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Environmental Awareness and Habitat Restoration as an Effective Tool for Conserving White-naped Tit (*Parus nuchalis*) in Southern Aravalli hills, Rajasthan, India

Final Report

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Introduction

First Rufford Small grant project on White-naped Tit (*Parus nuchalis*) resulted in the need for deep sense of involving local communities in the conservation perspective and assessing their basic dependency on the forest resources. This second Rufford small grant project started with an aim of assessing natural resources used by local communities around the thorn forest habitat through a questionnaire based house hold survey, focus group discussion to develop model fuel-wood and fodder plots, and simultaneously creating awareness about the bird and its significance to the landscape and the management and sustainable use of the natural resources. As part of this it was proposed to develop model plots in six villages along the boundary of the White-naped Tit habitat, with an extent of 10 ha in each village. The main purpose behind was to decrease or reduce the natural resource extraction from the bird's habitat and the study included the following objectives and methods to achieve this.

Objectives

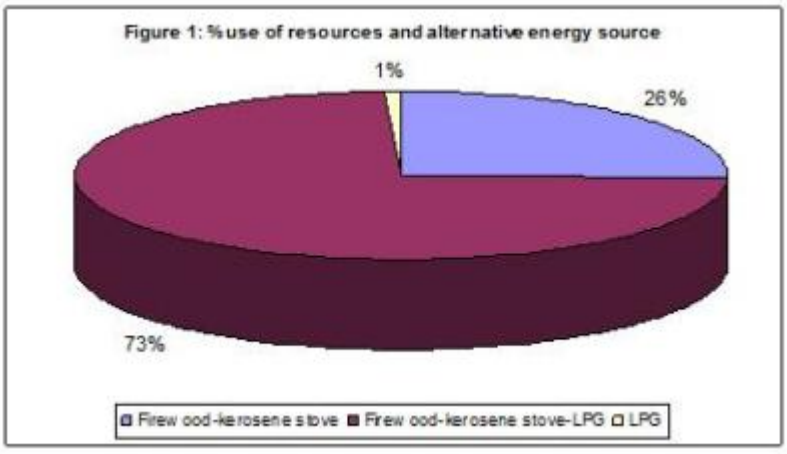
1. Assessment of Resource Use/Extraction : This would be done through house hold surveys and focused group discussion (FGD) using set questionnaire focused mainly on the resource needs (daily, seasonal and annual) in six selected villages, two each in high, moderate and less degraded habitats with White-naped Tit (*Parus nuchalis*) in Southern Rajasthan (based on first RSG). This would be further substantiated with secondary information if available.
2. Preparation of Resource Availability and Use Maps: Forest Resource availability and use (data acquired through FGDs) maps using GIS was prepared and validated using field surveys. Zone of high pressure was marked on the map, so that resource development, restoration/habitat improvement and awareness program can be designed accordingly.
3. Habitat Improvement and Development of Fuel-wood and Fodder plot: Common and grazing lands of the villages, habitats which needed to be improved were identified and seeds and saplings of native and indigenous species were procured through discussion with local people. Field implementation was done with the help of local communities and mangers, followed by monitoring.
4. Environmental Education Program: This program involved extensive group discussion, meetings with different stake holders, poster presentation in local language, training, work

shop on restoration, monitoring, managing and sustainable use of the resources, in addition to awareness on creation on the significance of WNT and its habitat.

The first RSG project revealed that White-naped Tit population was declining because of intra-specific competition (loss of habitat, nest site competition) due to various natural and anthropogenic pressures. These anthropogenic pressures were in terms of, acquiring the fuel-wood and fodder resources from the forest by the local communities surrounding the thorn forest habitat and the adjoining dry deciduous forest. Hence the household surveys and Focus Group Discussion (FGD) were aimed at assessing the amount of fuel-wood required per house hold, its availability and distance moved /covered to acquire this natural resource and how the local community sees a forest and use the natural resource to fulfil their basic requirement of fuel-wood and fodder was carried out using a set questionnaire.

Dependency on Tropical Thorn Forest for Fuel Wood

Six villages were selected based on the previous study to be highly dependent on the forest for meeting their resource needs. Since the monsoon was fast approaching, initial phase of the household survey was carried out in two villages Rampur (human population -1595) and Mandigarh (human population -1531) with 230 households, while surveys in rest of the four villages Sumer, Lampi, Ghanerao, Desuri was postponed. This was mainly due to the development of model plots and it involves plantations and grassland development, which is fully dependent on the rains during the monsoon that was to start by end of June. Hence the house hold survey was stopped and efforts were directed towards identifying plots for the model resource development. The potential restoration period that is the monsoon season spreads over only three months (end June to September).

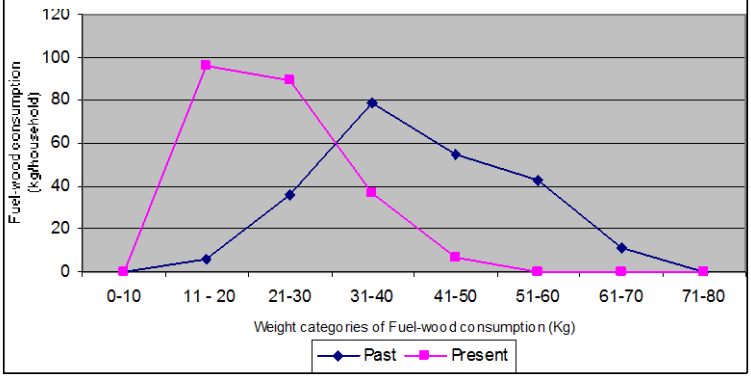


Questionnaire also contained questions on fodder species, but as mostly the local communities were traditionally dependent on forest to meet their fodder demand, it took time to make them aware on this issue of developing their own fodder and fuel wood plots so that pressure from the forest can be minimized and that some part of their resource needs can be met within their village environs. The survey in the Rajpura and Mandigarh villages

revealed that 73% of the household were totally dependent on firewood and rarely on kerosene stove and only 1% used LPG as a source of energy to cook their food, while the remaining 26% were found to use other alternatives which included firewood largely as source of energy (**Figure 1**).

On an average minimum and maximum amount of fuel-wood used by a household were 20 and 70 kg/household respectively. The maximum amount of fuel-wood collected 20 years back was 70 kg but presently this has decreased to 50kg. The decrease of 20 kg was due to lack of fuel-wood resources in their neighborhood (**Figure 2**). The fuel-wood consumpation from past to present has changed. Earlier when there were no other alternative available, people used a maximum of 40-50 kg/household, but today even when other option such as LPG, Gobar-gas (Biogas plant using cow-dung and other biodredable material) and solar energy are available, people still tend to use firewood for their basic needs just because it was a freely available resource.

Figure 2: Past and Present Fuel Wood Dependency in Rajapura and Mandigarh Villages



In the second phase after the completion of the model plot development, the household survey were carried out in the remaining four villages i.e. Sumer (households 144 & human population -660), Lampi (households 181 & human population -925), Desuri (households 1717 & human population -8897) and Ghanerao (households 1437 & human population -7650) showed that all four villages used fuel wood to a higher extent up to 70-80kg in the past, which has reduced to 40-50kg in present conditions (**Figures 3, 4, 5 & 6**). However, in the sample villages the use of fire wood in terms of quantity, had decreased, which was mainly due to the distances they had to travel to acquire the resources. Further, the fuel requirement was being met through use of charcoal and some even LPG gas. The difficulty in getting LPG gas and the high cost has still made the people to depend on the fuel wood that is being collected from the adjoining forest areas. The larger villages like Desuri and Ghanerao had more of LPGs compared to the smaller villages.

Increased human and livestock population coupled with competition for the natural resources has put tremendous pressure on the nearest forest areas, especially the thorn forest on the foot hills of the western slopes of Aravalli hill range. Hence these tropical thorn forests, the habitat of WNT are under continuous pressure from the local communities, as the major occupation of most of these communities that reside along the foot-hills of this hill range, was livestock rearing and rain fed agriculture. Some of the local communities are traditionally dependent on this forest for natural resources like fuel-wood and fodder. The figures (**Figures 3, 4, 5 & 6**) depict the changes in the past and present fuel-wood usage in the four study villages, which was based on the sample house hold surveys.

Figure 3: Past and Present Dependency on Fuel-wood by Sumer Village

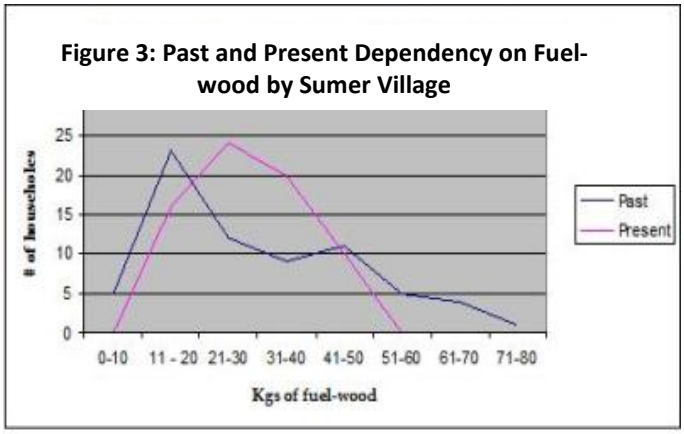


Figure 4: Past and Present Dependency on Fuel-wood by Lampi Village

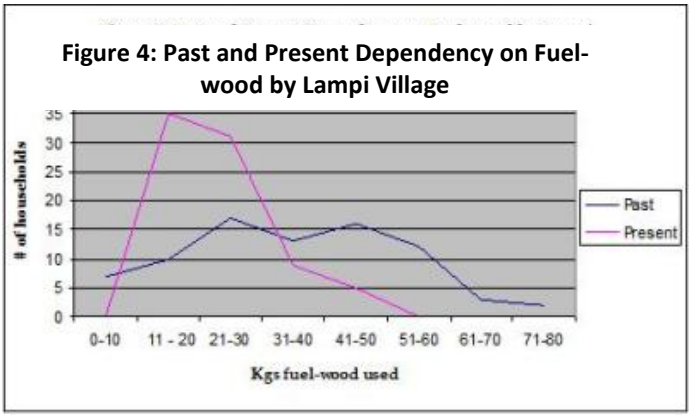


Figure 5:Past and Present Fuel-Wood Dependency in Desuri Village

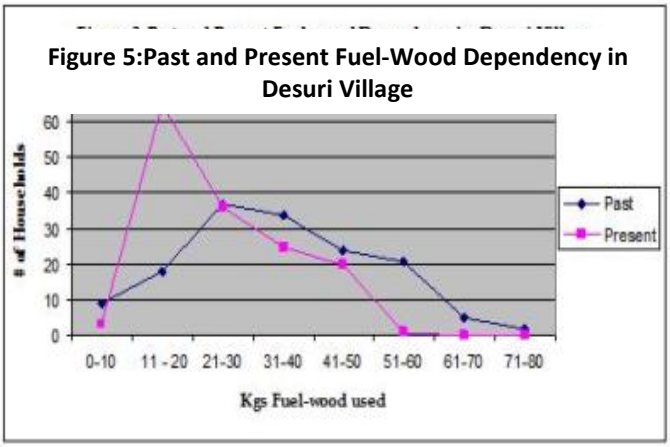
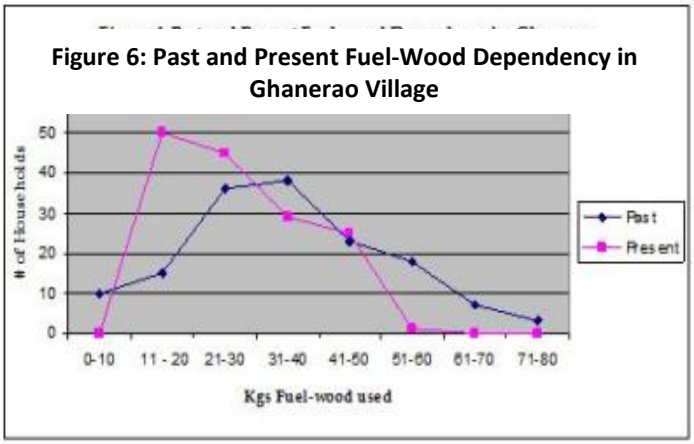


Figure 6: Past and Present Fuel-Wood Dependency in Ghanerao Village



<u>Distance Moved by Local Communities to Collect Natural Resources</u>

The distances moved by the villagers in pursuit of fuel wood and fodder collection and for grazing their livestock seem to have generally increased when compared to the past in all the study villages (**Figures 7, 8, 9, 10 & 11**).

Earlier distances covered to acquire this natural resource by the Rajpura and Madigarh villagers was within a range of 5km from their residence, but this distance has doubled presently to minimum

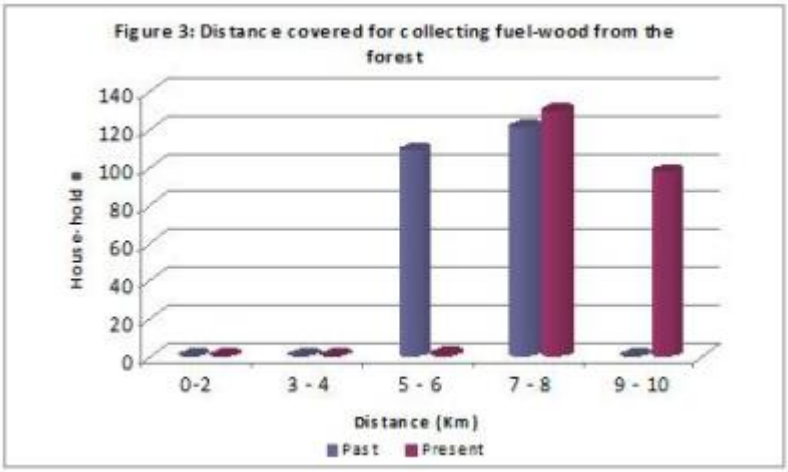


Figure 7: Distance Covered for Collection of Fuel-Wood by Rajpura & Mandigarh Villages

10km, which clearly depicts that the adjoining forest is shrinking day by day, mainly due to destruction through extraction to fulfil their basic fuel-wood and fodder needs (**Figure 7**). This has in turn subsequently exerted tremendous pressure on the thorn forest habitat of White-naped Tit, an endemic and vulnerable species found in this region.

Data showed that earlier, the local people had to rarely cover a distance of four kilometres to collect the fuel-wood and fodder, as majority of them moved maximum distances of up to 1-2 km, but presently they were found to go up to four kilometre or more. The decrease in the maximum distances covered by these remaining four villages was comparatively less to the Rajpura and Mandigarh villages, which was mainly because of the presences of forest around all these four villages, as against availability of forest on only two sides of other two villages (Rajpura & Mandigarh) that was more than 6-7 km.

Figure 8: Distance Covered for Collection of Fuel-Wood by Sumer Village

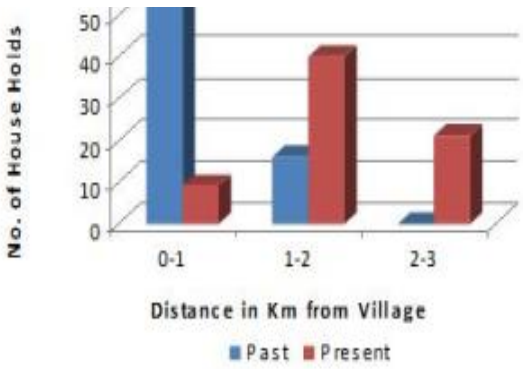
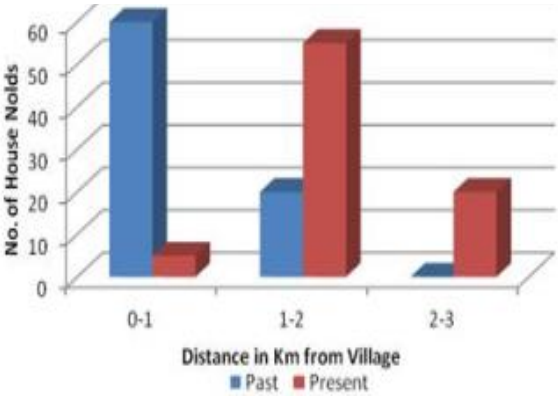


Figure 9: Distance Covered for Collection of Fuel-Wood by Lampi Village



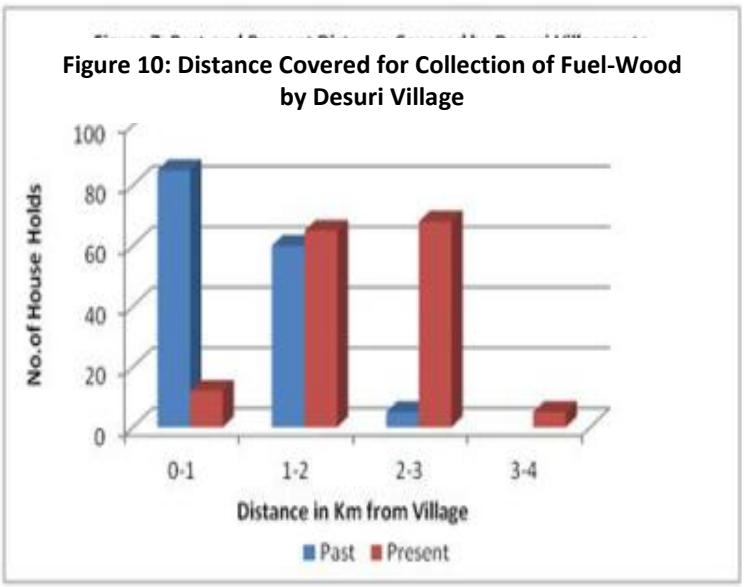


Figure 10: Distance Covered for Collection of Fuel-Wood by Desuri Village

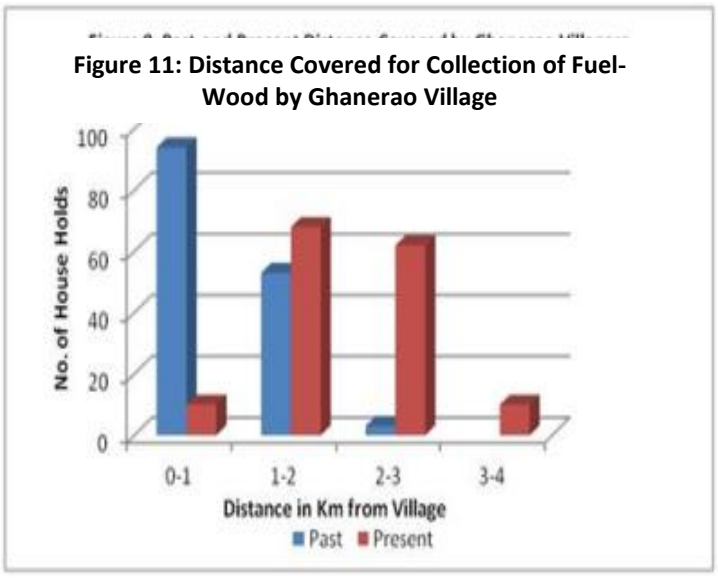


Figure 11: Distance Covered for Collection of Fuel-Wood by Ghanerao Village

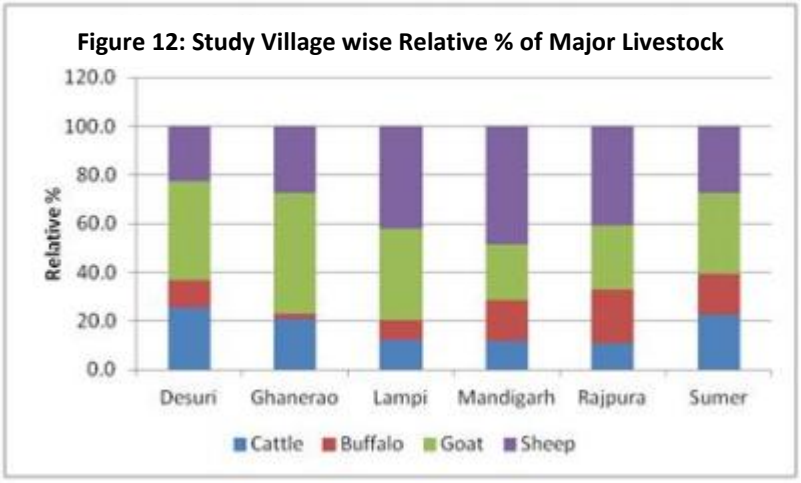
Keeping all this information in mind, question such as "what were the fuel-wood and fodder species present 20 years back in these areas" was also asked, so that those preferred species can be planted / restored in model fuel-wood and fodder plots.

<u>Relative Percent of Major Livestock in the Six Study Villages</u>

The study area comprised of different types of local communities, and these different communities used the forest for meeting out their different needs but mainly for fuel wood and fodder. Livestock rearing, being one of the main livelihoods for these local communities had a huge impact on these forests. The local communities who are dependent on the forested landscape, for meeting out the major fodder needs of their livestock, seem to have more of smaller animals like goat (predominantly browsers) and sheep (predominantly grazers) among their major livestock (**Figure 12**). Presently in order to feed these animals including cattle and buffalo, the local communities lop the trees extensively as all the fodder available within the livestock reach had exhausted due to over browsing and grazing. All these communities which are traditionally depended on the forest cannot be stopped to go to the forest but the pressure on the forest can be diverted to the other areas in and around their village environs, mainly through developing the

required resources within the Government wastelands and the village grazing or gauchar (*term used locally for grazing lands*), which are presently very highly degraded, but have potential to be restored into potential fuel wood and fodder / grazing plots. So as part of this second grant model fodder and fuel wood plots were developed in six villages to a total extent 60 ha, 10 ha each in Rajpura, Mandigarh Sumer, Ghanerao, and Desuri. In addition with the available funds, additional 20ha were developed in Bheegibawdii of Sadri, which was a village with more livestock.

Figure 12: Study Village wise Relative % of Major Livestock



Focus Group Discussions: Focus group discussion meant to discuss and create awareness on the criticality of the depleting natural resources, declining population of White-naped Tit, involvement of different stakeholders and school kids to pave ways and means of developing community participated conservation plans. Idea of development model fuel-wood and fodder plots was also initiated in focus group discussions. It was a time consuming exercise and needed lots of confidence building among village communities because the communities that live in and around the thorn forest habitat of the vulnerable white-naped Tit, are traditionally dependent on this forest and it takes time to change people's perception and mind set, when they are using these areas for ages.

Environmental Awareness among stake-holders

Environmental awareness is becoming one of the major tools in

addressing the conservation issue in present conservation practices. Conserving White-naped Tit and its thorn forest habitat by using this tool was one of the main objectives of this project. Most of

the local communities especially the livestock keeping communities were addressed primarily on the sustainable use of the natural resources, development and management of their grazing lands and the ecological significance of the other biodiversity and the WNT, of the Tropical Thorn Forest and their conservation for their own survival. Apart from this, the school kid who are the future users and the women group, who are actually involved in collection of these resources from the forest and the managers who are the main stakeholders of these forests, were also involved in this conservation initiative.

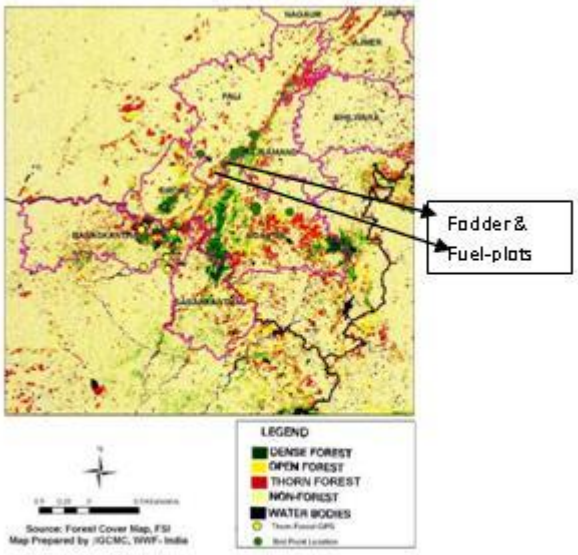
Hence the awareness program was started at different level including awareness among women group, Village Sarpanch (Village head elected constitutionally), village committees and school kids (eight schools were involved). Forest department, who are the managers of these forests were also made aware of all these activities through a workshop conducted separately for them, which is discussed later. In this program, findings of previous projects, small video clippings of nesting of White-naped Tit and significance of this species of the thorn forest, were also discussed. Findings of household surveys in the six villages were also shared with the stake-holders and used to convince them for developing their own resources. Different stake holders were further made aware of sustainable use of their natural resources. Sustainable management of resource included few exercises depicting global warming and its impact on monsoon cycle and depleting natural resources as well as, presentation were also shown on the current activities of the project. This program was carried out till the end of the project.






Development of Model Fodder and Fuel Wood Plots

The main aim of developing such model fodder and fuel wood plot was to try and divert or reduce some amount of pressure on the forest exerted by the local communities and make them aware that resource can be developed in their wasteland and utilized. Development of model fodder plots were done in six target villages (Rajpura, Mandigarh, Sumer, Lampi, Ghanerao and Desuri) in addition to Bheegibawdii of Sadri, as these villages had large extent of wasteland / Gauchar (the grassland / grazing land of the village) land with comparatively more livestock population and were also highly dependent on the forest area for fodder & fuel-wood. The fuel-wood development was done in mainly Rajpura and Mandigarh that were located adjoining to the thorn forest habitat and species used for plantation were the ones used by local communities and that existed and had better survival potential, in this climatic condition. This activity required more involvement of the local community, which included discussion with village heads for identification and allotment of land, land preparation, acquiring seeds and saplings, manure (farmyard manure - livestock dung & pellets), which are traditionally used in agriculture (artificial fertilizers - chemical were not used in this area). All seeds and manure used were indigenous in nature; however the seed growth potential or seed viability and the delay of monsoon were also a cause of concern. The monsoon that usually starts in the end of June or beginning of July got delayed and started in mid August. Plantation was done in the school also to create awareness among the children and get them involved in plantation of trees, in addition to planting in the model plots. Local Communities were also involved in various activities and plantation activity was also done with the help of school kids. The entire process of model plot development involved the following steps:



First step: - ***Selection of Site*****:** In all the villages that were selected for this model plot development, site selection was done. In each village 10 ha land was selected with the consciences / permission of village heads and committees (committee responsible for the welfare of village), within their grazing or wasteland (land left unused and highly degraded within their village boundary). All the target villages had different types of communities that included Raika community (Pastoral community), Luhar, Garasia, Meena tribes and other mixed tribes, who were dependent on the forest for fuel wood and fodder. Among these Raika community are traditional livestock rearers and are using these forest area for ages for grazing their livelihood, as it is part of their tradition and custom.

Second Step: - ***Removal of Invasive species*****:** These gauchar lands were encroached by invasive/ exotic species like *Prosopis juliflora* and non-palatable weeds like *Cassia auriculata, Cassia tora* and *Parthenium hysterophorus.* All these species have taken over the grazing lands and decreased the growth of preferable fodder species. Further, the villagers were also against these invasive and weed species, as according to them these species ruins the soil quality. The land, which was identified for model plot development was cleared manually and at places using machinery and prepared further for fuel-wood and fodder plot development. Mandigarh village was not willing to remove the invasive species, so awareness program was done to generate further insight to make them understand the ecological damage these species cause and also the significance/ necessity of the conservation of the forest around and the environment.

Third Step: - ***Acquiring the fodder seeds and arrangement of saplings*****:** After household surveys in two villages i.e. Rajpura and Mandigarh of Pali district and few focus group discussions in the other four villages (Sumer, Lampi, Ghanerao and Desuri) and the additional village at Sadri, it was clear what species were preferred and which species were the native to this region that were present earlier and vanished due to excess extraction / use. Fodder (grass seeds) and fuel-wood species that were acquired from different places are:

i. **Fodder species used:** *Cenchrus setigerus, C. ciliaris, Dichanthium annulatum* and *Heteropogon contortus.*

ii. **Fuel-wood Species planted:** *Acacia nilotica, Acaica leucophloea, Capparis decidua, Capparis sepiaria, Prosopis cineraria, Azadirachata indica, Zizyphus mauritiana* and *Z. nummularia.*

Fourth Step: ***Land Preparation and Seed Sowing*****:** Removal of invasive species and application of



indigenous manure on the model plots were done. Seed sowing was done using traditional and mechanized way. All work was done in 60 ha & additional 20 ha of land selected for developing the model plots.

Fifth Step: ***Monitoring of the model plots*****:** The land preparation, seed sowing and plantation work was followed by the most important task, monitoring of these plots. Mostly village community were involved in the monitoring work, as the villagers were motivated to protect their plots, which was also part of the focus group discussion and awareness program. However due the model plot development period also being the active cultivating period, only some villagers in all target villages were fully involved, while rest were only partly involved in protecting these plots. One village youth was employed as field assistant and trained in various aspects of the model plot development and monitoring process. This field assistant was involved in monitoring the plots and also assisted us in carrying out the house-hold surveys. Further, every fortnight monitoring was being done by the project team as well.

All these work, the household survey, development of model plots, awareness program and focus group discussion were done simultaneously, except for more focus given to model plot development just before monsoon and during monsoon. The major cause of concern was the delay in monsoon in Indian sub-continent during year 2012. Usually the monsoon that starts from end of June or first week of July was late by one and half months, during that year, and the entire country received very irregular rains leaving the western part of country (including study area in Rajasthan), where it was declared as drought condition initially. This information of late monsoon and irregular weather condition was put forward in focus group discussions to create awareness among local communities, mainly linking it to the forest cover in the area and their village environs.

During the awareness and education it was evident that women, old people and children were more receptive towards involvement in conservation process while men and youth of this area seem to be materialistic and least interested in community based conservation perspectives and need more motivation towards this direction.

The various actives that were involved in model grass/ fodder and fuel wood plot development are shown below in the series of photographs.

Indigenous Seed and Seed Sowing with Local communities



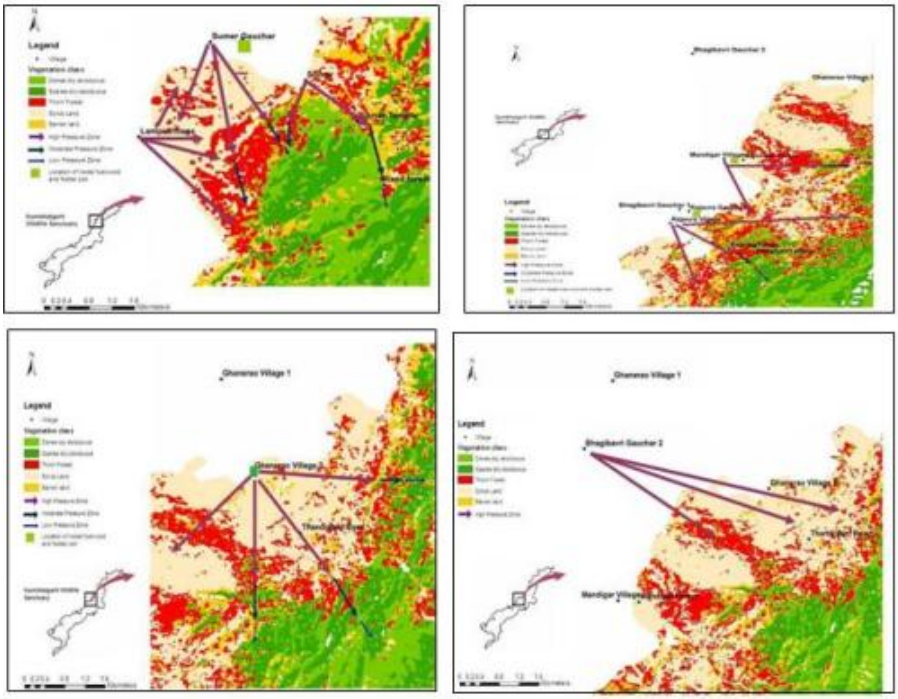







Maps Showing the Areas used for the Fuel-wood and Fodder collection

Map 1, 2, 3 & 4: Map showing Routes to the Tropical Thorn Forest used for collection of Natural Resources by the Study Villages - based on manual GIS



The maps (**Map 1, 2, 3 & 4**), showing the locations and the direction of movement that was used by the people of the study villages to collect fuel wood and fodder or for grazing, was prepared based on the drawings made on the ground (manual GIS) by the respective villagers during the Participatory Rural Appraisal (PRA) exercise. The maps clearly show that the areas in the immediate vicinity to the village boundaries that were used in the past were highly degraded, which decreases in the magnitude of degradation when moving further away from the village towards the interior forest. As the Tropical Thorn Forest are spread along the boundary of the villages, it is highly degraded, thus having an immense impact on the habitat of WNT. Areas which are described as

scrub land were earlier either pure thorn forest or partially thorn forest but due to excessive use of natural resources have been converted to scrub-land. Further, these maps also show the location of the model plots that were developed as part of this project.

Positive and Negative aspects of the Study

However, the model plots were developed; it was a mixed experience and success. The positive aspect of this work was that the local community was made aware of the potential of their grazing land and the means of restoring or developing them so that at least part of their fodder and fuel wood needs can be met within their village environs. Further, they understood that everything depends on following certain set principles such as: protecting the plots for the whole of the growth period until the seed sets and falls (about four months from July to November), after which cut and carry the grass for first two years, so that the natural seed bank improves. Practice rotational grazing by developing the entire grazing and wasteland in a block manner; never allow a single block to be over grazed. Sharing of resources including protection of the plots should be mutual, done and followed by all the resource users.

With regard to the fuel wood plots, once the sapling grow, it is important that the extraction done in a sustainable manner through collection of only dead branches and twigs, cutting of only one or two dead branches from a single tree and also take only the branches that are cut as part of thinning so that the tree grows bigger and taller. Further, with regard to the fodder trees, lop only few branches so that some branches are left behind for the tree to flower, fruit and produce seeds that would be needed for natural regeneration of the resources. The lopping should be done on rotational basis leaving the trees that were lopped in the first year, free from lopping and then lop again in the third year, which would ensure and allow the tree to grow.

The Rajasthan State Forest Department has included the experimental conservation action, taken up through both the first (artificial nest box provision) and second (model fodder and fuel wood plot development) RSG grants studies done, by including these in their upcoming wildlife management and conservation plan for the area. This would help in developing larger stretches of the village land with the resources that the local's need, which would at least reduce the present rate of pressure this forest, is facing.

The negative aspect was one year time was less in terms of gaining the confidence of the local people and getting them inclined towards developing, managing, monitoring and finally using it in a

sustainable manner. However, we were success full in developing the plots, except for Desuri, where villagers even though protected the plot initially, they started using the resources mainly fodder before the full growth of the grass. Some villagers were insisting in employing watchmen for protection, which ideally should be done on mutual basis among the villagers. All this is well sustained, would ensure the long term survival of the vulnerable White-naped Tit and its threatened habitat.