BIOLOGICAL ENVIRONMENT

Study of biological environment is one of the important aspects in Environmental Impact Assessments. Biotic component comprises of both plant and animal communities which interact within the community and between themselves but also with abiotic i.e. physical and chemical components of the environment. Generally a biological community is being dependent on the environmental conditions and resources of its location it may change if there are many major changes in the environment. The number of variables like temperature, humidity, atmospheric conditions, soil, and topography, etc. is responsible for maintaining the homeostasis of the environment and a change in any one or more of these variables may tend to destabilize the ecosystem. In such cases the change may be mostly irreversible. Therefore the need to assess the changes of the plant and animal resources is primary requisite as these living things determine the environmental healthiness of any given ecosystem or environment. Brief information regarding the environmental setting of the core and buffer areas is given in table. The core area is surrounded by cultivable and non-cultivable waste lands on all sides.

Flora

There is forest area boundary of core zone. The vegetation in the buffer zone is mainly of the shrub variety. As the mining activity is to the core zone, no impact on the flora of the buffer zone due to the mining activities is anticipated. In between above 7.4 km (S-W) from the mining area. There is no impact during mining activities between maximum 3 km in the core zone. Which is far away from the mine site, therefore, mining will not cause problem to the mining area.

The flora includes variety of timber trees like Rose wood, Teak, Sandal etc. Hundreds of medicinal herbs, minor forest plants like nelli, kadukkai, cheekai, pungam etc. The following trees like 'Charakkonnai' ('Cassia histula'). There is avail green vegetation within the district of Krishnagiri, denkanikottai taluk. The predominant species are small trees and bushes. The growth of natural flora is very limited. It is observed that prosopis spicigera is a predominant species present on uncultivable waste land. Due to absence of any perennial surface water bodies, there is abundance of lotus and water lily in seasonal surface water bodies. Cyperus rotundus, Opuntia dillenii and Borassus flabellifer have better adaptability among naturally growing species. The villages in study area are covered with cashew tree & coconut plantation. Plantation of fruit trees & decorative plants like Guava, Sappathikalli, Banana, Elanthai, Paalai etc. are seen.

Paddy is the main crop but pulses, Sugarcane & Groundnut are also grown is this area. The buffer zone of the project site consists of mines lands, waste lands, etc. The semi arid conditions with high temperature and poor rainfall influence the nature of flora. The buffer zone is within a radius of 10 km consisting of naturally occurring species as well as agricultural crops. The naturally occurring wild species grow in groups.

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The buffer zone is within a radius of 5 km consisting of naturally occurring species as well as agricultural crops. The naturally occurring wild species grow in groups.

Table 1.1.: Lists of Floral Species Present in the Study Area

I	**HERBS**		
1	Arachis hypogaea	Groundnut	Verkadalai
2	Coriandrum sativum	Coriander	Kothamalli
3	Crotalaria sp.	Rattle Box	Sangupuspam
4	Helianthus sp.	Sunflower	Suriyakandhi
5	Moringa oleifera	Drumstick Tree	Murungai
6	Perotis indica	Comet Grass	Narivalapullu
7	Tephrosia villosa	Runchhali	Kolingi
II	**SHRUBS**		
8	Cactus grandiflorus	Cactus	Kalli
9	Calotropis gigantean	Crown Flower	Erukku
10	Citrus aurantifolia	Lemon	Elumichai
11	Cynodon dactylon	Arugampul	Arugampul
12	Alstonia scholaris	Paalai	Paalai
13	Cyperus rotundus	Korai	Nut Grass
III	**TREES**		
14	Cyperus rotundus	Korai	Korai
15	Albizia lebbeck	Siris tree	Vagai
16	Azadirachta indica	Neem	Vembu
17	Casuarina equisetifolia	Shingle oak	Savukku
18	Albizia amara	Arappu	Arappu
19	Couroupita guianensis	Cannonbal tree	Nagamaram
20	Senna auriculata	Tanner's cassia	Avarai

21	Alstonia scholaris	Blackboard Tree	Paalai
22	Cocos nucifera	Coconut	Thennai maram
23	Ficus benghalensis	Banyan	Alamaram
24	Mangifera indica	Mango	Maamaram
25	Ziziphus jujuba	Elanthai	Elanthai
26	Opuntia dillenii	Sappathikalli	Sappathikalli
27	Prosopis spicigera	Dasara Tree	Karuvelam
28	Psidium guajava	Guva	Goiyamaram
29	Tamarindus indica	Tamarind	Puliyamaram
30	Leucas aspera	Thumbai	Thumbai
IV	LIST OF CULTIVATED CROPS		
31	Borassus flabellifer	Palm Tree	Panamaram
32	Arachis hypogaea	Groundnut	Verkadalai
33	Cocos nucifera	Coconut	Thennai Maram
34	Brassica nigra	Black Mustard	Katuku
35	Canna indica	Banana	Vazhaimaram
36	Piper betle	Betel Leaf Pepper	Vetrillai
37	Anacardium occedentale	Cashew	Munthiri
38	Eleusine coracana	Finger millet	Ragi
39	Sorghum bicolor	Sorghum	Cholam
40	Macrotyloma uniflorum	Horse gram	Kollu
41	Ricinus communis	Castor oil plant	Amanakku
42	Ttectona grandis	Teak	Thaeikku
43	Fragor Monstrum	Creeper	Kodi

Impact on Flora

No adverse impact is envisaged on the existing flora in core zone of 5 km radius, there will be no deforestation by mining operation. Plantation will be developed in the mining lease area as per plantation programme. These activities help to improve the floral cover of the area. The greenery and plantation development will eventually attract micro fauna, birds etc in the area. Assistance will be taken from local forest department in selection of species of plants so that green coverage could improve very fast. The varieties would include those plants, which are suitable in the area.

Effect on Flora

Due to project activity, there will be no damage to the major tree species except removal of Bamboo and other shrub species which are very common in buffer zone. Most of the land in the buffer area is undulating terrain with crop lands, grass patches and small shrubs. Hence, there will be no effect on flora of the region. As per the study, there are no endangered, endemic or threatened floral species present in the area.

Mitigation Measures

GREEN BELT PLAN

The project site should have a land to develop greenbelt in and around the limits of the mine, along roads and other vacant area. The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas

AFFORESTATION

As per the approved mining plan each year some part of the 7.5 m barrier zone will be subjected to afforestation and care will be taken to protect this sapling. Plantation program over life of the mine will be planned in a phased manner. A thick plantation is proposed to be provided and maintained along the roads.

Table 1.2: Plantation Program

Year	No. of trees proposed to plant	Survival rate	No. of trees expected to be grown
I	50	50%	25
II	50	50%	25
III	50	50%	25
IV	50	50%	25
V	50	50%	25

In order to minimize the impact of mining on the vegetation outside the mine lease area, it is recommended that adequate protection measures must be implemented. As mining involves movement of vehicles and increased anthropogenic activities, some of the areas can be fenced by involving local people and educating them about increased benefits of such activities. Mine dust should be suppressed by regular sprinkling of water on the mine overburden dumps and haul roads including the plants near the mining. The green belt will act as a barrier to trap the suspended dust particles and also suppresses air pollutants.

Fauna

The faunal survey has been carried out as per the methodology cited and listed out Mammals, birds, Reptiles, Amphibians and Butterflies. All the listed species were compared with Red Data Book and Indian Wildlife Protection Act, 1972. There are no endangered or endemic species present in this area.

The major wild animals include Elephants, Sambar, Spotted Deer, Gaur, Wild boar, Panther etc. The forest area of denkanikottai taluk forms the prime elephant habitat with lot of bamboos and this area constitutes the Cauvery elephant reserve, which is constituted over and area of about 450 Sq. Kms. The bird population is also attractive with beautiful bird like Paradise flycatcher. Big lakes in Anchetti and Hosur areas also attract large number of migratory birds like Painted storks, Teals etc.

Apart from these birds and mammals, there are variety of butterflies, giant spiders etc. that are coming under endangered list. Kodakkarai shoal forest in Denkanikottai taluk is known for large scale migratory butterflies during a particular season then one can observe thousands of migratory butterflies passing through this forest like a passing cloud.

Table 3.12.: Lists of Fauna Present in the Study Area

S.No.	Scientific Name	Common Name
I.	**Invertebrates**	
1	Megascolex mauriti	Earthworm
2	Nereis dumerili	Centipede
3	Scolopendra morsidens	Cherian
4	Araneus (epeira) diadematus	The Garden Spider
5	Caloptery xsplendens	Dasmel flies
6	Anax junius	Dragon flies
7	Bacillus rossi	Grass Hopper
8	Periplaneta Americana	Cockroach
9	Scorpio swammerdami	Indian Scorpion
10	Apis mellificia	Honey Bee
11	Bombyx eupterote	Silkworm
12	Anopheles maculipennis	Mosquito
13	Culux pipiens	Mosquito
II	**Vertebrates**	
a.	***Amphibians***	
14	Ichthyophis sps.	Blind Worm

15	Bufo melanostictus	True Toad
16	Rana hexadactyla	Common Frog
17	Rtigrina	Bull Frog
18	Cacopus sps.	Frog (small)
b.	**Reptiles**	
19	Calotes verticolor	Garden Lizard
20	Sitana ponticeriana	Small Lizard
21	Chamaeleon zeylanicus	Green Lizard
22	Hemidactylus sps.	Wall Lizard
23	Drago sps.	Small Lizard
24	Testudo elegans	Land Tortoise
c.	**Snakes**	
25	Bungarus sps.	Krait
26	Naja naja	Indian Cobra
27	Vipera russelli	Viper
d.	**Birds**	
28	Columba livia	Pigeon
29	Milvus migrans	Eagle
30	Corvus varius	Crows
31	Psittaciformes sps.	Parrot
e.	**Mammals**	
32	Pteropus medius	Bat
33	Oryctolagus cuniculus	Rabbit
34	Funambulus palamarum	Squirrel
35	Rattus rattus	House Rat
36	Suncus cacruleus	Rat
37	Canis familiarizes	Dog
38	Spotted Deer	Deer
39	Equus cabalus	Domestic Horse
40	Bus indicus	Cows
41	Bus bubalus	Buffalo
42	Sus scropa	Pig
43	Herpestes edwardii	Common mongoose
44	Oryctolagus cuniculus	Muyal
45	*Serpentes*	Snakes
46	Bandicota indica	Bandicoot

Impact on Fauna

The mining lease area is forest boundary around 5 km core zone area where presence of fauna is very rare. No endangered species of fauna is found in and around lease area. As such, there will be no adverse impact of the mining activity on fauna around the mining lease area.

Effect on Fauna

As per the study, there are no endangered, endemic or threatened faunal species are present in the area. Hence the present project activity will not having any effect. The project activities will result in the removal of some grassland, shrub dominated habitants.

Impact on Wildlife

There is no National Park, Wildlife Sanctuary, Biosphere Reserve, Tiger/ Elephant Reserve, Wildlife corridor etc. within 10 km radius of the project site. Udedurgam Reserve Forest in South east direction and Denkanikottai Reserve Forest in South-west direction in distance of 7.4 km and 7.0 km in SE direction respectively, which is far away from the mine site, therefore, mining will not cause problem to the existing mining area.

It is also observed that the faunal species found in the study area are commonly found species. No rare, endemic and endangered species are reported in the buffer zone. However, during mining activities the mine management will practice scientific method of mining with proper Environmental Management Plan including pollution control measures especially for air and noise, which will not cause any adverse impact on the surrounding wildlife.

Mitigation Measures

The fauna which was scared away due to the mining activities shall slowly restore. The restoration of Fauna shall be accelerated by the introduction of few native species also. The pits shall be fenced to prevent inadvertent entry of the animals.

However, during mining activities the mine management will practice scientific method of mining with proper Environmental Management Plan including pollution control measures especially for air and noise, which will not cause any adverse impact on the surrounding wildlife.