

STRATEGIES FOR CONSERVATION OF BIODIVERSITY IN THE BEED OF JHUNJHUNU (RAJ)

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ABSTRACT

Biodiversity is under serious threat as a result of human activities. The main threats as like population growth, resource consumption, climate change and global warming, habitat conversion and urbanisation, over-exploitation of natural resources, invasive alien species and environmental degradation. Overgrazing, Overharvesting of Selected Species, Pollution, Toxic Discharges, Habitat Alteration, Competition, Narrow Geographical Area, Disease and Parasites, Habitat Aridification, Modification Homogenization of Ecosystems, Natural Disasters, Deforestation, Soil Erosion are other most important threats to biodiversity. Biodiversity provides essential goods for human welfare like as food, fibre, that's most important. Plant diversity and the many ecosystem services that it provides are a key factor determining human well-being. Biodiversity is losses has-direct and indirect negative effect on living organism. Over the next few decades, as monoculture yields continue to decelerate or decline for many crops, and as demand for ecosystem services continues to rise, diversification could become an essential tool for sustaining development and ecosystem services.

Keywords: *Biodiversity, Population Growth, Resource Consumption, Climate Change, Global Warming.*

Introduction

Conservation of nature and its resources have been a significant part of cultural ethos, especially in remote, rural and indigenous communities or society in many parts of the world along with India. Moreover, these communities or society consider themselves connected with their biophysical environment and biodiversitic atmosphere in a web of spiritual relationship as well. These types of rural communities or societies consider specific plants, animals, or even surrounding rivers and mountains as their ancestors and protect them for their natural need. (Jeph, 2019); (Jeph and Khan, 2019);

Likewise religious and traditional bellicose, cultural mores and practices also play a crucial role in the conservation of environment and biodiversity effectively. Similarly sacred groves are the smaller areas of religious belief where a particular plants species is grown and is considered as a sacred since ancient times. Having religious significance, these plants species are protected by the local communities or societies and consequently it helps in the conservation of the species (Singh *et al.*, 2017; Devakumar *et al.*, 2018).

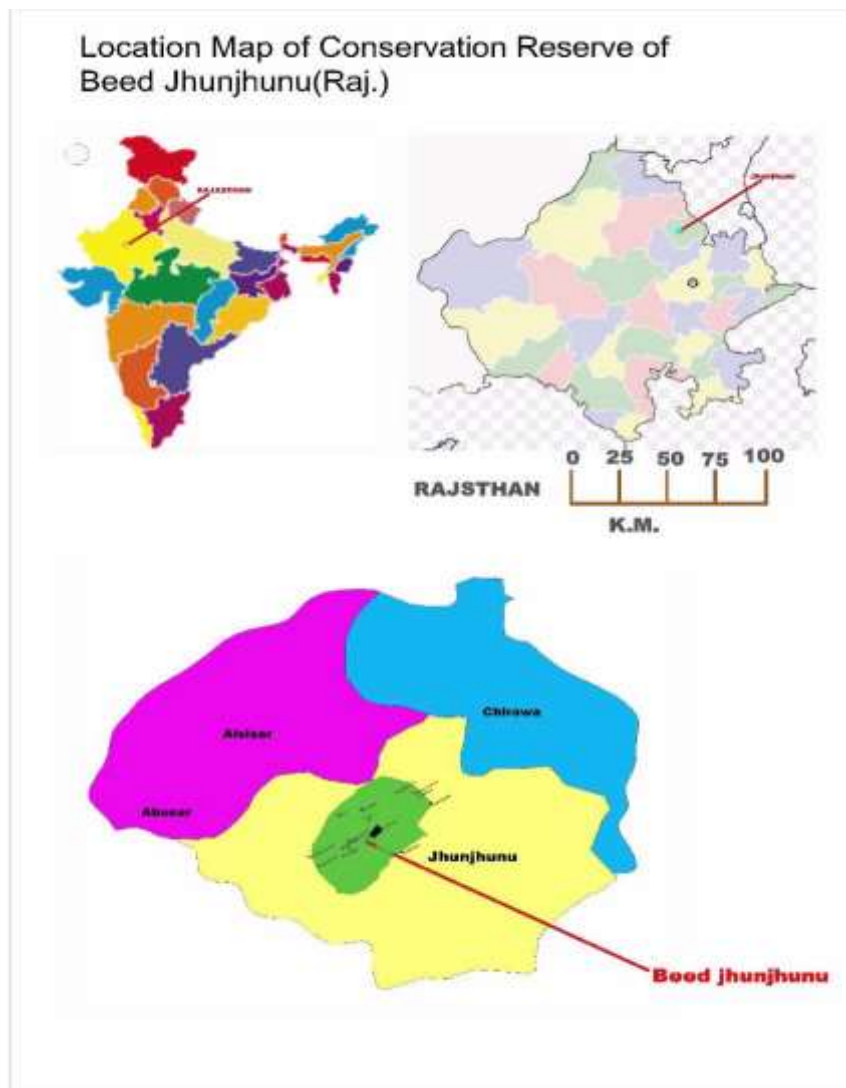
Moreover, we can say these are also the forest ecosystems conserved by local communities and reinforced by religious sentiments towards the forests. Sacred groves are also an example of positive human intervention into conserving forests. The contributions of local communities and societies towards the management of sacred groves are mainly in terms of providing protection, safety and tree

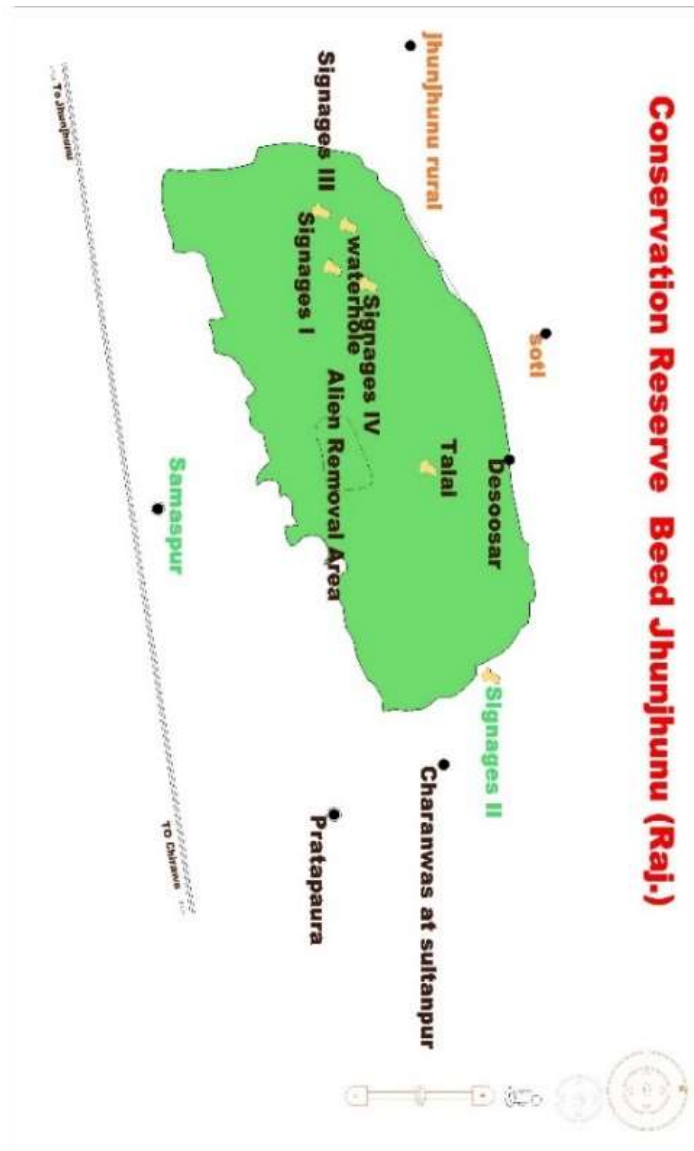
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enrichment also. This has contributed immensely into maintaining health and growth of sacred groves and it is also instrumental into providing many non-tangible benefits also like biodiversity conservation, carbon sequestration and water and soil conservation naturally, aesthetic and recreational services also (Swaminathan, 2012).

Study Area

Study area Jhunjhunu District is situated between 27° 38' and 28° 31' North latitudes and 75° 02' and 76° 06' East longitudes and covers 5928 Km² of geographical area (Fig. 1). It is characterized by dry climate with the hot season somewhat milder than in the adjoining district to the North and North-west of the state. The maximum temperature is 48°C and it falls below the freezing point in winter. Total annual rainfall is 300–400 mm. Jhunjhunu Beed is surrounded by Desusur village in the north; Samaspur village in the south; Charanwas village in the east; surrounding agricultural land and Jhunjhunu city in the west. In the rainy season, the forest is become luxurrious and rich in vegetation and enriched many medicines, rare, local and threatened plants. The total area of Jhunjhunu Beed is 1047.48 Hectare. It has been declared a conservation desert by the state Government's wild notification vide F3 (47) VAN/2008 Date 09-03-2012. This reserve area is the heart of Jhunjhunu City due to having a nearby location to city headquarter (Anonymous 2015). Figure 1. Location map of Jhunjhunu and Jhujhunu Beed of Rajasthan, India.





The intension behind the creation of the Beed Jhunjhunu Conservation Reserve is to preserve the bio-diversity by representing a sample of the semi desert ecosystem for the benefit of future generations. The main emphasis is to protect flora, present in this area especially natural jaal (*Salvadora oleoidis*). However, the idea was also to protect semi desert eco-system in its natural form for the coming era. Therefore, the Management plan has been prepared to fulfill the objectives in vision while creation of this Conservation Reserve. All the measures have been adopted to retain the unique characteristics of the semi desert intact (Hudda, 2020).

Nature had provided us its valuable biodiversity unevenly across the whole surface of earth. This type of biodiversity life on the earth is going to decrease rapidly due to human need and greed. As a goal, in recent past years, the area of conservation biology has been covered to protect the biodiversity for future. Conservation of biological diversity is essential for the survival of the human being as well as human generation. Earlier, conservation of biodiversity was limited and ultimately unable to save genes, species and habitats. But now a day's conservation philosophy has changed, emerged and is especially based on to save biodiversity. Conservation efforts which are focused on species are very much essential, but they must be implemented by the efforts to conserve habitant and ecosystems in natural and semi-natural states also.

Moreover, from conservation of biodiversity point of view, red listed plants are the common tool for conservation assessment as they explain the complex phenomenon entitled “Endangerment” in a simple way (IUCN, 2001), therefore, it is resulted in threatened status for a particular species and it is also taken as a measurement or example for conservation priorities. National Forest Policies and Forest Acts should be enunciated by the Government of India from time to time play an important role in the management and conservation of the forests all over the country. As far as conservation is concerned, government authorities of district head quarter must conduct seminars and camps to spread awareness among local people to save bio-diversity and habitats, to encourage and to preserve the traditional knowledge, to educate the rural people to conserve the protected forest area so as to promote its sustainable utilization. Along with this, conduction of regular seminar/programs at nears by villages to educate the people, to save forest as well as to save bio-diversity which effects the life of human being indirectly.

Some suggestions for conservation of the area are listed below;

Some Structural Strategies are:

From structure's point of view, the forest department has fixed some parameters like; zone, boundaries etc. to monitor the concerned area in a better way, these are;

- **Boundaries**

This protected area is situated in the east of Jhunjhunu city on Narnol-Chirawa-Jhunjhunu-Fatehpur National Highway No-11 in between Bagar and Jhunjhunu. The city of Jhunjhunu and villages like; Soti, Desusar, Pratappura, Samaspur and Kasaiyo Ki Dhani lies close to the protected area. This area is divided into two compartments and the total area of Conservation Reserve is divided into three parts by road viz. (1) Jhunjhunu- Bagar road (2) Jhunjhunu - Soti road. Village Charawas, Sewage Treatment Plant of the city, Desusar - Jhunjhunu - Soti road and villages Samspur, Pratapura, Kasaiyo Ki Dhani forms the Eastern, Western, Northern and Southern boundaries respectively of the Protected Area (Hudda, 2020).

North-West - 28°09' 58.8" N and 75°25' 34.3" E

North-East - 28°10' 23.1" N and 75°27' 09.5"E

South-East - 28°09' 22.4" N and 75°27' 32.3"E

South-West - 28°08' 14.7" N and 75°25' 18.4" E

- **Zonation**

The Conservation Reserve area is divided into three zones namely; Zone I, Zone II and Zone III for better management and achieving the set objectives. Various standard operating procedures are adopted for better management and conservation of wild life. Various activities are proposed in 10 years plan period from 2019-20 to 2028-29 in these three zones for improvement of wildlife habitat (Hudda, 2020). Precisely, we can elaborate the zonation part and it's strategy for preservation is as follows-

- **Zone I:** According to forest department, this zone is known as administrative zone. Range office is also situated in this zone. All the management, conservation, protection, developmental and ecotourism activities are controlled and managed from Range Office of this Zone. *Salvadora oleoides*, *Prosopis juliflora*, *Ehedra foliata*, *Capparis decidua*, *Euphorbia cauducifolia*, *Balanites aegytiaca*, *Zizyphus mauritiana*, water bodies, grass species, non-forest land and some encroachments area are present inside this zone. Total area of Zone-I is around 506.48 ha and Eastern-Southern part of the Conservation Reserve (i.e. towards right hand side Jhunjhunu – Bagar road of NH – 11) is categorized as Zone-I. In the rainy season, various fodder species, grass seeds are planted in 150 ha. area. Eco-trails are connected to water holes to promote tourism activities. The conservation and improvement of wildlife habitat, it is essential for safe movement of Wildlife. All ecotourism activities of the Zone are; managed by Range forest officer (RFO) office. Grazing is not permitted in the core zone and action against encroachers takes up as and when needed under provisions of the Wildlife Protection Act, 1972 (Hudda, 2020).
- **Zone II:** According to forest department, this zone is situated on the left side of Jhunjhunu - Bagar road of NH -11. It covers an area of 384 ha. lying in the North Eastern part of the Conservation Reserve. *Salvadora oleoides*, *Ehedra foliata*, *Acacia nilotica*, *Acacia leucophloea*, *Acacia tortilis*, *Capparis decidua*, *Zizyphus nummularia*, water bodies, grass species are presents inside this zone. A part (2.5 km length and 3.75 meter width) of Jhunjhunu-Soti village road passes through this zone. For the conservation and

improvement of wildlife habitat, a bypass road is there which is essential for safe movement of wildlife. All the management, conservation, protection, developmental and ecotourism activities of this zone are controlled and managed by Range Office. Grazing is not permitted in the core zone and actions against encroachers have been taken up as and when needed under provisions of the Wildlife Protection Act, 1972 (Hudda, 2020)

- **Zone III:** According to forest department this zone is the main tourism zone due to presence of old heritage Khetanath Bawadi and variety of bird species. This area also has water bodies. *Salvadora oleoides*, *Prosopis juliflora*, *Ficus religiosa*, *Ficus benghalensis*, *Mangifera indica*, *Acacia tortilis*, water bodies, grass species, and some encroachments are present inside this zone. An area of 157 ha. towards the Western part of the Conservation Reserve i.e. towards the left hand side of Jhunjhunu - Soti road come under this Zone. On the periphery of zone there exists old Sati mata mandir, Khetanath Bawadi, Pucca johda. Two STP (Sewage Treatment Plants) are situated outside the boundary of this zone. At present approximately 40 ha. area is covered with sewerage water due to depression area. Khetanath bawadi is full of this sewerage water. As per the plan is concerned, this Sewage treatment plant (STP), Approximately 40 ha. area is also covered with *Prosopis juliflora*.

According to Govt. policies, the Sewage treatment plant (STP) plan is fruitfully planned to save water as well as for use of water into the demand area and needy plants/grasses of this forest. If suitable results are obtained from computation laboratory, are obtained for requirement on million liters per day (MLD) water and Sewage treatment plant (STP) can be used in Conserve Reserve if suitable biochemical oxygen demand (BOD), chemical oxygen demand (COD) or use any other technical parameters. As a result, this water will be supplied from solar tube well or tube well. The 10 years management's plan includes plantation of silvipastrol system soil moisture conservation (SMC) works and removal of *Prosopis juliflora* and other alien species, construction of water holes, stored in talai and water tanks by solar tube well, renovation through boundary wall around Khetanath Talab/Bawari, ecotourism activates and other similar activities also. Grazing are not permitted in the core zone and actions against encroachers takes up as and when needed under provisions of the Wildlife Protection Act, 1972 (Hudda, 2020).

Various Ways of Protection and Suggestion for Conservation of the Area

Some suggestions for conservation of the area are listed below:

- **Prevention of Unauthorized People or Villagers:** As Beed Jhunjhunu is surrounded by the villages and townships and people living in these area use woods as a main fuel which is collected from the Beed Jhunjhunu. To fulfill the their requirement of fuelwood plants species like; *Acacia leucophloea*, *Acacia nilotica*, *Prosopis cineraria* etc. should be planted both by forest officials and villagers in rainy season and they should be protect also. Plantation of *Prosopis juliflora* is an option to reduce pressure of fuelwood on the indigenous species but it should be kept in mind the growth of this plant suppress the growth of native plant species. As conclusion, we can say that unauthorized peoples should be banned into Beed area to save the Beed in an effective manner. In another way, we can say that there should be a system to visit the Beed area by out-siders to protect the concerned area.
- **Illegal Cutting of Trees:** Since past decades, illegal cutting of trees was a practice to fulfill the requirement of fuel. Due to construction of boundary wall and vigilance by departmental officials it has reduced illegal cutting of trees. Likewise; by increasing awareness among people have resulted in the protection of vegetation especially; *Prosopis cineraria* (Khejri) and *Salvadora persica* (Jaal).
- **Encroachment, Other Illegal Activities and Illegal Removal of Non Timber Forest Product NTFP:** Primarily, peripheral area of this Conservation Reserve was used for small farming, fuel purpose and for grazing but later on this practice has converted this area into an encroached area. In current scenario, due to strict vigilance and compliance of rules, encroachment has been removed strongly. While encroachment area is being handled as per the extant rules and regulations. Illegal removal of NTFP (Non Timber Forest Product) is not in practice, however Dhaman grass is distributed free of cost among the members of Eco-development Committee (EDC) / Village Forest Protection and Management Committee (VFPMC).
- **Illegal Grazing of Grass and Plants:** The main occupation around the area is animal husbandry and agriculture. Grass grazing may be completely prohibited after completion of the boundary wall or Tarbandi.

- **Research and Monitoring:** There is lot of scope of research in the Conservation Reserve. Scholar from the nearby local colleges should be motivated to carry out research activities time to time. By increasing research practices, we can develop the importance of conservation and useful aspects of Beed area. Periodic monitoring should be carried out by the field personnel of Jhunjhunu division as well as of forest department also.
- **Awareness among Villagers to Grow Fodder Plants:** Green fodder is essential for the cattle's who have high milk yielding capacity. The cultivators in the surrounding area of Beed must be encouraged to grow green fodder by themselves for feeding their cattle. For this purpose seedlings of fodder trees, shrubs and grasses should be raised in nurseries and distributed to the local farmers and other individuals free of cost. Improved technology for the production of green fodder, suitable species and methods of cultivation should be made available to the villagers.
- **Rotational Grazing Pattern:** Regular grazing by cattle's at particular site stops regeneration of grass and create loss of biodiversity. To overcome this problem, rotational grazing pattern is an alternate for regeneration of grasses and plants. A particular area should be marked for grazing to finish a specific area while another area can be open for another cattle grazing. The marked area will provide seeds for regeneration. After natural dispersal of seeds, the grasses and plants may be allowed to cut as per direction of the forest officials. Likewise, in next year the marked area will open for grazing and open area will closed for cattle entry.
- **Pasture Development for Cattle:** In the past decades, there were large land area for grazing of cattle known as 'Gochar Bhumi'. This land was left behind as in present time this land is encroached by many Bhoo-Maphia's or from nearby land lords. Government should take strict action and plan to develop these lands as a pasture again. The development of pastures would invite certain resistance from the local villagers and they will be convinced about forthcoming benefits of this scheme. It is also suggested that the village Panchayats should be involved in execution and management to save such lands.
- **Protective Infrastructure and its Development:** From protection point of view, we should protect wildlife habitat of the Beed against timber destruction, illicit grazing and other activities, it is necessary to provide protection staff for regular mobility, and likewise govt. authorities should provide a number of fire arms for facing offenders.
- **Protection or Conservation by Biotechnology:** From protection point of view, biotechnology is a technique that must be used for living organisms to make a modified product, to improve plants or animals or to develop microorganisms for specific uses. Several tools for crop plants/range grasses, comprising endosperm and another culture, soma clonal variations, protoplast culture and fusion, transformation, etc. can break barriers for recombination and to raise desired traits like seed production, improved biomass, nitrogen fixing capability etc. Propagation of specific genotypes of endangered but useful species on a large scale in a short time frame is possible through the modern biotechnological approaches. There is a large number of threatened/rare/endangered plant species on which in-vitro propagation of plant could be achieved by clonal propagation, somatic embryogenesis, organogenesis, callus differentiation, etc.
- **Protection of Forest through Squad and Armed Guard Support:** The patrolling party of the Beed is presently deployed and to deal with illicit grazers wood cutters. They are not properly equipped to deal with the offenders. A special forest protection squad is required to protect the area. In the rainy season, the large number of cattle enters into grazing area of Beed for their food. These peoples are rigid and ready for violent action also whenever they are apprehended. Such people cannot be controlled by forest staff alone. For protecting the Beed against these offenders a company of 'Armed Guard' is exclusively required for help.
- **Inter-Agency Programmes and Problems:** Funds from schemes like Mukhyamantri Jal Swavlamban Abhiyan (MJSA), State plan, Mahatama Gandhi National Rural Employment Guarantee Act -2005 (MNREGA), Nagar Parishad and MLA / MP Local Area Development, funds from local people are used in various activities like plantation and other conservation related works. But it should be insured that the utilization of funds is there along with increment in the funding in a gradual way to develop the concerned area in very effective way. Local representative like MLA/MP should release the need of funds effectively.

- **Land Pollution:** Some signage of protection/instructions should be installed in the tourism areas to sensitize the tourists about keeping the area clean and safe. Sufficient number of trash bins should be kept for collecting the trash along the tourist roads and tourism spots inside the protected area. The food waste produced during camps should be disposed of immediately by the volunteers of respective camps strictly in accordance with the Solid Waste Management Rules. Necessary communication in this regard should be made with the Rajasthan Pollution Control Board by the Divisional forest officers (DCF). It is also noted that which land is going to be polluted due to unauthorized dumping of waste materials by city persons as well as by nearby villagers. So that it can be strictly banned by local authorities or officials in a very systematic way to protect the land from becoming a polluted land.
- **Control and Monitoring of Protected Area by Revenue Authorities:** The boundaries of this area should be managed as per the following objectives:
 - The revenue lands should be clearly identified at least 10 km distance from the boundary of protected area.
 - The boundaries of adjoining farms of Beed should be clearly marked through wall/Tarbandi by the related revenue authority strictly. By this activity we may prevent illegal encroachments.
 - The government lands / community lands should be restored to wildlife
 - habitats.
 - Pastures should be developed to meet the fodder needs of local people to reduce the biotic pressure on core zone. Revenue authorities need to mark the boundaries clearly to develop pastures in a very well manner.

Social and Community Initiatives for Conservation

In the vicinity of Beed Jhunjhunu there are various ethnic groups, which are associated with plant protection since ancient times. They believe that some plant species are directly linked with their almighty God.

Sacred Grove in Beed Jhunjhunu

The concept of sacred grove is primarily mythical and theological. Sacred groves are natural or near natural vegetation, dedicated by local communities to their ancestral or spiritually. Sacred grove are locally known in Beed Jhunjhunu as Baba Khetanath Ashram, Balaji Temple, Gogaji Temple, Sati Mata Temple, Mahadev Temple, Ghorakhnath ji ka Dhona etc. (Jeph, 2022).

Result and Discussion

The study indicates that before a decade the flora of Beed Jhunjhunu is rich in plant species and a large number of plant species were recorded in the area. The vegetation of Beed Jhunjhunu is varied, depending upon the climate and edaphic factors and it has impressive medicinal flora and large number of plants which are considered important for therapeutic aid and for alleviating ailments of human being. These plants are being used in the vicinity of Beed by various tribal communities in form of traditional medicines since hundreds of years. The present study emphasizes on both the use as well as the conservational aspect of medicinal plants of Beed, as in the wake of their bio prospecting use as herbal medicine, they have been badly exploited resulting into serious genetic erosion of their species (Jeph, 2021); (Jeph, 2021); (Jeph, 2022); (Jeph, 2022); (Jeph, 2022); (Jeph, 2023).

The Beed area must be specially explored and the biodiversity potential of the area need to be clarified as well as quantified by the authority itself. A special and extensive emphasis should laid on rare, endemic and threatened species of the concerned region, so that effective efforts for conservation can be adopted for their rehabilitation. Degraded land should be escaped, restored and brought under coverage area of forest cover. Moreover, forest Department should involve the local people as well as local communities and evolve a practical strategy of rotational grazing, government authority's work in such a manner so that sufficient rest is provided to grazed area to restore their diversity. In such areas, conservation activities cannot achieve their moto without involvement of the local communities, who are directly dependent on such resources for their daily needs and livelihood. There can be some incentive scheme to explore the awareness about conservation doing by this activity bio-resources can be increased. The awareness programmes should be conducted among the local people to aware them about conservation and importance of locally available threatened and rare plants species in the Beed Jhunjhunu.

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