

STUDY OF ROAD SIDE PHYTOSOCIOLOGY IN BORSAD TALUKA (GUJARAT)

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ABSTRACT

Borsad is located at 22°25'N 72°54'E / 22.42°N 72.9°E. It has an average elevation of 30 meters (98 feet). It is located around 17 km from Anand. Borsad is reach in biodiversity; All over the world, especially in developing countries, roads are continuously increasing at a fast rate; and roadsides occupy a very broad area of most countries. The present investigation was to identify the species richness and the degree of resilience of different roadside species on the basis of certain phytosociological parameters. Roadside vegetations are open to contaminations of diverse heavy metals and other gaseous pollutants, and to physical disturbances of being flattened by pedestrians and crushed by vehicles continuously. Being a biodiversity-rich region of the world, roadsides of Southwest India, are expected to be rich in unique pollution-tolerant species. Tolerant plants in heavy metal polluted roadsides may be excluders or accumulators or hyper-accumulators of the metals. Phytosociology of communities on roadsides is significant in the identification of the degree of tolerance of species, because the method in general, is considered efficient and appropriate to assess the ecological potentials of plants in natural communities. phytosociological analysis of busy roadsides of a biodiversity-rich Borsad taluka ,anand District of Gujrat, showed 18 species in fifty study site differently tolerant to the stressful environment, which included exotics as well as medicinal plants. ecological potentials of the tolerant species found on these Roadsides are discussed. Phytosociological investigations on roadsides plant in natural vegetations. Plants are the most important component of soil bioengineering. The success of stabilizing slopes with plantings depends to a great extent on the plants' survival success. And that survival depends on selecting the right plants for each site. Therefore to apply this methodology successfully, we need to understand plant phytosociology he characteristics, classifications, relationships, and distribution of plant communities.

Keywords: Phytosociology, frequency, density, relative abundance

INTRODUCTION

Ecologically unique roadside communities (National Research Council, 1997) provide enormous opportunities for investigations (Forman and Deblinger, 2000). Usual focus of roadside studies include variations in communities in relation to environmental gradients All over the world, especially in developing countries, roads are continuously increasing at a fast rate; and Roadsides occupy a very broad area of most countries.. Usual focus of roadside studies include variations in communities in relation to environmental gradients (Arevalo et al., 2005), survey of certain vegetation characteristics (Ahmad et al., 2004), conservation of wild species occupying the area (Allem,1997) and of invasive exotics. Plant phytosociology the characteristics, classifications, relationships,and distribution of plant communities (Mueller-Dombois and Ellenberg 1974). It is useful to collect related data to describe and understand the population dynamics of a species and how it relates to other species. G. Cleaver, L.R. Brown, G.J. Bredenkamp (2005), The phytosociology of the Marnewicks and Buffelsklip valleys of the Kammanassie Nature Reserve, Western Cape,Long ,M. Shah Hussain, Aisha Sultan, Jamal A Khan & Afifullah Khan(2008), Species composition and community structure of forest stands in Kumaon Himalaya, Uttarakhand, India

To gain a practical understanding of The Forest Survey of India (FSI) charged with the responsibility of assessment of the forest resource of the country, undertook the field inventory /survey of the trees in non-forest areas during 1992. The inventory has been with a slow pace until 1998-99. The pace of the inventorization has accelerated with the refinement of the methodology in the recent past. The inventory has been confined to rural non-forest areas only. The trees available in the no forest areas are classified into 8 categories for the purpose of data processing Growing trees in home gardens, farmlands, and sacred places, along the courses of water bodies and roads is an old age practice in India. Such trees have been important source for timber, fuel wood, fruit, fodder shade and shelter. The emphasis to plant more trees outside forests increased after the launch of social forestry programmers in India in late 1970s. The basic theme of the social forestry project was to plant trees in vacant lands, private as well as public, for meeting the domestic needs of local people through the Involvement of the people. The extent of trees outside forests and their contribution in meeting the requirement of wood and other forest products has not been studied in depth. These categories are farm forestry, roadside/rail side / pond side/ Canal plantations, village wood lot, block plantations and others. The sampling design followed is the stratified random sampling where village is treated as a final sampling unit. All the trees in the randomly selected villages are enumerated and measured. Some of the results of inventories are presented in the following Para. India is the seventh largest country in the world having an area of 328.72 m ha. It is bounded by the Great Himalayas in the north and crossed over by the Tropic of Cancer in the south and tapers off into the Indian Ocean between the Bay of Bengal on the east and the Arabian Sea on the West Countries having borders with India are Afghanistan and Pakistan to north-west, China, Bhutan and Nepal to north, Myanmar and Bangladesh to the east. Neighboring country In India, though forestry falls under the concurrent list of the Constitution, the Management and ownership of the forest rests with the States (Provinces). In the State Forestry Action Programmed prepared by State Governments, the role of trees growing outside forests has been greatly emphasized. The states have drawn their plans of growing trees for production of wood and other products from outside forests. In most of the state's major portion of the area where trees are

to be planted fall in the Farm lands. Areas which have been identified for growing trees are vacant land in the institutions (schools, colleges, offices, industrial complexes, religious places etc.) And parcels of land along roads, canals, railway lines and water courses. Plantations in homesteads and farmhouses have been proposed.

concept of life from for which he used the term “Vegetative from” since the different system have been devised by many ecologists for the description and classification of plant life forms (Raunkiar, 1934; Braun- Blanquet, 1932; Whittaker, 1975) but Raunkiaer, 1934) system is the most significant from ecological view point and has a universal applicability. Generally, a complete list of plants called “Floristic Composition” and their Life-Forms

METHODOLOGY

Generally the term phytosociology is understood as the study of the characteristic, classification, relations hips and distribution of plant communities via different measures the dynamic of each species as well as their relation among each other in community can be analyzed.

Sampling

For the purpose of carryout of the sampling process the Borsad taluka was 64 villages and all villages was their own taluka & district connecting roads, total 14 roads was selected for Phytosociological study. In this all sites there were cover the entire main & sub road of Borsad taluka necessary care was taken to include all roads sample was justifiable proportion while the collecting sample, the samples by taking random samples inside the plot. Samples were collected using standard quadrate methods (TrivedyandGoel, 1986)

Community Analysis

Community analysis was carried out during rainy season when majority of the plants were at the peak of their growth. In every study sites maximum 30 quadrates of 10 m × 10 m (100 sq m) size were randomly laid to study trees species. Laid maximum 50 quadrates.

RESULT AND DISCUSSION

Road Side Plantation

Borsad has good road network covering with state road. The detailed study was carried out for road side plantation 15 sites were study out of this were main sites has state road and other sites were village road. All this study site 18 tree species, 13 shrubs species and 20 herbs species studied phytosociological frequency, abundance, density, relative frequency, relative density and relative dominance, ivi.were calculated & tabulated.

Trees

Site -1 Anand crossing to Bochasan

In this site tree species of Cassia siemea 43 frequency while Albizzia lebbace and Accacia nilotica 33.33% both three plants dominant in frequency. Density of Azadirechta indica 0.7 and Acacia nilotica 0.6.

Site -2 Anand crossing to Napa

In this site *Accacia nilotica* 0.67 has highest density while *Mangifera indica* ranging in second position was 0.33. frequency of tree species like *Accacia nilotica* 29.17 was found dominant and

Site -3 Bhadran to Badalpur

Tree species diversity of this site enumerate that density of *Azadirachta indica* while frequency of tree species *Accacia nilotica* was stands first 16.66

Site -4 Bhadran to Gajana

In this site *Azadirachta indica* found highest in number density of this plant was 0.93 while *Accacia nilotica* were more pronounced in % of frequency .

Site -5 Vasad crossing To Kinkhlod

In this study site *Accacia nilotica* was highest dominant & frequency

Site -6 Sun Temple to Kasumbad

In this site *Accacia nilotica* had the highest frequency while *Azadirachta indica* had highest density . So study indicate that *Accacia nilotica* was cover site but the no. of plant present in this site *Azadirachta indica* was high in number.

Site -7 Napa to Bodal

Among tree species *Prosopis specigera* frequency was highest but this plant were not dense present this site thus density highest of *Azadirachta indica* (Table-5) result indicate that *Prosopis Spicegera* no. of species is not more compare to *Azadirachta indica* but they distributed whole site.

Site -8 Ras to Dali

In this study site *Prosopis specigera* has the highest frequency while *Accacia nilotica* 0.33 density highest no. of individual present in this study site and important value index also higher no. 35.67 *Accacia nilotica*.

Site -9 Sarol to Ras

In this study site *Albezia lebbek* frequency was 23.33 highest frequency, the tree species like *Prosppis specigera*, *Azadirachta indica* and *Albizzia Lebbek* had 0.53 density, however, the important value index species was *Azadirachta indica* (45.1) highest in this study site.

Site -10 Vaniyakuva to Santokpura

Azadirachta indica was 65 frequency compare to Raunkier life form. It's put in clacc C means higher number of frequency while in this site (0.65) density possess *Accacia nilotica* and (99.58)

Site -11 Vasad crossing to Ambav Toll

Accacia nilotica, *Cassia siemea* was highest frequency in this site (16.66) (table-9) while density had highest *Azadirachta indica* result show that *Accacia nilotica* and *Cassia siemea*

observed in highest no. of quadrate while Azadirechta indica had found no. of plant in less no. of quadrate.

Site -12 Vasad crossing to Kosindra

In this site has highest frequency (16.66) Mangifera indica while Accacia nilotica 90.33) had highest number of density

Site -13 Vasad crossing to Ras

Azadirechta indica, Albizzia lebbek both were highest frequency, density of tree species highest in Prosopis specigera, Azadirechta indica (0.53), Albizzia lebbek (0.53)

Site -14 Virsad to Amiyad

In this site Azadirechta indica (53) (Table11) had highest frequency while Accacia nilotica was highest in density.

Site 15 Virsad to Ras

Tree species diversity of Azadirechta indica (43.29) was highest frequency. In this site Albizzia lebbek (1.07), Eucalyptus (1.07) had highest density

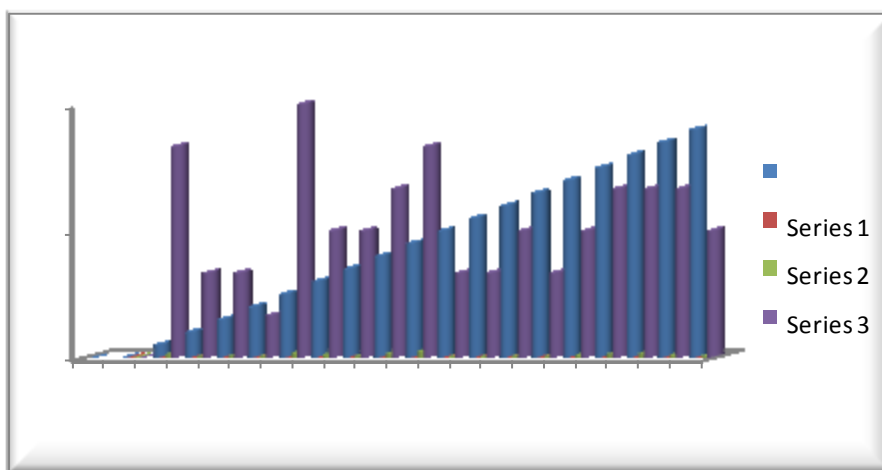


Chart-1 According To Table-1 in X- Name of Species, Y-Density, Frequence, Abundance

Table1. Density, Frequency and Abundance of trees species in Bhadran to Badalpur

No.	Name of the species	Density	Frequency	Abundance
1	Acacia nilotica (L.) Del.	0.27	16.66	1.6
2	Ailanthus excels roxb.	0.1	6.67	1.5
3	Albizzia lebbek Benth.	0.13	6.67	2.5
4	Alstonia scholaris R. Br.	0.1	3.33	3
5	Azadirachta indica A. Juss.	0.37	20	1.83
6	Cassia siamea Lamk.	0.23	10	1.43
7	Derris indica (Lam.) Bennet	0.1	10	1

Table1. Density, Frequency and Abundance of trees species in Bhadran to Badalpur
(Contd....)

No.	Name of the species	Density	Frequency	Abundance
8	<i>Eucalyptus globules</i> Labill.	0.33	13.33	2.5
9	<i>Ficus bengalensis</i> L.	0.5	16.66	3
10	<i>Ficus racemosa</i> L.	0.07	6.67	1
11	<i>Ficus religiosa</i> L.	0.07	6.67	2.5
12	<i>Holoptelea integrifolia</i> Planch.	0.1	10	1
13	<i>Limonia acidissima</i> L.	0.07	6.67	1
14	<i>Mangifera indica</i> L.	0.2	10	2
15	<i>Peltophorum pterocarpum</i> Backer.	0.27	13.33	2
16	<i>Pithecolobium dulce</i> Benth.	0.33	13.33	2.5
17	<i>Prosopis spicigera</i> L.	0.2	13.33	1.5
18	<i>Syzygium cumini</i> Skeels.	0.13	10	1.33

Table 2. Density, Frequency and Abundance of trees species in Bhadran to Gajana

No.	Name of the species	Density	Frequency	Abundance
1	<i>Acacia nilotica</i> (L.) Del.	0.66	16.66	3.8
2	<i>Ailanthus excels roxb.</i>	0.13	6.67	2
3	<i>Albizzia lebbek</i> Benth.	0.13	10	1.33
4	<i>Alstonia scholaris</i> R. Br.	0.13	6.67	2
5	<i>Azadirachta indica</i> A. Juss.	0.93	40	2.33
6	<i>Cassia siamea</i> Lamk.	0.37	16.66	2.2
7	<i>Derris indica</i> (Lam.) Bennet	0.1	6.67	1.5
8	<i>Eucalyptus globules</i> Labill.	0.07	3.33	2
9	<i>Ficus bengalensis</i> L.	0.17	10	1.67
10	<i>Ficus racemosa</i> L.	0.07	6.67	1
11	<i>Ficus religiosa</i> L.	0.03	3.33	1
12	<i>Holoptelea integrifolia</i> Planch.	0.1	6.67	1.5
13	<i>Limonia acidissima</i> L.	0.33	13.33	2.5
14	<i>Mangifera indica</i> L.	0.02	13.33	1.5
15	<i>Peltophorum pterocarpum</i> Backer	0.1	6.67	1.5
16	<i>Pithecolobium dulce</i> Benth.	0.13	6.67	2
17	<i>Prosopis spicigera</i> L.	0.02	13.33	1.5
18	<i>Syzygium cumini</i> Skeels.	0.3	10	3

Table 3. Density, Frequency and Abundance of trees species in Vasad crossing to Kinkhlod

No.	Name of the species	Density	Frequency	Abundance
1	Acacia nilotica (L.) Del.	0.37	16.7	2.2
2	Ailanthus excels roxb.	0.13	10	1.3
3	Albizzia lebbek Benth.	0.17	13.3	1.2
4	Alstonia scholaris R. Br.	0.27	6.67	4
5	Azadirachta indica A. Juss.	0.37	23.3	1.6
6	Cassia siamea Lamk.	0.23	16.7	1.4
7	Derris indica (Lam.) Bennet	0.17	13.3	1.3
8	Eucalyptus globules Labill.	0.13	10	1.3
9	Ficus bengalensis L.	0.1	6.67	1.5
10	Ficus racemosa L.	0.2	13.3	1.5
11	Ficus religiosa L.	0.13	10	1.3
12	Holoptelea integrifolia Planch.	0.27	16.7	1.6
13	Limonia acidissima L.	0.13	10	1.3
14	Mangifera indica L.	0.3	13.3	2.3
15	Peltophorum pterocarpum Backer.	0.23	10	3.5
16	Pithecolobium dulce Benth.	0.27	13.3	2
17	Prosopis spicigera L.	0.2	13.3	1.5
18	Syzygium cumini Skeels.	0.3	13.3	2.3

Table 4. Density, Frequency and Abundance of trees species in Sun temple to Kasumbad

No.	Name of the species	Density	Frequency	Abundance
1	Acacia nilotica (L.) Del.	0.97	26.67	3.63
2	Ailanthus excels roxb.	0.13	10	1.33
3	Albizzia lebbek Benth.	0.17	13.33	1.25
4	Alstonia scholaris R. Br.	0.1	6.67	1.5
5	Azadirachta indica A. Juss.	1.27	50	2.53
6	Cassia siamea Lamk.	0.07	6.67	1
7	Derris indica (Lam.) Bennet	0.13	10	1.33
8	Eucalyptus globules Labill.	0.33	10	3.33
9	Ficus bengalensis L.	0.17	6.67	2.5
10	Ficus racemosa L.	0.23	20	1.17
11	Ficus religiosa L.	0.07	6.67	1
12	Holoptelea integrifolia Planch.	0.1	10	1
13	Limonia acidissima L.	0.1	6.67	1.5
14	Mangifera indica L.	0.37	16.67	2.2
15	Peltophorum pterocarpum Backer.	0.1	6.67	1.5
16	Pithecolobium dulce Benth.	0.8	33.33	2.4

Table 4. Density, Frequency and Abundance of trees species in Sun temple to Kasumbad (Contd...)

No.	Name of the species	Density	Frequency	Abundance
17	<i>Prosopis spicigera</i> L.	0.33	20	1.67
18	<i>Syzygium cumini</i> Skeels.	0.4	10	4

Table 5. Density, Frequency and Abundance of trees species in Napa to Bodal

No.	Name of the species	Density	Frequency	Abundance
1	<i>Acacia nilotica</i> (L.) Del.	0.7	23.3	3
2	<i>Ailanthus excels roxb.</i>	0.1	10	1
3	<i>Albizzia lebbek</i> Benth.	0.1	6.67	1.5
4	<i>Alstonia scholaris</i> R. Br.	0.13	10	1.33
5	<i>Azadirachta indica</i> A. Juss.	0.57	23.3	2.43
6	<i>Cassia siamea</i> Lamk.	0	0	0
7	<i>Derris indica</i> (Lam.) Bennet	0.07	6.67	1
8	<i>Eucalyptus globules</i> Labill.	0.2	6.67	3
9	<i>Ficus bengalensis</i> L.	0.23	10	2.33
10	<i>Ficus racemosa</i> L.	0.13	10	1.33
11	<i>Ficus religiosa</i> L.	0.07	6.67	1
12	<i>Holoptelea integrifolia</i> Planch.	0.2	13.33	1.5
13	<i>Limonia acidissima</i> L.	0.1	6.67	1.5
14	<i>Mangifera indica</i> L.	0.17	13.33	1.25
15	<i>Peltophorum pterocarpum</i> Backer.	0	0	0
16	<i>Pithecolobium dulce</i> Benth.	0.2	10	2
17	<i>Prosopis spicigera</i> L.	0.17	16.65	1
18	<i>Syzygium cumini</i> Skeels.	0.2	10	2

Table 6. Density, Frequency and Abundance of trees species in Ras to Dali

No.	Name of the species	Density	Frequency	Abundance
1	<i>Acacia nilotica</i> (L.) Del.	0.33	20	1.67
2	<i>Ailanthus excels roxb.</i>	0.13	9.99	1.33
3	<i>Albizzia lebbek</i> Benth.	0.1	9.99	1
4	<i>Alstonia scholaris</i> R. Br.	0.1	6.66	1.5
5	<i>Azadirachta indica</i> A. Juss.	0.23	20	1.17
6	<i>Cassia siamea</i> Lamk.	0.1	9.99	1
7	<i>Derris indica</i> (Lam.) Bennet	0.13	9.99	1.33
8	<i>Eucalyptus globules</i> Labill.	0.27	16.65	1.6
9	<i>Ficus bengalensis</i> L.	0.03	3.33	1
10	<i>Ficus racemosa</i> L.	0.07	6.66	1

Table 6. Density, Frequency and Abundance of trees species in Ras to Dali (Contd...)

No.	Name of the species	Density	Frequency	Abundance
11	Ficus religiosa L.	0.17	3.33	5
12	Holoptelea integrifolia Planch.	0.13	9.99	1.33
13	Limonia acidissima L.	0.07	6.66	1
14	Mangifera indica L.	0.1	9.99	1
15	Peltophorum pterocarpum Backer.	0.07	6.66	1
16	Pithecolobium dulce Benth.	0.23	13.32	1.75
17	Prosopis spicigera L.	0.2	16.65	1.2
18	Syzygium cumini Skeels.	0.13	9.99	1.33

Table 7. Density, Frequency and Abundance of trees species in Sarol to Ras

No.	Name of the species	Density	Frequency	Abundance
1	Acacia nilotica (L.) Del.	0.4	13.33	3
2	Ailanthus excels roxb.	0.13	6.67	2
3	Albizzia lebbek Benth.	0.53	23.33	2.29
4	Alstonia scholaris R. Br.	0	0	0
5	Azadirachta indica A. Juss.	0.53	23.33	2.43
6	Cassia siamea Lamk.	0.1	6.67	1.5
7	Derris indica (Lam.) Bennet	0.13	10	1.33
8	Eucalyptus globules Labill.	0.33	10	3.33
9	Ficus bengalensis L.	0.03	3.33	1
10	Ficus racemosa L.	0.1	6.67	1.5
11	Ficus religiosa L.	0.03	3.33	1
12	Holoptelea integrifolia Planch.	0.3	20	1.5
13	Limonia acidissima L.	0.13	10	1.33
14	Mangifera indica L.	0.13	6.67	2
15	Peltophorum pterocarpum Backer.	0.4	16.66	2.4
16	Pithecolobium dulce Benth.	0.1	10	1
17	Prosopis spicigera L.	0.53	16.66	3.2
18	Syzygium cumini Skeels.	0.07	6.67	1

Table 8. Density, Frequency and Abundance of trees species in vaniyakuva to Santokpura

No.	Name of the species	Density	Frequency	Abundance
1	Acacia nilotica (L.) Del.	0.65	25	2.6
2	Ailanthus excels roxb.	0.1	5	2
3	Albizzia lebbek Benth.	0	0	0
4	Alstonia scholaris R. Br.	0.2	10	2

Table 8. Density, Frequency and Abundance of trees species in vaniyakuva to Santokpura (Contd....)

No.	Name of the species	Density	Frequency	Abundance
5	<i>Azadirachta indica</i> A. Juss.	1.4	65	1.75
6	<i>Cassia siamea</i> Lamk.	0.1	10	1
7	<i>Derris indica</i> (Lam.) Bennet	0.1	5	2
8	<i>Eucalyptus globules</i> Labill.	0.65	20	3.25
9	<i>Ficus bengalensis</i> L.	0.15	10	1.5
10	<i>Ficus racemosa</i> L.	0	0	0
11	<i>Ficus religiosa</i> L.	0	0	0
12	<i>Holoptelea integrifolia</i> Planch.	0.15	5	1
13	<i>Limonia acidissima</i> L.	0.1	10	1
14	<i>Mangifera indica</i> L.	0.2	15	1.33
15	<i>Peltophorum pterocarpum</i> Backer.	0.15	10	1.5
16	<i>Pithecolobium dulce</i> Benth.	0.2	15	1.33
16	<i>Prosopis spicigera</i> L.	0.15	20	0.75
17	<i>Syzygium cumini</i> Skeels.	0.15	10	1.5

Table 9. Density, Frequency and Abundance of trees species in Vasad crossing toambav

No.	Name of the species	Density	Frequency	Abundance
1	<i>Acacia nilotica</i> (L.) Del.	0.66	16.66	3.8
2	<i>Ailanthus excels roxb.</i>	0.13	6.67	2
3	<i>Albizia lebbek</i> Benth.	0.13	10	1.33
4	<i>Alstonia scholaris</i> R. Br.	0.13	6.67	2
5	<i>Azadirachta indica</i> A. Juss.	0.93	40	2.33
6	<i>Cassia siamea</i> Lamk.	0.37	16.66	2.2
7	<i>Derris indica</i> (Lam.) Bennet	0.1	6.67	1.5
8	<i>Eucalyptus globules</i> Labill.	0.07	3.33	2
9	<i>Ficus bengalensis</i> L.	0.17	10	1.67
10	<i>Ficus racemosa</i> L.	0.07	6.67	1
11	<i>Ficus religiosa</i> L.	0.03	3.33	1
12	<i>Holoptelea integrifolia</i> Planch.	0.1	6.67	1.5
13	<i>Limonia acidissima</i> L.	0.33	13.33	2.5
14	<i>Mangifera indica</i> L.	0.02	13.33	1.5
15	<i>Peltophorum pterocarpum</i> Backer.	0.1	6.67	1.5
16	<i>Pithecolobium dulce</i> Benth.	0.13	6.67	2
17	<i>Prosopis spicigera</i> L.	0.02	13.33	1.5
18	<i>Syzygium cumini</i> Skeels.	0.3	10	3

Table 10. Density, Frequency and Abundance of trees species in Vasad crossing to Kosindra

No.	Name of the species	Density	Frequency	Abundance
1	Acacia nilotica (L.) Del.	0	13	3
2	Ailanthus excels roxb.	0	7	2
3	Albizzia lebbek Benth.	0	10	1
4	Alstonia scholaris R. Br.	0	7	3
5	Azadirachta indica A. Juss.	0	10	2
6	Cassia siamea Lamk.	0	10	1
7	Derris indica (Lam.) Bennet	0	10	1
8	Eucalyptus globules Labill.	0	10	2
9	Ficus bengalensis L.	0	10	1
10	Ficus racemosa L.	0	7	1
11	Ficus religiosa L.	0	7	1
12	Holoptelea integrifolia Planch.	0	10	2
13	Limonia acidissima L.	0	10	1
14	Mangifera indica L.	0	17	2
15	Peltophorum pterocarpum Backer.	0	10	4
16	Pithecolobium dulce Benth.	0	10	2
17	Prosopis spicigera L.	0	10	1
18	Syzygium cumini Skeels.	0	13	1

Table 11. Density, Frequency and Abundance of trees species in Vasad crossing to Ras

No.	Name of the species	Density	Frequency	Abundance
1	Acacia nilotica (L.) Del.	0.4	13.33	3
2	Ailanthus excels roxb.	0.13	6.67	2
3	Albizzia lebbek Benth.	0.53	23.33	2.29
4	Alstonia scholaris R. Br.	0	0	0
5	Azadirachta indica A. Juss.	0.53	23.33	2.43
6	Cassia siamea Lamk.	0.1	6.67	1.5
7	Derris indica (Lam.) Bennet	0.13	10	1.33
8	Eucalyptus globules Labill.	0.33	10	3.33
9	Ficus bengalensis L.	0.03	3.33	1
10	Ficus racemosa L.	0.1	6.67	1.5
11	Ficus religiosa L.	0.03	3.33	1
12	Holoptelea integrifolia Planch.	0.3	20	1.5
13	Limonia acidissima L.	0.13	10	1.33
14	Mangifera indica L.	0.13	6.67	2
15	Peltophorum pterocarpum Backer.	0.4	16.66	2.4
16	Pithecolobium dulce Benth.	0.1	10	1

Table 11. Density, Frequency and Abundance of trees species in Vasad crossing to Ras
(Contd...)

No.	Name of the species	Density	Frequency	Abundance
17	<i>Prosopis spicigera</i> L.	0.53	16.66	3.2
18	<i>Syzygium cumini</i> Skeels.	0.07	6.67	1

Table 12. Density, Frequency and Abundance of trees species in Virsad to Amiyad

No.	Name of the species	Density	Frequency	Abundance
1	<i>Acacia nilotica</i> (L.) Del.	0.73	26.64	2.75
2	<i>Ailanthus excels roxb.</i>	0.37	13.33	2.2
3	<i>Albizia lebbek</i> Benth.	0.3	13.33	2.25
4	<i>Alstonia scholaris</i> R. Br.	0	0	0
5	<i>Azadirachta indica</i> A. Juss.	1.4	53.28	3.82
6	<i>Cassia siamea</i> Lamk.	0.23	0	2.33
7	<i>Derris indica</i> (Lam.) Bennet	0.17	13.33	1.25
8	<i>Eucalyptus globules</i> Labill.	0.07	6.67	1
9	<i>Ficus bengalensis</i> L.	0.07	6.67	1
10	<i>Ficus racemosa</i> L.	0.03	3.33	1
11	<i>Ficus religiosa</i> L.	0.07	6.67	1
12	<i>Holoptelea integrifolia</i> Planch.	0.1	10	1
13	<i>Limonia acidissima</i> L.	0	0	0
14	<i>Mangifera indica</i> L.	0.4	20	2
15	<i>Peltophorum pterocarpum</i> Backer.	0.13	6.67	2
16	<i>Pithecolobium dulce</i> Benth.	0.66	33.3	2
17	<i>Prosopis spicigera</i> L.	0.13	10	1.33
18	<i>Syzygium cumini</i> Skeels.	0.13	10	1

Table 13. Density, Frequency and Abundance of trees species in Virsad to Ras

No.	Name of the species	Density	Frequency	Abundance
1	<i>Acacia nilotica</i> (L.) Del.	0.27	10	2.67
2	<i>Ailanthus excels roxb.</i>	0.13	6.67	2
3	<i>Albizia lebbek</i> Benth.	1.07	36.63	2.91
4	<i>Alstonia scholaris</i> R. Br.	0	0	0
5	<i>Azadirachta indica</i> A. Juss.	0.87	43.29	2.89
6	<i>Cassia siamea</i> Lamk.	0	0	0
7	<i>Derris indica</i> (Lam.) Bennet	0.13	13.33	1
8	<i>Eucalyptus globules</i> Labill.	1.07	29.97	2.91
9	<i>Ficus bengalensis</i> L.	0.07	6.67	1
10	<i>Ficus racemosa</i> L.	0.17	10	1.67

Table 13. Density, Frequency and Abundance of trees species in Virsad to Ras (Contd...)

No.	Name of the species	Density	Frequency	Abundance
11	<i>Ficus religiosa</i> L.	0.15	10	1.5
12	<i>Holoptelea integrifolia</i> Planch.	0.1	10	1
13	<i>Limonia acidissima</i> L.	0.1	6.67	1.15
14	<i>Mangifera indica</i> L.	0.2	10	2
15	<i>Peltophorum pterocarpum</i> Backer.	0.33	13.33	3
16	<i>Pithecolobium dulce</i> Benth.	0.5	16.67	3
17	<i>Prosopis spicigera</i> L.	0.7	29.97	2.33
18	<i>Syzygium cumini</i> Skeels.	0.13	10	1.33

Table 14. Density, Frequency and Abundance of trees species in Anand crossing to Bochasan site

No.	Name of the species	Density	Frequency	Abundance
1	<i>Acacia nilotica</i> (L.) Del.	0.6	16.66	3.6
2	<i>Ailanthus excelsay</i> roxb.	0.13	6.67	2
3	<i>Albizzia lebbek</i> Benth.	0.57	33.33	1.7
4	<i>Alstonia scholaris</i> R. Br.	0.07	3.33	2
5	<i>Azadirachta indica</i> A. Juss.	0.77	33.33	2.3
6	<i>Cassia siamea</i> Lamk.	0.57	43.33	1.3
7	<i>Derris indica</i> (Lam.) Bennet	0.13	10	1.33
8	<i>Eucalyptus globules</i> Labill.	0.03	3.33	1
9	<i>Ficus bengalensis</i> L.	0.03	3.33	1
10	<i>Ficus racemosa</i> L.	0.13	13.33	1
11	<i>Ficus religiosa</i> L.	0.07	3.33	2
12	<i>Holoptelea integrifolia</i> Planch.	0.23	13.33	1.75
13	<i>Limonia acidissima</i> L.	0.03	3.33	1
14	<i>Mangifera indica</i> L.	0.07	3.33	2
15	<i>Peltophorum pterocarpum</i> Backer.	0.5	16.66	3
16	<i>Pithecolobium dulce</i> Benth.	0.03	13.33	2.25
17	<i>Prosopis spicigera</i> L.	0.1	10	1
18	<i>Syzygium cumini</i> Skeels.	0.57	23.33	2.43

Table 15. Density, Frequency and Abundance of trees species in Anand crossing to Napa site

No.	Name of the species	Density	Frequency	Abundance
1	<i>Acacia nilotica</i> (L.) Del.	0.67	29.17	2.29
2	<i>Ailanthus excels roxb.</i>	0	0	0
3	<i>Albizzia lebbek</i> Benth.	0	0	0
4	<i>Alstonia scholaris</i> R. Br.	0.08	8.33	1

Table 15. Density, Frequency and Abundance of trees species in Anand crossing to Napa site (Contd.....)

No.	Name of the species	Density	Frequency	Abundance
5	<i>Azadirachta indica</i> A. Juss.	0.29	20.83	1.4
6	<i>Cassia siamea</i> Lamk.	0.08	8.33	1
7	<i>Derris indica</i> (Lam.) Bennet	0	0	0
8	<i>Eucalyptus globules</i> Labill.	0.25	12.5	2
9	<i>Ficus bengalensis</i> L.	0.08	4.17	2
10	<i>Ficus racemosa</i> L.	0.08	8.33	1
11	<i>Ficus religiosa</i> L.	0.08	8.33	1
12	<i>Holoptelea integrifolia</i> Planch.	0.13	12.5	1
13	<i>Limonia acidissima</i> L.	0.17	16.68	1
14	<i>Mangifera indica</i> L.	0.33	25	1.33
15	<i>Peltophorum pterocarpum</i> Backer.	0.17	12.5	1.33
16	<i>Pithecolobium dulce</i> Benth.	0.33	25	1.33
17	<i>Prosopis spicigera</i> L.	0.17	12.5	1.33
18	<i>Syzygium cumini</i> Skeels.	0.25	20.83	1.2

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