

Trees Protected By the Bhil Community:

A Case Study of Sacred Groves in Dahod District of Gujarat

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Abstract

When a forest contains a value that is of outstanding significance or critical importance, extra safeguards are needed to ensure that the value is not degraded or otherwise negatively affected by any management. Management activities must be planned and implemented in order to maintain or enhance those values. This is also the basis of the concept of high conservation value forest management. Sacred Groves are such natural forest patches critical to local communities' traditional cultural identity. The Bhil community has for long served as the sole protectors and conservationists of such patches in the Dahod district of Gujarat. This paper is based on the study of eight sacred groves seen across the landscape of Dahod, conserved and protected predominantly by the Bhil community wherein they have been worshipping their deities and ancestral spirits since time immemorial. It brings out the present status of these groves in terms of ecological and cultural importance. It draws a comparison between the trees species found in these groves with those in the forest areas of Dahod district. The paper lists out 43 tree species as climatic climax species for the district, 39 species occur in the forest tract and 19 occur in the sacred groves. It suggests sustainable solutions to biodiversity conservation taking into account the present day threats faced by these groves and the measures needed for mitigating the depletive factors.

Key words: Bhils, Community, Conservation, Dahod, Sacred Groves.

Introduction

The word sacred means holy, blessed, divine, sanctified, religious, inviolable, and sacrosanct and the word grove means wood, plantation, thicket of trees. Sacred Groves are fragments of natural forests or patches of vegetation created by indigenous communities, varying in size from a few square meters having a cluster of few trees to several hectares (Malhotra, 2007), protected and conserved by them over the decades in the honour of their deities and ancestral spirits where they perform their religious and cultural rituals. Sacred Groves illustrate in-situ conservation. After the *Gonds* and the *Santhals*, the *Bhils* form the third largest tribe of India and they are inhabitants of Madhya Pradesh, Rajasthan, Gujarat and Maharashtra mainly. Dahod District of Gujarat came into existence after the division of Panchmahal District on 2/10/1997. The District is surrounded by Sabarkantha District and Banswada District of Rajasthan in the north, Godhara District in the west and Jhabua District of Madhya Pradesh in the east and south. According to the 2011 census figures of the demographic profile of various tribes in Gujarat, the population of the Bhils is maximum in the Dahod District of Gujarat. Out of the total Bhil population of 14,01,014 persons (male 7,02,517 and female 6,98,497) those inhabiting Rural areas are 13,50,529 (male 6,77,195 and female 6,73,334) and 50,485 (male 25,322 and female 25,163) live in Urban areas. There is predominance of tribals in Baria, Limkheda, Dhanpur, Dahod, Zalod, Garwada, Fatehpura, Randhikpur and Sanjeli taluka. The total forest cover in Dahod is about 88032 hectares out of which 86733 is

reserve forest, 359 hectares protected forest and 938 hectares of unclassified forest. The forest area is about 24.08% of the total geographic area of the district. As per the classification of Champion and Seth the forests of Dahod fall in Sub type C1b Dry Teak forest under 5A/C3 Southern Tropical Dry Mixed Deciduous Forests. (S.N.Tyagi, 2008)

In a district where the natural resource and vegetation has seen a decline due to heavy biotic pressure, illicit felling, encroachments, scanty rainfall and a semi-arid landscape, it comes as a surprise to see patches of vegetation with old trees near densely populated habitations. The people protecting these areas are Bhils who have never been given any glory for their conservation initiatives in anthropological texts. No inventory of such areas is kept at any forum, be it revenue office or in the Working Plan of the forest Department. Almost every village dominated by Bhil population has its sacred grove in the village. The belief system is very deep rooted in their culture, they have no written texts or religious books, they believe in Deities that live in the Sacred Groves and watch over them in every action and at all times. Their Deities reside in trees and the community will not let anyone cause any harm to those trees. Some groves present a picture of the past glory that the forests must have had once upon a time. The ground flora has however suffered in these areas due to grazing and invasion of weeds. What is also interesting is the presence of very old trees in the majority of groves and very few trees in the middle ages or small girth sizes. What would be the future of such groves then once the old trees died? Are these trees indicators of best adaptability for that area? I attempted to map some groves and study the tree species in them. With the help of the Forest Department find out the species that have resisted the changes around them and managed survival in the forests despite heavy biotic pressure and compare them with those in the sacred groves. Based on these findings then find out solutions for the maintenance and restoration of biodiversity in the sacred groves and degraded areas in the

district. The findings of this empirical study is based on eight sacred groves protected by the Bhils of Garwada, Limkheda and Fatehpura talukas. These sacred groves are based in Panchwada, Dakara, Lili Amba, Narwai, Garwada, Tukivaju, Nava Nagar and Fatehpura villages.

Methodology

The above mentioned sacred groves in the predominantly tribal dominant talukas of Dahod district were identified and visited with the help of the forest department and the villagers. It is noteworthy that these sacred groves have never been studied or documented before. The GPS points of the boundaries were taken and recorded on the Google maps thereafter, and area calculated. The plant species were recorded. The height of the trees and the measurement of girth at breast height (GBH) which is the perimeter of the stem taken at a height of 1.37 meters, were taken and recorded. Information regarding the deity, the prevalent taboos, and the importance of vegetation and the management of the grove was taken through informal interviews of the villagers, panchayat representatives and the priests of the sacred groves.

Observations and Results

The various attributes of the sacred groves studied in terms of their locations, area, and the deity worshipped. , the number of species and the number of trees girth wise found in them and the comparison of species with girth above 120 cms present in forest areas and the sacred groves along with their importance are stated in table number 1,2 and 3 respectively. The presence of old trees in the Sacred Groves ascertains its antiquity and also remind us of the age old traditions followed by the community. The older the trees the older the tradition and these trees are a witness to the cultural and spiritual ethos of the people. It is difficult to ascertain the age of the trees that do not have annual rings as seen in Teak, Pines etc. The data showing correlation of girth and age for most species that do not have annual rings is not readily

available. The girth of exploitability is the best size reached by an individual at a given age, when the ratio of growth: years culminates. After this the growth slows down. I consulted the Working plan for the forests of Dahod District, Baria division where in details of Stem analysis of *Tectona grandis* for decade 10 - 60 based on data collected in 1956-66 in site quality II of *Panchmahal* forests is given. It shows computation for diameter at breast height (over bark) and the increment details over six decades as shown in Table 5 and 6:

Decade	Diameter over bark	Girth at breast height
10	11.8	31.4
20	21.2	66.568
30	27	84.78
40	31.55	99.067
50	34	106.76
60	36.35	114.139

Age(years)	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60
Mean annual increment(cubic metre)/volume/age	0.008667	0.009923	0.01014	0.010014	0.00969
Periodic/current annual increment (cubic meter)increment/period(10 years)	0.013285	0.012438	0.010792	0.00951	0.00808

Based on the increment values a teak tree with girth between 106 to 114cm that would be between 50 to 60 years old would be harvestable and yield the best product. Then ageing would set in. The Working plan of Nagpur district puts the harvestable girth of *Teak* as 135 cm for site quality II, 120 cm for III and 105 for site quality IV. It fixes 135 cm for species like *Adina cordifolia*, *Pterocarpus marsupium* etc and as 105 cm for *Gmelina arborea*, *Anogiessus latifolia*, *Lagerstoemia parviflora* and 60 cm for *Acacia catechu*. (Jarnail, 2004). The Working Plan of Gondia Division in Maharashtra fixes 135 cm girth for site quality III for *Teak* and 120 cm for IV. For *Adina cordifolia* etc it is 135 cm for site quality III and 120 cm for IV and for *Anogiessus latifolia* group

it is 90 cm for site IV. 45 cm is prescribed as exploitable girth for site type IV for *Acacia catechu*. (Choubey, 2013). The different Locality factors therefore affect the growth of trees. Based on the above facts and taking into account that in Dahod division the average site quality of the forest corresponds to type III, the trees with a girth above 120 cm can be termed as old trees of the area that tell the tale of their survival and be termed as the species most adapted for that region.

An ecological community in the final stage of succession, in which the species composition remains relatively stable until a disturbance such as fire occurs, is called a climax community. (Heritage, 2011)

It is the final stage of succession which relatively remains unchanged unless climatic factor or human interference destroys it. The old trees of Sacred Groves represent such climatic climaxed species. Not all groves represent the miniatures of their original forest types but may represent the characteristic vegetation of each area as these have been preserved on religious grounds and never been clear felled.

About these Groves

These above mentioned sacred groves grow on revenue land that belong to the village, the community and the government has no control over these. The areas are marked as '*dev sthan*' in the village maps or just *Gouchar* which is the pasture land. None of these were demarcated on the ground by the revenue authorities. The villagers respect the boundaries of groves set by the village pujari who performs religious ceremonies of worship to the deity. Among the eight groves Panchwada was the smallest and Fatehpura the largest. Tukivaju stands on a hillock and is like a pilgrimage for the bhils in that area. Garbada is atop a hill, has very few yet old trees and harbours a large temple with marble interiors. Modernisation has started to take its grip there. Navanagar is in the interiors of the district and has good specimens of *Mytragyna parviflora*, *Sterculia urens* and *Bombax*

ceiba.Kalam and *Boswellia serrata* are the species worshipped but are not to be seen in the nearby forests. Eucalyptus of a plantation done by the forest department 15 years back stand tall .Lili amba is situated on the roadside yet harbours some of the best protected old trees of many species. On its edge is a *Mahavriksh* of *Mytragyna parviflora* having a girth of 450cm.The best specimens of *Tectona grandis* and *Terminalia bellirica* occur here but the ground is almost devoid of flora due to heavy grazing pressure. Dakara sacred grove seems like an extension of a household, is small and has a few old trees of teak and *Butea monosperma*. The deity is seen under the *Tectona grandis* tree without a temple .*Narvai* is on the bank of a village tank, is protected by a barbed wire fence, the deity resides on a concrete platform. A plantation by the social forestry wing has been taken up but little thought had gone behind the selection of species planted. The need to design restoration of such an area mindfully gets endorsed by this area. Fatehpura is a large and relatively well protected area although grazing problem exists. The area is rich in biodiversity and has very old trees of *Anogeissus latifolia* and *Mytragyna parviflora* .An *anganwadi* and a road around the grove constructed by the *Panchayat* is a recent development in the grove. Taboos occur in different forms in all these groves. Nobody can remove any parts of trees or plant parts from these areas for personal use. They have a tree assigned to their *Gotra* and under no circumstances can they harm the tree or its part, for example *the Ninamas* worship the *Neem* Tree, others worship *Ficus religiosa*, *Mytragyna parviflora*, *Boswelia serrata*, *Ficus benghalensis* ,*Terminalia bellirica* and *Terminalia arjuna*. If ever they remove any dead or uprooted tree, it will be used for the purpose of construction of shade for the deity or in activities related to rituals. Some ceremonies are exclusively performed by men and some by women separately. The women are not discriminated against and have the right to visit the groves any time they wish. Animal sacrifice and liquor is offered to the deity

for appeasing the Gods for general wellbeing of the worshippers or in individual capacity after their prayers have been heard and wishes fulfilled. There is a shift in the trend of offerings since many Bhils are turning *Bhagats* who have now embraced vegetarianism and therefore grains, fruits, ghee, incense, coconut etc are offered and no animal sacrifice made. Specially prepared *terracotta* horses and urns called *garba* are offered too mostly during the festival of *Diwali* and *Navratri*.

Table No: 1 Basic information about Sacred Groves					
S.No	Name of the Sacred Grove	Location		Area (square meters)	Name of Deities and the tree they reside under
1	Panchwada Garbada Taluka	Devdha	N22 44 23.2 E74 18 14.1	654	Kalika Mata /Mahakali under Ficus benghalensis
		D2	N22 44 23.2 E74 18 14.2		
		D3	N22 44 23.4 E74 18 13.1		
		D4	N22 44 22.0 E74 18 13.4		
		D5	N22 44 22.1 E74 18 14.2		
		92	N22 44 22.1 E74 18 14.1		
2	Dakara	Dakara1	N22 53 54.4 E74 00 49.6	779	Sawan Mata under Tectona grandis
		Mata	N22 53 54.5 E74 00 50.6		
		D2	N22 53 55.1 E74 00 50.2		
		D3	N22 53 55.5 E74 00 50.7		
3	Lili Amba Vasiya Dungri, Limkheda	K2	N22 38 20.6 E74 12 21.7	7767	Baba Dodamal Kunwar and Sawan Mata under Tectona grandis
		K3	N22 38 22.2 E74 12 21.0		
		K4	N22 38 22.3 E74 12 18.0		
		K5	N22 38 20.3 E74 12 17.9		
		Baba Doda Malkunvar	N22 38 20.8 E74 12 20.0		
		KalamvasaDungri	N22 38 18.8 E74 12 22.4		
4	Narwai	Varahi Mata	N22 40 50.0 E74 17 39.9	2957	Varahi Mata under Annona sqamosa
		V1	N22 40 51.8 E74 17 41.5		
		V2	N22 40 50.2 E74 17 40.8		
		V3	N22 40 49.4 E74 17 40.1		
		V4	N22 40 49.5 E74 17 39.4		
		V5	N22 40 50.4 E74 17 38.9		
		V6	N22 40 51.3 E74 17 39.7		
		V94	N22 40 51.8 E74 17 40.7		
5	Garwada	Baliadev temple	N22 41 03.5 E74 18 27.9	6717	Badiadev and Sitla Mata in a temple next to Azaradicta indica
		B1	N22 41 04.4 E74 18 29.9		
		B2	N22 41 04.8 E74 18 28.6		
		B3	N22 41 04.8 E74 18 27.5		
		B4	N22 41 03.8 E74 18 26.2		
		B5	N22 41 03.1 E74 18 26.2		
		B6	N22 41 02.4 E74 18 27.1		
		B7	N22 41 02.1 E74 18 28.2		
		B8	N22 41 02.2 E74 18 29.3		
		B9	N22 41 03.3 E74 18 29.7		
6	Tukivaju	Ghodaji	N22 43 51.9 E74 16 57.8	5630	Ghodaja Baba and Howan Mataini in a temple next to Tectona grandis
		GH2	N22 43 52.7 E74 16 57.4		
		GH3	N22 43 53.9 E74 16 59.0		
		GH4	N22 43 54.5 E74 17 00.4		
		GH5	N22 43 52.5 E74 17 01.1		
		GH6	N22 43 51.7 E74 16 59.6		
		Mandir	N22 43 53.2 E74 17 00.0		
		93	N22 43 53.0 E74 16 59.9		
8	Fatehpura, Fatehpura Taluka	Fatehpura	N22 53 58.4 E74 01 45.3	15475	Karwai Mata, Baba Dev under Holorrhena antidyentrica
		F1	N22 53 59.8 E74 01 45.7		
		F2	N22 53 59.3 E74 01 43.2		
		F3	N22 53 56.8 E74 01 41.9		
		F4	N22 53 55.2 E74 01 41.9		
		F5	N22 53 56.5 E74 01 45.0		
		F6	N22 53 57.3 E74 01 46.4		

Every deed done in the grove is done by the permission of the deity. These are unwritten rules followed by all the members of the community. Any act that contravenes the above rules attracts the wrath of the deity and is sure to suffer with some kind of disease in the

family members or cattle or even face death .The fear is so strong that no one dares to err. Stories of the unfortunate things that happened to the ones who erred are known to one and all in the village. The men women and children, all take part in the rituals of the deity and so the religious ethics are imbibed to an extent in most of them.

The result of this belief system are conserved patches of vegetation, a few square meters to a few hectares in area outside the forest areas in Dahod and are models of in-situ conservation. These sacred groves have high conservation values at the local level as these are patches representing the diverse vegetation of the past and have high ecological and cultural and spiritual value. This groves may get classified under High Conservation Value forests (HCVF) which are of six types. (Steve Jennings, 2003) A forest may be designated a HCVF if it contains or provides values without which a local community would suffer an unacceptable cultural change and for which the community has no alternative. Sacred groves qualify under HCV6 which is category that specifically takes such areas into account. HCV6 includes Forest areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

S.No	Vernacular name	Botanical Name	Family	In Forest Areas	In Sacred Groves	Economic		Sacred	Medicinal
						Timber	Non Timber		
1	Saag	<i>Tectona grandis</i>	Verbenaceae	✓	✓	✓			
2	Khakhar	<i>Butea monosperma</i>	Fabaceae	✓	✓		✓		
3	Kakad	<i>Lagerstroemia parviflora</i>	Lythraceae	✓		✓			
4	Timru	<i>diyospyros melanoxylon</i>	Ebenaceae	✓	✓	✓	✓		
5	Kado	<i>antidysentrica</i>	Apocyanaceae	✓			✓		✓
6	Umbh	<i>Milusa tomentosa</i>	Annonaceae	✓	✓		✓		
7	Dhavdo	<i>Anogeissus latifolia</i>	Combretaceae	✓	✓	✓	✓		
8	Sadad	<i>Terminalia crenulata</i>	Combretaceae	✓		✓			
9	Aledi/Aal	<i>Morinda tomentosa</i>	Rubiaceae	✓					✓
10	Bhutdi	<i>Cassine glauca</i>	Celastraceae	✓					
11	Khair	<i>Acacia catechu</i>	Mimosaceae	✓			✓		
12	Limdo	<i>Azadirachta indica</i>	Meliaceae	✓	✓	✓		✓	✓
13	Nilgiri	<i>Eucalyptus</i>	Myrtaceae	✓		✓			✓
14	Aakal	<i>Alangium salvifolium</i>	Alangiaceae	✓					
15	Patradi	<i>Dalbergia paniculata</i>	Fabaceae	✓					
16	Simdo	<i>Bombax ceiba</i>	Bombacaceae	✓			✓	✓	
17	Kananj/Audo	<i>Holoptelea integrifolia</i>	Ulmaceae	✓	✓	✓			✓
18	Amli	<i>Tamarindus indicus</i>	Caesalpiniaceae	✓			✓		
19	Moyano	<i>Lannea coromandelica</i>	Anacardiaceae	✓					
20	Mahudo	<i>Madhuca indica</i>	Sapotaceae	✓	✓		✓	✓	✓
21	Kalam	<i>Mitragyna parvifolia</i>	Rubiaceae	✓	✓				
22	Kusum	<i>Schleichera oleosa</i>	Sapindaceae	✓	✓		✓		
23	Beheda	<i>Terminalia bellirica</i>	Combretaceae	✓	✓		✓	✓	✓
24	Charoli	<i>Buchanania lanzan</i>	Anacardiaceae	✓			✓		
25	Jambu	<i>syzygium cumini</i>	Myrtaceae	✓			✓		✓
26	Guggal	<i>Boswellia serrata</i>	Burseraceae	✓			✓	✓	✓
27	Sissoo	<i>Dalbergia sissoo</i>	Fabaceae	✓		✓			
28	Sivan	<i>Gmelina arborea</i>	Verbenaceae	✓		✓	✓		
29	Dharan	<i>Dalbergia lanceolaria</i>	Fabaceae	✓		✓			
30	Tambodiyo	<i>Ehretia laevis</i>	Ehretiaceae	✓					
31	Sisam	<i>Dalbergia latifolia</i>	Fabaceae	✓		✓			
32	Arduso	<i>Ailanthus excelsa</i>	Simarubiaceae	✓					✓
33	Umarado	<i>Ficus glomerata</i>	Moraceae	✓				✓	✓
34	Kadayo	<i>Sterculia urens</i>	Sterculiaceae	✓	✓		✓	✓	✓
35	Dundro	<i>Hymenodictyon excelsum</i>	Rubiaceae	✓					
36	Biyo	<i>Pterocarpus marsupium</i>	Fabaceae	✓	✓	✓		✓	
37	Pipdo	<i>Ficus religiosa</i>	Moraceae	✓	✓			✓	✓
38	Haldu	<i>Adina cordifolia</i>	Rubiaceae		✓	✓			
39	Vad	<i>Ficus benghalensis</i>	Moraceae	✓	✓			✓	
40	Mokho	<i>Schrebera swietenoides</i>	Oleaceae	✓					
41	Gorasamli	<i>Pithecellobium dulce</i>	Mimosaceae		✓		✓		
42	Gulmohar	<i>Delonix regia</i>	Fabaceae		✓				
43	Kasi	<i>Cassia siamea</i>	Caesalpiniaceae		✓				

Source of data for forest species; Working plan for the forests of Dahod District, Baria division; by S.N. Tyagi, 2008

S.No	Name of Sacred Grove	Girth Class											
		0-30		31-60		61-90		91-120		120-150		151	
		SP	TR	SP	TR	SP	TR	SP	TR	SP	TR	SP	TR
1	Panchwada	3	8	1	1							2	9
2	Dakara	14	79	2	7	4	7	2	5	1	1	2	2
3	Lili Amba	2	188	1	26			1	1			8	20
4	Narwai	17	978	3	3	2	2	2	2			3	6
5	Garwada	1	36					1	1	1	1	2	4
6	Tukivaju	10	134	9	39	6	33	2	12	1	1	3	3
7	Nava Nagar	9	222	1	2	13	23	4	11	7	7	2	7
8	Fatehpura	14	716	15	627	3	99	1	20	2	2	5	5
			2361		705		164		52		12		56

SP - Number of Species | TR - Number of Trees(3350)

This value is designed to protect the traditional culture of local communities where the forest is critical to their identity, thereby helping to maintain the cultural integrity of the community.

These groves show the three characteristics that allow them to be classified as Indigenous Peoples' and Community Conserved territories and areas (ICCA) (Corrigan, 2013) too. The first characteristic is *Community* or well-defined people that possesses a close and profound relation with an equally well defined site (territory, area, or habitat) and/or species. This relation is

embedded in local culture, sense of identity and/or dependence for livelihood and wellbeing. The second is *Decisions*, that the people or community is the major player in decision-making and implementation regarding the management of the site and/ or species, implying that a local institution has the capacity to develop and enforce decisions, either by law or practice. The third characteristic is *Conservation*, the people's or community's management decisions and efforts lead to the conservation of habitats, species, genetic diversity, ecological functions/ benefits and associated cultural values, even when the conscious objective of management is not conservation alone. Table 4: Species Composition of Sacred Groves (Source: Field data)

Species Composition of Sacred Groves

S.No	Local name	Botanical Name	Family	Panchwada	Dakara	Lili Amba	Narvai	Garwada	Tukivaju	Navanagar	Fatehpura	Total
1	Akoli	<i>Alangium salvifolium</i>	Alangiaceae		√		√		√	√		4
2	Amli	<i>Tamarindus indicus</i>	Caesalpinaceae				√					1
3	Arduso	<i>Ailanthus excelsa</i>	Simarubiaceae				√		√			2
4	Astra	<i>Bauhinia racemosa</i>	Caesalpinaceae		√						√	2
5	Baval	<i>Acacia nilotica</i>	Mimosaceae								√	1
6	Behda	<i>Terminalia bellirica</i>	Combretaceae			√						1
7	Bel/Billi	<i>Aegle marmelos</i>	Rutaceae						√	√		2
8	Biya	<i>Pterocarpus marsupium</i>	Fabaceae								√	1
9	Bor	<i>Zizyphus mauritiana</i>	Rhamnaceae				√				√	2
10	Cheend	<i>Phoenix sylvestris</i>	Arecaceae							√		1
11	Dhava	<i>Anogeissus latifolia</i>	Combretaceae								√	1
12	Doodhi	<i>Wrightia tinctoria</i>	Apocynaceae								√	1
13	Gadha Saag	<i>Cordia wallichii</i>	Ehretiaceae						√			1
14	Garmado	<i>Cassia fistula</i>	Caesalpinaceae		√					√		2
15	Ghant	<i>Zizyphus xylopyra</i>	Rhamnaceae						√			1
16	Garasamli/Jungle Jalebi	<i>Pithecellobium dulce</i>	Mimosaceae		√		√			√		3
17	Gulmohar	<i>Delonix regia</i>	Fabaceae		√		√			√		3
18	Holdu	<i>Adina cordifolia</i>	Rubiaceae			√				√		2
19	Israili Baval	<i>Acacia tortilis</i>	Mimosaceae						√			1
20	Jambo	<i>Syzygium cumini</i>	Myrtaceae				√					1
21	Kodaya	<i>Sterculia urens</i>	Sterculiaceae							√		1
22	Kahua/Arjun Sadad	<i>Terminalia arjuna</i>	Combretaceae								√	1
23	Kalam	<i>Mitragyna parvifolia</i>	Rubiaceae							√	√	2
24	Kanaji/Auda/Chiral	<i>Holoptelea integrifolia</i>	Ulmaceae			√	√			√	√	4
25	Kanji/Karanj	<i>Pongamia pinata</i>	Fabaceae		√		√					2
26	Karamda	<i>Carissa congesta</i>	Apocynaceae				√					1
27	Karanj Palpaliya	<i>Bauhinia purpurea</i>	Caesalpinaceae		√							1
28	Kasi/Cassia Siamea	<i>Cassia siamea</i>	Caesalpinaceae							√		1
29	Kesuda	<i>Schleichera oleosa</i>	Sapindaceae						√			1
30	Khakhra	<i>Butea monosperma</i>	Fabaceae		√			√	√	√	√	5
31	Landia	<i>Lagerstroemia parviflora</i>	Lythraceae						√			1
32	Limda/Neem	<i>Azadirachta indica</i>	Meliaceae		√		√	√	√	√	√	6
33	Mahuda	<i>Madhuca indica</i>	Sapotaceae			√		√				2
34	Nilgiri	<i>Eucalyptus</i>	Myrtaceae				√			√	√	3
35	Peepda	<i>Ficus religiosa</i>	Moraceae				√			√		2
36	Peltaforum	<i>Pterocarpum</i>	Fabaceae							√		2
37	Prosopis	<i>Prosopis juliflora</i>	Fabaceae	√	√					√	√	4
38	Raintree	<i>Samanea saman</i>	Fabaceae								√	1
39	Rinjhalo	<i>Prosopis cineraria</i>	Mimosaceae	√					√			2
40	Saag	<i>Tectona grandis</i>	Verbenaceae		√	√			√	√	√	4
41	Semal	<i>Bombax ceiba</i>	Bombacaceae		√				√	√	√	4
42	Sevan	<i>Gmelina arborea</i>	Verbenaceae				√					1
43	Sissoo	<i>Dalbergia sissoo</i>	Fabaceae				√					1
44	Sitaphal	<i>Annona squamosa</i>	Annonaceae	√	√		√		√	√	√	6
45	Subabool	<i>Leucaena leucocephala</i>	Fabaceae								√	1
46	Timru	<i>diospyros melanoxylon</i>	Ebenaceae	√	√	√			√		√	5
47	Umh	<i>Milusa tomentosa</i>	Annonaceae			√						1
48	Umro	<i>Ficus glomerata</i>	Moraceae							√		1
49	Vaas Jhund	<i>Dendroclamus strictus</i>	Poaceae		√		√		√	√		4
50	Vad/Bargad	<i>Ficus benghalensis</i>	Moraceae	√		√	√					3
				5	15	8	19	3	16	21	19	

The sacred groves of Dahod studied also fall into the criteria of being called CCA's (*Community Conserved Areas*) The CCAs have the following criteria:

1. There is an identified group of people that can be considered a community (a group of people geographically, culturally and traditionally linked, sharing an interest in and/or interacting with a common natural resource base, ecosystems and species) who are involved in the effort. (A. Kothari, 2000) .THE *Bhils* is such a community in Dahod.
2. The concerned communities have substantial ethical, livelihood, cultural, economic or spiritual associations with and dependence on the conserved area. This is evident from the observations listed above.
3. The concerned communities are the major players or among the major players in decision-making and implementation of decisions. *Bhil* community follows unwritten rules and collectively protect and maintain the sacred areas.
4. The concerned communities have established systems (institutions, regulations, processes) for achieving their objective.
5. Irrespective of the objective of the initiative, the efforts lead towards maintenance or enhancement of one or more natural ecosystems and species therein. The sacred groves of Dahod are safe havens for numerous naturally occurring plant species.
6. The effort is taking place within a locally identified boundary (even though this may not always be very clear on a map). (Pathak, 2009-10)

Data analysis

The importance of these sacred patches of vegetation cannot be emphasized more by the fact that the collected data depicts the following:

1. All sacred Groves are unique in their ecological and cultural attributes for the area.
2. The eight areas studied occupy an area of 39979 sq mts. and have 50 species of trees. There are 705 trees in girth class 31 of to 60, 164 in 61-90, 52 in 91-120, 12 in 121-150 and 56 in above 151 girth class. The 0-30 girth class has 2361 established plants. The groves have a total of 3,350 trees of various girths in total.
3. The eight Sacred Groves have trees of 50 species belonging to 26 families. The maximum no of species are from family *Fabaceae* which is 9 families, followed by family *Caesalpinaceae* with 5 species and family *Mimosaceae* with 4 species. (Table 4)
4. The species comparison shows that there are 43 species in the girth class above 120 cm belonging to 25 families in the forest as well as the sacred groves. Family *Fabaceae* has 7 tree species, *Rubiaceae* has 4 and 3 species of *Combretaceae* and *Moraceae* have the old surviving members (table 3). The species in Sacred groves are protected irrespective of their economic importance. Old trees of sacred species like *Boswellia*, *Bombax*, *Gmelina*, *Ficus glomerata* are seen protected in forests as well.
5. Among the Sacred groves Lili Amba has the maximum number of species followed by Fatehpura and Navanagar. The oldest trees are found in Lili Amba. Navanagar has maximum number of middle aged trees. The girth classes of 90-120 and 121-150 have fewer trees than the trees above 151 girth class. (table 2)
6. Some of the largest trees of nineteen species occur in the 8 sacred groves studied. The forest have 43 tree species of comparable size but are scattered over a very large tract of land as compared to the sacred groves.
7. These trees indicate their ecological adaptability and stability in the district. These sacred groves are an equivalent of ancient woodlands that have great age protected without significant biotic disturbances. On comparison of the trees species above the 120cm girth size found in the forest tract and the Sacred groves outside the forest areas, forty three species were found to have stood the test of time and can be named the climatic species of the district.
8. Due to religious beliefs, no tree dead or otherwise has been removed over years. The ground flora has however been severely damaged due to biotic interference, mainly due to overgrazing by cattle.
9. The species composition and occurrence of old trees of different species together in comparatively well stocked sacred groves like *Fatehpura*, *Lili Amba*, *Nava nagar* indicate ideal associations of the species occurring together in an area.
10. These nineteen species of the tree species could be used for rehabilitation works as the local belief systems and their importance is certain. The healthy and plus trees found in these sacred groves could be identified and with the help of the communities seedlings prepared in village nurseries or seeds dispersed for rehabilitation works.

Why protect the Sacred Groves and the way forward

These are conservation areas which fulfil the most important criteria of defensibility where relatively more protection is assured. These areas are insulated by demographic pressures to a large

extent due to the religious beliefs of the Bhil community. These areas show the potential of maintaining high levels of biodiversity close to high human population density. Once rehabilitation works begin these areas will not be eyed for alternate use by non-believers also. Manageable small patches enabling rehabilitation and insitu conservation of species on the decline, maintained by the community will yield success and species loss from the district will be deferred. (Duthie, 1997) . The belief system of the Bhils has played a crucial role in the in-situ conservation of natural forest patches as the Bhils obey unwritten laws of their belief system and share a collective responsibility towards their protection and maintenance

The sacred groves need restoration. Species seem to be imperiled and need a rehabilitation package as soon as possible. There are some species that are worshipped by them and others that are economically important and yet spared due to religious beliefs in areas where scarcity is the norm all around.

There are unwritten rules of these groves and they need to be respected. Conservation has to be left in the hands of the villagers only and any sort of intervention or rehabilitation should be done through the community.

Each sacred grove is unique and therefore would need independent attention. It must be remembered while proposing to rehabilitate these sacred groves that just because we have access to them it does not give us the right to infringe their sacred space without their consent. Conservation has to be a participatory process.

They do not need shrines there, as the deities prefer to occur in natural surroundings under particular trees and not under civil structures. They need help in restoration in regards to

plantation demarcation and protection of the boundaries..

Demarcation, inventorying the biodiversity, recording the beliefs and rituals surrounding it, facilitating the protection and maintenance of the grove with the community in driving seat is the need of the hour. Building bridges of faith and co-operation between the government and the villagers for the sustenance and biodiversity and cultural values may show the way forward.

A form of *conservation area matrix* of such plant diversity areas outside the forest areas with the help of the tribal community. Since floristic diversity occurs in a mosaic of forest areas, wilderness sites, ethnic habitats, endemic centers and sacred groves, it is necessary to develop a matrix of conservation area network with community participation. (P, 1997)

The alarming fact seen is that a climax stand that is composed of very old/senescent tree would degrade/fall within a short time period resulting into the start of a new cycle of succession. Therefore in order to create a mixed age stand it is important to carefully choose suitable species to be planted in the gaps over a period of time. Select the most adapted species of the area for restorative plantation. Although these groves are protected in general by the villagers but the grazing pressure has taken a toll on nearly all of them. Soil compaction, invasion of weeds are preventing the regeneration of valuable species of all forms.

The surviving trees are huge in size and only shade bearing species survive underneath so if these larger trees were to die and fall the area would look like an open scrub therefore thought will have to be given while gap planting the area taking into consideration the following facts: Assess the area available under the canopy cover throughout the year and plant the same species as the oldest trees present there. Selection and planting of shade tolerant species of local importance already existing in the areas Plant in a way so as to maintain the area's natural

look. Seeding of other forms of plants can be done to enrich the local biodiversity. Species composition must be maintained as per the structure of the sacred grove. Reintroduce the relevant species in the plant associations. Rehabilitate the degraded forests in the line of the plant associations found in these old safe havens of sacred groves. These can contribute to the genetic resource required for rehabilitating the sacred groves and nearby forest areas. Sustainable solutions to protecting and conserving biological and cultural diversity together can be only through collaboration among local people facilitation by government schemes. (Effective dialogue and action)

Healthy ecosystems and biocultural knowledge are of great value. The ties between traditional local peoples, their knowledge and resources must remain strong. These Sacred Groves although small in size represent the characteristic vegetation of the area they are found in, they are in large numbers and represent strong ties between the local peoples and nature in the name of their belief system and have high conservation values. They need to be maintained and protected at all costs.

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