MINE CLOSURE - AN APPROACH ADOPTED IN GOAN MINES

Progressive Mine closure has been successfully undertaken at some of the mines in Goa.

The salient features of reclamation and Mine Closure are described below:

Reclamation by means of afforestation started in eighties at the said mine. Most of the areas were covered by planting fast growing plants like Acacia auriculiformis and Casurina equisatifolia. The former species was at that point of time advocated and supplied by forest department. The reason being the species is fast growing, leguminous, and can grow on dumps without any aftercare and irrigation. These species were basically planted as nurse crop so as to prevent erosion on dumps and stabilize the dumps. After the dumps were stabilized, company selected one of the reclaimed mine pits to experiment with different techniques of mine reclamation and replaced the existing monoculture plantations.

Biodiversity plantations were taken up by getting expertise from organisations like agriculture dept., Forest dept and rubber board etc. Various systems of plantations like horti- silviculture were adopted. Most of the horticulture crops growing in Goa were also planted with success. The fruit produce from the area like pineapples, mangoes, guava, and banana is as of now not commercially exploited but distributed to students from football academy and technical school and some of the fruits are retained on the trees for attracting birds and insects. All these plantations are irrigated with rainwater harvested in the exhausted mining pit. Rubber plantations are also carried out in some areas. Green covers species Plureria leguminous creeper is planted on these waste dump surfaces, which helps to enrich the soil by fixing Nitrogen and also increasing the organic matter in the soil.

The results of cultivation of above mentioned crops demonstrated that it is possible to cultivate different Agricultural and Horticultural crops with a careful planning on waste dump successfully.



Till date total plantation done at Sanquelim Mine is 7, 74,341.

Technical expertise from various research institutes (Goa university, NIO, Fisheries dept) and government bodies (agriculture dept. and Forest dept)were taken for adopting various mine reclamation techniques for instance "Pisciculture project"was taken up in collaboration with National Institute of Oceanography in the year 1990. One of the worked out pits (Lisboa) was terraced with loose soil to facilitate afforestation, and the pit is used for Pisciculture.

The pit receives fresh water from rains and good volume of water remains throughout the year.

The fingerlings of Rahu, Mrugal & Carp (around 15000) were released in the open pit and were fed daily with soaked groundnut cakes. The temperature was monitored daily at 1m depth for the adjustment of feed as per feed chart. The results were very encouraging, and now the pond is full of fish.

Exhausted mining pits are also utilized for Rainwater harvesting. All the dump run-off and surface runoff during monsoon is channelized into this pits and the same is utilized for our plants located 10 Km at Amona, for dust suppression and for irrigation. This is beautiful example of Natural asset creation after exhausting of mining.

Company has prepared a Sanquelim mine biodiversity management plan and the same is approved by state forest department. The objective of the plan being to cut the mature trees(mostly monoculture plantation of Accacia) and undertake plantation of native species, thus improving biodiversity of the area.

Various projects like medicinal gardens(as described above), bamboo pavilion, bamboo setum, butter fly park have already been developed under the management plan initiative. This has totally changed the scene of the area making it look like a ecotourism spot.



To conserve the medicinal plants and to improve the biodiversity of the area, Medicinal gardens have been developed on one of the dump benches based on two concepts:

NakshatraDevataUdyan and CharakDevataUdyan



Naksahatra Devata Udyan is based on the 27 Constellations (Nakshatras). The garden consists of two sacred trees to each of the 27 Nakshatras. Also there are sacred plants for Rashis and Planets. Charak Devata Udyan is based on Ayurveda. Plants are classified in to 9 different classes and again according to functions in to 81 sub classes. Major classes of distribution is as under:

Nervous system
Eye, Nose, Ear, Tongue & skin
Circulatory system
Respiratory System
Digestive System
Liver, Spleen
Reproductive system
Kidney
Fever & other blood related

Systematic arrangement of plants in garden has been done and specific Board depicting the details of each plant species, its botanical name, plant part in use etc is displayed, which adds educational value to the area for the students and visitors. Small area is developed into the Aromatic plants garden from the local area.

Faunal studies has been conducted for this mines through the NGO Canopy, It was observed that the mine reclamation efforts has improved the biodiversity of the area. It states " 3species of mammals, 20species of birds and 42 species of butterflies, 14 species of odonates, 12 species of repltiles and 10 species of amphibians were documented during present study.

Survey was conducted by Botany Department, Goa University in year 1994, which recorded that in all total of 164 species belonging to 138 genera distributed among 55 families exists, consisting of grasses, legumes, climbers, shrubs and trees.

The reclaimed mine sites also houses two schools namely Sesa Technical School and Sesa Football Academy.

Sesa Technical School: established in the year 1994 on the reclaimed mine. The premises of the earlier mining workshop and office were utilized for the running this technical school. The prime objective of the school is to impart training skill, to develop technical knowledge and to train the local

youth in employment oriented fields, so as to enhance their opportunities in securing jobs in the industries or help in self-employment.

Sesa Technical School has been affiliated to National Council of Vocation training. Courses are designed on the market requirements. There are five courses namely Fitter, Machinist, Instrument mechanic, Multi trade (mechanical) and Multi trade (electrical). Annually 70 students are given the admission based on the merits. Students from mining area/ belt are given preference. School also provides the hostel facility. Till date around 1000 youths from mining belt have passed out from this institute and are employed in various industries.



Students of these schools are most preferred by the employer. The school has got a 100% track record and many multinational companies absorb these boys in campus interviews itself. Students from this school have national recognition also.

Sesa Foot ball Academy: The Sesa football academy was established in the year 1999. The prime objective is to nurture football talent in Goa and to make positive contribution to our society by producing foot ball players and disciplined citizens.



The course is fully sponsored by the company. It is a residential course of four years. The boys are taken in the age group of 13 to 15. The boys in the morning session go to the local school and in the afternoon hours go through the professional football training. All the facilities like good diet, health care, gymnasium, play ground, etc is provided to the students.

Residential academy accommodates 36 students per 4 yrs, giving free academic as well as specialized professional football training. Till date the academy has rolled out around 100 professional footballers who represent various professional clubs in India and four of them have also represented the Indian National team.