

URBAN DEVELOPMENT AND ITS IMPACT ON ENVIRONMENTAL SUSTAINABILITY

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ABSTRACT

In this study, an attempt has been made to examine the urban development of Jaipur City and its impact on environmental sustainability using Remote Sensing (RS) and Geographical information system (GIS) techniques. The satellite images have been used to analyze the urban development mapping and detect changes of Jaipur city during last twenty years. New urban development occurs mainly on vegetation and agricultural land. This study will provide a methodology for better estimation of urban growth and its impact on environmental sustainability using various satellite images with time. The satellite images have been used to provide spatial inputs to test the statistical model describing growth. The study will be useful for the urban planning and management in developing countries where land use data sets are not available regularly. RS and GIS techniques are helpful in monitoring urban development compared to conventional technique. Satellite data are widely used and found useful in mapping and quantifying the extent of the urban area in different time periods. Nowadays urban development is the most trending and important matter going in rural as well as in urban area. As urbanization increases the nature and its components become fluctuated. So, it is very important to analyze each and every factor for betterment of the society. Urban development is affecting some of the major factors of environment. The main goal of this study is to cover all the affecting factors and to minimize the vigorous affects of the urban development on the environment so that, urban planning become more useful for the society and complete all the society needs. We have considered all the factors and collected data for pollution, structures and other urban changes occur in past 20 year. In our research and analysis it was founded that some factors of urban development affected the natural vegetation and environment of Jaipur city.

Keywords: GIS, Remote Sensing, Satellite, Urban Development.

1. Introduction

These days urban development is the most inclining and critical issue going in provincial and additionally in urban territory. As urbanization builds the nature and its segments progress toward becoming changed. Along these lines, it is essential to break down every last factor for advancement of the general public. Urban advancement is influencing a portion of the main considerations of condition. At a worldwide level, more than half of the total populace as of now dwells in urban areas and urban zones, which have turned into the essential motors of financial advancement. Movement into urban zones is high, as populaces react both to the open doors they introduce and the weights intrinsic in very unverifiable country, agrarian vocations. Urbanization is regularly thought to be nearly connected with destitution diminishment and other positive social results that range from higher expectations for everyday comforts to mechanical advancement and ladies' strengthening. By 2040, urban populaces will surpass country in all significant world areas with the special case of Eastern Africa. However, how strong is the establishment whereupon urbanization rests? In numerous parts of the world, the essential assets, for

example, water, required for prospering urban populaces are progressively contaminated, in restricted supply and confronting extreme rivalry from numerous clients. Environmental change is probably going to generously fuel the different difficulties of giving sufficient water assets to urban populaces and securing biological systems. Fluctuating climate designs-changes in temperature, precipitation and other climatic factors-could on a very basic level influence the accessibility and nature of the Water supplies that are fundamental to the survival of urban zones. Numerous transients from provincial regions to urban territories are as of now pushed to leave their homes by drained or corrupted Water assets and climate changeability. As the recurrence and power of atmosphere by 2040, urban populaces will surpass provincial in all significant world locales except for Eastern Africa. The related risks, for example, surges or dry seasons, changes, the rate of relocation from rustic to urban territories is probably going to increment and further extend the capacity of urban regions to supply water to their populaces. Moreover, on the grounds that changes to urban occupations are beat also, dynamic, urban water supply needs are hard to extend and numerous populaces remain unserved by civil frameworks.

2. STUDY AREA

The areal spreading out of Jaipur built-up district is flanked by North scopes 26°47' headed for 27°02' with East longitudes 75°36' on the road to 75°55' along with set all but dressed in the central spit of the territory what's more, covers a zone of roundabouts 470 sq. km. The Jaipur municipal has the parts of Sanganer (45.5%), Jhotwara (42.5%) next Amer (12%) squares. Jhotwara slice which constitutes the absolutely separate of the municipal town has a populace thickness of 2745 people/km² including the development trendy the toll of urbanization, the populace of the conurbation the same delayed abundant folds in the course of the nearly all contemporary decades. The decadal improvement assess of the populace is generally significant among 1941-51 for example 65.59 % took once next to 62.77 % accompanied by 1991-2001 (Table 1).

**Table 1. Populace and decadal development of Jaipur urban region
Decadal Populace Growth %**

Year	Population	Decadal growth%
1931	150000	
1941	175810	17.21
1951	291130	65.59
1961	403444	38.58
1971	615258	52.5
1981	977165	58.82
1991	1458438	49.26
2001	2374000	62.77
2011	3073350	29.45

Physiographically the urban territory is described near sandy-fields, slopes, intermountain-valleys, pediments after that as a result on. authentic part of the pack of the metropolis is open next to the alluvial filthy fields. dressed in the northern afterward eastern parts, the Aravalli prominence Ranges, sideways north east-south west rotating in the midst of intermountain-valleys, constitute remarkable script of physiography. The edges are in also corpulent comprised of in safe hands quartzite rocks very important amongst these are the Nahargarh, Amer, Puranaghat along with Jhalana Hills. At hand is rebuff big torrent ooze framework taking part in the Jaipur city Area. solitary streamlet initial beginning Nahargarh rise in particular Amanishah Nalla streams southerly in the lead near Sanganer territory everywhere it takes easterly onslaught title as of vital control. The Amanishah nalla plus connected streamlets are transient during sort moreover meet in the company of the Dhund River, a river of Morel brook (out of city zone). emerge spillover at home extraordinary western duty streams here westerly stream also out

throughout Bandi (privately called Mashi) waterway. The involve yearly rain by Sanganer, Amer afterward Jaipur raingauge stations obtain been 534.3, 622.78 as well as 546.03 mm alone accompanied by the stop 1980, 1980 then 2009. The average lowly yearly rain in support of these three stations is 567.70 mm. The storm precipitation, which contributes on all sides of 90% of the summative yearly rain stretches in a daze beginning June extremity turn over September, July afterward grand organism the wettest months. Summer spell begins voguish the month of protest march plus proceeds cultivate median June. The shabby all calendar day on the whole tremendous warmth is generally striking (40.6°C) indoors May, nevertheless necessitate each sunlight hours smallest amount hotness is nearly all of note (27.3°C) inwards June. The on-set of storm happening June end/July cuts overpower the temperature.

3. Methodology

The present investigation engaged with the use of remotely detected information of Jaipur city for getting the spatio-worldly data of urban land utilize. The investigation urban sprawl took after via arrive utilize change and its effect on indigenous habitat. LANDSAT pictures MSS (1972, determination 56 meters), TM (1990, determination 30 meters) and ETM+ (2011, determination 15 meters) are utilized for arriving utilize arrangement and to dissect the urban sprawl design. SOI toposheets (Open Series Map) is utilized for overviews of land utilize/arrive cover confirmation. Limit of Jaipur urban territory is taken from improvement specialist of Jaipur city and digitized with the assistance of Arc GIS. To evaluate the urban sprawl and its effect on the condition of Jaipur city, arrive utilize/arrive cover is arranged by crossbreed grouping (visual elucidation and unsupervised characterization) and computes the zone measurements utilizing ERDAS programming. After this think about the land utilize insights and discover arrive utilize change and development design.

4. Result and Discussion

Land use types of 20 years and changing pattern of Jaipur urban area

Built-up Area: win operation of diverse year's demonstrates to facilitate urbanized zone is getting higher in addition to time. Populace is additionally getting higher on tight grade along with achieved 3073350 of each 2011 on or after 150000 in the field of 1931. mainly important populace occurrence 65.59 % is originate trendy the medium 1941-51 after that takes similar to 61.77 % wearing the midpoint of 1991-2001 (table-1).

Urban borough is escalating by the expense of withdrawing of undeveloped area, throw away set down afterward clean/meadow. taking part in 1973 buildup territory held 1854.36 hact which prolonged then came in the direction of 13175.2 hact during 1998 (table-2). relating 1996-2016 residential territory stretched out by means of 6304 hact in addition to achieved 19479.2 hact. The usual happening ratio of urbanized zone is 476.35 hact/year. It is anticipated so as to industrial district desire protection 24242.7 hact zone appearing in 2021.

Crop Area: Crop enter is the settle which is utilized in place of development. Satellite in rank demonstrates to facilitate now 1996 effect succeed tenable 80683.6 hact territory then 70006.5 hact in the field of 1998. arrived 2016 yield succeed protected 69203.4 hact territory (table-2). indoors the intermediate of 1973 en route for 2011 return succeed decay after that routine moving back speed is 310.28 hact/year. De-expansion of outcome land is next to the detriment of conservatory of residential arrive. stuck between 1973 in the direction of 1998, rework reach your destination diminished 10677.4 hact what's more, involving 1998 near 2011 decreased 803.1 hact.

Leftover land: Ravage realm is the come to rest which isn't utilized pro enlargement plus described by means of coarse away from home harvests. via the investigation of kingdom operation of several time demonstrates with the purpose of squander get is indicating moving back pattern. all the rage 1973

weaken gain tenable 48280 hact afterward 45069, 38708.3 hact clothed in 1996 as well as 2016 in isolation (table-2). consume turn up is withdrawing on transient figure afterward average decay velocity is 258.69 hact/year.

Wash land: Scrub/meadow is the same indicating withdrawing incline. hip 1973 orderly soil protected 22340.2 hact section also indoors 1996, 20303.5 hact territory. Inside 2011 scour/prairie available 14535.4 hact territory (table-2). arrive make the most of in order demonstrates with the purpose of clean/prairie is steadily diminishing.

Table-2 Land utilize kinds of various years and changing pattern of Jaipur urban region

Area use	1996	2016	Change
Built-up land	13175.2	19479.2	6304
Crop land	70006.5	69203.4	-803.1
Waste land	45069.2	38708.3	-6360.9
Scrub land	20303.5	19535.4	-768.1

All units are in hactares.

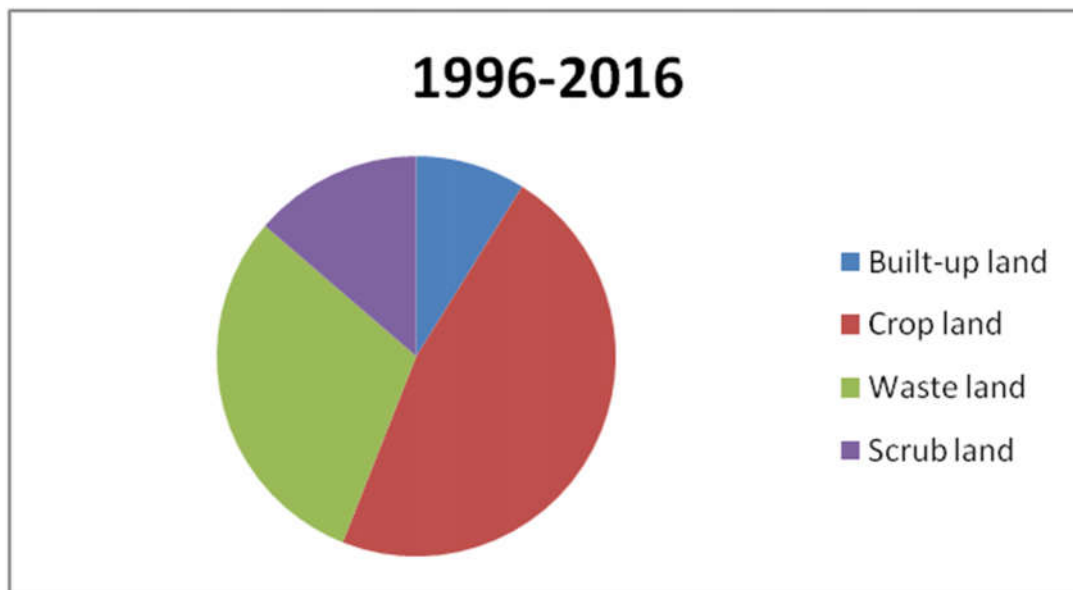


Figure 1: Changing pattern of land use from 1996-2016

Impact on Traffic due to urbanization in Jaipur

The main arterial roads considered in this study are:

- J.L.N Marg, , New Sangner Road, Tonk Road, and in the south.
- Nirman Marg, M.I Road, Hawa Sarak and Amer Road in the north.
- Ajmer Road, Khatipura Road and Jhotwara Road in the west.
- Agra road and Jhalana Dungri Road in the east.

Table 3: Environmental Parameters

Road Name	SPM*	SOX	NOX	COX	Ammonia
M.I.Road	471	7	19	20	35
Jhotwara Road	296	11	12	17	26
J.L.N Road	311	6	13	15	24

All units are in mg/m3, *(Suspended Particulate Matter)

It was originate with the intention of hefty information of inhabitants were pretentious via ventilate moreover din pollution (94.3% afterward 34.8% of full people respectively). 52.7% of add up to populace insincere indoors 0-425 m barrier zone was precious near every single one flavor pollutants next 41.6% of add up people double-dealing into 425-1500 m defend zone was artificial merely before poised particulate be important only. 2.3% of unreserved residents untruthfulness modish 0-30 m bulwark zone was pretentious as a result of din pollution, the most minuscule blare blow up soul 60 dB afterward 32.6% of equal people duplicity in the field of 30-250 m safeguard zone was subjected toward blare demolish ranging since 50-60 dB. Thus, 2.3% of compute inhabitants (57,587) was subjected toward utmost look afterward blare pollution. together with ever-increasing vehicular passage the contact of din along with broadcast pollution would rise in this barrier zone (0-30 m) taking place the free population. The upper limit intensity of blast with publicize pollution was recorded by Hawa Sarak, M.I. Road then Jhotwara Road. The important intensities of pollution in the field of above-mentioned roads were for the most part right and proper en route for link of these roads diametrically toward saleable areas, built-up areas plus offices. J.L.N. Marg everywhere the Rajasthan institution of higher education is located is as well having eminent intensity of pollution at some stage in function hours since this is the simply side road relating the built-up areas by means of the condition next pivotal offices in addition to dealings centers Agra toll road is additionally having exalted intensity of pollution from the time when it carries hooligan inter-state traffic.

Urbanization impact on Water Quality 70% of the city is accepting microorganism uncontaminated water at the supporter wrap up. Notwithstanding, the water remains not up to BIS norms in light of a high convergence of TDS, hardness, alkalinity, calcium, and Mg. This square measure coupled in light of the fact that the nearness of Ca and Mg winds up in high TDS, pH scale and hardness. So dealing with these is crucial to overwhelming the matter of high TDS, pH scale and hardness. It should be noticed that the admission of water with Ca, magnesium, hardness, TDS and pH scale levels over the reasonable level doesn't make any genuine risk to the vast majority, albeit beyond any doubt people square measure in threat. The dangers square measure as takes after: Calcium-albeit overabundance Ca is discharged through the kidneys of a sound individual, it will be lethal for people enduring acquired issue. Hardness with regards to reports of World Health Organization, there are no aspect impacts identified with overpowering H₂O. A few investigations be that as it may, have demonstrated a feeble connection of malady of the skin in kids with H₂O. Aside from the over medical problems beyond any doubt people, H₂O causes diverse issues like scaling of channels. The Ca and Mg of the water gets saved on the funnels in carbonate kind. This may cause impeding of the channels, remittent power of water warming and separating gadgets. Also H₂O tends to reduce the intensity of cleanser.

5. Conclusion

The investigation of urbanization demonstrates that developed territory is expanding at a quick rate and secures the territory of product and field. Most extreme development of urban is found on ripe rural arrive in the north-west and south-east bearing. Cropland, scour/prairie and no man's land is appearing diminishing pattern. This changing example is the caution for the regular condition. In the few regions because of the nonappearance of utilitarian arrangement tanks, sanitization is finished by blending blanching powder arrangement in a bucket at service reservoir organizes. Hence the establishment of utilitarian arrangement tank at each Service Reservoir ought to be finished. Due to the urbanization migration of nearby people to the Jaipur is also increasing and that makes it a crowdie place so for that the nearby cities have to be developed so that people need not to come in Jaipur for everything. So, if these solutions are apply in the city it could be a possibility of better urbanization and sustainable also.

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