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ENVIRONMENTAL DIMENSIONS AND HUMAN HABITATION IN AND AROUND SARISKA NATIONAL PARK, ALWAR, RAJASTHAN

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ABSTRACT:

Flora and fauna form the base of biomass on earth. They play a significant role in well-being of the people and the stability of the life-support system. Rapid population growth, unregulated urbanisation, industrial development and associated societal demands for land products have put an unprecedented strain on natural resources. Consequently, natural habitat of plant and animal species has started shrinking. The several in-situ strategies have been adopted worldwide for conserving animals and plants species in their natural habitats and prohibiting any kind of human activities therein. Similar strategies for conservation have also been taken up in India. Sariska National Park (SNP) was



established with this purpose. However, this park is also facing many problems regarding the sustainability due to increasing population pressure and resulting Land-use/Land-cover changes. Therefore, the study try to examine land use and land changes in Sariska National Park in the last three decades and identify major factors responsible for land-use/land cover changes and assess the impact of changes on Park's Resources and on the livelihood of dependent population. Result of Land-use/Land-cover changes show an overall increase in forest cover in Sariska from 1989 to 2011. Area under open forest and dense forest has shown a significant and consistent increase during this period. An Increase of 28.22 percent area under dense forest and 76.85 percent under opens forest has been observed between the years 1989 to 2011. Land under wasteland and agriculture has shown continuous decline trend. Area under scrubs & shrubs and fallow land has shown rising as well decline trend. Improvement in management strategies, village relocation programme, implementation of Joint Forest Management (JFM), eco-development activities and community based development programme have brought improvement in forest cover.

KEYWORDS: Sariska National Park (SNP) , resulting Land-use , Joint Forest Management (JFM).

INTRODUCTION :

Nature and human beings form an inseparable part of life support system. The system has five elements air, water, land, flora and

fauna which are interconnected and interdependent and have co-evolved and are co-adapted in such a way that these provide essential conditions for survival of all forms of life on earth¹. In a country like India where the economy is primarily based on agriculture, well-being of people and stability of life-

support system depends on effective management of natural resources. Flora and fauna not only provide society with a resource base, but is also the only source of livelihood particularly for the tribal and some other poor

¹Khosoo, T.N. (1991) Environmental Concerns and Strategies, Third Edition, Ashish Publishing House, New Delhi pp-52-55

communities whose economy directly depends on forest and forest based activities. About 27 percent of total world's population depend on forest resources for at least part of their subsistence and livelihoods, which is based on selling of fuel wood, fodder, bamboo, and a range of other non-timber forest products.² Nearly Half of India's 89 million tribal people who are among disadvantaged sections of the society, live in forest and its fringe areas and they tend to have close cultural and economic links with natural forest areas.³ Therefore, any deterioration of forest areas directly affects corresponding dependent population. It has been observed, that over time, increasing population pressure, rapid industrial and infrastructure growth, and urbanisation have accelerated the demand of natural resources. Consequently, natural habitat of plant and animal species has started shrinking. This escalated rate of depletion of flora and fauna species has become the matter of grave concern worldwide and has become as a common problem for the humankind. Therefore, in order to conserve and control human over-interference in ecologically rich areas, several in-situ strategies have been adopted worldwide for conserving animals and plants species in their natural habitats and prohibiting any kind of human activities therein. These strategies include creation of protected areas like National Parks, Wildlife Sanctuaries, Biosphere Reserves and Nature Reserves etc. Similar strategies for conservation have also been taken up in India. Sariska National Park (SNP) was established with this purpose. SNP is a compact patch of natural forest located in the state of Rajasthan. However, this park is also facing many problems regarding the sustainability due to increasing population pressure and resulting land use/land cover changes. Therefore, an attempt has been made in this paper to analysis the human centric major problem and their impacts on rich biodiversity of the parks.

STUDY AREA

Sariska is one of the highly diverse and rich ecosystems of India. It is located in Thanagazi block zone of Alwar district in state of Rajasthan. Sariska was declared a wildlife reserve in 1955 and was given the status of a tiger reserve in 1978, making it a part of India's Project Tiger scheme. Sariska was also declared as a National Park in 1978. It lies on hilly terrain of Aravalli Range covering an area of 881 km², of which 492 km² has been designated as Sariska Wildlife Sanctuary and remaining 374 km² includes forested ranges of adjoining Alwar and Rajgarh areas⁴. There are 25 forest blocks within Sariska Wildlife Sanctuary, out of these 12 blocks are of reserved forest, 13 are of protected forest⁵. Landscape of Sariska National Park has comprises dry deciduous forest with patches of dry thorn forest and undulating hills in between. Dry deciduous forests is characterised by dry broad leaf trees with closed and uneven canopy. The entire area of Sariska National Park is on semi-arid tract as a result, it faces water scarcity. There are three large lakes within the park boundary. These are Mangalsar, Siliserh and Somasagar. Sariska is a storehouse of natural flora and fauna. It also cradles some of the rare species of birds both native as well as migratory. Around 404 indigenous and naturalized plant species belonging to 272 genera under 87 families are found in Sariska National Park area.⁶ It is one of the richest reserves as far as avifauna is concerned. More than 250 species of residential, local and migratory birds are found in the park⁷. Tigers are the main attraction

² Forest in India (2012) CSE Media Briefing Report, Centre for Science and Environment, Tughlakabad Institutional Area, New Delhi 110 062, India .p-1-8, www.cseindia.org

³ Poverty and Forest Linkages (2008) A synthesis and Six case Studies Report published by The Program on Forests (PROFOR) at the World Bank 1818 H Street NW Washington DC 20433 United State .pp-36

⁴ Tourism Infrastructure Development Project Report (2010), Conservator of Forests & Field director Sariska Tiger Reserve, Government of Rajasthan pp-13

⁵ Tourism Infrastructure Development Project Report (2010), Conservator of Forests & Field director Sariska Tiger Reserve, Government of Rajasthan *ib.id*.p-17

⁶ Government of Rajasthan, (2004), Management plan for Sariska Tiger Reserve (2004-2014), Project Tiger, Sariska, Rajasthan, pp 33

⁷ Government of Rajasthan, (2004), Management plan for Sariska Tiger Reserve (2004-2014), Project Tiger, Sariska, Rajasthan, *ib.id* . p 68

of Sariska National Park. The park used to have about 25 tigers, but in 2004 it was reported that tiger population in the park had started shrinking, which became a matter of serious concern for the state as well as for the country as this region is a tiger reserve due to its large size and wilderness.

As per the guidelines of National parks, Sariska National Park has 4 different zones. These are (i) "Core area"- of total preservation, (ii) core II- which act as a shock absorber to the core (iii) core III" and (iv) buffer zone area with human activities. It has a total area of 881 km² with 28 villages. The core area of SNP extends up to 400sq km. It is the main tiger habitat containing 11 villages including pilgrimage sites and tourist zones. Remaining 18 villages are located in buffer and fringe area. People living in these villages mostly belong to tribal community. Every aspect of settlements tradition, and culture is tribal based. People inhabiting in villages of Sariska are traditionally pastoralists. About 80 per cent of villagers engaged in livestock-rearing as their primary occupation. Most of their income accounting 72.33 per cent comes from the selling of milk and other dairy products like Ghee and Mawa. Apart from grazing, cultivation of land and working as daily wage labourers are some secondary occupations of villagers. Economy of people of core villages is totally dependent on livestock activities and daily wage labourers in adjoining areas. Villager of buffer zone villages such as Dabli, Deori and Raikamala are engaged in agricultural activities. It was observed that economic opportunities available to them have declined mainly due to Land-use/Land-cover changes and relocation of villagers to other areas. As a result, majority of people are moving to nearby town and cities.

OBJECTIVES

- ❖ To examine the diversity of flora and fauna in Sariska National Park and their ecological significance.
- ❖ To show land use and land changes in Sariska National Park in the last three decades.
- ❖ To identify major causes and factors responsible for land-use/land cover changes inside Sariska National Park.
- ❖ To understand the impact of changes on Sariska National Park Resources and on the livelihood of dependent population.

RESEARCH QUESTION

- ❖ What is the nature and extent of land-use/land cover changes in Sariska National Park?
- ❖ What is the nature of Village Relocation Process in Sariska National Park and its impact on the livelihood of people?
- ❖ Have the flora and fauna increased after relocation of villages.

Data Base

The study has been carried out both at theoretical and empirical level. Data required for present study has been obtained from various sources, which included both secondary and primary sources.

Secondary Data Sources:

Census of India, District census handbooks, 1991 to 2011 of Alwar district Rajasthan, Satellite imageries have been used for last three decades. Landsat TM data was downloaded from global land cover facility (www Landsat.org)⁸ for the period 1989,2001,2011.

⁸<http://www.landsat.org/data/srtm>

Primary Data Sources:

Available secondary data providing information at the village level or on SNP, as a whole was insufficient for the study. So primary data was required at household level that represents exact ground reality analysis of land cover changes in the area.

Purposive method of sampling was used while keeping in view the location aspects of high / low change areas. Selection of villages was made from entire group of core, buffers zone villages for ground truthing and associated rectification of land use/land cover corrections. The data for the study was obtained through a sample of four villages and from 150 respondents, covering all the administrative zones of SNP marked by the forest authorities as the core zone I, II, and buffer zone. Haripura village from core I, Nathoosarvillage from core II, Nagaliwardivillage from buffer zone were chosen. Village Thelma and Malutanavillages are the Rehabilitee sites which were surveyed to get the information regarding their socio economic condition after rehabilitation

Table 1
DETAILS OF SURVEYED VILLAGES

| S.No | Zone | Name of Village | Number of Households |
|------|------------------|-----------------|----------------------|
| 1 | Core I | Haripura | 30 |
| 2 | Core II | Nathoosar | 30 |
| 3 | Buffer | Nagaliwardi | 30 |
| 4 | Rehabilitee site | Bardod | 30 |
| | | Malutana | 30 |
| | Total | | 150 |

The village survey was carried out with the help of questionnaire to get information about socioeconomic key indicators and to see land- use/land cover changes in Sariska National Park. Two separate survey schedules were prepared for the villagers and for the tourists.

- ❖ Village level info-sheet was prepared to collect all socio - economic aspects of villagers. The questionnaire was designed to collect the information, which was carrying 7 perspectives as (a) Household Size, (b) Source of income, (c) education, (d) Resource Utilization, (e) Area under Cultivation, (f) Livestock Holding, (g) Rehabilitation Issue.

Second survey was conducted with tourists to get their views regarding Sariska biodiversity, restriction on tourist vehicle, strict implementation of anti-poaching laws, and ban on development of commercial activities.

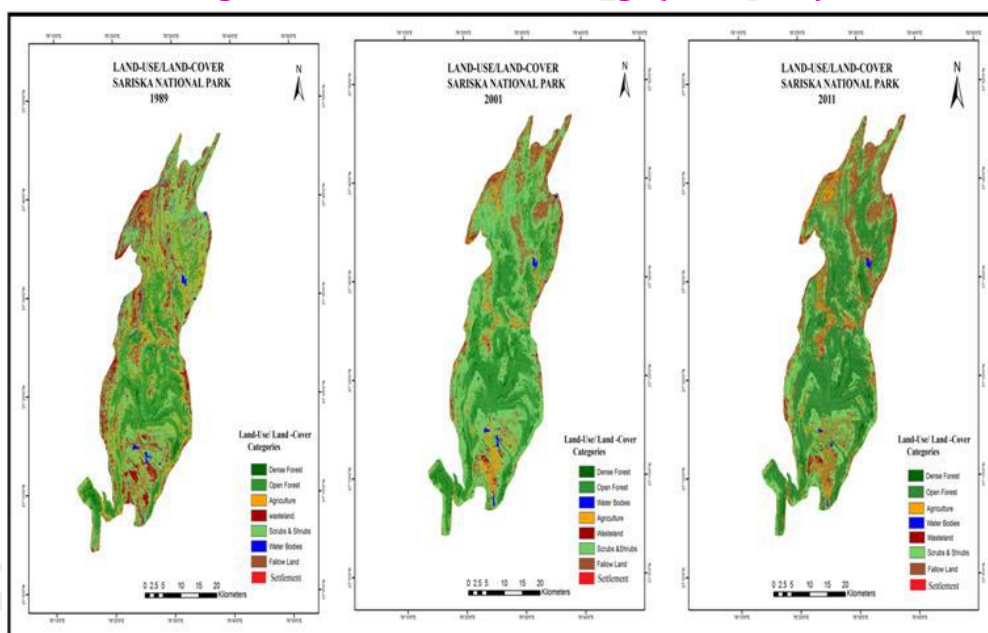


LAND-USE/LAND-COVER CHANGES IN SARISKA NATIONAL PARK

The term 'Land-use' refers to series of operations on land, which human being carry out with the intention to obtain products of benefits through use of land resources.⁹Whereas 'Land-cover' refers to the entire physical, biological cover over the surface of land,including water, vegetation, bare soil, and human made structures. Study of land-use/land-cover of an area is fundamental to understand various social, economic and environmental problems.¹⁰ Therefore, today there is an increasing awareness of issues involved in land-use and changes in it. Rapid population growth, unregulated urbanisation, industrial development and associated societal demands for land products have put an unprecedented strain on natural resources and have caused significant change in land-use and land-cover in the last four decades. Among all the land use classes, forest is main victim of human interference. Most of forest land has been transformed either into agricultural land or deforested area or got modified into areas with scanty tree cover or degraded land. Such Land-use/Land-cover change (LUCC) can be a major threat to biodiversity as a result of destruction of natural vegetation and fragmentation or isolation of natural areas.¹¹

Land-use/Land-cover map gives an idea of land-use pattern and trends of change. Last thirty years have witnessed drastic change in land use in India, caused by increasing population and some other factors. Thus, the land-use study of Sariska National Park, which is one of the important National Parks in Rajasthan, is similarly reflecting some threats in term of sustainability. Therefore study of Land-use/Land-Cover changes in Sariska National Park has been carried out to assess changes in last three decades.

Fig 1: Land use-land cover Change (1989-2011)



⁹N.C.Gautm, National land use/Landcover Classification, Centr for land use Management (CLUMA),Hyderabad,2004,pp-7

¹⁰R.Pelarosso,A.Leone&A. Leone &L.Boccia,Land- Coverand Land –Use change in the Italian centalApennines:A comparison of AssesmentMenthods”Applied Geography ,Vol-29, (2009)pp35-38

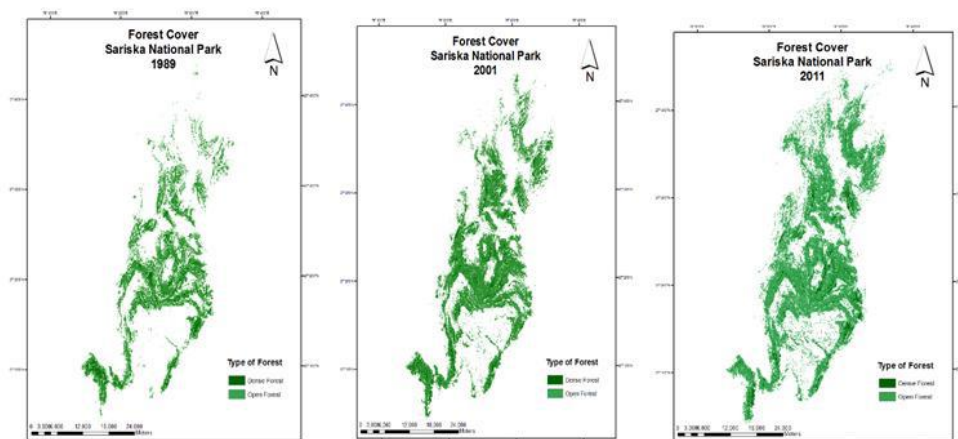
¹¹P.H. Verburg , K.P Overmars, M.G.A. Huigen ,W.T.de Grootb,A. Veldkampa ‘ Analysis of the effects of land use change on protected areas in the Philippines” Applied Geography vol -26, 2006 , pp.153-173

Table 2 :Change in Land-use/ Land-cover Classes in Sariska National Park (1989-2011)

| Land use/Cover | 1989 | | 2001 | | 2011 | | Area Change between 1989-2001 (km ²) | Percent Change 1989-2001 | Area Change between 2001-2011 (km ²) | Percent Change 2001-2011 | Area Change between 1989-2011 (km ²) | Percent Change 1989-2011 |
|-----------------|-------------------------|-------|-------------------------|-------|-------------------------|-------|--|--------------------------|--|--------------------------|--|--------------------------|
| | Area (km ²) | % | Area (km ²) | % | Area (km ²) | % | | | | | | |
| Dense Forest | 128.17 | 5.65 | 157.68 | 6.95 | 164.34 | 7.24 | 29.51 | 23.02 | 6.66 | 4.22 | 36.17 | 28.22 |
| Open Forest | 379.93 | 16.74 | 455.45 | 20.07 | 671.90 | 29.60 | 75.52 | 19.88 | 216.45 | 47.53 | 291.97 | 76.85 |
| Agriculture | 799.83 | 35.24 | 782.38 | 34.47 | 688.30 | 30.33 | -17.45 | -2.18 | -94.08 | -12.02 | -111.53 | -13.96 |
| Wasteland | 73.39 | 3.23 | 30.64 | 1.35 | 28.52 | 1.26 | -42.76 | -58.26 | -2.12 | -6.91 | -44.87 | -61.14 |
| Scrubs & Shrubs | 624.44 | 27.52 | 662.58 | 29.19 | 412.53 | 18.18 | 37.92 | 6.07 | 250.05 | -37.74 | -212.13 | -33.96 |
| Water Bodies | 29.67 | 1.31 | 7.67 | 0.34 | 7.94 | 0.35 | -22.01 | -74.16 | 0.28 | 3.65 | -21.73 | -73.22 |
| Fallow land | 229.86 | 10.13 | 156.55 | 16.90 | 275.90 | 12.16 | -73.31 | -31.89 | 119.35 | 76.23 | 46.03 | 20.03 |
| Settlement | 4.12 | 0.18 | 16.67 | 0.73 | 20.17 | 0.89 | 12.55 | 304.61 | 3.50 | 21.00 | 16.05 | 146.56 |
| Total | 2269.69 | 100 | 2269.69 | 100 | 2269.69 | 100 | - | - | - | - | - | - |

Source: Landsat image, Global Land Cover Facilities, (1989-2011)

Fig 2 : Growth of Forest Cover (1989-2011)



Study of Land-use/Land-cover changes in Sariska National Park (SNP) has been carried out to assess changes in three decades. The categorization of land use patterns is taken as dense forest, open forest, wasteland, fallow land, agricultural land, water bodies, scrubs & shrubs and settlement. Result of Land-use/Land-cover changes show an overall increase in forest cover in Sariska from 1989 to 2011. Area under open forest has shown a significant and consistent increase during this period. Similarly, a consistent increase in dense forest has been observed. An Increase of 28.22 percent area under dense forest and 76.85 percent under opens forest has been observed between the years 1989 to 2011. Reclamation and large scale tree plantation activities carried out by the forest department under a Joint Forest Management Scheme (JFM) seems to be the main contributor to net increase in forest cover in Sariska National Park.

Land under wasteland and agriculture has shown continuous decline trend. A decline of 13.96 percent area under agriculture land and 61.14 percent area under wasteland has been noted in Sariska

National Park from 1989 to 2011. Most agricultural land of the region is found close to water bodies like, canal, drains, ponds and lakes. Sariska forest range, Southern western part of Telha range, eastern part of Talviriksh range comprise agricultural land experiencing change over time. Whereas the Area under scrubs & shrubs and fallow land has shown rising as well decline trend. Area under these two categories has slightly increased in 2001 and then went down in 2011. However an decline in an area of 212.13 sq.km i.e 33.96 percent is observed in scrubs land category during 1989 to 2011. Similarly, about 46.03 sq.km i.e. 20.03 percent increase areas under fallow land have been observed from 1989 to 2011. This increase in fallow land could be related cultivation within park becoming economically inviable due to relocation of villages one the one hand and availability of job on the other.

It is also seen that land under settlements have also witnessed a continues rising trend. Although forest cover and human population are increasing in absolute number from 1989 to 2011. But the rate of growth of forest cover is higher than growth rate of population in Sariska over the same time period. Forest cover has increasing at the rate of 36.40 percent from 2001 to 2011, while population increasing at the rate of 24.16 percent in same period. However, an increase in area of reserved forest from 800 Sq.Km. to 866 Sq.Km. has brought improvement in the environment of Sariska National Park. This was done by adding the forest ranges from adjoining area of Alwar and Rajgarh tehsils. Apart from this, improvement in management strategies, restrictions on collection of fuel wood, strict implementation of anti-poaching activities, village relocation programme, implementation of Joint Forest Management (JFM), eco-development activities and community based development programme have also brought improvement in forest cover.

Table 3: Growth of Population and Forest Cover in Sariska National Park (1989-2011)

| | | Forest cover (sq.km) | Population (In'000) |
|----------------------------|-----------|-------------------------|------------------------|
| Year | 1989 | 508.12 | 14801 |
| | 2001 | 613.14 | 20767 |
| | 2011 | 836.24 | 25785 |
| Decadal Growth Rate (in %) | 1989-2001 | 20.66 | 40.30 |
| | 2001-2011 | 36.40 | 24.16 |
| Annual Growth Rate (in %) | 1989-2001 | 2.07 | 7.60 |
| | 2001-2011 | 3.64 | 2.42 |

Source- Landsat image, Global Land Cover Facilities, Primary census abstract 1991, 2001, 2011

REHABILITATION PROCESS IN SARISKA NATIONAL PARK

The issue of displacement and rehabilitation of human population located within wildlife areas is recurrent and central theme of management of Protected Areas (PA) in India. Displacement of villages started with the aim of protecting the entire spectrum of biodiversity with minimal or no anthropogenic interference. Keeping these objectives in mind, village Relocation has been undertaken in several countries as means of reducing pressure on wildlife.

Sariska National Park is one such Indian Protected area where village relocation has been prioritised as one of the key programmes for safeguarding its rich biodiversity. But it has been estimated that ever increasing population pressure, activities like mining, unregulated tourism have accelerated habitat degradation since early 1990s. It is posing serious threat to tiger population and to other species. Therefore, there is an urgent need to relocate the villages located inside the park to outer area so that habitat of tigers as well as the livelihood of the poor can be protected.

Village Rehabilitation in Sariska National Park

Sariska National Park is one of largest National parks of Rajasthan, covering total area of 866 sq.km. There are 29 villages located within the park, 11 villages with approximately 2454 families are in the core area of SNP Displacement of local communities is not recent issue in Sariska National Park. It has a long history of village relocation. Numerous forest blocks those were previously under the control

of local communities were declared as the hunting reserve of the Maharajas and consequently were displaced during 1888-1938. In post-independence India, for the first time Karnakawas village from the core area were relocated at Sirawas and Bandipul village near Silisere and Ajabgarh town of Alwar district in 1970. But the plan proved to be unsuccessful, as the plot of land where these communities were settled was subsequently declared as forest land. Therefore, the site was considered inappropriate for village rehabilitation even though basic infrastructure like concert houses, wells and roads had already been built in preparation of the relocation¹². Another attempt of relocation was made for Kankwadi, Kraska and Pilapan villages in 1977. Kraska site was thereafter declared as forest land and the villagers were only given permission to perform religious activities at their 'devsthan' (sacred site) and the use of public road. However, out of the 19 families those were allotted land, nine sold their land and came back to the park along with other landless people. Thus, despite given land and cash compensation, the plan was unsuccessful. Thereafter no concrete plan of displacement was formed till 1980s.

Systematic plan of relocation process in Sariska has been carried out under Centrally Sponsored Beneficiary Oriented Tribal Development Scheme. This scheme was introduced in 9th five year plan and framed by Ministry of Environment and Forest (MoEF) in 1989-90. As per the scheme, a list of beneficiaries and village-specific plans were drawn up for 4 villages i.e. Bhagani, Umri, Kankwari and Kraska. All these villages located in the Core Zone. These villages were given priorities in the first phase of relocation. First complete relocation took place for Bhagani village. All 21 families of this village were relocated in financial year 2007-08 to new site of Bardodrunth, which is close to Delhi – Jaipur highway. Second phase of relocation in Sariska was started in 1997. Umri village was relocated to new site of Mojpurrundh in this phase. Presently 54 families of Umri village are residing there after construction of concrete houses. Whereas villages like Dabli, Rotyala, Kraska are under the process of relocation. Local communities completely refused relocation process in case of Haripura, Devri villages. These villages are still in same place. Map 4.1 and Table 4.2 show current scenario of village rehabilitation programme in Sariska National Park. These indicate that total 985 families located in core area have given first priority for relocation. Out of these, 451 families have been relocated successfully, 157 families are under process of Rehabilitation and about 348 families still remain.

Table 4 : Current Scenario of Village Rehabilitation Programme in Sariska National Park

| S.NO | Name of Village | No. of Families | Consent Given | | | Relocated Families | Under progress | Remaining |
|--------------|-----------------|-----------------|---------------|------------|------------|--------------------|----------------|------------|
| | | | Op I | Op II | Total | | | |
| 1 | Bhagani | 21 | - | 21 | 21 | 21 | - | - |
| 2 | Umri | 85 | 31 | 54 | 85 | 85 | - | - |
| 3 | Dabli | 126 | 125 | - | 125 | 108 | 17 | - |
| 4 | Rotkyala | 55 | 54 | - | 54 | 46 | 7 | 1 |
| 5 | Sukola | 46 | 12 | | 12 | 12 | 0 | 34 |
| 6 | Kankwari | 170 | 39 | 95 | 134 | 132 | 2 | 36 |
| 7 | Kraska | 200 | 107 | - | 107 | 17 | 90 | 93 |
| 8 | Haripura | 74 | 4 | - | 4 | 4 | - | 70 |
| 9 | Devri | 181 | 48 | 19 | 67 | 26 | 41 | 114 |
| Total | | 958 | 420 | 189 | 609 | 451 | 157 | 348 |

Source- Official Record Sariska, 2013

¹²Maria Costanza Torri (2011) Conservation, Relocation and the Social Consequences of Conservation Policies in Protected Area: Case study of Sariska Tiger Reserve, India, Department of Social Science, University of Toronto Scarborough, Toronto, Canada, pp-54-64

Table 5; Relocation Package

| S.No | Items | Proposed Amount (in lakh) |
|------|--|------------------------------|
| A | CASH COMPANSATION | |
| 1 | Housing construction / compensation | 1.00 |
| 2 | Cash incentives/ Relocation Compensation | 0.30 |
| | A. Transportation of household and cattle's | 0.10 |
| | B. Disturbance allowance | 0.10 |
| 3 | Purchasing of land and development | 5.00 |
| 4 | Deposit in the nationalised bank for obtaining income through income generated (5year Fixed Deposit) | 3.00 |
| 5. | Community development work | 1.00 |
| | Total | 10 lakh |
| B | LAND COMPENSATION | |
| 1 | For housing | 60 x 90 plot of forest land |
| 2 | For agriculture | 6 bigha of forest land |

Source- official records Sariska, 2013

Village relocation is one of the main priority of forest department and government of Rajasthan for safeguarding rich biodiversity of Sariska National Park. For this purpose a relocation package for villagers was planned. New scheme of Ministry of Environment and Forest (MoEF), commonly known as 'integrated Development of Wildlife Habitat was launched under 11th five year plan. The compensation package for relocated families has been increased from Rs 1 lakh as mentioned in earlier tribal development scheme of 9th five year plan to 10 lakh in this scheme. As the part of this package, every male above the age of 18 years is considered a separate family and isentitled to services worth Rs 10 lakh including 1 lakh for house construction, 5 lakh for purchasing of land and development, 3 lakh as Fixed deposits, 1 lakh for community development work i.e. for road, hospital, school construction as a part of relocation package. The plan consists of allotting 6 bigha of cultivable land, and 60 x 90 plot for housing.

Land acquired for relocation has been identified through consultation process with the villagers. Revenue land or forest land duly reserved/diverted under the Forest Act 1980 were given for rehabilitation of villagers. The villagers have been allotted land according to the policy approved in the rehabilitation package, consisting of constructed houses and community facilities like school, place for crop thrashing and a community hall along with drinking water facilities such as community well, hand pump etc. Laying and designing of the plot have been down by a town planner. The rehabilitation committee has supervised all the activities including the land allotment. The beneficiaries have been given land pass book duly issued by the revenue department. All this work has been done with the aim of improving living conditions of villagers which was not possible in the park premise.

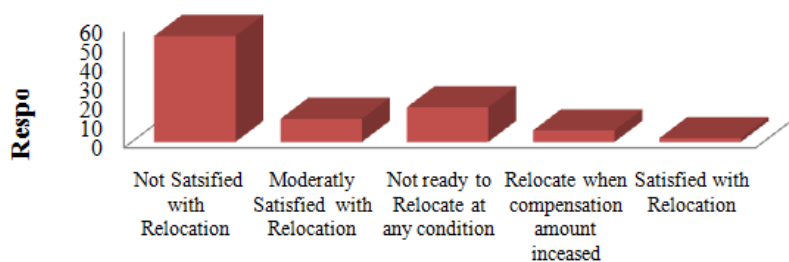


Concrete houses in Relocation site- Malutana village
Community Facilities in Relocation site- Bardod village

However the rehabilitation package has not satisfied the villagers when it was applied at ground level due to various reasons. It was mainly due to the amount offered as a part of relocation package which was considered insufficient for re-establishing of each family to various livelihood resources. The relocation plan with respect to the new proposed sites reveals following inadequacies.

- According to villagers of Haripura, land allotted to villager as a part of rehabilitation scheme is hilly and unsuitable for cultivation and housing. The villagers sold off this land at low prices and returned to their previous place, where they were declared illegal occupants by forest department.
- About Rs two lakh earmarked for house construction and community development work involved construction of concrete house, provision of electricity, common drinking water well, road and provision of irrigation facilities. However as per the prevailing cost of these activities, the earmarked amount was found to be highly insufficient and leaves no surplus for irrigation.
- The relocation plan did not provide irrigation facilities for the villages. The villagers had to manage their own irrigation facilities. This situation was peculiar to those villagers (villagers of core area i.e. Kraska, Umri) who shifted their livelihood from livestock grazing to Cash Crop cultivation after rehabilitation and settled at the proposed agricultural site in buffer zone. Since water table in this area went down significantly up to 400 ft due to water-intensive cultivation of wheat and mustard. It required considerable investment for bore wells facilities which was not possible with the limited amount.
- Compensation package did not include expensive inputs like fertilizers, pump sets, irrigation, electricity, pesticides etc required to set up agriculture for villagers relocated from core areas.
- Community facilities such as school, hospital, roads were still not provided to rehabilitee villagers even the plan made a brief mention of utilizing existing governmental scheme to develop infrastructure at the new site. But in reality there was no exact budgeting for such facilities.
- Restriction on collection of wood and other forest products along with lack of secure grazing and lopping rights within the park premises severely threatened some communities particularly gujjars whose occupation is forest dependent like livestock rearing and collection of forest product. Thus, restrictions on resource use and access imposed by reserve authorities and the necessity to meet the basic needs for survival, sometimes led to some illegal forms of connivance between local communities and the forest staff.
- The agriculture practices followed in Sariska were basically primitive in nature. Production of crops was used for self consumption by the villagers. It was found that yield of most of crops has decline significantly after the relocation. It happened because the land allotted to villagers as part of compensation was under scrub forest and degraded forest and was not suitable for cultivation. The problem becomes more acute due to lack of irrigation facilities. Rather than benefiting the villagers suffered at relocation sites. Due to this prevailing inadequacy in relocation process along with past history of forced migration, Relocation processes was not satisfactory for majority of the rural people.

Fig 3 Perception of Villagers toward Relocation Process



Source- Field Survey, 2013

Figure no 3 showing the perception of villagers towards the relocation process in Sariska. It indicates that about 55 percent of villagers i.e. 83 respondents out of 150 respondents were not satisfied with relocation process. While 18 percent i.e. 27 respondents were not willing to move out of the reserve under any condition, Around 12 percent i.e. 17 respondents were moderately satisfied with relocation while other 12 percent i.e. 17 respondents were ready to move if the cash compensation amount increased to 2 lakh along with 10 bighas land. They also wanted other amenities such as schools, electricity and drinking water facilities.

It may be concluded that government has been successful in achieving growth of forest cover by relocating of local communities to outer areas. However, aim of improving overall living conditions of villagers has not been achieved till now. The inadequacies of rehabilitation package, lack of strong institutional arrangements and active participation of local communities are some limiting factors responsible for faulty rehabilitation process in Sariska. Limitations of rehabilitation package and restrictions imposed on villagers have posed a severe threat to their livelihood security. And have severe impact on their cultural heritage, identity and economic system

CONCLUSION

The above discussion of Land-use/ Land-cover changes shows a drastic change in the landscape of Sariska National Park over the last three decades. The study shows an overall increase in forest cover in Sariska from 1989 to 2011. Area under open forest has shown a significant and consistent increase during this period. Similarly, a consistent increase in dense forest has been observed. Increase in build-up area and decrease in Agriculture and wasteland land has been seen as major land use changes in the Sariska National Park. Apart from these, changes have been seen in other land use categories. Area under scrubs and shrubs has come down. However, Area under fallow land shows slight reduction while water bodies are stressed due to pressure of population increase. The improvement in Land-use/Land-cover particularly between 2001 -2011 is the result of implementation of better management practices, village relocation programme. Apart from this, strict restriction on the collection of fuel wood, and regulation on grazing, mining activities, implementation of Joint Forest Management (JFM) has also brought significant improvement in forest area.

Relocation of villages from Sariska was started with the aim of protecting the entire spectrum of biodiversity and provide local communities a good standard of living through access of transportation, health and education facilities. About 451 families have been relocated successfully from Sariska, 157 families are under process of rehabilitation and about 348 families still remain in Sariska. However, many villagers are not satisfied with rehabilitation process. It is mainly due to the amount offered as a part of relocation package was considered insufficient. The inadequacies of rehabilitation package, lack of strong institutional arrangements and poor participation of local communities are some limiting factors responsible for faulty rehabilitation process in Sariska. Although government has been successful in achieving growth of forest cover in the park by relocating local communities to other areas.

But the aim of improving overall living conditions has not been achieved till now. It can be concluded that a re-thinking of Sariska village relocation plan is urgently needed. The indigenous needs of local communities must be taken into consideration, infrastructure facilities and sources of regular income should be developed before relocation along with sufficient compensation package. Above all, active participation, cooperation with forest authorities is very essential for managing ecology of Protected Areas. Therefore further comprehensive micro analysis is needed at all levels to capture the holistic impact of land-use/Land-cover changes on the ecology of the park and livelihood of local communities.

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