



Impact of urbanization on biodiversity of Jhalana hills and around it in Jaipur city

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ABSTRACT

India abounds in wealth of complex and diverse biodiversity, exhibiting a great deal of variation however, its documentation is necessary for its proper record and management. India with its vast geographical area of about 329 m ha ranks seventh largest in the world (Venu, 1998). Present studies were conducted on the foot hill, slope (middle hill) and top of the protected and unprotected hills of Jhalana at Jaipur (26° 49' N, 75 48' E, 436 m.s.i.). Land is always in a constant flux of continual change due to transformation, resulting either from natural processes or due to human activities. Large portions of land transformation have been witnessed in and around major cities of India e.g. Kolkata, Bangalore, Chandigarh etc. Some of these are dynamic and fast, particularly in the urban tassel. The main factors affecting the urban area and land transformation are growth of industrial, commercial and institutional activities. Secondly due to urbanization and increasing trend, migration towards urban areas for employment and other developmental opportunities.

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Introduction

The people of Jaipur city have observed expansion at the cost of peripheral agricultural land, quite often very fertile and productive. This process has resulted in the conversion of agricultural lands into non-agricultural uses. The extensive damage to environment due to industrial waste, pollution and mismanagement of land can also be seen in the Jaipur areas and its periphery. Nevertheless, other important impact has also been noticed on the natural hydrological system of the city.

Topography of jaipur

Jaipur is situated on 26° 55' North latitude and 75° 49' east longitude. It's municipal boundary extends from 26° 46' minutes North latitude to 27° 01' north latitude and 75 degree 37 minutes east longitude to 76°57' minutes east longitude. The city is surrounded by the Nahargarh hills in the North and Jhalana in the East, which is foot part of Aravalli hill - ranges.° To the South and the West of the city are also prevailing knoll but they are isolated and discontinuous in formation. The southern end of the city is open to plain and stretches far and wide towards Sanganer tehsil and beyond. The walled city was originally located on the rocky street to provide an easy drainage system on either side of the city but the future extension of the city took place on the South and West on the alluvial plains, formed in the confluence's zone of the Amani Shah Nala in the west and Jawahar Nagar Nala in the East and beyond.

The general slope of the Jaipur city and its surroundings is from North to South and then to South-East. Nearly all the ephemeral streams flow in this direction. Higher elevations in the north exist in the form of low, flat-topped hills of Nahargarh (587 meters). Jaigarh, Amber and Amargarh, are deeply dissected and eroded. An isolated hummock called "Moti Dungari" upon which an old royal castle exists is near the Rajasthan University. Further in the South, topographical levels of the plain area varies between 280 meters along Bandi and Dhund rivers in the South to some 530 meters in the North- East

of Chomu near Samod hills. The overall trend is towards decline level from the areas bordering the hills in the North to plains in the South however, slopes of the plain areas are in general gentle.

Climate

Geographically Jaipur comes under semi-Arid Zone of India. It is characterized by high temperature, low rainfall and mild winter. The mean temperature of Jaipur is 36° C varying from 18° C in winter (January) to 40°C in summer (June).

Thus, the January and June are the coldest and hottest months, respectively. The normal rainfall of Jaipur is 600 mm; nearly 90% of which takes place in the summer monsoon period i.e. from June to September, the rest comes from the winter cyclones.

Objective

The present study was aimed to investigate the changes occurred due to the urbanization around the Jhalana hills bringing drastic changes in its biodiversity during the last one decade.

Methodology

The present study was carried out on the basis of traditional methods like, physical survey, to draw information on land use, geomorphology and geological features as well as maps.

The field survey was conducted in two phases i.e. scouting survey and thorough survey for ground truth collection and preparation of image interpretation.

The list of trees, bushes, grasses, climbers were listed out physically. The major vegetation was reported, which is economically important and valuable to increase levels of biodiversity were also noted and presented in the tables (1, 2, 3, 4).

The collected data on flora is compared with the investigation carried out by Bohra, 2001, earlier on the same hills, to draw attention on the changes of the biodiversity in the area.

Tropical changes

The construction activity has a direct bearing on agricultural land. However, the topography shows that Jaipur city on the north and eastern part, is covered by the hills (Joshi and Suthar, 2002), while the west and southern part are plains, which are the prime agricultural land areas. However, hill foot area and the agricultural area are equally threatened by construction activities either for residential, commercial, transportation or industrial purposes.

On the other side the large area of Jaipur is also surrounded by hills called Amer, Nahargarh and Jhalana. It is important for the topography of a city to have forest; they are also a source of rivers and wild life. Fortunately, Jaipur due to awareness about the environment and alertness of the forest department, the forest cover has shown increasing trend. The Jaipur forest area was covered 28.20 sq.km in 1975 has increased upto 45.80 sq.km (11.89%) by 1991.

Impact of land use by colonization around foot of jhalana hills

The rapid increase of urban population and the urbanization, leading to increasing urban environment, at the same time plains, forest, land areas at the foot of the hills being converted into colonial habitation. With the colonial habitation there is continuous stress on the hill areas due to the development of houses schools, health centers and small scale workshops for the conveniences and earning of urbanizing population on account of which the natural habitat and the land area is showing total transformed scenario which used to be a decade ago (Figure 1 A-H).

Conclusion

The environment encompasses both the non-living (abiotic) and living (biotic) components of the planet earth. Thus on the basic structure, the environment may be divided in to two types: - physical or abiotic environment and biotic environment. Human induced climatic changes have become increasingly important in our everyday lives and inevitably will continue to do so. This describes current status of climatic changes in the forests and wood land of Jhalana hills, Jaipur. Observed changes in the abiotic environmental factors like temperature, water availability, wind humidity and rising carbon dioxide level together have adverse potential impacts on forest growth and threats. Destruction of cover and the under growth is called afforestation. Rapid rate of industrialization, urbanization, agricultural development and population growth have greater pressure on the land water and vegetation, resulting in the degradation of tree resources. Similarly in the foot of Jhalana hills complete changes are occurring in the habitat, habitation and biodiversity due to urbanization and colony formation.

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Figure

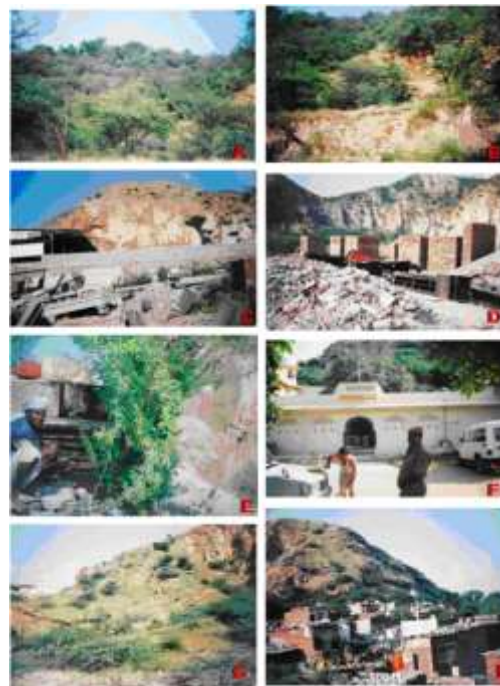


Figure A-H: Rich phytodiversity and its further vanishing by various man made activities at Jhalana Hills (Jaipur)

- A: Rich phytodiversity at Jhalana Hills
 B: Gradual Disappearance of phytodiversity
 C-D: Construction work at the foot hills of Jhalana Hills
 E: This man was doing cutting plant in Jhalana Hills
 F: Fully constructed police station in Jhalana Hills
 G: Total barren area at foot Hills of Jhalana
 H: Urbanization in Jhalana Hills

Present Flora Available on Jhalana Hills – Jaipur

Table 1: Tree species

S.No.	Botanical Name	Local Name	Family
1	Acacia catechu Willd.	Khair	Mimosaceae
2	Acacia leucophloea Roxb.	Ronjh	Mimosaceae
3	Acacia nilotica Linn.	Babool	Mimosaceae
4	Acacia senegal, Willd.	Khairi, Kumtha	Mimosaceae
5	Acacia tortilis (Forsk.) Hayne	Israili Babool	Mimosaceae
6	Ailanthus excelsa Roxb.	Aradu	Simaroubaceae
7	Annona squamosa Linn.	Seetaphal	Annonaceae
8	Anogeissus latifolia, Wall	Dhavada	Papilionaceae
9	Anogeissus pendula, Endgew	Dhok	Combretaceae
10	Azadirachta indica L.	Neem	Meliaceae
11	Balanites aegyptica, Delile	Hingota	Simaroubaceae
12	Bauhinia racemosa Lamk.	Jhinjha	Caesalpiniaceae
13	Bombax ceiba Linn.	Samel	Malvaceae
14	Boswellia serrata Roxb.	Salar	Burseraceae
15	Butea monosperma, Lamk.	Dhak, Chhila	Papilionaceae
16	Cassia fistula Linn.	Amaltash	Caesalpiniaceae
17	Citrus medica Linn.	Nimbu	Rutaceae
18	Cordia dichotoma G. Forst	Lisoda	Boraginaceae
19	Dalbergia sissoo Roxb.	Shisham	Fabaceae
20	Delonix regia Bojer ex Hook.	Gulmohar	Fabaceae
21	Diospyros melanoxylon Roxb.	Tendu	Ebenaceae
22	Emblica officinalis Gaerth	Awla	Euphorbiaceae
23	Erythrina indica Lam.	Gadhpalas	Fabaceae
24	Eucalyptus hybrid DEH	Safeda	Myrtaceae
25	Ficus racemosa Linn.	Gular	Moraceae
26	Ficus religiosa, Linn.	Pipal	Moraceae
27	Jacarnada mimosaeifolia Benth.	Jaikanda	Bignoniaceae
28	Lannea coromandelica, Houtt.	Gurujan	Anacardiaceae
29	Mangifera indica, Linn.	Aam	Anacardiaceae
30	Melia azedarach Linn.	Bakayan	Meliaceae
31	Moringa oleifera Lamk.	Shajjana	Moringaceae
32	Morus alba Linn.	Shatut	Moraceae
33	Parkinsonia aculeata Linn.	Parkinsonia	Caesalpiniaceae
34	Phoenix sylvestris, Linn.	Khajur	Palmae
35	Pithecolobium dulce Rozb. Benth.	Jangal jalebi	Leguminaceae
36	Prosopis cineraria, Linn.	Khajedi	Mimosaceae
37	Prosopis juliflora Sw. DC.	Vilayati Babool	Mimosaceae
38	Salvadora persica Linn.	Jal	Salvadoraceae
39	Sterculia urens, Roxb.	Khaddu, Kaday	Sterculiaceae
40	Syzygium cuminii, Linn.	Jamun	Myrtaceae
41	Tamarindus indica, Linn.	Imli	Leguminaceae
42	Tecomella undulata G. DON	Rohida	Bignoniaceae
43	Wrightia tinctoria Roxb. R.Br.	Khirani	Apocynaceae

Table 3: Creeper Species

S.No.	Botanical Name	Local Name	Family
1	Abrus precatorius Linn.	Rati, Chirmi	Papilionaceae
2	Aristolochia bracteolata Linn.	Hukka vel	Aristolochiaceae
3	Asparagus racemosus Willd.	Nahar kanta	Liliaceae
4	Cocculus hirsutum Linn.	Peelwani	Monispermaceae
5	Cryptostegia grandiflora Roxb.	Rabar bail	Asclepiadaceae
6	Cuscuta reflexa Roxb.	Amarbail	Convolvulaceae
7	Tinospora cordifolia Thunb. Miers	Neem Giloy	Menispermaceae

Table 4: Grass Species

S.No.	Botanical Name	Local Name	Family
1	<i>Apluda mutica</i> Linn.	Govan	Graminae
2	<i>Aristida setacea</i> Retz.	Lapla	Graminae
3	<i>Cenchrus biflorus</i> Roxb.	Bharboot	Graminae
4	<i>Cenchrus setigerus</i> Vahl.	Kala dhaman	Graminae
5	<i>Cyanadon dactylon</i> Pers.	Doob	Graminae
6	<i>Cymbopogon foveolatus</i> E.Mey. Stearn	Motha	Graminae
7	<i>Dactyloctenium aegypticum</i> Wild.	Makda	Graminae
8	<i>Dendrocalamus strictus</i> Roxb. Nees	Bansh	Grminae
9	<i>Desmostachya bipinnata</i> Stapf.	Dhab	Graminae
10	<i>Dicanthium annulatum</i> Forssk. Stapf.	Karad	Graminae
11	<i>Eremopogon foveolatus</i> Del.	Buhari	Graminae
12	<i>Heteropogon contortus</i> , Beauv.	Surwal	Graminae
13	<i>Saccharum munja</i> Roxb.	Munj	Graminae
14	<i>Saccharum spontaneum</i> Linn.	Kans	Graminae

Table 2: Bush & Shrub Species

S.No.	Botanical Name	Local Name	Family
1	<i>Acacia jacquemontii</i> Benth.	Boli, Bhubhawali	Mimosaceae
2	<i>Achyranthes aspera</i> Linn.	Onga	Amaranthaceae
3	<i>Adhatoda vasica</i> Nees	Adusa	Acanthaceae
4	<i>Aerva pseudotomentosa</i> , Burn	Bui	Amranthaceae
5	<i>Agave americana</i> Linn.	Rambans	Agavaceae
6	<i>Albizia lebbek</i> Benth.	Sirak	Leguminaceae
7	<i>Alhagi pseudalhagi</i> Bieb. Desv.	Jawasa	Papilionaceae
8	<i>Argemone mexicana</i> Linn.	Satyanashi	Papaveraceae
9	<i>Barleria cristata</i> Linn.	Bajradanti	Acanthaceae
10	<i>Barleria priopatus</i> Linn.	Pili Kanteli	Acanthaceae
11	<i>Bauhinia variegata</i> , Linn.	Kachnar	Leguminaceae
12	<i>Cactus opuntia</i> Linn.	Thapla Thor	Cactaceae
13	<i>Calligonum polygonoides</i> Linn.	Phog	Polygonaceae
14	<i>Calotropis procera</i> Ait. R.Br.	Ankda	Asclepiadaceae
15	<i>Cannabis sativa</i> Linn.	Bhang	Papilionaceae
16	<i>Capparis decidua</i> Forsk.	Kair	Caparadaceae
17	<i>Carissa spinarum</i> Linn.	Karunda	Apocynaceae
18	<i>Cassia tora</i> , Linn.	Povad	Ceaealpiniaceae
19	<i>Commiphora wightii</i> , Arnott.	Google	Burseraceae
20	<i>Crotalaria burhia</i> Sania.JPG.	Kharkana/saniya	Sapindaceae
21	<i>Datura innoxia</i> P. Mill.	Dhatura	Solanaceae
22	<i>Dodonea viscosa</i> Hopbush	Reliya	Sapindaceae
23	<i>Euphorbia nerrifolia</i> Linn. Sun.	Danda thor	Euphorbiaceae
24	<i>Evolvulus alsinoides</i> Linn.	Shankh Pushpi	Convolvulaceae
25	<i>Ficus benghalensis</i> Linn.	Bad	Moraceae
26	<i>Holoptelia integrifolia</i> Roxb.	Churel, Papdi	Ulmaceae
27	<i>Leptadenia pyrotechnica</i> , Forsk	Khip	Asclepiadaceae
28	<i>Maytenus emarginata</i> , Wild	Kakeda	Celastraceae
29	<i>Mitragyna parviflora</i> Roxb. Korth.	Kadam	Rubiaceae
30	<i>Nyctanthes arbortristis</i> Linn.	Harsingar	Nyctanthaceae
31	<i>Ocimum sanctum</i> Linn.	Tulsi	Libiatae
32	<i>Pavonia indica</i> Linn.	Chhach kamadi	Malvaceae
33	<i>Pongamia pinnata</i> Linn.	Karanj	Leguminosae
34	<i>Rhus mysurensis</i> Heyne	Dancer	Anacardiaceae
35	<i>Sapindus emarginatus</i> Vahl	Aritha	Sapindaceae
36	<i>Tephroisa purpurea</i> L. Pers.	Dhamasa	Papilionaceae
37	<i>Tridax procumbens</i> Linn.	Molya, Mahendi	Compositae
38	<i>Xanthium strumarium</i> Linn.	Aadhashishi	Compositae
39	<i>Zizyphus numularia</i>	Jhadbair	Rhamnaceae
40	<i>Aloe barbadensis</i> Linn.	Gwar patha	Liliaceae
41	<i>Pogostemon bengalensis</i> Burm.f.	Van Tulsi	Libiatae
42	<i>Salanum incanum</i> Linn.	Oot katela	Solanaceae
43	<i>Tribulus terrestris</i> Linn.	Gokhru	Zygophyllaceae