

# Study of biological environment and dependency of tribal people on forest near Ambaji Multimetal mine, Gujarat

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**Abstract-** Tribal's and their symbiotic relationship with forest and their surrounding environment has been seen from the ancient time. Their relationship with forest has crossed many centuries and forest maintained their existence until now. The nature of any type of new project in the forest area has negative and positive impacts and widen of these impacts can be minimal to significant in terms of biological environment and dependency of tribal habitat on the forest area. Therefore, mining operations essentially involves many significant impacts on deforestation, habitat destruction and biodiversity. Present study was based on study of biological environment and tribal habitat dependency on it in various sectors in the context of Ambaji Multimetal Mine project. Study of flora and fauna and tribal habitat was carried out to observe the interrelationship of these two.

**Index Terms-** Biological Environment, Flora, Fauna, Ethno medicinal plant, NTFP

## I. INTRODUCTION

Mining of minerals is closely related with forestry and environment concerns such as land degradation, deterioration of air quality, impact on water resources, noise and affect biological environment as well as socio economic environment. Development for region and country, to fulfill the demand from market for minerals and for satisfying these demands rapid use of natural resources is being seen all over the world. The stress and threat to the wildlife and stress on tribal habitat livelihood is a big concern of these days. Mineral mining in any region has likely to deteriorate the ecological balance of the environment and its related components. Indiscriminate exploitation of natural resources is an alarming sign for biodiversity loss<sup>1</sup>. It affects direct and indirect damage to wildlife biodiversity. Some impacts may be short-term and confined to the mine site only while others may have far-reaching, long-term effects. The most significant effect on flora and fauna is habitat destruction or displacement of valuable species in area of excavation. Wildlife species birds, predators and other animals migrate from the area of mining due to free movement space destruction. In addition invertebrates, reptiles, rodents and small mammals are more rigorously affected of that area. Wild animals often divert movement and route due to heavy vehicle machinery and high frequency of traffic on roads<sup>2</sup>. The damage reported for mining activities by overburden deposits and drainage is 20 times the lease area<sup>3</sup>. Biodiversity is continually shrinking due to the anthropogenic activities<sup>4</sup>.

Natural flora and fauna are the two important components of the biological environment of the eco system. Flora gives many things such as food, raw materials such as fiber for clothing, materials, shelter, fertilizer, fuel and medicines and timber<sup>5</sup>. The tribal people are dependent on these natural resources. Both the factor is highly dependent on each other. Present study deals with the study of flora and fauna and its relationship with tribal people. Study of biological environment is one of the important aspects in view of the need for conservation of environmental quality.

## II. STUDY AREA AND LOCATION

The study was carried out near and around Ambaji Multimetal mine in Ambaji village, Gujarat. A 10 Km radius area was selected and study was conducted to collect the information of flora and fauna from the near by areas. The Balaram sanctuary comes under Ambaji Multimetal mine and the distance between the sanctuary and mining is around 0.5 km. The proposed mine is situated in the vicinity at Ambaji town in the SE direction of the mine. Ambamata temple is also located in the south direction around 1.0 Km away from the mining area. This temple is one of the important pilgrimage places of the region. Another temple is located on the hillock of Gabbar hill. The entire area is very rich in biodiversity. Ambaji Multimetal mine is a part of reserved forest land for that reason it becomes more important to study the terrestrial ecosystem in depth.

## III. MATERIALS AND METHODS

Data was collected through extensive and widespread survey to collect the information regarding flora and fauna in the study area. The data was collected by visual observation and by the help of tribal people residing in the area. The forest and their dependency and symbiotic relationship were established by interviewing the tribal people residing in the different villages in the study area chosen. Total 10 villages were chosen for the extensive survey. Information's were also collected from different Government offices such as DFO Social Forestry, Animal Husbandry & Forest Office, District Banaskantha, and Government of Gujarat as secondary data.

## IV. RESULTS AND DISCUSSION

### Study of Flora

Most of the study area comprises of forestland. The type of forest was observed during the study mostly dense mixed jungle with open mixed jungle and open scrub at some of the places. The forests in general belong to the tropical dry mixed deciduous forests. The tropical moist deciduous forests are present in parts of Ambaji Range <sup>6</sup>.

The floral constituents of the Banaskantha forest region can be broadly classified as tropical dry deciduous forest and tropical thorn forests as per the revised classification of forest types. The predominant flora observed near Sebalpani area & Bedopani area is fairly dense mixed jungle, mainly with Bamboo trees. Open shrubs are found at Taleti, Baldihar areas of the study area. However, the lease area in study did not have any dense mixed jungles except open shrub areas. The lease area also did not have any presence of flora.

### Floral species

Among Flora *Emblica officinalis Gaerth*, *Tamarindus indica Linn.*, *Acacia catechu wild*, *Salmaalina malabarica Sch. & E*, *Dalbergia latifolia Roxb.*, *Zizyphus jujuba lank* and *Diospyros melanoxylon Boxb.* etc. were found in the forest area. The observed flora species with top canopy and lower canopy are given in **Table 1**.

### Grasses

During the survey *Sorghum holepense*, *Apluda mutica*, *Heteropgon contortus* etc. were major species of grasses found in the forest area. The grasses are observed during the study are given in **Table 2**.

### Fauna

Some species of wild animals and birds were recorded during the survey under the study area. A variety of common reptiles, worms and insects are found in the study area. Some of them are Turtle, Earthworm, Crab, Snail, Cobra, Viper, Lizard, Scorpion, Chameleon, Centipede, Cricket, Locust, and Grasshopper etc. Herbivorous animals were scarce in the area.

### Balaram Sanctuary

The sanctuary derived its name from two historical temples – Balaram and Ambaji, situated at opposite corners of the sanctuary<sup>7</sup>. The entire area of the sanctuary falls completely within Banaskantha district comprising of forests of 95 villages of Danta, Amirgadh, Palanpur and Vadgam talukas.

The sanctuary hills range is above the 170 to 923 m sea level. The forest tract is highly undulating and comprise of broken hills. The sanctuary rich in different species of plants including trees, herbs, shrubs, climbers, grasses and lower plants

In Southern dry mixed deciduous forests the main species observed were *Butea monosperma*, *Acacia catechu*, *Bombax ceiba*, *Terminalia arjuna*, *Cassia fistula*, *Tamarindus indica*, *Carissa congesta*, *Capparis sapieria* etc. The grasses include *Themeda triandra*, *Aristida funiculate*, *Cynodon dactylon* etc.

Due to heavy biotic pressure on the plains, the floral diversity in the flat lands and the foothills has suffered the most and the biotic interventions with afforestation and invasion of horny species converted the plain land into thorn forests. In such areas the canopy differentiation is quite difficult. The main tree

species of this type were *Acacia senegal*, *Acacia catechu*, *Acacia tortilis* etc.

Among Fauna Sloth Bear (*Melurus ursinus*) was the main species of the sanctuary. The top carnivore inhabiting the area is Panther, *Panthera pardus*. Other major vertebrate species of the area include the striped hyaena, jungle cat, jackal, Indian fox, common langur, neelgai, palm striped squirrel, rats, hedgehog, Indian pangolin, bats, porcupine etc. The variety of birds inhabiting the sanctuary ranges from land birds to water birds. The multistoreyed forests in several parts of the sanctuary and the scrubs in other parts provide a suitable habitat for various avifaunal species.

The reptiles include the snakes, tortoises and lizards of various types. Among the non-poisonous snakes, Indian python is the rarest snake. Other non-poisonous snakes include the rat snake and John's sand boa. The poisonous snakes include the cobra, common krait, Russell's viper. Bamboo pit viper is the rarest of the poisonous snakes of the area. Lizards including monitor lizard, Indian Chamaeleon, chandan gho, etc. are also quite commonly observed.

Details of flora observed in the forest area are given in **Table 1** and different species of grasses existing in the forest area are given in **Table 2**.

### The Tribal's of the area

As per the study area observations, the major tribes in the belt were

- Garasia (largely towards Gujrat border) and
- Rebaris (more towards Rajasthan border)
- Bhils (comparatively more in Rajasthan).

### Gender Distribution in ST

As per the census of India 2011, the male population constitutes of 50.85% of the total ST population and female are 49.14% with respect to the total population of schedule tribes in the study area. The gender ratio is 966 among the ST population. The gender ratio of the total population in study area is 931, much lower against the Gender distribution among the ST population in the study area.

The main features were established with biological environment and tribal people.

### The symbiotic relationship between forest and Tribal's

Forest is the life supporting system for the tribal's dwelling in the forest area. Therefore, play a vital role in their livelihood and economy. They know how to use the natural resources of the forest area and same time they preserve it for future uses. They exploit the natural resources for their need but they are very generous to protect the biodiversity of the area<sup>A</sup>. They are having the dependency on the forest as follows:

### Raw material from forest

Tribal is dependent on the raw material from the forest for making their house. Tribal's living in scattered habitation and the housing pattern was scattered with personal land holdings. They live in *pakka houses* with sheds and storage areas, made up of thash grass, mud, wood etc. All these raw material they found from the nearby forest area. However, a few households (E.W.S.) live in semi *puccha* houses made of *khapral* (mud baked tiles)

which is a completely indigenous housing technology widely acknowledged and practiced by all tribes. It is also a source of communal solidarity among the various tribes. There were no concrete house was seen in the tribal villages. During the survey the tribal people interviewed about the concrete houses for living and concluded that they were habitual to live in puccha and semi puccha houses because they do not need to invest much money to prepare it and also does not have any environmental hazard. They feel that are connected with nature.

#### Non- Timber Forest Products (Fruit and Flowers)

They collect the non - timber forest products (NTFP) from the forest area such as fruits, tree leaves, berries, and flower<sup>8</sup>. The tribal's gathered flower of simal (*Salmalia malabarica Sch. & E*) to make the herbal color during the festive time. Many fruit bearing plants from the forest were the main source of fruits for these people. Mahua (*Madhuca indica*) tree was seen in Taleti and Jambudi village forest area and found that the flower and fruit were used to make the liquor by fermenting them traditionally has said the tribal people during the survey. This was the local and tradition liquor they used mostly in their festive season. They also collect these flower and fruits to sell in the market, Koteshwer temples, Ambaji Temple and at Gabbar temple to pilgrims. This is the source of their day to day income in the area.

They also collect fuel wood, fibers, grass, gum, medicinal plants for their use<sup>8</sup>. Hence, forests are the major source for their food, shelter, employment and income source in the area.

#### Minor produce forest

These tribal's linked with Minor Forest produce like Timru or Tendu patta (Bidi leaves), gum, tamarind, Mahua etc. from forests which form the main base of their income and their livelihood. They had benefited for the right of gathering of minor food produce by custom<sup>9</sup>. The collection of minor forest products is a major money-making activity of the tribal community in the area. They also earn remuneration as forest worker. They depend upon the medicinal plants from forest and gather medical herbs from the forest area<sup>10</sup>.

#### Emotionally Attachment

They are emotionally attached with the forest and to protect them they perform rituals such as offering sindoor and milk to the tress and worship them. This is one of the ways they protects their environment. Apart from it they worship bushes, animals, birds<sup>9</sup>.

#### Animal Husbandry

They are found to be dependent for grazing their animals for milk production for their in - house use. They kept goats in large numbers whereas Cow and Buffalo were also found in some houses.

#### Knowledge about rare Herbs

The old people in the area had knowledge about the rare herbs found in the villages. But they rarely wanted to share with outsider from their communities. R.S Patel et al.<sup>7</sup> also studied the herbal medicinal climbers (ethno medicinal) in the study area and also reveal that tribal's were not found very much interested to

share their knowledge. However, in general interviewed with tribal's they also used Garmala (*Cassia fistula linn.*) for diarrhea and fever, Amla (*Emblca officinalis Gaerth*) for betterment of tooth and prevent dandruff and use the juice, Jambu (*Syzygium cumini Sk*) for cure of mouth ulcer and diarrhea such as tribal's of Sabarkantha used these medicine<sup>11</sup>.

#### V. CONCLUSION

The livelihood of the tribal's is strongly dependent on the forest and their NTFP and MFP. The biological environment and tribal's shows a positive and symbiotic strong relationship. The absence of biological environment they feel stressed. The degradation of the environment by several natural and anthropogenic activities makes the situation worsen. Hence, to protect the environment they are the chain between forest and environment. A better take care of forest diversity can make the scenario better. They are friend of forest and to enhance the forest ecosystem they can make a great role by participating in the afforestation programme by sensible use. Ethnobotanical plants also make a great part of these lives so by collecting information on rare species also can enhance the medicinal help and also can use to combat with lots of disease naturally.

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