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REVOLUTION IN URBAN DEVELOPMENT AND PLANNING AFTER THE INTRODUCTION OF GEOGRAPHICAL INFORMATION SYSTEM

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ABSTRACT

Planning and development are mutually beneficial processes that are also quite challenging. Due to its scarcity and high value, land-related activities account for the majority of urban problems. Traditional planning techniques, record-keeping procedures, and data gathering techniques cannot be effective management tools in today's metropolitan environment. Because of how quickly people and technology are evolving and being ahead of time.

In the current situation, a tool that records, saves, evaluates, and provides a workable answer is required. Geographic Information Systems (GIS) are now widely used around the world. One such elegant tool for handling spatial data and progressively analysing the physical environment in relation to its topology and attribute data, such as canopy, land use, land cover, environmental resources, water line, and sewage line, is GIS. Our social lives have altered significantly as a result of the Information Technology (IT) sector's rapid development, specifically the Internet, mobile computing, internet banking, remote sensing, and virtual reality. Even in the discipline of urban planning, this is evident.

The major goal of this study is to investigate the potential applications of GIS in urban planning with regard to master or development plans. For the example of Obedullaganj Town, a development plan has been created using the advanced features of the GIS programme. The applications of GIS with reference to urban planning and development have been studied for their potentials for social development, environmental conservation, inclusiveness, safety, etc. as this is the need of the hour. In addition to the conventional attributes of GIS like intensity of change, expansion of impermeable areas, growth pattern, etc.

Urban planners face a difficult problem when it comes to managing cities in terms of numerous factors since they must combine urban planning with various technology improvements. A sustainably planned city will undoubtedly result from the right integration of GIS, remote sensing, and related techniques with urban planning strategies.

1. INTRODUCTION

1.1 GENERAL

The most important difficulty India currently confronts is urbanisation in a way that adds to rather than detracts from social value. The projected rates of urbanisation and infrastructure gaps, as well as the funding needed to address them, need to be highlighted in depth (Morris, 2017). In the ensuing decades, it is anticipated that urban populations in emerging countries would grow rapidly. According to the response to a United Nations (UN) poll from 2007, 51% of the nations that replied were worried about their rapid urbanisation. By 2050, the world's population is estimated to increase by 9.6 billion people (960 crore), while the urban population will increase by 2.5 billion people (250 crore). The population of rural regions is really declining, and the growth is concentrated in metropolitan areas (Suri, 2010). According to the 2011 Census of India, there were 1.21 billion people living there (121 crore), of which 31.1% were urban dwellers (Cushman & Wakefield, 2014). 7,935 towns and cities existed in 2011—an increase. As a result, the country's urban population rises from 290 million (29.5 crore) to 377 million (37.7 crore). Population growth in cities and urban regions during the census years of 2001 and 2011 was 54% and 30%, respectively. In the decades between the 2001 and 2011 censuses, there were 3 megacities (Greater Mumbai, Delhi, and Kolkata), 35 million plus cities, and 468 Class I cities (Kshirsagar & Srinivas, 2013). In addition, it has been predicted that during the next 20 years, there would be more than 600 million (60 crore) people living in cities, dispersed unevenly across 87 metropolitan areas (Jothilakshmy & Arulmalar, 2013). By 2050, KPMG (2014) projects that India's urban population would total over 810 million (81 Crore). By 2051, it is anticipated that half of India's population would live in urban areas, with more than 100 metropolitan areas (cities with populations of one million people or more) and a potential total of more than 10,000 urban areas (Kshirsagar & Srinivas, 2013).

India's cities have unequal urban expansion, with some expanding more quickly than others. Urban planning's goals and objectives have evolved as a result of the current restructuring of urban areas to meet the expanding needs of the global economy and to provide improved infrastructure facilities for the successful implementation of the neo-liberal agenda (Gavsker, 2011). As a result, the majority of urban areas exhibit poor performance in areas such as poverty, housing, efficient water supply, suitable sewage system, urban encroachments, traffic congestion, pollution, and social

unrest, making the role of urban government complex (Verma, Kumari, & Tiwary, 2008). Rapid urbanisation and population expansion call for planned urban development, thus design an urban area development plan.

Urban development and planning entail the purposeful use of current resources to accomplish desirable goals for the future. It involves the art of spatial organisation, science that synthesises information from diverse fields, and politics that use available tools to achieve certain goals (Pettit & Pullar, 2000). The art and science of controlling land usage in order to preserve the greatest possible amount of economic and aesthetic qualities. It may also be seen as a method for methodically predicting and bringing about changes to the physical landscape of a town or city setting, provided that these changes are in keeping with societal norms and sensible civic design principles (Dekolo & Oduwaye, 2005).

2. LITERATURE REVIEW

Ardiwijaya, et al. described the urban sustainability context, there is a growing concern about social, economic, and environmental costs of sprawling urban development patterns. Idle landis one indicator of that sprawl. This paper aims to investigate the relation of urban physical growth to the expansion of idle land and its effects to the urban environment sustainability. This paper also examines the land rejuvenation as the method to manage the growth of idle lands in urban areas. This paper takes Bandung Metropolitan Area (BMA), one of the metropolitan areas in Indonesia that has basin shape restricted to the urban physical expansion, as a case study [2].

Artal-Tur explained international tourists engaging in cultural activities accounted for more than 500 million of international tourist numbers in 2017. City tourism relies on culture as a major product, providing benefits not only for interested visitors, but also for the local resident population. New trends in tourism include "experiential tourism", where the interactions between tourists and residents become a key part of the tourism experience and overall customer satisfaction. New technologies and IT applications allow tourists to design their own trip, given the presence of global companies like Trip Advisor, Booking.com and Air BnB. This comprehensive volume explores new trends in cultural tourism, demonstrating how and why culture has become a central factor in tourism [3].

Ashworth is review the relationship between three phenomena, heritage, tourism, and its context of places. This triangular relationship has been viewed in three main ways namely as automatically harmonious, inevitably in conflict or potentially sustainable. The basis for sustainable heritage tourism can be investigated in two directions. First by examining the management of heritage for tourists which requires answers to the questions, ‘why are tourists interested in heritage?’ and ‘how do tourists use heritage?’ Secondly heritage tourism can be managed for the attainment of local objectives, frequently local economic development, which requires investigation of the relationship between heritage and places and between heritage tourism and local economies [4].

Bhatia, A. K. explained, "International Tourism Management", tries to examine this complex global phenomenon, exploring its various concepts in their different manifestations. The book offers comprehensive information on various concepts, methods and framework giving a systematic overview of the subject on a global basis. Key elements of the book include: nature and components of the tourism industry; and communication; economic dimensions and international cooperation. The book will be of value to students pursuing tourism studies at different levels, particularly as part of various courses in tourism studies at professional training institutes and colleges affiliated to both Indian and foreign Universities. The text of the book will enable the students, who are to form the future resource of the travel and tourism business, to face the increasingly competitive world where they intend to pursue their careers [5].

Bostancı, B. et al. explained the development provides economic growth with location, project ideas, and capital factors. In addition to their own experiences, workers in the field of housing development should consider several criteria when choosing the best locations for residential investments. All of these criteria can be evaluated using fuzzy multi criteria decision-making analyses. In this study, the weights of different evaluation criteria are determined using the fuzzy analytic hierarchy process (FAHP) and fuzzy entropy (FENTROPY) methods. Luxury residential zone-oriented ranking is applied using the fuzzy technique for order preference by the similarity to ideal solution (FTOPSIS) method with weights determined by the FAHP and FENTROPY methods. Performance evaluation for the determination of the best luxury housing is performed by the FTOPSIS method [6].

Bulatovic has been proposed that the tourism as the panacea for many of the problems of the developing world and has been seen as a potential solution to ensure the long-term protection of natural resources and as a means of satisfying the needs of the poor communities in close proximity to protected areas. Community-based ecotourism (CBE), a very specific form of tourism, focuses on initiatives that are not only environmentally sensitive, but aim to give community members a high degree of control over tourism and ensure that a significant portion of benefits accrue to them. Many CBE ventures have been plagued by many challenges in the past and have been unsustainable and as a result ceased to operation. This study applies a framework of sustainability indicators to a number of CBE ventures

across southern Africa, in an attempt to ascertain areas of concern and potential threats to the long- term sustainability of these operations [7].

Castela, A. described that urban tourism has in the last 5 years grown expansively, especially in Southern Europe and the Mediterranean. Lisbon is no exception. In the last four years, there has been a major development in urban tourism, a trend that will certainly continue increasing thanks to being named the best 'city break' destination in 2017. Residents play a very crucial role in the development of cultural tourism. The literature indicates that when residents perceive tourism as beneficial there is a greater level of interaction between residents and visitors, and consequently loyalty to the destination. This article aims to analyze the level of interaction between tourists and residents and the extent to which this interaction will influence the residents' perceptions regarding tourism's social representation and community impacts. We chose Alfama for this case study because it is one of the most typical and historical neighborhoods of Lisbon and one of the most visited by tourists. We decided to use the following qualitative methods: direct observation, 24 residents' interviews and one interview with a local association president [9].

Cete, M discussed urban populations in Turkey have been growing steadily since the 1950s. As such, adequately supplying development parcels for the growing population is one of the most important responsibilities of the local governments, primarily by preparing and implementing development plans. The tools most widely used in this implementation include expropriation, voluntary application and land readjustment (LR). LR provides efficient implementations both for government and landowners when compared to expropriation and voluntary application. However, Turkish LR bears a number of weaknesses that must be addressed in order to facilitate widespread use. This paper discusses the importance of the LR method in implementation of the development plans in Turkey. Furthermore, it introduces Turkish LR method, including its primary principles and implementation phases. It concludes with the strengths and weaknesses of the method and such proposals as encouraging voluntary LR applications, providing landowners' participation in the projects, carrying out the projects based on the value instead of the area, introducing legal sanctions to provide developments after the LR implementations, constructing a web-based platform to share the experiences gained in different projects, and using Geographical Information System technologies to improve overall implementation of the LR projects [10].

Chen, D. et al. explained in this study uses a hedonic price model to examine the relationship between proximity to newly purchased conservation lands and single-family property values. Specifically, a variant of the hedonic price model is used that addresses changing market values of neighborhood and locational attributes during a given period. Fixed effects are included to control spatial autocorrelation and year and month influences under three variants of an ordinary least-squares (OLS) model, which are double-log, semi-log, and linear model. In addition to the traditional OLS model to explain residential values, a geographically weighted regression (GWR) model is used to study the local difference of coefficient values for each primary variable. An empirical study using a single-family house market-price data set from 2002 to 2010 and 104 newly purchased conservation lands in Alachua County, Florida, is also conducted. To account for the impact of the housing market crash around 2006, the researchers break the data set into two groups (precrash and postcrash), and compare them. The results indicate that sales price increases 0.04% for every percent decrease in distance to the nearest conservation land in general, while the positive influences from conservation lands are larger precrash compared to those afterward. In addition, time from acquisition is not significant precrash; however, it has a negative influence on property values after the housing market crash in 2006 [13].

Chen, H. described examines the interplay of visitor engagement, cultural contact, and memorable tourism experience (MTE), and destination loyalty in cultural tourism. The research was conducted with 320 individuals who have visited cultural tourist destinations within the past five years. Results, employing structural equations modeling, showed that visitor engagement positively influenced cultural contact and cultural contact positively influenced MTE. In addition, MTE had significant positive effects on loyalty. Furthermore, cultural contact was found to fully mediate the relationship between visitor engagement and MTE. Findings underscore the importance of crosscultural interactions in creating MTEs in cultural tourism. Avenues used to engage tourists must address the cultural tourists' need for deeper cultural experience in order to successfully create MTEs [14].

Christou, E. discuss in this article examines the matter of cultural tourism and sustainable development. Culture is a set of distinctive spiritual, material, intellectual and emotional features of society or a social group. It encompasses, in addition to art and literature, lifestyles, ways of living together, values systems, traditions and beliefs. Positive effects as well as negative effects are being examined. The methodology selected is the case study. The author presents two case studies from Izmir (Smyrna) and Hong Kong. The conclusions summarize that during the last decades, the movement of sustainability has come to light affecting all aspects of human activity and drifting cultural tourism industry as well [15].

Cohen, E. described the first attempt to assess systematically the environmental impact of tourism and to spell out the principal factors on which this impact depends: the intensity of tourist site-use, the resiliency of the eco-system, the time perspective of the developers and the transformational character of touristic developments. The environmental dynamics of the tourist ecological sub-system are shown to consist of a constant expansion at the margins and intensification at the mature core, leading to the creation of "contrived" attractions both at the core (as "natural" attractions decline) and the margins (to supplement meager "natural" attractions as tourism expands into less attractive regions). Two major types of measures for environmental protection are discussed: those protecting the environment for tourism and those protecting it from tourism. The need for the second type of measures is emphasized, particularly in developing countries, which face greater environmental risks from tourism than the developed ones [16].

Crotts, J. C. explained over the past decade, many rural communities have been encouraged to incorporate tourism in their economic development strategies. Tourism is increasingly seen as a potential basic industry providing employment opportunities, income and economic diversity. However, concerns over the potential impacts have created a demand for comprehensive planning and research on the effects of tourism development on residents' quality of life. The purpose of this study was to demonstrate an objective means of determining the impact tourism development has on rural residents' quality of life. Using census data from rural counties in a US state, the findings suggest that tourism development is a viable means of improving the quality of life in rural communities [18].

3. METHODOLOGY

Numerous researchers have conducted extensive research on the issues facing big cities. However, a nation that is only made up of a few, randomly placed, extremely large urbanised areas is neither viable nor optimally sustainable. It is more practical to have a network of medium-sized cities uniformly scattered over the area. It is crucial to look into the issues in these smaller cities as well. Obedullaganj has been chosen as the case for the empirical portion of the research because of its significance to small towns. With less than 20,000 residents, it is a tiny town. The updated population estimate and other demographic information would be presented in the census of 2021.

Different planning scales call for various types of information and methods. Data may be divided into many categories based on various factors. The categorization of data according to its source of availability is done using primary and secondary data. Based on the amount of information they include, image data are often divided into raster and vector categories. For research using GIS, the use of imagery data is crucial since GIS uses geographic data. Raster data are helpful for strategic urban planning since they cover huge, city-wide regions without the need for high resolution. The processing of raster data occurs significantly more quickly than that of vector data. Particularly in buffer analysis and map overlay, the outcome could be noticed. Because very high resolution analysis is necessary for small scale district and local area planning, vector data are typically used. In this study, an effort has been made to show how GIS techniques may be used for base mapping, land-use and land-cover mapping, detecting and mapping urban change, mapping urban infrastructure and utilities, urban management, etc. The materials and research techniques are covered in this chapter.

3.1 SELECTION OF STUDY AREA: OBEDULLAGANJ TOWN

On July 17, 1983, the town of Obedullaganj was formed as a Gramme Panchayat; however, it was later declared a Nagar Parishad. There are 15 wards in the town, which has a population of 22845. According to municipal records, the municipal area is approximately 28.86 sq. km. However, based on empirical calculations by the consultancy, the municipal area is roughly 10.1225 sq km. The municipal boundaries has recently undergone revision. The Obedullaganj Municipal Corporation (OMC)'s most recent municipal boundary recommendations were used in the current analysis. Obedullaganj has a wide variety of demographic, social, and economic variance in facts and numbers while being a tiny town. A vibrant residential and commercial real estate market is produced by this variance. Agriculture and allied businesses are the main sources of income for the residents of the town. When creating urban planning policies and undertaking project planning, this variation needs to be taken seriously.

3.2 DATA COLLECTION

Processing data to draw conclusions is a part of the research process. Spatial and temporal data are included in analysis at various levels. The sources of secondary information and data included the City Development Plan, State Regulations, Urban Development Guidelines, Central and State Urban Policy, Annual Progress Report, Demographic and Socio-economic Data from Census, etc. The material was all generalised and at a higher level. Only secondary data were obtained, and only those were checked by field visits, evaluating the reality on the ground, and, if necessary, face-to-face interviews.

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3.3 DATA TABULATION AND SYNTHESIZED

The key applications of GIS in urban planning include database administration, visualisation, geographic analysis, and spatial modelling (Levine & Landis, 1989). In order to process the data, it was synthesised and tabulated once it was collected. The following tools and approaches were recognised as being utilised throughout the study process and addressed in this part along with the procedures used to synthesise spatial and non-spatial data

3.4 DATA ANALYSIS PROCESS

Data analysis is the methodical application of logical and/or statistical tools to explain and display, summarize and assess data. Different analytical techniques offer a way to infer conclusions from data and separate the signal—the phenomenon of interest—from the noise—statistical fluctuations—in the data.

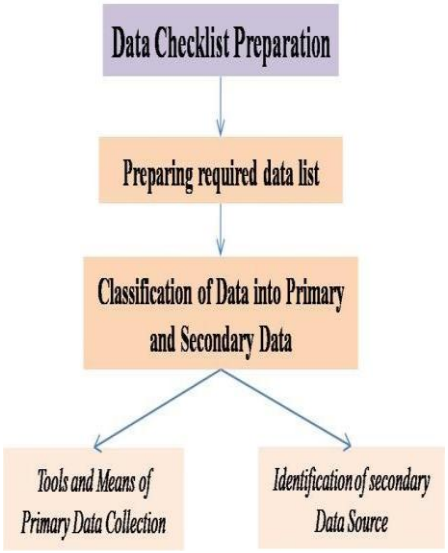

Figure-1 Data Checklist Preparation Approach

The current study uses statistical techniques to explain and analyse qualitative research data. The accurate and appropriate interpretation of research findings is a critical component to ensuring data integrity and dependability. Inadequate statistical analysis distorts scientific results, incorrectly informs judgements, and may unintentionally influence how the general public views research. Examining reliability concerns with regard to non-statistical data is as appropriate.

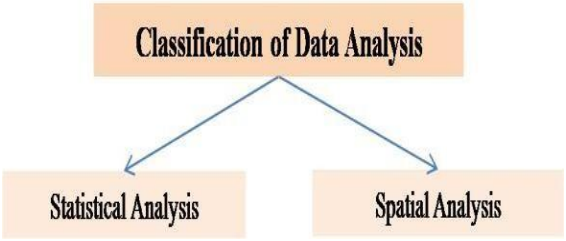

Figure-2 Data Analysis Process

As demonstrated in Figure below, statistical and geographical analysis may be used to divide up data analysis. Analysis of non-spatial data benefited greatly from descriptive statistical analysis. Additionally, spatial analysis was carried out to evaluate geographical data spatially. Analysis of spatial data benefited greatly from GIS application.

4. ANALYSIS OF RESULTS

The study's goal is to investigate how GIS might be used in novel ways in modern urban planning techniques. Beginning with a survey of the literature, research analyses Indian urban planning practises and the growing significance of geographic information systems (GIS). It also examined GIS-based best practises used in India. Start an empirical study after learning from the literature. In this part, GIS has been applied to the case of the town of Obedullaganj, which might be helpful for the creation of a master plan or development plan.

4.1 DATA ANALYSIS

The analysis and overview are based on secondary data from relevant authorities, departmental reports of government authorities, relevant literature, amnesty laws, statistics from various government organisations, maps, images, development plans of neighbouring towns, development plans of the city, and reconstruction improvement plans. The indices and criteria used for the research analysis comprised:

- Demographic variables like population, male population, female population etc.
- Socio-economic variables like sex ration, workforce participation etc.
- Status of public services and facilities according to the planning standards
- Spatial variation covers land use and land utilities based on GIS

From the descriptive information such as infrastructure, population data and area of the different land use zone, suitable land use plan was prepared.

4.2 LAND USE MAP

The following criteria must be taken into consideration in order to find locations that are suitable for urban growth (GrindGIS, 2018): the land must be flat, easily and inexpensively accessible, unoccupied or with little vegetation, currently cost-effective, and with an abundance of clean water for domestic use.

Digitization was carried out to the extent necessary to present the GIS functions that add value to the creation of a Development Plan in order to fulfil the project aim of organising the land use map with innovative steps. The map below displays the different land uses in a digitalized portion of Obedullaganj town. Both projected and existing land uses are depicted. A lot of factors are taken into account when deciding which land use belongs in which sector. Among them, but not only, are the following:

The amount of accessible land can influence how it is used. In this context, the term "land size" refers to the degree of subdivision and ownership rather than the amount of accessible undeveloped land. A preliminary land use map was created based on the building and land's current uses, and it was then compared to the development plans submitted by developers and authorities.

4.3 THEMATIC AND VECTOR MAP PREPARATION

A grid map was created on the GIS platform following the creation of the base map. Non-spatial data was used to enhance themed spatial maps. Other non-spatial data gathered from the census were also filled in and the top sheet index map was overlaid. Thematic maps were upgraded into vector format by this procedure. The final maps were helpful for comparison discussions as well. Numerous tools, such as the near tool in the proximity toolbox, allow for the calculation of each grid's nearest point of facility for each attribute. Classes were divided into groups of equal size to determine distance.

The satellite images of various time periods allowed us to evaluate the geographical expansion and chronological development of the settlement. The map below shows the town's growth patterns for the years up to 2000, 2000–2005, 2005–2010, and 2010–2015.

4.4 ANALYSIS FINDING

Aerial and close-up photographs, reports, articles, drawings, maps, satellite pictures, statistics, and reports all help in evaluating the planning area and the problems that are associated to it. Importing this data into computer-based models can help create alternative explanations and answers. These computer models might simulate traffic flow, predict demographic trends, and change how land is used. GIS enable the generation of digital geodata, presentation of intermediate, and calculation of final results. Stakeholder collaboration and communication lead to the best possible outcome. Stakeholder communication is best accomplished with visual aids like graphics and maps rather than just plain text. An excellent visualization support is GIS software. Therefore, GIS creates models, makes them easier to understand, and takes considerations that cannot be made in any other way.

Land is a valuable resource that consistently increases in value. It is quite difficult to do what surveyors could have done fifty years ago. Today, the world is developing more quickly than ever thanks to significant technological advancements. To accomplish planning goals, the planning industry nowadays requires highly specialised GIS tools, equipment, excellent software, and sufficiently trained and competent labour. Urban planning and development are complex tasks that cannot be completed without the use of powerful investigative tools, such as Arc GIS software.

5. DISCUSSION AND CONCLUSION

5.1 DISCUSSION & CONCLUSION

The primary use of GIS is in urban planning. GIS is a technology used by urban planners for modelling and analysis as well as for creating geographical databases. The many phases, levels, stages, divisions, sectors, and roles of urban planning are taken into account differently by the GIS applications. With its user-friendly behaviour, expanding functionalities, and fair drop in prices of GIS software and hardware, GIS is becoming a more operational and inexpensive information system for planning practise. It is increasingly turning into a crucial part of planning support system procedures. GIS is becoming increasingly useful for urban planning practices thanks to recent development and success in its merger with planning models, visualization research, and the inclusion of internet usage. The

availability of data, organizational change, and personnel are now the biggest barriers to the use of GIS in urban planning, not associated technological issues.

Despite the GIS's effective implementation, there are still a number of problems with the development plan that need to be resolved. The ongoing issue is updating and maintaining the database and making full use of the system's capabilities, primarily as a decision support tool for planning and monitoring the region's urban growth.

The capabilities of GIS may be improved and upgraded over time with no additional costs. With the help of this software, GIS should be able to be a thorough and effective planning support tool that takes into consideration the rules governing land use as well as the effects of development scenarios on the environment, transportation, and physical features. However, before GIS can truly be used for planning and management purposes, related technical, organizational, statutory, and human issues need to be addressed. As a result, planning techniques are crucial in determining a GIS development's success.

Using a variety of options, the planning process works to declare appropriate alternative future decisions and necessary suitable actions. Making decisions amongst possibilities throughout the planning process requires extensive geodata from the past, present, and future in addition to rigorous planning expertise. Descriptive, prognostic, predictive, or prescriptive data and information are all possible. Information management that is appropriate, adequate, and effective considerably improves the standard of planning practises. Using traditional manual ways to generate the proper data is exceedingly difficult. Numerous additional fundamental tasks and assisting tools are made possible by GIS for proper and expert professional management of geo-information.

According to the research, it is clear that GIS is an extremely important tool that can be used to advance planning in terms of time savings during the plan preparation process, making the best decisions possible based on the requirements and needs of the situation, and producing maps that are specifically tailored to the needs of the user. GIS are being used by planning organisations in both developed and developing nations. In place of other mapping software, planning institutions and agencies that had previously purchased mapping systems and other software have switched to GIS software.

GIS is used as a modelling, analytical, and logical tool in the process of urban planning. It includes a broad range of geographic and non-spatial issues. This involves identifying flaws with data structures, composition, simple and complicated investigative models, and resolving them. When managing an area or planning a viability study for an explicit purpose of an area, such as determining whether an area is suitable for the location of a solid waste dumping yard, GIS is incredibly helpful. The feasibility analysis of even smaller projects, such as the site of public buildings, schools, and hospitals, can benefit greatly from the use of GIS.

The use of GIS applications in environmental and geographical research is becoming more and more necessary to solve issues arising from spatial modelling tasks. This has been acknowledged as being quite useful and applicable for projects of a similar nature. The use of GIS may also help with data or information about a land's environmental appropriateness, level of suitability, and contamination behaviour. The feasibility of a trash dumping site and a waste treatment location may also be assessed using the GIS application. The area's physical, topographical, chemical, geographical, biological, and biological aspects should all be taken into account when determining if the target location is appropriate. Technologies like GIS and remote sensing deal with complex concerns like developing wetlands.

Planners have easier access to GIS, which is a crucial tool and database for urban planning in both developed and developing nations. In order to effectively foresee and respond to ongoing urban problems and future market fluctuations, planners need for solutions that meet daily effort requirements. The capacity of planners to use efficient tools and planning support systems that enable them to make educated decisions based on actionable intelligence greatly influences their effectiveness in addressing persistent urban challenges. GIS is being used by planners all around the world for many different purposes.

5.2 RECOMMENDATIONS FOR FUTURE WORK

Urban planning is a very difficult undertaking that involves several related fields. The first generation of planners worked on projects alongside allied economists, sociologists, and designers. The second generation evolved with the inclusion of GIS since it has shown to be a very potent tool. Information technology, simulation models, and decision support systems are extremely beneficial to the third-generation trend in urban planning. These benefits are put into practice using GIS-based models. New technology has made it possible to monitor crowd behaviour and social media interactions to learn how people react to diverse sociocultural events. These should make it feasible to conduct future study on the dynamics and behaviour of urban development utilizing soft skills.

Due to the dynamism of urban expansion, many new research topics are also expected to become accessible in the future. One of the biggest issues will be the constantly changing definitions and interpretations of the term "urban

development," which will have a significant impact on the idea of urban growth and development. From an anthropological standpoint, these outcomes are quite worrying for anybody looking at societal change. A collaboration between anthropological study and urban planning may be very beneficial in areas where urbanization is thriving and changing society. Consequently, mutual aid between the two areas is crucial. Some of the research's weaknesses could be addressed in other studies. This study used a small number of urban modifications that were reviewed by renowned Indian academics, planners, and practitioners. These modifications were obtained from the literature. However, they might not account for all urban impacts that might affect the communities studied in sociological study.

The planning database includes 3D graphics of the built and natural environments, spatial data, and all of the physical infrastructure, including roads with intricate hierarchies, water supplies for various uses, unclean effluent, and power lines of various supplies.

Therefore, there is a great opportunity to apply cutting-edge technology to enhance urban planning research.

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