपालिका, ठाणे.
४	श्री.प्रमोद भाऊराव गावंडे, उपसंचालक, नगर रचना	नागपूर महानगरपालिका, नागपूर
५	श्री.शिवाजी व्यंकटराव जाधव, सहायक संचालक, नगर रचना	सहायक संचालक, नगर रचना, परभणी शाखा
६	श्री.सतीशकुमार पंढरीनाथ उगीले, सहायक संचालक, नगर रचना	सहायक संचालक, नगर रचना, रायगड-अलिबाग शाखा, अलिबाग
७	श्री.संभाजी विठोबा कांबळे, सहायक संचालक, नगर रचना	सोलापूर महानगरपालिका, सोलापूर
८	श्री.संभाजी सिग्राम मोरे, सहायक संचालक, नगर रचना	सहायक संचालक, नगर रचना, प्रादेशिक योजना, रत्नागिरी-सिंधुदुर्ग, रत्नागिरी
९	श्री.कृपालसिंह भारतसिंह गहेरवार, सहायक संचालक, नगर रचना	पुणे महानगर प्रदेश विकास प्राधिकरण, पुणे
१०	श्री.संजय अरुणराव देशपांडे, सहायक संचालक, नगर रचना	सहायक संचालक, नगर रचना, (मुल्यांकन) नागपूर
११	श्री.सुनिल बाजीराव दहिकर, सहायक संचालक, नगर रचना	चंद्रपूर महानगरपालिका, चंद्रपूर
१२	श्री.सुनिल प्रल्हादअप्पा मिटकरी, सहायक संचालक, नगर रचना	सहायक संचालक, नगर रचना, लातूर शाखा, लातूर
१३	श्री.विद्याधर तुकाराम देसाई, सहायक संचालक, नगर रचना	सहायक संचालक, नगर रचना, सिंधुदुर्ग शाखा, सिंधुदुर्ग
१४	श्री.किशोर भिमराव पाटील, सहायक संचालक, नगर रचना	सहायक संचालक, नगर रचना, ठाणे शाखा, ठाणे
१५	श्री.सतिश धर्मराज वाणी, नगर रचनाकार	सहायक संचालक, नगर रचना, सातारा शाखा, सातारा

अ.क्र.	नाव, पदनाम	कार्यरत कार्यालय
१६	श्री.श्रीहरी दत्तात्रय दाभाडे, नगर रचनाकार	सहसंचालक, नगर रचना, नाशिक विभाग, नाशिक
१७	श्री.दे.प्र.रहाणे, नगर रचनाकार	नगर विकास विभाग, नवि-९, मंत्रालय, मुंबई
१८	श्री.सुनिल पांडूरंगजी खांडेकर, नगर रचनाकार	सहायक संचालक, नगर रचनाकार, सिंधुदुर्ग शाखा, सिंधुदुर्ग
१९	श्री.नवलकिशोर दुर्गाप्रसाद शर्मा, नगर रचनाकार	सहायक संचालक, नगर रचना, वाशिम शाखा, वाशिम
२०	श्री.संजिवकुमार जगन्नाथ बारगळ, नगर रचनाकार	सहायक संचालक, नगर रचना, अहमदनगर शाखा, अहमदनगर
२१	श्री.राजेंद्रसिंग शामसुंदरसिंग चौहाण, नगर रचनाकार	सहसंचालक, नगर रचना, कोकण विभाग, नवी मुंबई
२२	श्री.नंदकिशोर विठ्ठलराव भैलुमे, नगर रचनाकार	सहायक संचालक, नगर रचना, पालघर शाखा, पालघर
२३	श्री.बापु दयाराम सामुद्रे, नगर रचनाकार	उपसंचालक, नगर रचना, प्रादेशिक योजना, डहाणू / ठाणे.
२४	श्री.भरत निवृत्ती शेंडगे, नगर रचनाकार	उपसंचालक, नगर रचना, वाहतुक व परिवहन, पुणे
२५	श्री.मंगेश गणपतराव गावंडे, नगर रचनाकार	नोंदणी उपमहानिरीक्षक व मुद्रांक उपनियंत्रक, अमरावती
२६	श्री.प्रमोद पुनाजी ढाणके, नगर रचनाकार	सातारा नगरपरिषद, सातारा
२७	श्री.अन्सारी अब्दुलफैज अन्वोरोद्दीन, नगर रचनाकार	उपसंचालक, नगर रचना, वाहतुक व परिवहन, छत्रपती संभाजीनगर
२८	श्री.विश्वनाथ भागोजी दहे, नगर रचनाकार	विशेष भूसंपादन अधिकारी, विशेष घटक, छत्रपती संभाजीनगर
२९	श्री.हरिष अंबर खंडारे, नगर रचनाकार	उपसंचालक, नगर रचना, विकास योजना, विशेष घटक, महानगरपालिका, अकोला
३०	श्री.मिलिंद मधुकरराव अनाजपुरे, नगर रचनाकार	सहायक संचालक, नगर रचना, (मुल्यांकन) छत्रपती संभाजीनगर
३१	श्री.भगवानदास गंगन्ना आईटवार, नगर रचनाकार	सहायक संचालक, नगर रचना, वर्धा शाखा, वर्धा

अ.क्र.	नाव, पदनाम	कार्यरत कार्यालय
३२	श्री.भरत हिंदूराव कुंडले, सहायक नगर रचनाकार	सहायक संचालक, नगर रचना भूसंविअ (१), मुंबई
३३	श्री.शेख युनुस अब्दुल मजिद, सहायक नगर रचनाकार	सहायक संचालक, नगर रचना, छत्रपती संभाजीनगर शाखा
३४	श्री.लक्ष्मण सदाशिव घंगाळे, सहायक नगर रचनाकार	अपर मुद्रांक नियंत्रक, प्रधान मुद्रांक कार्यालय, मुंबई (मुद्रांक जिल्हाधिकारी कार्यालय, कुर्ला)
३५	श्री.राजेंद्र बिरु मारकड, सहायक नगर रचनाकार	अपर मुद्रांक नियंत्रक, प्रधान मुद्रांक कार्यालय, मुंबई (मुद्रांक जिल्हाधिकारी कार्यालय मुंबई शहर)
३६	श्री.गजानन पंपासा पुजारी, सहायक नगर रचनाकार	सहायक संचालक, नगर रचना, भूसंविअ (१), मुंबई
३७	श्री.अनंत संजयराव मोरे, उच्चश्रेणी लघुलेखक	सहायक संचालक, नगर रचना, (मुल्यांकन) अमरावती
३८	श्री.रविंद्र बापूराव विसपुते, निम्नश्रेणी लघुलेखक	सहायक संचालक, नगर रचना, जळगाव शाखा, जळगाव
३९	श्री.बापू कृष्णा ढगारे, प्रमुख आरेखक	सहायक संचालक, नगर रचना, वि.यो.वि.घ.- भिवंडी-निजामपूर शहर महानगरपालिका
४०	श्री.महावीर चंद्रनाथ गोसावी, सहायक आरेखक	सहायक संचालक, नगर रचना, श्रीरामपूर शाखा, श्रीरामपूर
४१	श्री.प्रवीण पंडितराव कुलकर्णी, सहायक आरेखक	सहायक संचालक, नगर रचना, परभणी शाखा
४२	श्री.राजेंद्रकुमार बाबाराव कुंभारकर, प्रथम लिपिक	सहसंचालक, नगर रचना, नागपूर विभाग, नागपूर
४३	श्रीमती श्रद्धा भालचंद्र मुरकर, प्रथम लिपिक	सहायक संचालक, नगर रचना, वि.यो.वि.घ.- भिवंडी-निजामपूर शहर महानगरपालिका
४४	श्रीमती संगिता अशोक कांबळे, प्रथम लिपिक	सहसंचालक, नगर रचना, कोकण विभाग, नवी मुंबई
४५	श्री.भास्कर रावजी गावित, कनिष्ठ लिपिक	नगर रचनाकार, वर्ग-१, मुल्यांकन तज्ञ, नाशिक कार्यालय
४६	श्री.ज्ञानदेव श्रीरंग गावडे, मेस्त्री	संचालक, नगर रचना, महाराष्ट्र राज्य, पुणे
४७	श्रीमती सविता संजय तांबेकर, दप्तरबंद	सहसंचालक, नगर रचना, पुणे विभाग, पुणे

अ.क्र.	नाव, पदनाम	कार्यरत कार्यालय
४८	श्री.पंडित चांगदेव काकडे, दप्तरबंद	सहायक संचालक, नगर रचना, श्रीरामपूर शाखा, श्रीरामपूर
४९	श्रीमती पंचफुलाबाई ज्ञानेश्वर टेमकर, दप्तरबंद	सहायक संचालक, नगर रचना, जालना शाखा, जालना
५०	श्री.अब्दुल सलीम हमीद खान, दप्तरबंद	सहायक संचालक, नगर रचना, सांगली शाखा, सांगली
५१	श्री.मारुती नावजी फलके, शिपाई	सहायक संचालक, नगर रचना, अहमदनगर शाखा, अहमदनगर
५२	श्री.दामोदर रतन माळी, शिपाई	सहायक संचालक, नगर रचना, श्रीरामपूर शाखा, श्रीरामपूर
५३	श्री.रासनाथ भिकाजी बोंबडे, शिपाई	सहायक संचालक, नगर रचना, (मुल्यांकन) छत्रपती संभाजीनगर

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PART – III

प्रशिक्षण

सन २०२४ मध्ये नगर रचना आणि मूल्यनिर्धारण विभागातील अधिकारी व कर्मचारी यांना उपस्थित राहण्यासाठी नामनिर्देशित केलेल्या कार्यशाळा / प्रशिक्षणे याबाबतची माहिती.

अ. क्र.	विषय	प्रशिक्षणाचा दिनांक	प्रशिक्षणाचा एकूण कालावधी (दिवस)	प्रशिक्षण आयोजित करणा-या संस्थेचे नांव आणि प्रशिक्षणाचे ठिकाण	प्रशिक्षणार्थी/अधिकाऱ्यांचे नांव आणि पदनाम
१	२	३	४	५	६
१	State Energy Efficiency Action Plan (SEEAP) Final Validation Workshop for Maharashtra-State	दि.१३.०६.२०२४	१	संस्था- महाराष्ट्र ऊर्जा विकास अभिकरण - (महाऊर्जा), पुणे. ठिकाण - दि ताज महल पॅलेस, अपोलो बंदर, कुलाबा, मुंबई	१) श्रीमती जयश्रीराणी बाळकृष्ण सुर्वे, उपसंचालक, नगर रचना २) श्री.ललित मुन्हारी खोब्रागडे, सहायक संचालक, नगर रचना ३) श्रीमती पूजा अजित हिप्परगेकर, सहायक संचालक, नगर रचना
२	Urban Flood Management	दि.०१/०७/२०२४ ते ०४/०७/२०२४	४	संस्था- Deputy Director & Course Director, National Water Academy, Central Water Commission, Pune ठिकाण - नॅशनल वॉटर अकॅडमी, सेंट्रल वॉटर कमिशन, खडकवासला, सिंहगड रोड, पुणे.	१) श्री.युवराज प्रल्हाद चव्हाण, सहायक नगर रचनाकार २) श्री.अनुप फडतरे, रचना सहायक ३) श्री.अभिजीत प्रभाकरराव हांडे, रचना सहायक
३	Manage my Law Suits	दि.१४.०७.२०२४	१	संस्था- मे.जे.बी.के. इन्फोटेक प्रा.लि. ठिकाण - आय.टी.पी.आय. त्रिमुर्ती नगर, एन.आय.टी. गार्डन जवळ, नागपूर	नागपूर विभागातील एकूण ९ अधिकारी आणि अमरावती विभागातील एकूण ७ अधिकारी

IIRS डेहराडुन येथील GIS, प्रशिक्षणकरीता उपस्थित राहण्यासाठी नामनिर्देशित केलेल्या अधिकारी व कर्मचारी यांची माहिती						
अ.क्र.	विषय	प्रशिक्षणाचा दिनांक	प्रशिक्षणाचा एकूण कालावधी (दिवस)	प्रशिक्षण आयोजित करणा-या संस्थेचे नांव आणि (प्रशिक्षणाचे ठिकाण)	प्रशिक्षणार्थी/अधिका-यांची एकूण पदसंख्या	प्रशिक्षणार्थीचे पदनाम
१	२	३	४	५	६	७
१	नगर रचना संचालनालयातील अधिकारी (Tier - II, सहायक नगर रचनाकार) यांना /कर्मचारी यांना GIS चे प्रशिक्षण देणेबाबत.	दि. २२ जानेवारी २०२४ ते ०२ फेब्रुवारी २०२४	१२ दिवस	संस्था - Indian Institute of Remote Sensing Dehradun ठिकाण- Dehradun	२०	५ सहायक संचालक, नगर रचना आणि १५ नगर रचनाकार
२	नगर रचना संचालनालयातील अधिकारी (Tier -III, सहायक नगर रचनाकार) यांना /कर्मचारी यांना GIS चे प्रशिक्षण देणेबाबत.	दि. १२ फेब्रुवारी, २०२४ ते ०८ मार्च, २०२४	२६ दिवस	संस्था - Indian Institute of Remote Sensing Dehradun ठिकाण- Dehradun	२०	४ सहायक नगर रचनाकार, ७ रचना सहायक, ९ कनिष्ठ आरेखक

नगर रचना संचालनालयातील तांत्रिक अधिकाऱ्यांना पायाभूत बाबींचे प्रशिक्षण					
अ.क्र.	बॅच क्रमांक	प्रशिक्षणाचा दिनांक	प्रशिक्षणाचा एकूण कालावधी	प्रशिक्षण आयोजित करणा-या संस्थेचे नाव आणि (प्रशिक्षणाचे ठिकाण)	उपस्थित राहिलेल्या एकूण प्रशिक्षणार्थींची संख्या
१	बॅच क्र.१ व २	दि.१६/०२/२०२४ ते दि.१९/०३/२०२४	३३ दिवस	यशदा, पुणे	एकूण ८० प्रशिक्षणार्थी (र.स.)
२	बॅच क्र.१ व २	दि.०८/०४/२०२४ ते दि.१०/०५/२०२४	३३ दिवस	यशदा, पुणे	एकूण ८० प्रशिक्षणार्थी (स.न.र व र.स.)
३	बॅच क्र.३	दि.०१/०७/२०२४ ते दि.०२/०८/२०२४	३३ दिवस	यशदा, पुणे	एकूण ३९ प्रशिक्षणार्थी (स.न.र व र.स.)
४	बॅच क्र.४	दि.२२/०८/२०२४ ते दि.२३/०९/२०२४	३३ दिवस	यशदा, पुणे	एकूण ४० प्रशिक्षणार्थी (स.न.र व र.स.)
५	बॅच क्र.५	दि.२६/१२/२०२४ ते दि.२७/०१/२०२५	३३ दिवस	यशदा, पुणे	एकूण ४० प्रशिक्षणार्थी (स.न.र व र.स.)

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PART – IV

क्षणचित्रे

डॉ. प्रतिभा उमेश भदाणे, मा.संचालक, नगर रचना तथा सहसचिव, नगर विकास विभाग यांना “A Multi Criteria Framework for Development Plan Preparation and Implementation Process : Modified Practices and Tools for Inclusive Urban Planning.” या विषयासाठी डॉक्टरेट पदवी मिळाल्याबद्दी हार्दिक अभिनंदन.





Savitribai Phule Pune University
(formerly University of Pune)

Declaration of Result of the Doctor of Philosophy (Ph.D.)

Bhadane Pratibha Umesh (भदाणे प्रतिभा उमेश)
Mother's Name: Hirabai (हिराबाई)

University has accepted the thesis submitted by the above-mentioned candidate for the award of Ph.D., as per reports of referees and examiners of open defense of the thesis. Accordingly, it is hereby notified that, the above-mentioned candidate is declared to have passed the examination of Ph. D. and has become eligible for the award of Ph. D. Degree.

RELEVANT DETAILS ARE AS UNDER:

- 1 Faculty : Science & Technology
- 2 Subject : Civil Engineering
- 3 Title of the Thesis : "A Multi Criteria Framework for Development Plan Preparation and Implementation Process: Modified Practices and Tools for Inclusive Urban Planning".
- 4 Place of Research : Dr. D. Y. Patil Unitech Society's
Dr. D. Y. Patil Institute of Technology
Pimpri', Pune 411018.
- 5 Name and Address of the Guide : Dr. Jain Rakeshkumar Balakchand
Dr. D. Y. Patil Unitech Society's
Dr. D. Y. Patil Institute of Technology
Pimpri', Pune 411018.
- 6 Name and Address of the Co Guide : Dr. Radhika Menon
Dr. D. Y. Patil Unitech Society's
Dr. D. Y. Patil Institute of Technology
Pimpri', Pune 411018.
- 7 Date of Registration : 11th July, 2015
- 8 Date of Re Registration : 11th July, 2020
- 9 Date of Declaration of Result : 03rd May, 2023



Ganeshkhind, Pune 411007
Ref. No. PGS/Ph .D./265
Date: 10/05/2023

Director

Board of Examinations & Evaluation

स्वराज्य अभियंता हिरोजी इंदूलकर पुरस्कार, २०२४









कोकण व पुणे विभागस्तरीय स्नेहसंमेलन व क्रिडा स्पर्धा-२०२५





















नागपूर व अमरावती विभागस्तरीय स्नेहसंमेलन व क्रिडा स्पर्धा-२०२४











श्रद्धांजली



नगर रचना संचालनालयातील खालील अधिकारी / कर्मचारी यांच्या दुःखद निधनाची नोंद घेतांना आम्हाला अतिव दुःख होत आहे. त्यांच्या कुटुंबीयांच्या दुःखात आम्ही सहभागी आहोत. विभागातील त्यांचे योगदान कायम स्मरणात राहील.

अ.क्र.	अधिकारी / कर्मचार्याचे नांव	पदनाम	विभाग
१	श्री. प.पि.तोडरे	नगर रचनाकार	छत्रपती संभाजीनगर
२	श्री. अ.प्र.गावंडे	नगर रचनाकार	पुणे
३	श्री. रा.पां.बालमवार	नगर रचनाकार	नागपूर
४	श्री. ग.प्रे.भोपळे	रचना सहायक	अमरावती

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