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Characterisation of Jaisamand Lake and its Implication for Management

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ABSTRACT

Jaisamand Lake (earlier known as Dhebar Lake) is a water structure situated on Udaipur-Banswara road around 52 kms from Udaipur town in Rajasthan. The lake was constructed during 1711-30 AD in the regime of Maharana Jai Singh of Mewar in whose memory the lake has been named. It was the largest artificial lake of the country for quite some time. The purpose of construction of this lake was to provide facilities for regeneration and preservation of wildlife. Till 1954 no attempt was made to use the water for irrigation purposes.[i]

The catchment area is 1,80,974 ha. comprising of 6 % irrigated and 16% un-irrigated land, 16% forest 25% culturable waste and 37 % not available for cultivation. Though 79% of the land is legally common, a lot of this is encroached either for private agriculture or private pastures. This has implications in the land use management plan for the region[ii]

A characterisation exercise done by SPWD, attempts to understand the issue of basin level management from its smallest unit, the village watershed and building up to the catchment area by characterising different parts of a sub basin from upper catchment to its entry into the lake. Industrial development, agriculture, animal husbandry and mining are the major economic activities within the river basin. The related issues and the interest of different sections of the community in this regard have been documented. GIS mapping and field survey, uncover different facets of the natural resources, the people and their relation to natural resources. The survey for instance clearly brings out the relationship of different communities to animal husbandry resources and their link with agriculture and fodder availability.

CBOs of partner organisations total 550 and cover 40% of the villages. This forms the basis for integrating basin and watershed management through federation.

Keywords: Jhamri, Remote-Sensing, SPWD, JJVS, HVVS, PS, Wastelands

FEATURES OF JAISAMAND CATCHMENT

Climatic Features:

Erratic and low rainfall with varying intensity and uneven distribution of heavy intensity rainfall in short spells characterizes Southern Rajasthan. In the particular context of small and marginal farmers, the steep slopes with sandy soils making out a livelihood from natural resources a very challenging task. A major portion of the rainfall is wasted as runoff, which also takes the top layer of soil away from the fields. These sand/soils deposit in the bed of the river and silt up Jaisamand reservoir. The water tables in general are very deep and declining further still. A combination of all these factors makes agriculture a difficult proposition in the region. The communities have adapted to this challenge and depend on livestock rearing as another activity to support their livelihood. Depleting forests and tree cover with little or no agriculture production have depleted the fodder supply. Existing watershed and allied NRM programmes focus mainly on conservation of the resources. There is a need to look at the fertility of the soil and productivity of different types of biomass as also the biodiversity aspects in order to ensure the long term sustainability of the resources and the livelihoods in the region.

The rainfall analysis done by SOPPECOM indicates that generally, one may assume that a high proportion of the surface flows may be intercepted with proper planning and placement of water harvesting structures. However, the situation is not that simple with respect to groundwater interception. In view of the very small proportion of cultivated and cultivable land and the low spread of inhabitation it is better, at least initially, not to assume too high a proportion of interception for groundwater. It is likely that in many places this proportion could be higher, but this needs to be studied and established at a micro level before it can be made part of routine assumption. Accordingly, it is initially assumed that 80% of the surface water and 50% of the groundwater is intercepted. Under these assumptions, one may see how the mean and *annual* (one is not taking note of cumulative effects here) availability match for the period 1986 to 1998.

For 6 out of the 12 years: The entire requirement for livelihood needs is satisfied. Additionally, in four of these six years, on an average, the availability of water per household is *twice* the requirement worked out: in those *everybody* can get extra water.

For 3 out of the twelve years: The livelihood requirements are not fulfilled. In these years all that can be assured is food security and drinking and domestic water needs including drinking water for the livestock.

For the remaining 3 out of 12 years: Not only are the livelihood requirements not fulfilled during these years even food security and drinking and domestic water needs including drinking water for the livestock cannot be assured.

Land Distribution:

Of the surveyed 419 HH, only 8 hold land above 5 ha and another 54 hold between 2 and 5 ha. Most of the families are fairly evenly distributed between the first three classes of landholding (Less than 0.5 ha, between 0.5 and 1 ha and between 1 and 2 ha).[iii] When combined with the ownership of irrigation facilities, one will find that the average figures enunciated by SOPPECOM have a differential impact on the population. About 20-30% is able to enjoy food, fodder and water security. For the rest, they have to migrate out in search of wage labour, the period varies from 3- 9 months with a few families entirely dependant on wage labour due to the marginal nature of their agriculture

Land use characteristics:

The above does not give an accurate picture of the key issues in the catchment area. The land use analysis in Table 1 shows that 79% of the land is common land with only 21% agricultural land, 6% being irrigated[iv]. Apart from agriculture and wage labour, animal husbandry is a major source of livelihood be it from milk production or from goats. While milk production depends primarily on agricultural production for fodder, the fodder for goats comes primarily from common land. Calling it common lands is a misnomer, as a lot of the land has been encroached and in many cases regularized as well. After agriculture residue, private pastures are the second largest source of fodder for the milch cattle. The details of the survey given below will throw light on this aspect. As the table shows, only 19.94% of Jhamri river basin is cultivated (21.85 % for Jaisamand Catchment area). Under the area shown as not available for cultivation a large part of it is either private pasturelands or encroached private pasturelands.

Characteristics of the Region

Drought is a normal feature of Rajasthan. In the Southern region context its intensity is once in three years, though this is valid only when long term rainfall data is considered. During the last 15-20 years, more than half the period was affected by drought, with drought being continuous between 1998-2004. In this scenario on the one hand towns require more and more water, on the other existing irrigated areas are under pressure. Irrigation water to Sarada Block of Udaipur District, which is a part of the Jaisamand command area, was affected because of the drought and supply of drinking water to Udaipur from Jaisamand Lake. The situation in the catchment areas is even more precarious. Over the years a steady decline in the water tables has been observed. This is resulting in the decline not only of the Rabi crop but Kharif as well. This further affected the fodder availability in the region. The instances of fodder purchases have increased. In some villages even water has to be purchased for household needs. Despite the financially tight scenario the middle farmers have gone for deepening the wells, even some have to take loan for this purpose. And the worst was seen when even moneylenders refused to provide loans without mortgaging the land or jewelry. Since, this is a common phenomenon across the state; we need to work towards rational use of available water in agriculture, so as to evolve a sustainable strategy to tackle the situation.

The Jaisamand Initiative

SPWD started working in Jaisamand catchment area since the 90's with its partner organizations Prayatana Samiti (PS) and Hanuman Van Vikas Samiti (HVVS). Initially the work centered on Joint Forest Management, pastureland development moving towards watershed development. Subsequently a study on small water harvesting structures was done, which attempted to establish the link between the watersheds and the basin level data.

Table 1. Land Use of Jaisamand

Land Use	Watershed Atlas	Census Data Jaisamand	Census Data Jhamri
Total Area	1,63,000 has	1,80.974 has	63,337 has
Cultivated Land	36,660 has		
Irrigated		11,209 has (6.1 %)	4,515 has (7.13%)
Unirrigated		28,946 has (15.99 %)	8116 (12.81%)
Forest	31125 (19%)	28,494 (15.74%)	10,412 (16.44%)
Culturable waste		45,353 (25.06%)	12,790 (20.21)
Not available for Cultivation		66,963 (37.0%)	27,476 (43.41%)

A revised Han model was developed which provided an approximate fit between rainfall data in the catchment and inflows into the Jaisamand Lake. This formed the basis for discussions among civil society institutions and CBOs about the need for looking at various aspects of natural resource management at the basin and sub basin level in order to bring in synergy in the efforts of various NGOs, activists and CBOs. Over a period of four years, these interactions matured into three partners (also Jagran Jan Vikas Samiti) deciding to collaborate in the Jhamari river basin for a study on Wastelands Characterisation. A few villages were selected outside the Jhamari basin but within Jaisamand Catchment area, that would bring to bear the different types of land use conditions within the basin (the sand mining area and the forest area). Apart from opening up possibilities at the macro level, these organisations will bring to bear different skills and dimensions to the project. The land use data of Jaisamand catchment area and Jhamari river basin are given above. Jhamri river basin is approximately 60, 000 ha. (some villages outside Jhamri have been included in the census data analysed while some villages in Jhamri have been excluded).

Wastelands Characterisation Exercise

The need for the wastelands exercise that could be of use to practitioners on the ground and provide a nuanced understanding to interested stakeholders and policy makers emerged at a national consultation held by SPWD in Delhi on 18th February 2007[v] . Since SPWD has been working on building up the data base in Jaisamand catchment area and since this provided a range of options with respect to natural resource management and land use issues, this became one of the natural choices with respect to the study. This particular pilot exercise in Jaisamand catchment area will combine the experience of SPWD in highlighting the dynamic nature of wastelands creation and of degradation being intrinsic to the production process, the vast experience of Regional Remote Sensing Centre Jodhpur in land use mapping using remote sensing techniques and Jagran Jan Vikas Samiti, Prayatna Samiti & Hanuman Van Vikas Samiti who have field based experience

FINDINGS OF THE STUDY

The details of the methodology for the study are given in the Flow charts (Methodology I and II). Broadly it can be divided into two parts

1. Remote Sensing and GIS based methodology
2. Survey data and secondary information

Regional remote sensing Agency, Jodhpur has provided contributed the major portion of the study of remote sensing information and GIS layering. The diagram on the cover page , locates Jaisamand on the toposheets.

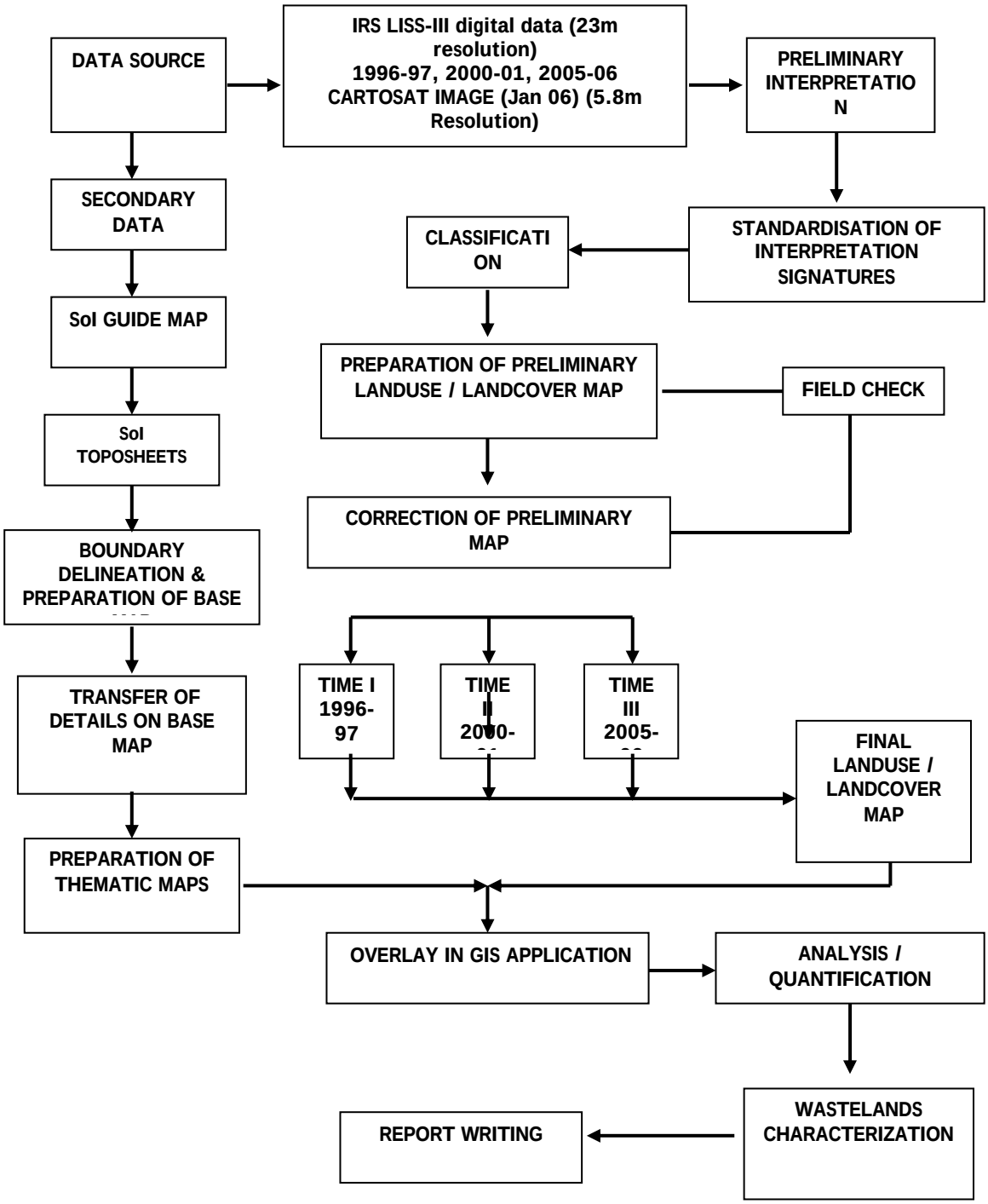
Jaisamand Catchment Area

Jaisamand as can be seen from the schematic Diagram on the cover page is located on the following toposheets 45h 14,15,16 45L 2,3,4, 6, 7 and 8 . These are on 1:50,000 scale. The total area defined is 186,674 .58 has. Figure 1 is a satellite image of Jaisamand. The major rivers of Jaisamand have been identified. Table 2 provides additional information about the data used to make the GIS maps. The land use, land cover maps (Figure 2- 5) are based on two season satellite imagery data for the years 1997-98, 2000-01 and 2005-06.

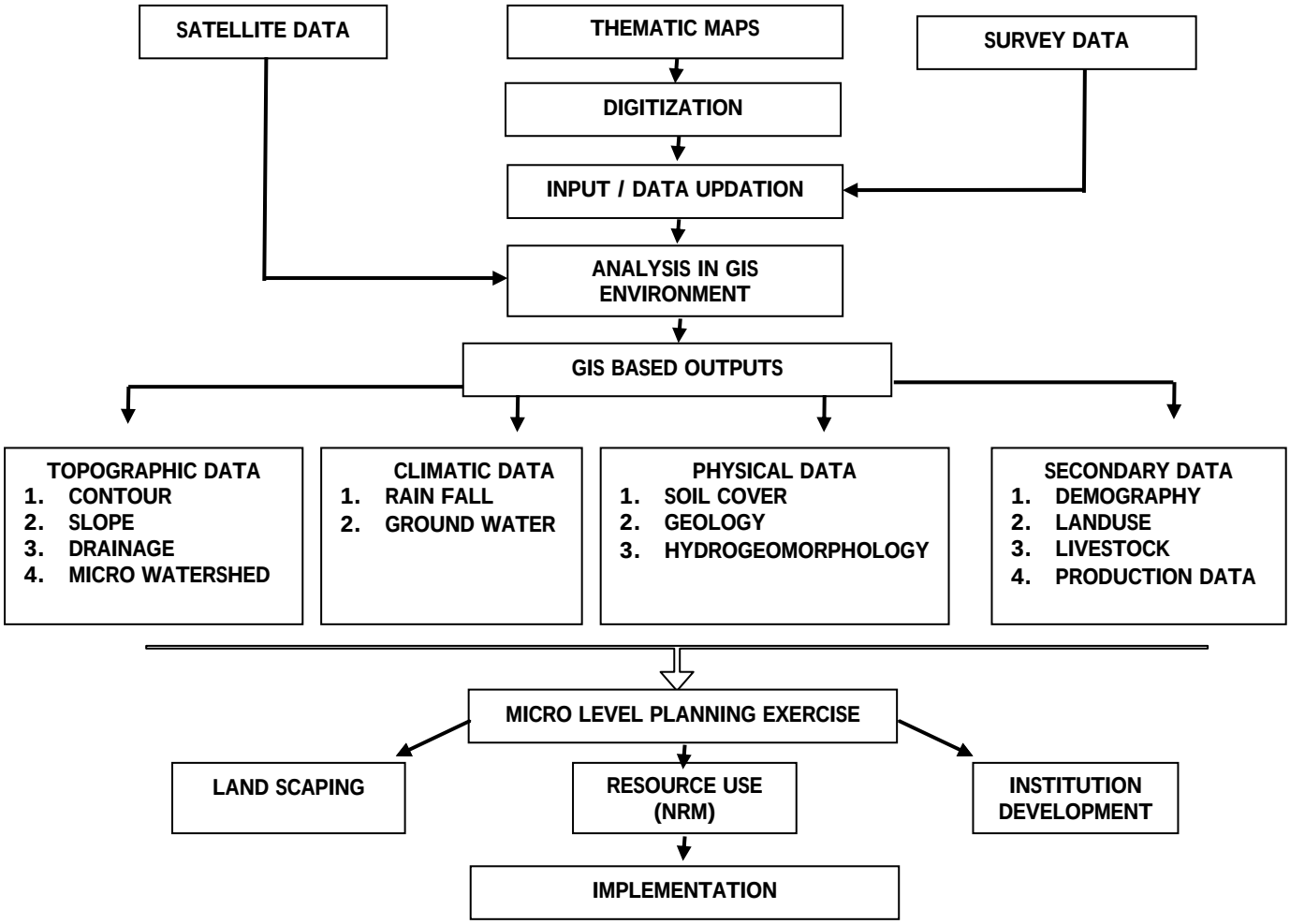
Table 2. Type of data used to make the GIS maps .

Type of Data	Details of Data			Source of Data
Survey of India (SOI) toposheets	45H - 14,15,16 45L - 2,3,4,6,7,8 (1:50,000 scale)			Survey of India (SOI), Dehradun
Thematic maps: i) Soil ii) Geology & iii) Geomorphology	i) 1:5 million scale ii) 1:250, 000 scale iii) 1: 50, 000 scale			i) National Bureau of Soil Survey and Land Use Planning (NBSS & LUP), Nagpur, ii) Geological Survey of India (GSI), Calcutta iii) National Remote Sensing Agency (NRSA), Hyderabad
Satellite data	Path/ row	Date of pass	Date of pass	National Remote Sensing Agency (NRSA), Hyderabad
	94/54	09-Jan-2006	05-oct-2005	
	94/54	17-Jan-2001	14-Sep-2000	
	94/54	20-Feb-1998	23-Oct-1997	

METHODOLOGY (I)



METHODOLOGY (II)



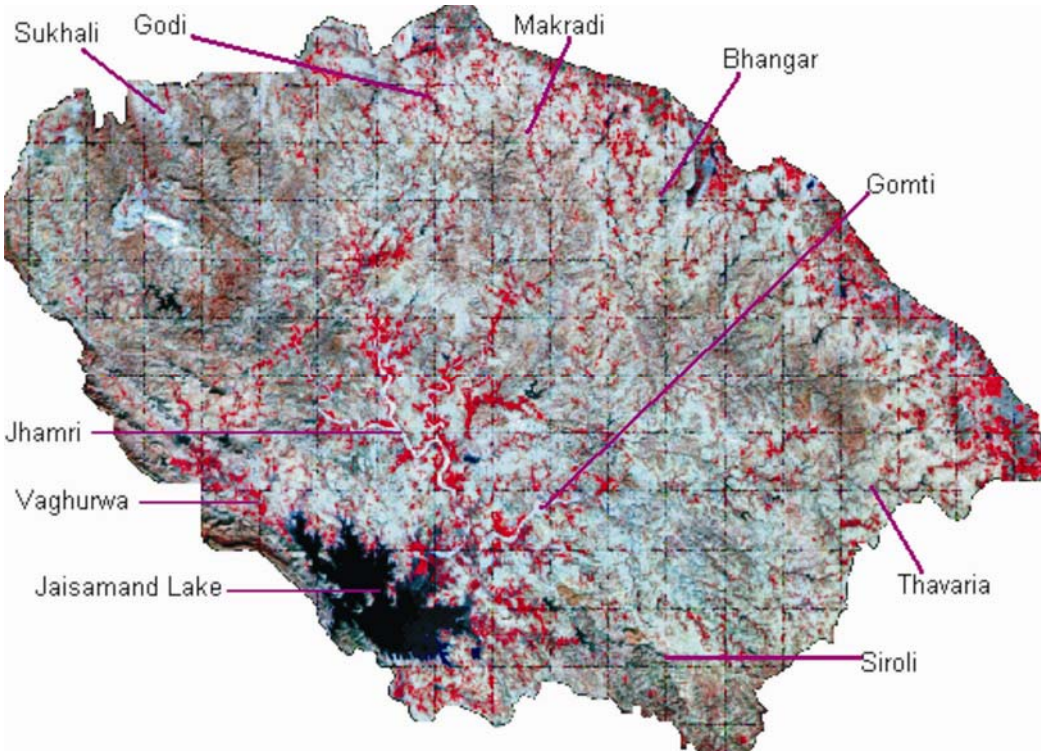


Figure 1. Satellite smage of J Jaisamand lake

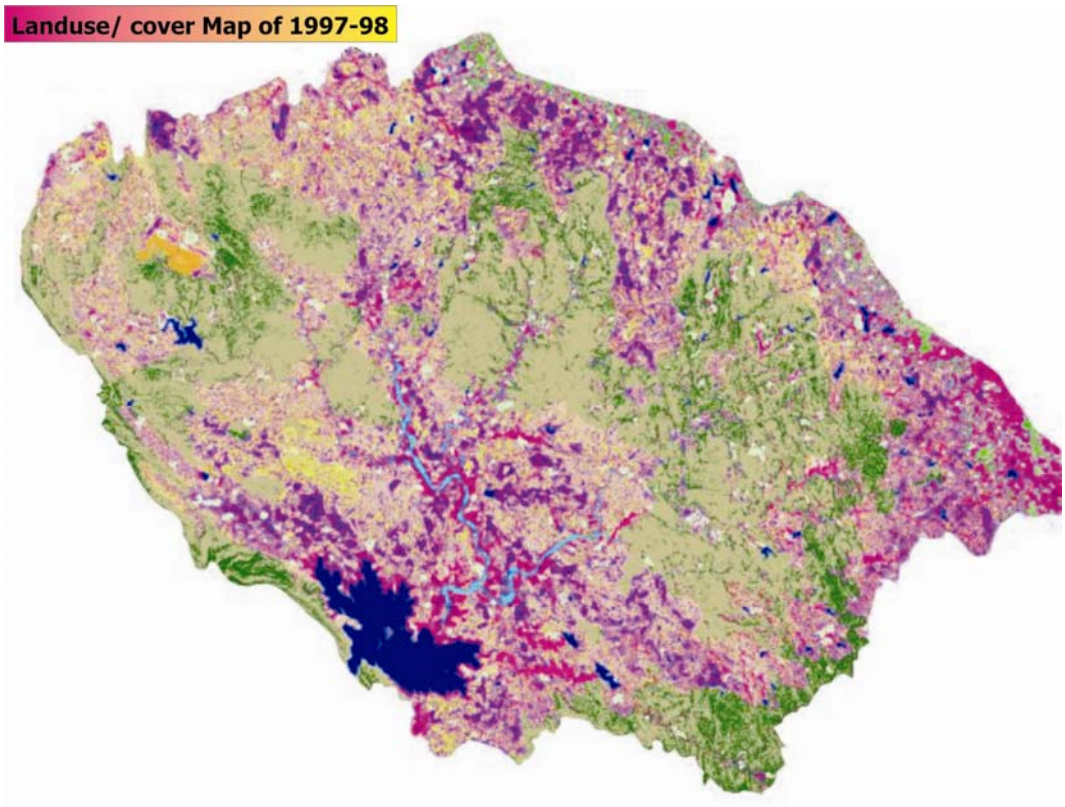


Figure 2. Jaisamand Landuse cover

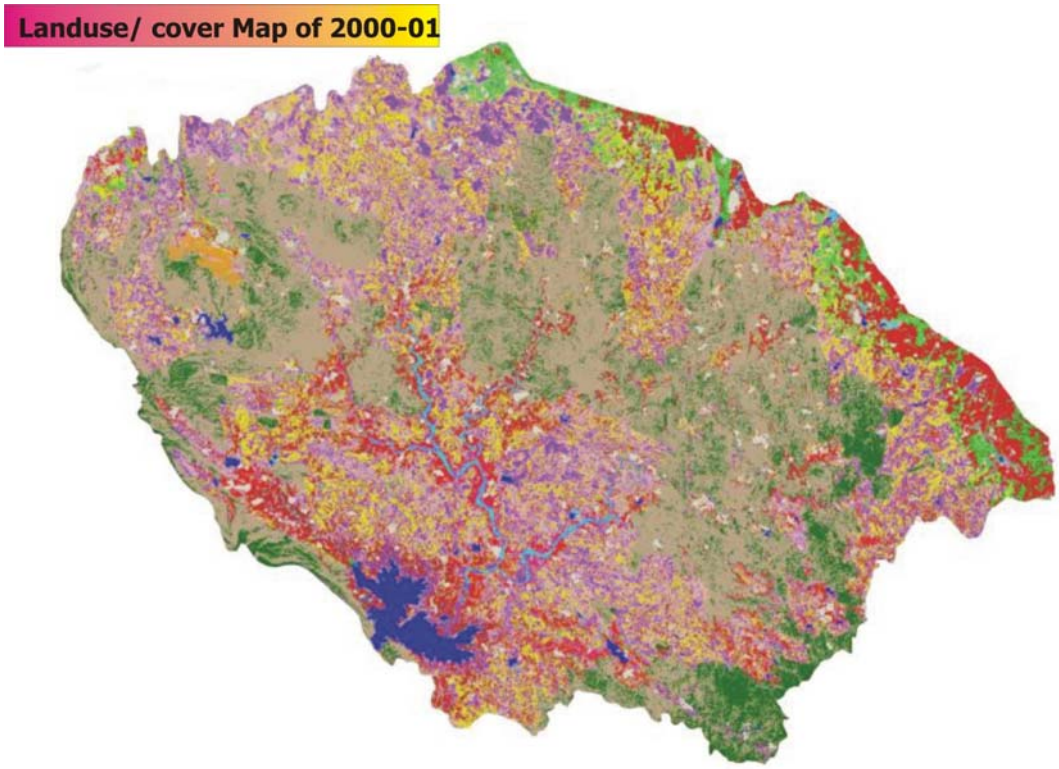


Figure 3. Jaisamand Landuse cover.

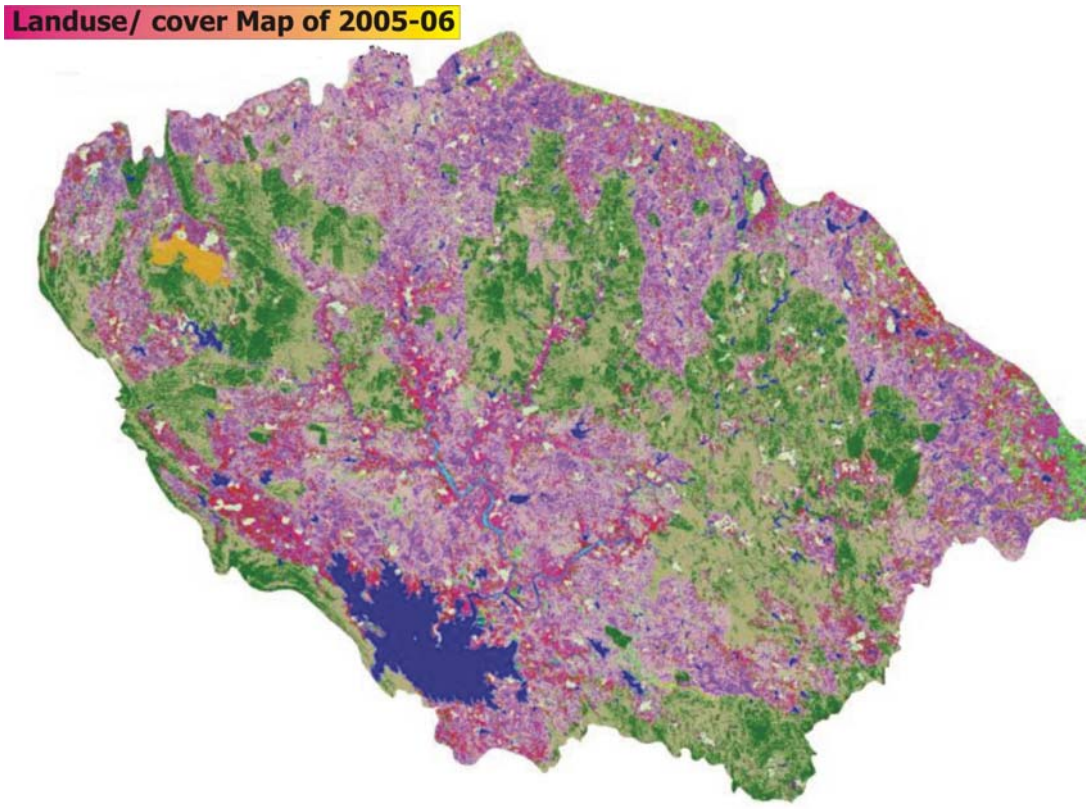


Figure 4. Jaisamand Landuse cover.

Jaisamand Landuse cover legend.

Based on details given in Table 3, agriculture accounts for 12.65% of the area while wastelands constitute 38.01 %. Forest area is 35.07 %, however 63% of this is either barren or comprises of scrub like plants. The dense forest area as declined over the last 10 years from 13.53 % to 9.38%. Sheet rock covers 20% of the area. The land use data is at variance with that given in the census figures and need to be correlated. The figures here do not indicate the nature and type of grazing land, though one can guess that the scrub land and degraded land is primarily used for grazing. A more detailed analysis of land us and land cover in Jaisamand is given in Table 4 which provides 2 season data for the three years where satellite data has been taken.

The two maps of Jamun village show different aspects (Figure 5-6). The first map delineates private land government land and encroached land, while the second map shows the demarcation of private plots on government land marked in red. This confirms that a major part of the revenue land and all the pasture land is encroached. Details shown in map one are given in an excel sheet and hence individual farmer details also can be easily accessed. With good resolution satellite imagery, the features present on the land can be shown[vi].

The two maps depict the vegetation in the 69 villages of Jhamari river basin. While the first maps provides the incidence of number of tree species found in the village (based on a one ha sample plot), the second depicts the herbs and shrubs[vii].

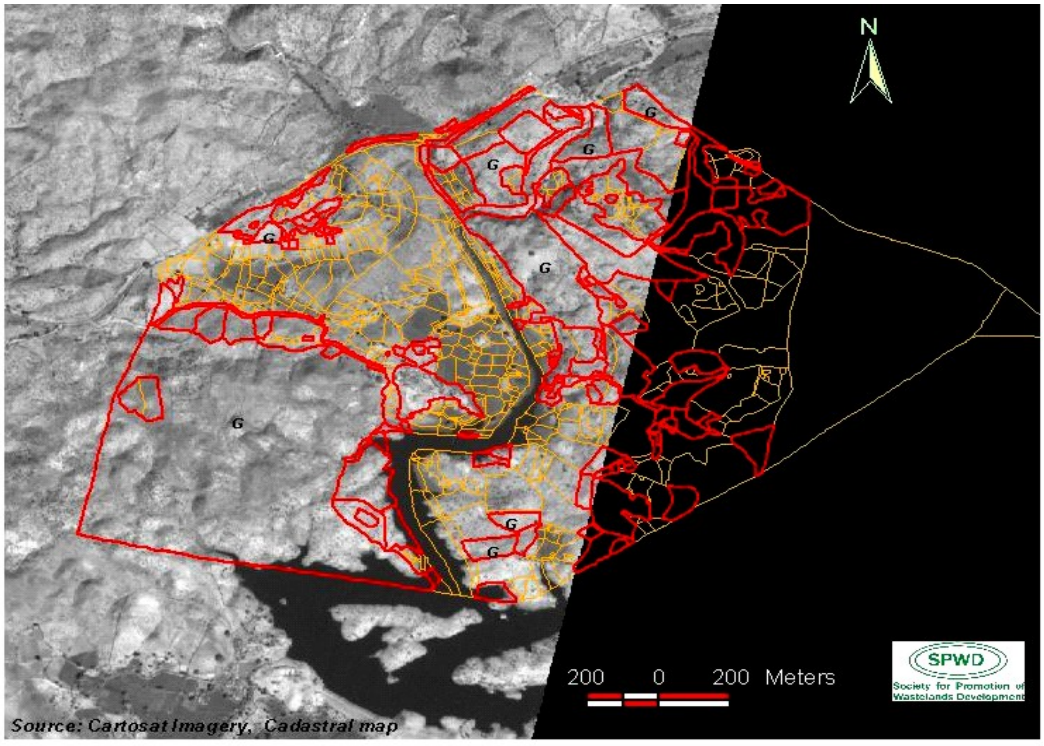


Figure 5. Jaisamand Jamun-cartosat cadastal.

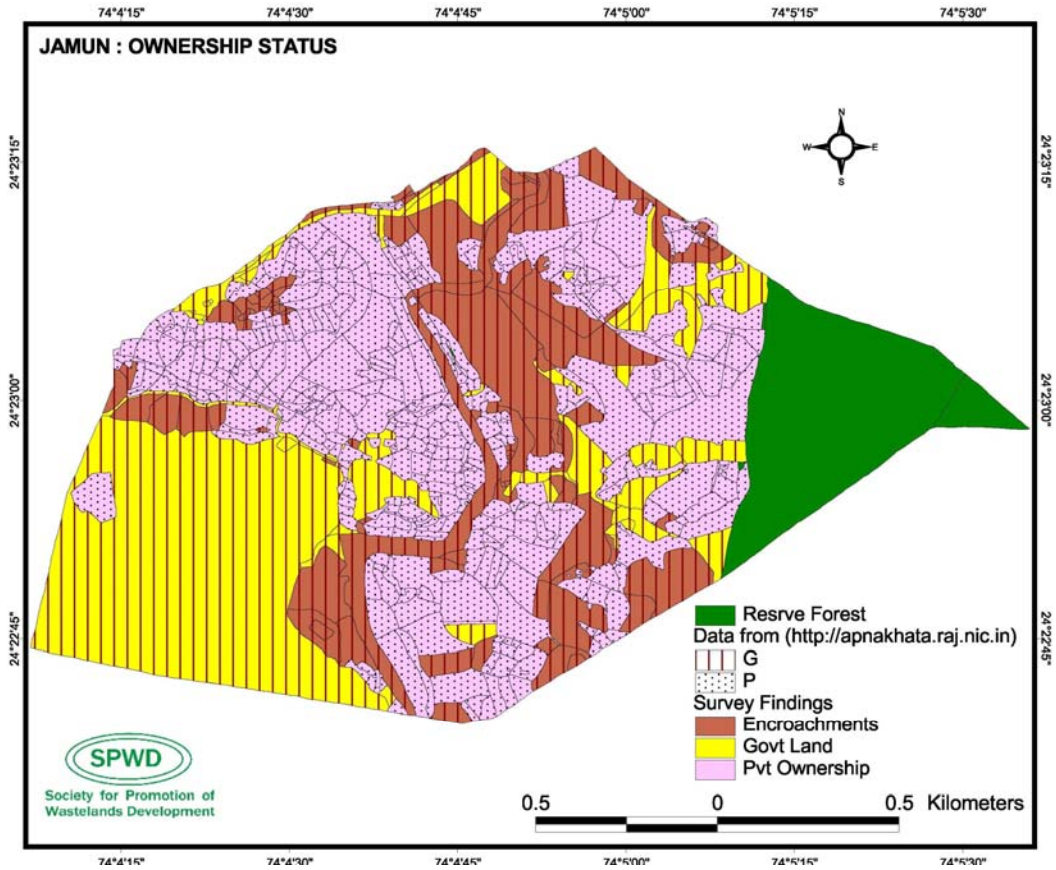


Figure 6. Jaisamand Jamun-ownership.

The two maps (Figure 7-8) show different aspects of wastelands. While the first depicts the wasteland categories as defined under the exercise conducted by NRSA in 2003 (wasteland map published in 2005), the second shows the right hand corner tip of the first map. In the first map it is not shown as wasteland, while in the second it is depicted as degraded forests. Rabi crop is taken along the river Siroli, though it is not depicted in the map. The degraded forest category also includes scrub land (refer table 3). With respect to the biofuel programme announced by the Government of India and taken up in a big way by the Government of Rajasthan , in Udaipur 2,00,000 has of wasteland has been identified for plantation of jatropha . Out of these 58,000 hectares has been identified as degraded forest land to be handed over to companies either directly or in terms of an agreement with local village forest protection committees. The land identified is the same which will classify as eligible for recognition under the forest rights act. Jaisamand catchment area also has land identified under this programme. With respect to revenue land, the modus operandi is to allot wasteland to groups and facilitate the plantation of jatropha under NREGA and Keshav Badi scheme. The schema is depicted in diagram 2 [viii].

RESULTS OF THE SURVEY

A field study of 90 villages was done with a total of 1214 sample families being surveyed having a population of 6,782. The findings of the study are being tabulated. Some of the basic findings are as follows

1. Considering all types of land available with the farmers, irrigated, unirrigated and pasturelands, 90% (60% landless and semi landless) SC and 60% (30%alndless and semi landless) ST fall in marginal farmer category. While OBC (mainly Dangis) have 75% falling in marginal farmer category (35 Landless and semi landless). 25% ST are small farmers while 12% OBC fall in this category. The proportion of agricultural land to total land is approximately 50%
2. In terms of the legal land available, 40% of the ST falls in landless and semi landless farmer category, while OBCs have 18% landless and semi landless farmers. 32% of STs are marginal farmers and 36% OBCs are marginal farmers. 22% STs are small farmers and 21% OBCs are small farmers.

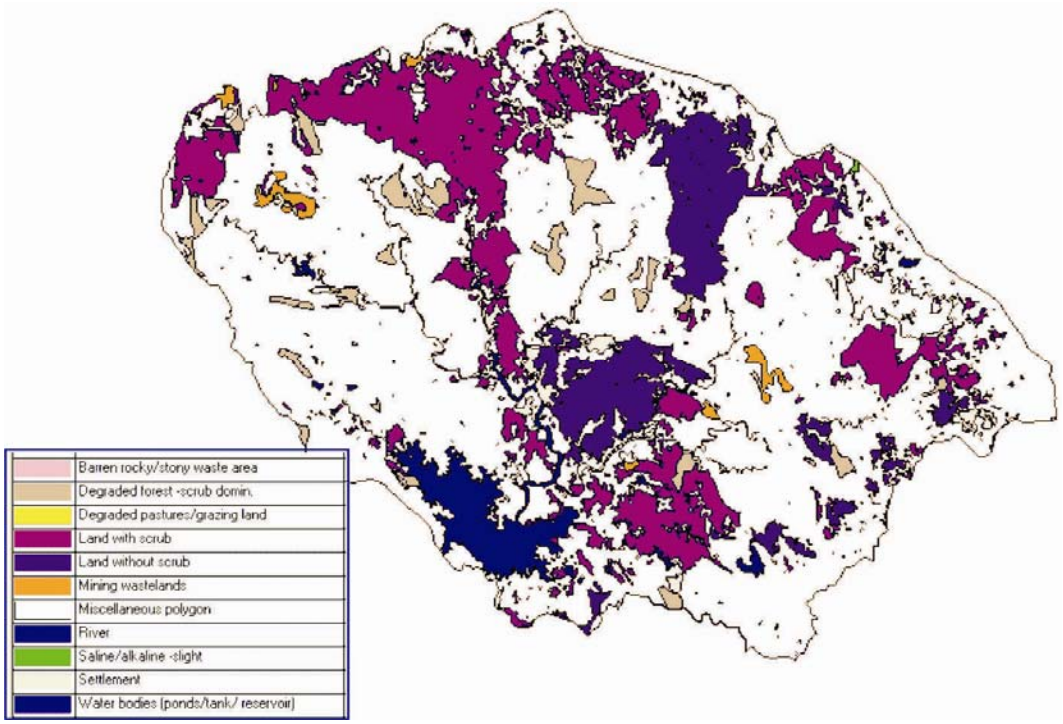


Figure 7. Jaisamand wasteland NRSA 2003.

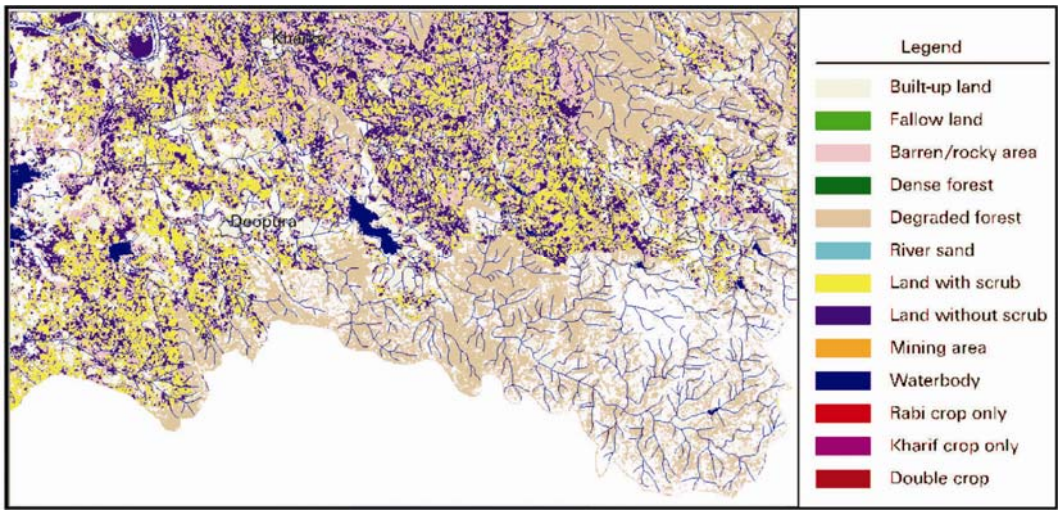


Figure 8. Jaisamand wasteland Siroli.

Table 3: Land use/ land cover distribution in Jaisamand catchment

Sl .no	*Date of pass / Category*	*9-Jan-06*		*5-Oct-05*		*17-Jan-01*		*14-Sep-00*		*20-Feb-98*		*23-Oct-97*	
		Area	*%*	*Area*	*%*	*Area*	*%*	*Area*	*%*	*Area*	*%*	*Area*	*%*
1	*Crop land*	*11308.55*	*6.06*	*17723.87*	*9.49*	*12543.26*	*6.72*	*22958.67*	*12.30*	*6001.23*	*3.21*	*10899.19*	*5.84*
2	*Fallow land*	*8134.33*	*4.36*	*21440.91*	*11.49*	*6549.58*	*3.51*	*7044.48*	*3.77*	*2679.9*	*1.44*	*4037.53*	*2.16*
3	*Barren/rocky area*	*55037.84*	*29.48*	*12438.84*	*6.66*	*29172.61*	*15.63*	*24513.47*	*13.13*	*54736.3*	*29.32*	*53535.63*	*28.68*
4	*Dense forest*	*25249.77*	*13.53*	*46092.38*	*24.69*	*16276.78*	*8.72*	*51746.05*	*27.72*	*17518.64*	*9.38*	*29127.23*	*15.60*
5	*Degraded forest*	*41925.95*	*22.46*	*20273.99*	*10.86*	*51141.83*	*27.40*	*14903.88*	*7.98*	*49962.18*	*26.76*	*37856.51*	*20.28*
6	*River sand*	*294.74*	*0.16*	*975.57*	*0.52*	*1006.5*	*0.54*	*620.29*	*0.33*	*829.5*	*0.44*	*437.59*	*0.23*
7	*Land with scrub*	*3856.95*	*2.07*	*39673.56*	*21.25*	*34515.24*	*18.49*	*43664.26*	*23.39*	*16707*	*8.95*	*12703.68*	*6.81*
8	*Land without scrub*	*34555.1*	*18.51*	*21070.37*	*11.29*	*32466.36*	*17.39*	*18252.63*	*9.78*	*34672.84*	*18.57*	*33102.14*	*17.73*
9	*Mining area*	*439.26*	*0.24*	*585.85*	*0.31*	*427.68*	*0.23*	*266.46*	*0.14*	*379.53*	*0.20*	*240.83*	*0.13*
10	*Water bodies*	*5872.09*	*3.15*	*6399.24*	*3.43*	*2574.74*	*1.38*	*2704.39*	*1.45*	*3187.46*	*1.71*	*4734.25*	*2.54*
		186674.58	*100*	*186674.58*	*100*	*186674.58*	*100*	*186674.58*	*100*	*186674.58*	*100*	*186674.58*	*100*

3. In terms of agricultural land 66% of ST is in landless and semi landless condition while 71% OBC are in this condition. 25% STs are marginal and 21% OBCs. 5 % STs are small farmers and 4.5% OBCs.
4. 34% ST s have 0-1 has of pasture lands while 70 % OBCs have same type of land. 22% STs have 1-2 has while 20% OBCs have similar and.
5. Despite this the OBCs are better off due to better quality land and better irrigation potential. Some SCs are also better off due to being in other business. While the STs primarily use the private pastures for goats, the Dangis use it for cattle.
6. The STs have 5.29 goats per family compared to the average of 3.3. The OBCs have 2.45 buffaloes per family compared to the average of 1.44.
7. In terms of migration 60% of the ST migrants totaling 339 migrate from between 1-6 months. 55% of the OBC migrants totaling 145 migrate for the same period. While the former is for wage labour, the latter is mostly for business to Mumbai and Ahmedabad. More than 70% of the respondents mentioned Udaipur as the place for migration. Wage labour within the region can be found in the nearby big villages on agricultural fields, mining (stone and sand). More than 50% of the population of Kharka goes for sand mining while a similar figure commute daily to Udaipur from Umarda, Tank etc (this is not considered as migration).
8. While the survey data shows 150 has out of total of 2500 ha. as being encroached (mostly pastureland), the field observations in Karget, Onkar, Rawatpura and Jamun show that a major portion of the revenue land has been encroached, while the remaining land is commonly grazed . Detailed field survey of Jamun shows a much larger percentage of encroachment which has been depicted in the cadastral map above. This will be evident from the satellite imagery of the Jamun, Rawatpura and Onkar which have been studied in greater depth. The figure of actual common land available is far short of the 60% shown in the 2001 census data on Jaisamand.

The Institutional Dimension

The three NGOs, Jagran Jan Vikas Samiti, Prayatna Samiti and Hanuman Van Vikas Samiti between them work in 170 villages in Jaisamand and have facilitated the creation of 550 Self help groups with a total saving of over Rs 2 crores. Earlier the individual SHG groups were the basis for initiating discussion of NRM issues and forming the basis for the core leadership (it must be noted that the NRM is not contagious with the SHG group, though it helps to initiate its formation). With the increase in numbers, the NGOs have thought of federating the SHG groups with the first task being to organize them in clusters. The regular monthly cluster level meetings and the meetings at the federation level have created the possibility of discussing the issues emerging at the cluster level and in some specific cases sub basin level as well. The study done by SOPPECOM was the basis for discussing with the farmers about the larger issues relating to specific regions of Jaisamand catchment area. The current study of wastelands characterization will be shared with farmer representatives from various parts of Jhamri river basin. This will slowly forge a collective farmers unit of the three NGOs (currently the three NGOs have resolved to work together on common issues in Jaisamand catchment).

Jan Sangharsh Manch

Apart from the SHG groups, the NGOs have created separate forum of farmers. In Hanuman Van Vikas Samiti, Jan Sangharsh Manch is loose forum representing farmers from about 25 villages where they are working. The members of the Manch have been active in the Gram Sabha on burning issues affecting the local population. One of the major issues taken up by the Manch has been the issue of pollution downstream of the tailing dam in Bhekra. Pollutants from the tailing dam have affected 5-7 villages and people have mobilized to highlight the issue. The extent of impact of people is not clearly known but what is clear that it has affected the quality of drinking water for man and animals. Agriculture production while initially benefiting is now being affected due to destruction of the soil quality and soil structure in the fields.

Jhamari Bachao Andolan

The ecological imbalance (central to which is the drying up of Jhamari river which has been the region's lifeline since times immemorial) caused by mining and industrialization has impacted every area of local life, from livelihood to health, displacement, shelter and habitation, livestock, agriculture, irrigation and water tables, ecological balances and social and cultural aspects of peoples lives. Eg. Well water has become unfit for human, cattle and vegetation consumption. Water tankers have to be brought from outside to meet daily needs; Mining companies and industry are given land leases but villagers are not; mine blasting have damaged or cracked many houses in surrounding villages; pollution, decreasing grazing areas and related ailments are leading to declining livestock population; villages remain covered with dust from mines and this in turn has adversely affected food and fodder for humans and livestock alike; one village, Sameta, being uprooted for mining purposes; has increase ill-health manifold about 40% people of the region are suffering from tuberculosis.

It is the firm belief of people that checking mining and allied industrialization on one hand, and reviving river Jhamri on the other, are twin keys for regeneration of the region. The Save Jhamri Movement has acquired a distinct and strong identity in people's imagination. Cross sections of people cutting across caste, community and religious lines now stand mobilized on this issue. Traditionally, the notion and practise of village republics has revolved around five 'Js': Jal (water), Jungle, Jan (people), Janwar (animals and livestock), Jamin (land). Each of these five vital constituents of village life has been severely damaged over the years. This issue has become seminal to the regeneration of traditional and sustainable native identity, autonomy and livelihood.

Jaisamand Consortium

This is a newly formed consortium comprising of five organizations vis jagran Jan Vikas Samiti, Prayatna Samiti, Hanuman Van Vikas Samiti , Samarthak Samiti (for marketing issues) and Society for Promotion of Wastelands Development. The Consortium will take up three panchayats for comprehensive development under NREGA in Girva panchayat of Jaisamand Catchment area (Udaipur District). The programme seeks to enhance NRM based livelihoods by strengthening the programme under NREGA and in addition taking up value added activities in agriculture and animal husbandry. Marketing of agricultural produce, milk and NTFP will be undertaken by aggregating produce so as to have better bargaining power in the market. The programme is envisaged to carry on for three years.

Case Studies

Rawatpura

The Rawatpura study was undertaken to understand the process of superimposition of village outline from block map on to the satellite imagery. Whether the local community would be able to understand the major features of the village discuss land use and understand the dynamics of natural resource management. Rawatpura is about 8 kms from Bambora by road. On one side is Bambora River. Rawatpura forms a dumb bell shape. Forest is located in the upper catchment area. There is a Dangi Basti below this. In the rod part of the dumb bell, Rawats are located. On the other side of the dumb bell near the river again Dangis are located. Some other castes (rajputs, Salvis and Meghwals) are located in the upper reaches of this part. A stream has been damned above the the Rawat bastis, from the surface it looks as if they are well endowed, but on visiting them, it was found they had single cropped area.

The village has 198 households. Of these Dangi basti (45- 50HH), Rawat bastis Kavtia (15 HH), Kamania phala(15 HH), Bhamela phala (10 HH), Pasuria phala (5 HH), kalulia phala (15 HH).

Agriculture is practised in the dumb bell. On either side of the rod of the dumb bell are private pastures (encroached). What is surprising is that the Dangis have encroached a lot of this pastureland which is located next to the farms and hamlets of the rawats. The main reason for this is that the Dangis own a lot of cattle and use them for milk production. The Rawats depend a great deal on wage labour since agriculture can only meet 4-6 months of food requirements. Forests are in the upper reaches. They are in a degraded state. Grazing is the major usufruct being derived.

Jamun

In Jamun the village cadastral map and, entitlements register were available. Rajasthan Government has set up a system of apna Khata[ix] with knowing the khata number, it is possible to identify the legal land available with one person (knowing the name of the person is not sufficient to operate the system). Jamun is being used as a test case to understand whether it is possible to correlate the profile of individual as available in the apna khata records and from the survey records available to us. Since the details of those who have come from outside are known to us and since upper castes are known to us, it is possible to trace where the land procured / confiscated by these outsiders is and also do a caste wise profile of the land in the village.

Though pastureland is there, this is heavily encroached. In fact no common land is available on it. This fact can also be confirmed by the satellite imagery. Agricultural land is located in pockets around the village, with a major chunk located next to the upper part of Phila Tank. In fact Fila tank dwarfs the whole of Jamun in terms of the agricultural land available. The common land has been parceled out. As in Rawatpura, one feature of the common land is that it is the Dangis who have encroached most of it. The Rawats having hamlets and agricultural land close to the common lands have not encroached as much. This is because of dependence of Dangis on Animal husbandry.

Umarda

The Umarda village on one hand is facing the issue of problems of industrialisation and its impact on the livelihoods of people and natural resources on the other. Umarda is a large village having 500 families. There are 1045 has of forest land. Irrigated land is 143 ha. while unirrigated land is 230 ha. Culturable wastes 519 ha. and unculturable wastes 2053 ha. The village is about 15 kms from Udaipur and has eight factories set up here. The reason for these factories is that it is the nearest railway line from Jhamar Kotra mines situated about 8 kms south of Umarda. These

mines supply 98% of India's rock phosphate. Jhamar Kotra mines is also located in the upper Jhamari catchment area. Water that is pumped out of Jhamar Kotra mines is put into Mamadev dam (Jhamari dam located south of Jhamar Kotra). This supplies Udaipur city with 25 % of its water supply. It is on the ridge line of Jaisamand catchment area. Villages nearby are also semi industrial towns with some of them supplying water by tankers to Hindustan Zinc. Bagdada crocodile Nature park is located about 3 Kms South of Umarda. The pollution from the factories, have destroyed the vegetation in the south eastern hamlets of Umarda , apart from the villages of Parola and Bagdada nature park. In monsoon, the South western part is affected. The pollutants are released at night. In terms of the effects of pollution, it has caused respiratory problems; cattle drop their off spring in three to four months. The fodder of this area cannot be sold due to pollutants in them. Lately one factory set fire to a fodder patch located next to them as an investigation was to be conducted on it. Most people migrate for wage labour to Udaipur with 4 buses plying daily.

Kharka

Kharka village is known for sand mining and sand based economy. Kharka is not on Jhamri River, it is on Gomti River about 10 Kms upstream of Jaisamand Lake. Since it is famous for its supply of sand to Udaipur, the village was chosen. Gingla is a similar village nearby on the Jhamari village, but the output of sand is less. The village has 500 families, out of which 200 mostly women and adolescent girls are engaged in Sand extraction from the village. People from 10 20 kms radius are engaged in sand mining. They come in groups and work in gangs on one – two trucks. Work takes place during day and night. Associated with this is the possibility of contracting HIV, sexual diseases etc. About 100 families are engaged in business in Mumbai, Ahmedabad etc. Kharka has 21 castes, details are as follows Meena (100), Rajput (75) , Jain (50), Brahmin (35), Lohar (15), Suthar (40), Meghwal (20), Salvi (5), Kalal (15), Karsi (4), Kumhar (4), Jogi (70), Ved (12), Taylor (7), Teli (5), Vja(6), Gayri (15) Vaishnav(3), Soni (3), Harijan (1), Gaacha (15). The history of the the castes in Kharka, is because of its central location for nearby villages in the range of 10- 12 Kms. It is located between Bambora and karavali on the Bambora Jaisamand road. Agricultural land is very productive as also the availability of water. However electricity is available only for four hours a day making the potential usage very limited as also creating problems with relation to drinking water. The forest is shared with Ratanpura. It was protected with help of the forest department under JFM for 5 years. Last year it was opened. Ratanpura harvested all the grass while most of the trees have been cut. Now the cattle from Ratanpura nad Kharka graze on the land. Agriculture land is located near the river and away from the river as well. There is potential culturable land however water source for this needs to be developed. Milk is not produced in marketable quantities in the village. Whatever is produced is consumed in tea and sweet shops within the village. Goats and sheep are about 600 in number.

Onkar

Chauda is hemmed in on the upper side by Uppla Phala where the farmers are cultivating the revenue land , they have blocked the access of Chauda to the grazing lands in the North . The agricultural fields of Amba Phala are in the North east portion. The movement to close the pasturelands of the neighbouring villages left Chauda with no grazing lands. Somehow they convinced the Sarpanch (a lady) from Shishvi that Palmlaveli has been closed for seven years and needs to be opened. The combination of private pastures, agriculture on revenue lands in Uppla phala means that there is no land which can be protected. The situation will become clearer when we can superimpose the cadastral map on Onkar and analyse the survey details.

This was a case study circulated internally in SPWD on August 2 2005. A neighboring village of Chauda has attacked the 12 ha pastureland of Palmlaveli developed with help from SPWD in collaboration with HVVS. 120 families from this village have descended on Palmlaveli, which has 32 families. Both parties are facing each other in pouring rain (fields are flooded) with the possibility of killing a person or two on either side quite imminent. Palmalaveli has rushed for help to the collector and the ADM (A), however both have been on emergency duty battling the situation emerging out of the flood.

The situation has arisen because a group of 30-40 people from Chauda find themselves deprived of grazing area due to closure, blocking of access routes for cattle. (Some of the plight of Chauda is of their own making, having sold land to farmers who have now blocked their access roads - of course the selling was done by individuals, but the blocking affects the whole village)

HVVS who also works with a few families of Chauda is caught in a dilemma. How does it straddle the two villages should it defend the rights of Palmlaveli who have protected the pastureland for the last 7 years? Should it advocate rights for Chauda? Chauda has done nothing to protect the charagah, neither is it a part of Onkar, or a part of Shishvi Panchayat, or a part of Girva tehsil to which Onkar belongs. What then happens to the politics of consensus advocated by SPWD and like minded organisations? Does Chauda even want a share of the

cake or is their fight something else (access to other pastures beyond Palmlaveli).

On the one hand, we now have Private ownership impinging on collective rights. On the other group ownership has parcelled out community rights and these are being managed in diverse ways (the 138has of pastureland in Onkar is being managed in pockets in different systems). The whole system works in such a way that while the village is the administrative entity, use patters and pressures on the commons straddle villages. Alliances are being made and broken to divert pressure of others from the particular pastureland on which a group has its eyes on. In the case of Chauda, it has meant that Chauda has been moving in all directions to meet its fodder needs.

A number of livelihood questions also need to be addressed. The fodder availability from Agricultural lands also need to be understood. The immediate question, is how if at all Palmla veli will be able to protect its pasturelands? They are certainly not lacking in effort However Chauda has nothing to lose and everything to gain Failure to answer questions like these have meant failure in addressing the question of sustainability of pasturelands, Is the differences between Onkar and Chauda a resolvable issue ? For Palmlaveli it means the sweat and toil of 7 years going down the drain. Who has more stakes in this issue? SPWD? HVVS? Onkar? Palmlaveli? Chauda? Is this the right question to ask?

Karget

Brahmano ka wada is located in the valley bottom and the lower end of the catchment area. It has relatively better water resources and this is reflected in the high productivity of the land. Gyan singh who has a tube well has recently got an electric connection. He has opted for crop diversification, which includes fruits in the upper part of his field . In the lower lands wheat and maize have been taken with some sugarcane which he crushes on his own farm. Water from the canal is flows in this region, though the flow has been limited.

Kaliya: Here the crops are grown on the upland. Wells are at the depth of 60 ft . Food production is not sufficient for year round production.

Solki talai: This is undulating land, with cultivation taking place in the valley. The valley is not so fertile as in Brahmano Ka Bada due to it being in the upper reaches. Water in the nala enters here from 1- 2kms upstream.

Ghodva: This is similar to Khaliaya , but the souil thickness is better . Wheat, Gram are taken in residual soil moisture, there are also 8-10 wells in this region.

The settlement pattern is such that the higher caste resides in the good land, while SC and ST have land in the uplands. Works in these uplands will benefit the lower reaches.

Agriculture land is a very small component of the land. This is reflected in the land use statistics and visual observations. Most of the undulating slopy land is private pastures either encroached or having been regularised. The common pasture land available is very small (20 has). Forest land occupies 80 % of the land. There are very few encroachments in the forest land. Bhekra village is located in the heart of this forest land but it is a revenue village. Grass from the forest land is the major NTFP.

CONCLUSION

Basin level management is a multi dimensional issue and requires proper understanding and coordination of a number of data bases. The GIS format provides sufficient flexibility to examine issues in a multidimensional space. However by itself this will not be useful if at the grass roots appropriate organization is not there to take up the relevant issues. Hamlet level organizations, networked over time deal with sub basin level issues, provides both the flexibility and the unity of purpose to deal with larger problems affecting the local communities. While the paper does not deal with the specific issue relating to natural resource management at Panchayat level and the relevance of National Rural Employment Guarantee programme to provide the critical labour component needed in building up the productivity of the asset base. The importance of such organizations in improving governance at the panchayat level cannot be undermined. It is clear that the strengthening building up of decentralized governance is intricately linked with an up-to-date data base that can correlate local issues with more macro ones which alone can lead to more effective planning of natural resources at the sub basin level . The ongoing initiatives in Jaisamand over the next 3 years should help to provide more answers to these critical questions.

[i] Report of Central Water Commision , Udaipur

[ii] Census 2001 , village data collated

[iii] Study of small Water harvesting structures in Jaisamnd Catchment area , SOPPECOM (Suhas Paranjape, K J Joy, Ajay Singh).

[iv] Table 1 , Census 2001 , collation of village statistics
[v] Minutes of the National consultation held , among the people attending were NRSA , Hyderabad , NEERI Nagpur , FES Anand , Viksat Ahmedabad , World Association of Soil and water conservation , new Delhi and All India Soil and land use survey , New Delhi
[vi] Details of the maps and GIS information prepared by Jagadeesh Menon , Programme Associate, SPWD

[vii] Ibid reference number vi
[viii] www.udaipur.nic.in
[ix] www.apnakhata.nic.in