

## ECOLOGICAL RESTORATION/ BIOLOGICAL RECLAMATION

- The Jharia Coalfield was in the hands of private mine owners since 1890s until it was nationalised by the Govt. in 1971-73. The then mining methods were unscientific compared to the present day technology. Mining was carried with the sole motto of profit making and 'more hole more coal' without any regard to safety, conservation and environment. Due to such type of 'slaughter mining' and un-systematic mining in the coalfield over a long period resulted in severe land degradation. The landscape resulted into remnants of old abandoned quarries, spoil dumps, subsided depressions, mine fires and baked soil due to mine fires. Thus resulting into disturbance of biodiversity.
- BCCL is the pioneer company in the mining industry for conducting three tier ecological restoration which replicates natural forest with native species & biodiversity rejuvenation on its degraded and mined out lands. Ecological Restoration involves three tier plantations with native species consisting of lower level grasses, middle level shrubs/ bushes and top level trees. The objective being establishing a natural forest eco-system with biodiversity and to bring back original normalcy of function, structure, potential, service and process of eco system as existed prior to mining activity. Earlier massive plantation work was taken up by BCCL in the coalfield through state forest department.
- However such single tier plantation shows green canopy in aerial view only and not effective in checking erosion, recharging ground water and establishing bio-diversity. Further selection of species was not considered to meet socio-economic requirement of the local community. Ecological restoration is the process of short-circuiting the natural recovery of degraded ecosystems through ecological interventions. The ecological restoration is to establish a three-tier vegetation comprising of native species grasses as lower tier, shrubs and bushes as middle tier and trees as upper tier with an objective to establish biodiversity and food chain; to improve the local climate regime and socio-economic condition. Removal of invasive weeds and addition of biomass to the degraded land creates an opportunity for the native species to germinate and establish biodiversity. Ecological restoration enhances biodiversity at faster rate and over time, 300 species may develop creating natural forest over OB dump. Therefore ecological restoration of mined out areas is the most appropriate ecologically and socio-economically compatible measure. Such restored area can serve as replacement of Reserve forest below which the presence of mineral is found in future. It will be like to like replacement & will fulfill energy security of the country The mined dumps were composed of big and small boulders of shaly sandstone, sandstone, shale and with traces of soil. Earlier, these dumps were profusely invaded

by exotic weeds like Parthenium Hysterophorus, Croton Bonplandianus, Xanthium Strumarium and Eupatorium Odoratum, Lantana Camara. Due to more than 100 years of mining and severe land degradation, there is no soil cover on the dumps and was poor in nutrients.

- BCCL has started ecological restoration since 2011-12 departmentally and is being continuously increasing the mined out degraded land/OB dumps under ecological restoration.
- In 2011, BCCL in association with Forest Research Institute (FRI), Dehradun and Prof. CR Babu, Centre for Environmental Management of Degraded Ecosystem (CEMDE), Delhi University started ecological restoration of the mined out degraded land and overburden dumps. Efforts were specially made in selection of species which are native to the region; generate the large quantity of biomass to enrich the soil; ability to stabilize the soil structure; utility to the local community. Therefore, species of trees, shrubs, herbs, grasses with multiple use value like fuel, fodder, fruit, medicine were used during the process of ecological restoration. Subsequent to the success of the above pilot projects, BCCL has identified surplus man power for taking up Ecological restoration departmentally. BCCL has drawn up a plan for ecological restoration of about 226 ha mine degraded land in 5 years.
- The Plantation/ eco-restoration taken up in different areas for the past 05 years is as follows:

Year	Area (Ha)	No. of plants
2017-18	55.20	97755
2018-19	34.10	83812
2019-20	54.00	186546
2020-21	54.50	145250
2021-22	90.10	186408
<b>TOTAL</b>	<b>287.90</b>	<b>699771</b>

- Till 2021-22, BCCL has done biological reclamation over 1534.73 Ha consisting of 32,98,920 no. of plants including 32,036 gabion plantation along different transportation routes, mine boundaries etc.

## Steps of Ecological restoration



*Physical reclamation*



*Fencing and Weeds removal*



*Mulching with dry grass  
over slopes*



*Grass Seed balls*



*Establishment of biodiversity*



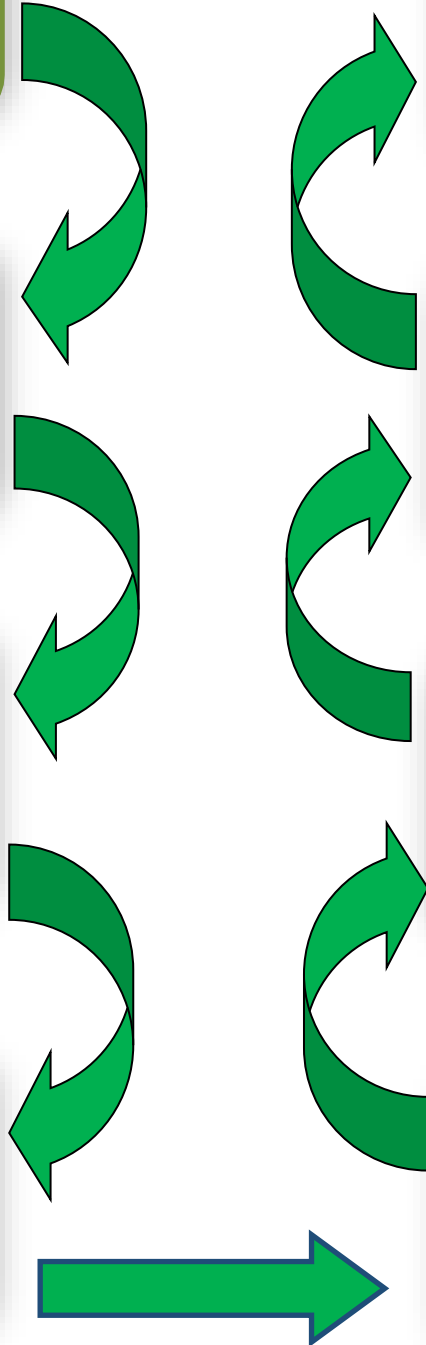
*Establishment of 3-tier  
ecological restoration system*



*Sapling plantation*



*Seed balls broadcasting*







Damoda, Barora Area site before Ecological restoration



Damoda, Barora Area site after Ecological restoration



ROCP, Bastacola Area site before Ecological restoration



ROCP, Bastacola Area site after Ecological restoration



Murulidih, WJ Area site before Ecological restoration



Murulidih, WJ Area site after Ecological restoration



Gokul Eco-cultural cum Tourism Park, Lodna Area before Eco-cultural restoration



Gokul Eco-cultural cum Tourism Park, Lodna Area after Eco-cultural restoration





NAK, Govindpur Area site before Ecological restoration



NAK, Govindpur Area site after Ecological restoration



Tetulmari, Sijua Area site before Ecological restoration



Tetulmari, Sijua Area site After Ecological restoration



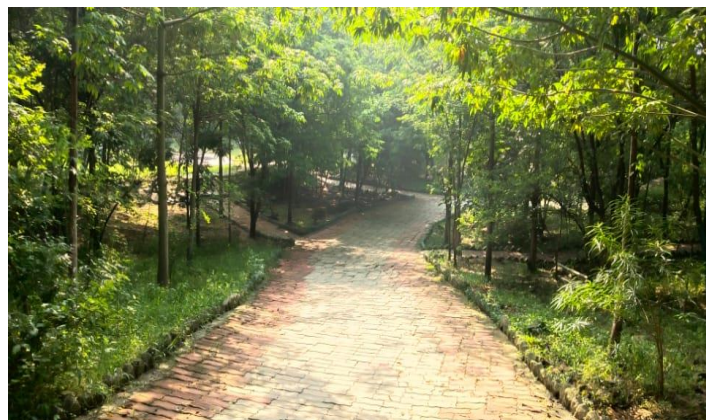
GKKC Kusunda Area site before Ecological restoration



GKKC Kusunda Area site after Ecological restoration



AKWMC Katras Area site before Ecological restoration



AKWMC Katras Area site before Ecological restoration





## VISIT BY DIGNITARIES AT VARIOUS ECOLOGICAL RESTORATION SITES:

The Ecological restoration works being done by BCCL on mined out degraded lands has been visited, reviewed and appreciated by various dignitaries and organizations of national and international levels and recommended for adoption of Ecological Restoration as a means for restoration of degraded lands. Some of the glimpses are as below:



Visit of Hon'ble Minister of Railways and Coal to Gokul Eco-cultural Park, Lodna, 2018



Visit of CMD, BCCL to Gokul Eco-cultural Park, Lodna, 2021



Team from South Florida University, USA at Gokul Eco-cultural Park, Lodna, 2017



Sri. R.K Dey, APCCF, MoEFCC visited GKKC Site, Kusunda, 2018



Visit of Director, IIT-ISM, Dhanbad to Gokul Eco-cultural Park, Lodna, 2018



Team from Finland visiting Kusunda, Dec 2016