



**STUDY OF COMMON PROPERTY RESOURCES (CPR) WITH SPECIAL REFERENCE TO WATER AND BIOLOGICAL RESOURCES AT PROJECTED AREA NEAR VILLAGE NINAT, BARDOLI, DISTRICT-SURAT**

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**Abstract:** Common property resources constitute all such resources which are meant for common use of the villagers. In the pre-British India, a very large part of the country's natural resources was freely available to the rural population. These resources were largely under the control of the local communities. Gradually, with the extension of state control over these resources, resulting in decay of the community management system, CPRs available to the villagers declined substantially over the years. Nevertheless, it is widely held that CPRs still play an important role in the life and economy of the rural population. Gujarat is favorite industrial destination and industrial development is very high this time. The present study is based mainly on the information on the size of common property water and biological resources available in projected area around 10Km radius from Village Ninat Takluka Bardoli, District-Surat. The data were collected from a sample of households by interview method. The survey period was March to June 2013. The biological value of an area can be characterized by the species richness, degree of species endemism, uniqueness of the ecosystem and magnitude of threats of extinction. Based on field experiences and review of the resources synergy, it is strongly advocated that the management and conservation of common property resources must be framed, implemented and evaluated in the light of area specific needs, socioeconomic characteristics, bio-physical attributes and the influence of external forces. Thus it is urgently required that the management of common property resources could be ensured by maintaining harmony between man and nature.

**Keywords:** Biological diversity; Common property resources; Geo-hydrology; Water resources.

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## INTRODUCTION

Common Property Resources (CPRs) play pivotal roles for the livelihood of the people in the mountains region, including the Himalayan hills where their livelihood mostly depends in (subsistence) marginal agriculture (Gadgil and Iyer, 1989; Chopra et al., 1990). CPRs include all resources like village pastures and grazing grounds, village forest and woodlots, protected and unclassified government forests, waste land, common threshing grounds, watershed drainage, ponds and tanks, rivers, rivulets, water reservoirs, canals and irrigation channels. In the pre British India, a very large part of the country's natural resources was freely available to the rural population. These resources were largely under the control of local communities. Gradually, with the extension of state control over these resources and the resultant decay of community management system, CPRs available to the villagers declined substantially over the years. Today, in almost all parts of the country, the villagers have a legal right of access only on some specific categories of land and water resources.

Nevertheless, it is widely held that CPRs still play an important role in the life and economy of the rural population. The present enquiry aims at providing certain basic statistics on the size of CPRs, type of benefits derived from CPRs, their magnitude and the proportion of households making use of CPRs. Resources accessible to and collectively owned/held/managed by an identifiable community and on which no individual has exclusive property rights are called common property resources. Resources owned or held by an individual or a family or an organization like a company or corporation or co-operative are not be considered as CPRs. However, a resource held by a co-operative society constituted of persons who were co-users of the resource prior to its formation, is treated as a CPR. The beginning of the studies of the CPRs in India can be traced back to early 1980's (Turkelboom *et al.*, 2005; Jodha, 2007; Yae Sano, 2008).

### **Common Property Resources**

According to NSS 54<sup>th</sup> Round (1999), followings are the common property resources available in India:

**a). Common village land:** These categories of CPRs refer to common property land resources within the boundary of the village and were formally *i.e.* by legal sanction or official assignment, held by village panchayat or community of the village. Categories of common village land are described below:

- **Village panchayat grazing land/pasture land:** This is a well-defined category of land in the classification used in official land-use records. Traditionally, grazing and pasture land has been the most important constituents of CPR land. Many villages have land earmarked as permanent pastures land/grazing land. These are variously known as gauchar, gochar, gairan, gomol, etc. Villagers have user right on permanent pasture by legal sanction. Village woodlots which may have come up on the grazing land/pasture land were not considered under this category.
- **Village forest and woodlot (not under Forest/Revenue Dept.) and van panchayat forest:** This item includes all land under village forest and woodlots. This also includes the area notified as forest within the village which may belong to the forest department, or any other government department like Revenue department or PWD but is formally under the management of village panchayat or a community of the village. Van panchayat forests in the hills of Uttar Pradesh, which are formally managed by village communities, are also included in this category.
- **Village sites and threshing floor:** They include village sites and all area of land which is earmarked for common use of the villagers for economic activities, such as processing of agricultural produce, storing of grains, other agricultural produce, firewood, etc and use for other household enterprise.

**b). Government forest:** By legal status, forests in India are classified into following three categories, viz. reserved forest, protected forest and unclassified forests. Forest land also includes all state owned area of land classed as forest under any legal enactment or administered as forest, whether or not actually under forest. However, area of land under social and farm forestry, village forests, Van Panchayat forests and forests owned by individual households are excluded.

- **Reserved forest:** Reserved forests are constituted under the Indian Forest Act or other forest laws of the States. The government holds absolute rights of ownership in reserved forests. The products of a reserved forest are not to be used by the local population unless specifically permitted by way of grant of privilege and not as a matter of right. Access to these forests is generally restricted.
- **Protected forest:** Protected forests too are constituted under the Forest Act. The locals are permitted to gather all produce except those items which are specifically prohibited. Other privileges to the local population are also permitted. The privileges commonly enjoyed by the local population include collection of leaves, firewood, fodder and other minor forest produce, grazing of cattle, etc.
- **Unclassed forests:** According to the classification by legal status, this category includes all other forests. Some of these forests are privately owned. All village forests are included in this category. In the hill States of the North-east, forests are owned by district councils, village community and even by individual households. All these come under the category of unclassified forests. In some parts of the country, there are forests on revenue land, which are normally assigned to the forest

department for management. These are called as revenue forest or soyam forests.

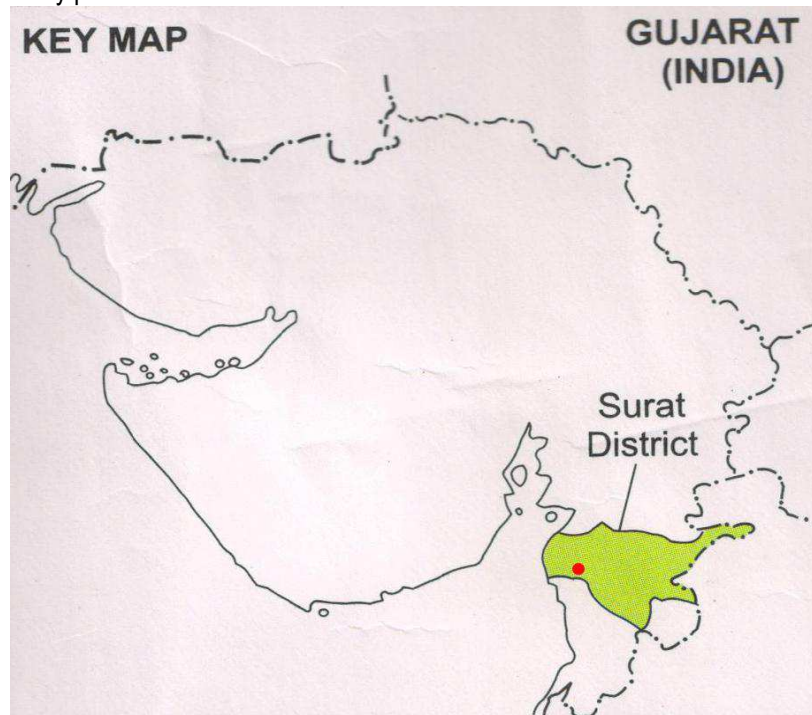
**c). Common water resources:** Typically, an Indian village uses a number of water sources, usually of different types, to meet their needs. Besides meeting needs for domestic purposes, such as drinking, bathing, washing etc., these sources provide for irrigation, feeding and washing of livestock, fishing and needs of other household enterprises. Many of the water sources used by villagers are owned by individual households. But in most of the villages, there are some sources which are meant for community use. These are either held by the village community as a whole or a caste/religion/occupation-based community or a community based on traditional social order or community of persons of a geographical location. There are also sources of water which are either constructed by or lie within jurisdiction of a government department. All these sources, whether or not controlled by a community or a local body, which are not held by individual households, have been treated as common water resources.

### **Community Management of Water Resources**

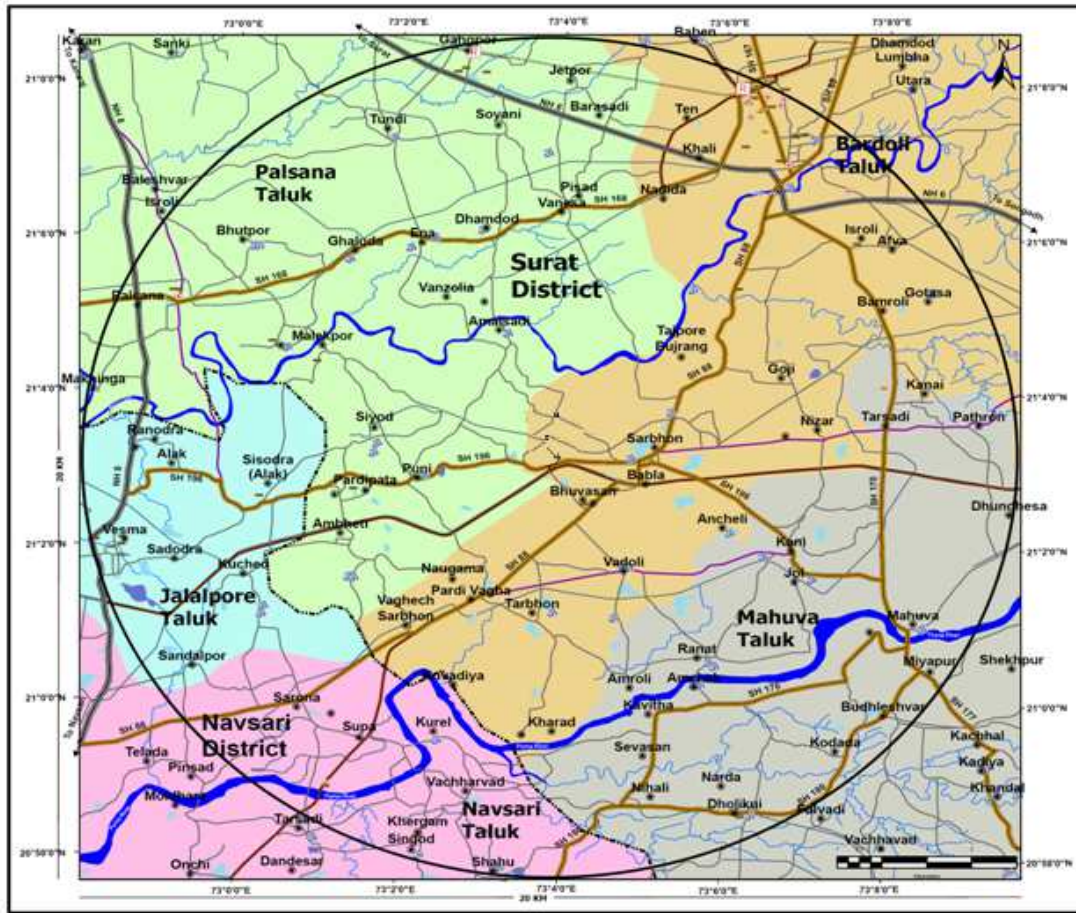
Management of water resources by a local body, whether formal or informal, has been referred to as community management of common water sources. Apart from local self-government like panchayat and formal local organizations like co-operative, pani panchayat, sinchai samitis and other farmers associations, totally informal but functionally effective local-level organizations for managing common water resources are commonly found in a large number of villages. A strong case should be developed for protecting and developing common property resources, since they promote the economic activity best suited to the natural resource base of a region, sustain the rural poor and ensure the use of arid lands according to their capabilities (Jodha, 1986; Deshpande et al., 2001; Joshi, 2006).

### **EXPERIMENTAL**

The data were collected for the present study from a sample of households by interview method. The survey period was March to June 2013.



**Figure 1. Key map of Area of Interest**



**Figure 2. Map of Study (Projected) Area-10 Km Radius**

The preliminary surveys were conducted in the projected area shown in figure 2. Extrapolation and prediction techniques were used to limit the number of sites to be assessed. The knowledge of species habitats requirement, soil type, terrain, vegetation etc. were used to predict species occurrence. The rapid biodiversity assessment were undertaken by identifying potentially rich sites from satellite imagery (Google Earth) and conducting the field survey in the potential habitats. GPS was utilized for locating field sample plots as well as gathering positional attributes. For floral survey, sample plots have been randomly distributed across the suitable stratum within 10 Km radius. Emphasis has been placed on presence of rare, endemic, migratory and threatened species, if any present in the study area. Desktop literature review was conducted to identify the representative spectrum of threatened species, population and ecological communities as listed by IUCN, ZSI, BSI and in Indian Wildlife Protection Act, 1972. The status of individual species was assessed using the revised IUCN category system. The five parameters were taken for the current study, listed in table 1.

**Table 1. Parameters considered for CPRs Study**

S.No.	Synergy Parameters	Factors
1	People	Population, number of household's and caste composition.
2	Status of Existing CPRs	Forest, water resources, pasture lands, wasteland etc.
3	Geophysical Characteristics	Altitude, geographical area, slope, distance from the road head and blockhead quarter.
4	Biological Resources	Floral Diversity, Trees, timber, herbs, shrubs, climbers etc.
5	Accesses and Management	Access to essential system amenities and infrastructure, adoption rate and interventions by modified traditional knowledge.

## RESULTS AND DISCUSSION

The present enquiry on common property resources (CPRs) aims at assessing their role in the life and economy of the rural people. In recent years, use of common property resources in India has drawn the attention of planners and policy-makers dealing with wasteland development, antipoverty programmes and environmental problems. There are 70 villages within study area of 10 Km radius of projected site which is presented in following table-2.

### Demographic Structure

The details concerning the demographic structure of the survey were collected from Census record of Surat and Navsari district. Survey area covers five talukas in two districts.

- Total area in hectare is 28327.9 and population density is 4 persons per sq km.
- Total households are 27679 in the region.
- The composition of the population in project area 121716 was found to be slightly skewed in favor of male. Total males are 63549 and total females are 58167 this is reflected in the males are more than females. Total SC population is 5553; total ST population is 64856.
- Sex ratio (number of female per thousand male) in the surveyed area is 915; this shows that male population is higher in the region as compared with the female population.
- The social development of a region is signified by many indices. One of which is literacy status of the population. The literacy rate in the project area is around 69.73%. Gender disparity in literacy rate is considerable. The male literacy rate is 470257 (55.40%) as against the female literacy rate of 37848 (44.51%).

**Table 2. Water Recourses (all types) in Villages at Projected Area**

S.No.	Village	Population			Water Resources
		Total	Male	Female	
1	Bhutpor	591	310	281	T, W, TK, HP, C
2	Ghaluda	440	219	221	T, W, HP, C
3	Tundi	2282	1151	1131	T, W, TW, HP, C
4	Tena	1976	1075	901	T, W, TK
5	Ena	3777	1895	1882	T, W, TW, HP
6	Palsana	10945	6893	4052	T, W, TK, TW, HP
7	Malekpor	2531	1213	1318	T, W, TW, HP, R, C
8	Siyod	758	377	381	T, W, TK, TW, HP, R, C
9	Vanzolia	1176	569	607	T(2), W, TK(2), TW(2), HP, R, C
10	Puni	1843	935	908	T, W, TK, HP, R, C
11	Ambheti	2202	1136	1066	T,W, TK, TW, HP, R, C
12	Amalsadi	2775	1401	1374	T,W, TK, TW, HP, R, C
13	Dhamdod	1344	659	685	T,W, TK, TW, HP, R, C
14	Vanasa	2881	1445	1436	T,W, TK, TW, HP, R, C
15	Pisad	1898	959	939	T,W, TK, TW, HP, R, C
16	Soyani	1658	851	807	T,W, TK, TW, HP, R, C
17	Barasadi	1022	504	518	T,W, TK, TW, HP, R, C
18	Jetpor	503	240	263	T,W, TK, TW, HP, R, C
19	Gangpor	1516	760	756	T,W, TK, TW, HP, R, C
20	Ten	6251	3252	2999	T, HP, R
21	Khali	157	82	75	T, W, TK, HP
22	Nadida	1136	573	563	T, W, TW, HP, R
23	Tajpore Bujrang	958	492	466	T, W, HP
24	Goji	1303	665	638	T, W, TW
25	Bamroli	418	205	213	T, TW, HP, R, C
26	Isroli	969	507	462	T, W, HP, C
27	Afva	2202	1058	1144	T, W, HP
28	Gotasa	487	230	257	T, W, HP

29	Nizar	1312	672	640	T, W,TK, C
30	Sarbhon	4476	2298	2178	T, W, HP
31	Babla	829	419	410	T, W, HP
32	Ninat	1037	513	524	T, W
33	Bhuvasan	739	360	379	T, W
34	Ancheli	255	126	129	T, W
35	Vadoli	2296	1173	1123	T, W, HP
36	Naugama	506	250	256	T, W, HP
37	Pardi Vagha	712	355	357	T,,W, HP
38	Vaghech Sarbhon	958	471	487	T, W, HP, C
39	Tarbhon	2229	1120	1109	T, W, HP
40	Kharad	37	18	19	T, W, R
41	Tarsadi	2079	1173	906	T, W, HP, C
42	Pathron	988	492	496	T, W, C
43	Dhundhesa	468	222	246	W, HP, C
44	Kani	2649	1362	1287	T, W, HP, C
45	Jol	898	442	456	T, W, HP, R, C
46	Mahuva	5050	2653	2397	T, HP
47	Miyapur	941	466	475	W, HP, C
48	Budhleshvar	688	358	330	W, HP, C
49	Ranat	1152	590	562	T, W, HP
50	Amroli	484	252	232	T, W, HP,R, C
51	Amchak	1163	593	570	T, W, HP, C
52	Kavitha	969	496	473	W, HP, R
53	Sevasan	229	121	108	W, HP, R
54	Nihali	1185	595	590	T, W, TK, HP, C
55	Narda	462	229	233	W, TK, HP, C
56	Dholikui	1480	745	735	T(2), W, TK(2), HP, C
57	Kodada	912	463	449	T(2), W, TK(2), HP, C
58	Sandalpor	1533	780	753	T, W, TK, HP, C
59	Kuched	1249	655	594	T, W, TK, HP, C
60	Sadodra	354	171	183	T, W, TK, HP, C
61	Vesma	8833	4541	4292	T, W, TK, HP, C
62	Sisodra (Ganesh)	8406	4285	4121	T, W, TK, HP, C
63	Alak	797	406	391	T, W, TK, HP, C
64	Ranodra	298	158	140	T, W, TK, HP, C
65	Vachharvad	723	346	377	T, W, TK, HP, R
66	Shahu	1414	706	708	T, W, HP
67	Kurel	1223	622	601	T, W, TK, HP, R
68	Singod	753	393	360	W, TK, HP
69	Supa	2248	1444	804	T, W, HP, R
70	Sarona	703	359	344	T
<b>Total</b>		<b>121716</b>	<b>63549</b>	<b>58167</b>	<b>310</b>

**Legends:** T= Tap Water, W= Well water, TW= Tube well water, TK= Tank water, HP= Hand pump, R= River, C= Canal.  
Number in ( ) represent number of resource.

### Geo-Morphological Study

Based on the general elevation, slope and landscape configuration in the terrain, the studied area falls in the plain. The topography is almost flat to semi flat. As per Geo-morphological study, low lying area is towards west and Northern-West. It means ground slope is towards west and northwest of the studied area. Regional water flow direction is towards west and south west. All surface water flows through Nalla and continuing to downstream and lastly merge in Arabian Sea. As the slope is low, so runoff becomes less and as a result the seep rate increases as per flat topographical condition of the area, water seeps through topsoil below that silt, kankar/calcareous concentration and below that

secondary structure weak plains/ flow plains/joint plains/fracture plains persists at moderate to deeper depth. One man made irrigation canal has been observed at E73°03'54.9" and N21°03'08.0", trending north east to south west. South of area important river Purna River, chief tributary of Tapi River, also trending north east to south west and confluence into sea. The shown studied area belongs to alluvial plains as well as flood plain. Regional study indicates no prominent drainage pattern but indicates almost dendritic drainage pattern of the area. The thick topsoil layer spreads almost throughout area, in low lying area thickness becomes more which does not exceed over 1.50 m from ground level varying from place to place and below this there is laterite/basalt rock formation persisting below ground. The physiography of the area controls the erodibility, availability of ground water, groundwater saturation, groundwater recharging etc. The most favourable water zones are always expected to occur parallel to nallah or low-lying area and geologically disturbed area. All the above revelation is also supported by the collected data.

### Hydro-Geology

Groundwater prospects are good to excellent in alluvial plains and flood plains. The depth of groundwater level is ranging between 1m to 6m below ground level. The litho unit comprises alluvial deposit. The general direction of groundwater flow is north east to south west or westerly. All nalla confluencing into Purna river and lastly merge in Arabian sea. Groundwater quality in the area is marginal at some patches quality of groundwater is good and at some places quality of groundwater is not drinkable. Sisodra pond is on bank of road. Water samples were analyzed and incorporated for detail chemical analysis. Water level 1.0m-6m below ground level have been measured from non yielding/ yielding open well with good quality and good yield. Generally in Bhuvasan village area and other area farmers are using surface water for cultivation. Top black soil/yellow brown soil, below that silt/kankar and below that basalt rock persist at deeper depth. Due to shallow water level and good groundwater condition density of green area with good crops observed in agriculture land, farmers are growing sugarcane, banana and paddy etc. in fields. Surrounding village water supply is totally based on local water source system of individual village.

**Table 3. CPR (Water) Availability in Study Area**

#	Type of Source	Co-ordinates	Masonry (mt bgl)	Water level (mt bgl)	Depth (mt bgl)	Diameter (inch)	Remarks
1.	Open well at Ninat village	N21°02'40.2" E073°04'11.3"	Masonry Below WL	02.35	09.05	1.6m	Well to overhead tank then supply for hamlets
2.	Open well Sarbang village	N21°02'42.9" E073°04'27.3"	Masonry Below WL	1.05m	11.85	2m	Black cotton then thin layer of laterite below that basalt.
3.	Open well Panchayat village	N21°03'19.4" E073°05'12.9"	Masonry Below WL	01.60	08.50	4.6m	1 inch dia discharge line for supply Bhuvasan
4.	Open well Near over Head tank village	N21°04'25.4" E073°05'29.9"	Masonry Below WL	08.55 Rock Basalt	17.10	2.4m	1.5 inch dia discharge line for supply Tejpur.
5.	Open well Junction of Road -Goji	N21°04'22.3" E073°05'56.3"	Masonry Below WL	01.90 Rock Basalt	10.05	1.3m AGL-1.30m	No pump; Drinking use by rope and bucket
6.	Open well	N21°09'18.7"	Masonry	01.40	06.70	2.1m	3 inch dia.

	Near over Head tank at Goji village	E073°06'34.3"	Below WL	Rock Basalt			discharge line (village water supply by this well, drinkable quality)
7.	Open well Private well at Isroli village	N21°06'08.9" E073°07'42.7"	Masonry Below WL	01.00 Rock Basalt	13.50	2.5m	2.5 inch dia. discharge line for supply; Present yield 8hrs/day by 7.5HP pump/pre monsoon-1 - 2hrs/day
8.	Open well near Temple at Mahuva village	N21°00'58.9" E073°08'15.3"	Masonry Below WL	16.70 Subsurface Unconsolidated	17.80	2.1m	1.5 inch dia. discharge line for supply; using for temple use, No Bore-well in this area total supply by wells.
9.	Open well at Kani village	N21°01'47.1" E073°06'56.5"	Masonry Below WL	1.80 Expected rock-Basalt	07.90	1.5m	No pump, no diesel engine; abandoned well.
10.	Open well at Kani village	N21°02'42.0" E073°06'08.7"	Masonry Below WL	1.10 Basalt rock	05.50	1.1m	No pump, No diesel engine; Abandoned well.
11.	Open well Surbhon Village	N21°03'10.4" E073°03'15.9"	Masonry Below WL	1.0m Basalt rock	08.70	2.1m AGL-1.05m	No pump/No diesel engine; Abandoned well.
12.	Open well Puni Village	N21°02'55.1" E073°02'16.3"	Masonry Below WL	0.50m Basalt rock	09.20	3.10m AGL-1.50m	No pump, No diesel engine; Abandoned well.
13.	Open well Puni Village	N21°02'57.3" E073°01'17.1"	Masonry Below WL	0.20m Basalt rock	05.30	1.0m AGL-0.90m	No pump, No diesel engine; Abandoned well, Irrigation by canal water
14.	Open well Lakhanpore Village	N21°02'37.8" E073°01'06.0"	Masonry Below WL	0.70m Basalt rock	08.30 AGL-0.70m	2.60m	No pump, No diesel engine; Abandoned well; Covered by iron steel tool bars

WL= water level, AGL= Above ground level.

Most of the natural resources of the region have been using various to meet their day to day needs and in maintaining the ecological balance between the resources and socio economic status. Economic



status of the inhabitants is around a holistic and complex network of livestock, cultivable land, forests and water.

### Biological diversity (resources)

The dominant trees in the study area were generally planted either as farmland plantation or homestead plantation or along the road sides. Otherwise natural tree cover is very less in this part. Dominant tree species in the farmland was dominated *Tectona grandis* (Sag), *Cocos nucifera* (Narial), *Adirachta indica* (Limbad), *Ailanthus excelsa* (Aurdso), *Eucalyptus sp* (Nilgiri), *Albizia lebbek* (Siris) and *Mangifera indica* (Keri). Homestead plantation was dominated by *Pithecellobium dulce* (Gorasamli), *Tamarindus indica* (Amali), *Mangifera indica* (Keri), *Moringa oleifera* (Sargavo), *Ficus benghalensis* (Vad) and *Cocos nucifera* (Narial). Road side Plantations were dominated by *Acacia auriculiformis* (Bengali Baval), *Peltophorum pterocarpum* (Sonmukhi), *Tamarindus indica* (Amali), *Delonix regia* (Gulmohar), *Casuarina equisetifolia* (Sharu), *Azadirachta indica* (Limbad), *Acacia leucophloea* (Hermobaval), *Acacia nilotica* (Baval), *Albizia lebbek* (Siris), *Leucaena leucocephala* (Pardesi Baval), *Prosopis cineraria* (Khijdo), *Ficus benghalensis* (vad), *Dalbergia latifolia* (Shisam), *Pongamia pinnata* (Karanj), *Ailanthus excelsa* (Aurdso) and *Tectona grandis* (Sag). No mangrove was observed in the study area. The dominant shrub community in this area was represented by, *Calotropis procera*, *C. gigantea* (Akado), *Prosopis juliflora* (Gando baval), *Ipomoea fistulosa* (Nasarmo), *Lawsonia inermis* (Mendi) and *Lantana camara* (Ganthai). Climbers/ twiners in the study area dominated by, *Ipomoea pes-tigridis* (Wagpadi), *Ipomea pes-caprae* (Dariani vel), *Ipomea aquatica* (Nali ni Bhaji), *Coccinia grandis* (Ghiloda), *Luffa cylindrica* (Galku) and *Abrus precatorius* (Chanothai).

Table 4. Biological (Trees) Recourses in the Study Area

S.No.	Family and Scientific Name	Vernacular Name
<b>1</b>	<b>Family: Anacardiaceae</b>	
1/1	<i>Mangifera indica</i> L.	Kari, Mango
<b>2</b>	<b>Family: Annonaceae</b>	
2/1	<i>Polyalthia longifolia</i> (Conn.) Thw.	Asopalav
<b>3</b>	<b>Family: Apocynaceae</b>	
3/1	<i>Plumeria rubra</i> L.	Champo
<b>4</b>	<b>FAMILY: BOMACACEAE</b>	
4/1	<i>Adansonia digitata</i> L.	Rukh, Rukhdo
5/2	<i>Bombax ceiba</i> L.	Savar, Shimlo
<b>5</b>	<b>Family: Arecaceae</b>	
6/1	<i>Cocos nucifera</i> L.	Narial
7/2	<i>Borassus flabellifer</i> L.	Toddy palm
8/3	<i>Phoenix dactylifera</i> L.	Date Palm
9/4	<i>Roystonea regia</i>	Royal Palm
<b>6</b>	<b>Family: Caesalpiniaceae</b>	
10/1	<i>Delonix regia</i> (Boj.) Raf.	Gulmohar
11/2	<i>Cassia fistula</i> L.	Garmalo
12/3	<i>Cassia siamea</i> Lam.	Kasid
13/4	<i>Peltophorum pterocarpum</i> (DC.) Backer ex Heyne	Sonmukhi,
14/5	<i>Tamarindus indica</i> L.	Amali
<b>7</b>	<b>Family: Caricaceae</b>	
15/1	<i>Carica papaya</i> L.	Papaya
<b>8</b>	<b>Family: Casuarinaceae</b>	
16/1	<i>Casuarina equisetifolia</i> L.	Sharu
<b>9</b>	<b>Family: Combretaceae</b>	
17/1	<i>Terminalia catappa</i> L.	Badam
18/2	<i>Anogeissus latifolia</i> ( Roxb)	Dhavdo
<b>10</b>	<b>Euphorbiaceae</b>	

S.No.	Family and Scientific Name	Vernacular Name
19/1	<i>Emblica officinalis</i> Gaertn.	Ambla
<b>11</b>	<b>Family: Malvaceae</b>	
20/1	<i>Thespesia populnea</i> (L.) Sol.ex Corr.	Paras piplo
<b>12</b>	<b>Family: Meliaceae</b>	
21/1	<i>Azadirachta indica</i> A.Juss	Limbado
<b>13</b>	<b>Family: Mimosaceae</b>	
22/1	<i>Acacia auriculiformis</i>	Austrian baval,
23/2	<i>Acacia leucophloea</i> (Roxb) Willd.	Hermobaval
24/3	<i>Acacia nilotica</i> (L.) Del.subsp.indica (Bth.) Brenan	Baval
25/4	<i>Albizia lebbbeck</i> (L.) Bth.	Siris
26/5	<i>Leucaena leucocephala</i> (Lam.) De	Pardesi Baval
27/6	<i>Pithecellobium dulce</i> (Roxb.) Bth.	Gorasmlī
28/7	<i>Prosopis cineraria</i> (L.) Druce	Khyigdo
<b>14</b>	<b>Family: Moraceae</b>	
29/1	<i>Ficus benghalensis</i> L.	Vad
30/2	<i>Ficus religiosa</i> L.	Piplo
<b>15</b>	<b>Family: Moringaceae</b>	
31/1	<i>Moringa oleifera</i> Lam	Sargavo
<b>16</b>	<b>Family: Myrtaceae</b>	
32/1	<i>Eucalyptus</i> sp.	Nilgari
33/2	<i>Syzygium cumini</i> (L.) Skeels.	Jambu
<b>17</b>	<b>Papilionaceae</b>	
34/1	<i>Dalbergia latifolia</i> Roxb.	Sisam
35/2	<i>Pongamia pinnata</i> (L.) Pierre	Karanj
<b>18</b>	<b>Family: Poaceae</b>	
36/1	<i>Dendrocalamus strictus</i> (Roxb)	Bans
<b>19</b>	<b>Family Rutaceae</b>	
37/1	<i>Limonia acidissima</i>	Kothi , Kotha
<b>20</b>	<b>Family: Salvadoraceae</b>	
38/1	<i>Salvadora oleoides</i> Decne	Piludi
<b>21</b>	<b>Family: Sapotaceae</b>	
39/1	<i>Manilkara hexandra</i> (Roxb.) Dub.	Rayan
40/2	<i>Manilkara zapota</i> (L.)	Chikoo
<b>22</b>	<b>Family: Simaroubaceae</b>	
41/1	<i>Ailanthus excelsa</i> Roxb.	Aurdso
<b>23</b>	<b>Family: Rhamnaceae</b>	
42/1	<i>Zizyphus glabrata</i> Heyne ex Roth.	Bor
<b>24</b>	<b>Family: Verbenaceae</b>	
43/1	<i>Tectona grandis</i> L.f.	Sag

No natural forest land was observed in the study area except few scattered scrub cover in the barren lands and area demarcated for grazing. The IUCN Red List is the world's most comprehensive inventory of the global conservation status of plant and animal species. It uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. With its strong scientific base, the IUCN Red List is recognized as the most authoritative guide to the status of biological diversity. Among recorded plant species, during the survey period, none can be assigned the status of endemic plant of this region. The major agriculture activities of this region are Sugar cane (*Saccharum officinarum*) cultivation. In few of the villages, mainly Sisodara, Kanav and Ena rice is cultivated as major crop. The crop occupying the highest percentage of the sown area of this region is taken as the major crop and all other possible alternative crops which are sown in this region either as substitutes of the base crop in the same

season or as the crops which fit in the rotation in the subsequent season, are considered as minor crop. There are no such places archaeological, historical or tourist interest within the study area. Almost all the villages having places of worship like temples and mosques in the buffer zones.



**Figure 3. Purna river (a) and Mindhola river (b) passing through the study area**

The beginning of studies of CPRs in India can be traced back to early 1980s. Since then, a large number of field studies have been conducted. These studies mostly deal with the nature and extent of dependence of the rural poor on the CPRs for their bio-mass needs, depletion and degradation of the CPRs and the existing systems of community management of these resources. Some of these studies covered a fairly large number of villages scattered over a vast area of the country, some were confined within a State or a region of a State and a majority were in the nature of case studies. These studies provide detailed information on the nature, size and contribution of the CPRs, problems relating to access to them and the factors underlying the depletion and degradation of these resources. But they offer little help in understanding their role and associated problems at the national or State level. Moreover, most of these studies were conducted in the arid and semi-arid areas or hill and forest fringe regions of the country (Runge, 1990; Bhowmik, 2011). The rights and practices determining the access to these resources are generally conventional. In India, CPRs include village pastures and grazing grounds, village forests and woodlots, protected and unclassed government forests, waste lands, common threshing grounds, watershed drainage, ponds and tanks, rivers, rivulets, water reservoirs, canals and irrigation channels. The CPRs have traditionally been a source of economic sustenance of the rural poor and have played an important resource-supplementing role in the private-property based farming system. They are also the main source of bio-mass fuel for the rural population (Dorji, 1995). Total 12 industries were observed in this area which can contaminate the natural resources.

**Table 5. List of Industries in 10 Km Radius from the Projected Area**

S. No.	Name of Company	Location/Taluka
1.	Evergreen Board (P) Ltd. Ninat	Palsana
2.	Hi-Tech Board Pvt. Ltd.	Palsana
3.	Magicrete Building Solution Pvt Ltd. Alak	Palsana
4.	Himalaya Plywood	Palsana
5.	Parishram Processors Pvt. Ltd.	Palsana
6.	Prafull (Agrawal) Art Prints Pvt. Ltd.	Palsana
7.	J.K. Polyfilm	Palsana
8.	Garden Silk Mills Ltd.	Palsana
9.	Vimal Agro Product (P) Ltd. Ten	Bardoli
10.	Pooja Textile Dyeing & Printing House	Bardoli
11.	Pigeon Latex Pvt. Ltd.	Bardoli

S. No.	Name of Company	Location/Taluka
12.	Shree Khedut Sahakari Khand Udyog Mandli Ltd.	Bardoli



Figure 4. Few patches of thick vegetation consist mainly *Acacia nelotica* was observed near Kanai.

## CONCLUSION

Gujarat is the most developing industrial destination and rapid industrial development is not good for natural resources. The study concludes that the higher exploitation of common property resources become a threat for longevity of such resources. Thus there need for appropriate management practice is essential to conserve to these CPRs by suitable measures as required for each category of CPRs. The people centered approach might be ensuring sustainable, balanced and equitable development of the area. The socioeconomic aspects and their indicators seem highly relevant for better understanding of sustainable management and utilization of CPRs. This exercise can be used in other watersheds *i.e.* capacity building, strengthening of local institutions, essential policy amendments PRA, decentralized policies and programme formulation at micro-level, creating awareness, ensuring effective and massive involvement of women along with maintaining harmony between man and nature.

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## REFERENCES

- Bhowmik Debesh (2011). Common Property Resources. Accessed on 26th Sept. 2011 Available online at <http://debeshbhowmik.blogspot.in/2011/09/common-property-resources.html>
- Chopra, K. Kadekodi, G. K. and Murty, M. N. (1990). Participatory Development: People and Common Property Resources. Sage Publication India Pvt. Ltd., New Delhi.
- Deshpande R.S., Marothia D.K., Shah Khalil (2001). Managing Common Pool Resources for Poverty Reduction in Tribal Areas of Eastern India with Special Reference to Small Scale Culture Fisheries and Non-Timber Forest Products. Policy Brief. Institute for Social and Economic Change. Available online at <http://www.isec.ac.in/Managing%20Common%20Pool%20Resources.pdf>

- Dorji, Tenzin. (1995). Assessment of non-timber forest resource utilisation in Eastern Bhutan. Field Document. No.UTF/BHU/008/BHU/Third Forestry Development Project, Forest Services Division, Thimphu, Bhutan.
- Yae Sano (2008). The role of social capital in a common property resource system in coastal areas: A case study of community-based coastal resource management in Fiji. SPC Traditional Marine Resource Management and Knowledge Information Bulletin #24. Pp 19-32
- Gadgil, M. and Iyer, P. (1989). On the diversification of common property resource use by Indian society. In: Common Property Resources. Fikret Berkes (Ed.). International Book Distributors, Dehradun. pp. 240-55.
- Jodha N S (1986). The Decline of Common Property Resources in Rajasthan, India. Pastoral Development Network Papers 22c. Agricultural Administration Unit AP India.
- Jodha N S (2007). Common Property Resources and the Rural poor. *In: Environmental Issues in India: A Reader.* Mahesh Rangarajan (Ed). Pearson Longman Dorling Kindersley (India) Pvt. Ltd. India. pp 206-209
- Joshi B. K. (2006). Common Property Resources Synergy and Perspectives of Sustainable Management in Garuganga Watershed, Indian Central Himalaya. *J. Hum. Ecol.*, 20(1): 69-75
- NSS 54th Round (1999). Common Property Resources in India. Report by National Sample Survey Organization, Department of Statistics and Programme Implementation Government of India January 1998 – June 1998.
- Runge, C. Ford (1990). Common Property Resources in a Global Context. Royal Swedish Academy of Sciences Available online at <http://ageconsearch.umn.edu/bitstream/13736/1/p90-27.pdf>
- Turkelboom F., Gurung T.R. and Dukpa D. (2005). Role and use of Common Property Resources (CPRs) in Bhutan Himalayas: between Tradition and Globalization. Available online at <http://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/1294/turkelboom.pdf>

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**CONFLICT OF INTEREST:**            Nothing