

REDUCTION OF FIRE IN JHARIA COALFIELD

- The coal mining operations in the Jharia Coalfield have been done since more than 100 years by the erstwhile private owners. Due to the un-scientific mining methods adopted by them, large areas of coal mines were subjected to mine fires and subsidence which had resulted in serious social and environmental problems in the area. By the time of the nationalization of coal mines in 1972-73 and taking over the mines by BCCL, the situation of mine fires was grave. Since then the fires have been increased day by day extending to an area of about 9 sq.km. as assessed by a World Bank team. These fires could not be controlled even after spending more than Rs.100 crores through various methods like sand flushing, chemical treatment, blanketing etc.
- However after adopting **Strategic Plan** , fire area has reduced from 8.9 sq.km(as assessed in Master Plan). to 1.80 sq.km as per the satellite survey done by National Remote Sensing Centre, ISRO, Deptt. of Space, Hyderabad(October-2021). This could be achieved only due to the successful “excavation method i.e. digging out of fiery coal” adopted by BCCL. This 1.80 sq.km. fire area is in the locality where BCCL colonies, encroacher colonies and other residents are situated in fire affected Jharia Coalfield pockets.



Fire excavation at Muraidih Fire excavation at Bararee



Fire excavation at Ena OC

DELINEATION OF SURFACE COAL FIRE IN THE JHARIA COALFIELD, DHANBAD, JHARKHAND USING REMOTE SENSING DATA

In order to manage effectively the coal fire menace, it is essential to know the exact location and extent of the fire affected areas. Remote sensing technique in thermal band offers a cost-effective and time-saving technology for mapping various geoenvironmental / hazardous features like coal fires, forest fires, oil well fires, volcanic eruptions etc.

A Memorandum of Understanding between BCCL and NRSC was signed and a project was formulated to take up Coal fire study of the Jharia Coal Field using space-borne remote sensing techniques to study the status of coal-fire as of the year 2020-21.

The objective of project was

- I. To map Coal fire in the study area based on pixel integrated relative radiant temperature derived from latest available Landsat-8 data of 2020 time period.
- II. To compare the change in the coal fire distribution in the Jharia coalfield between the period of 2017 and 2020.
- III. To delineate probable subsidence areas in the region using differential interferometry method.

SUMMARY OF REPORT

Remote Sensing Data

Thermal band data of Landsat-8 (100m resolution) have been used to demarcate the coal mine fire areas from non fire areas. For this study, Landsat-8 data of May, 2021 have been used. The band 10 (10.60-11.19 μm) of Landsat-8 data are used to derive the relative radiant temperature. Further ALOS-PALSAR 2, L band microwave data have been used to delineate zone of probable land subsidence (using differential interferometry) due to mining.

Analysis

The study reflects that, compared to 2017, the eastern flanks (Lodna and Tisra etc) show a significant reduction in total fire area. The western flank (Block II and Shatabdi) and the northern flank (Katras and Gaslitand) show isolated fire pockets in active mines as well as in OB dumps. The current total fire area mapped is 1.8 sq.km. Apart from this, one distinctive area of land subsidence has been identified using interferometric method. These are primarily caused by older or active underground mining in the Moonidih Project. The coal mine fire and subsidence areas are further verified on the ground. The final coal mine fire and subsidence maps of Jharia coal field are prepared by using remote sensing data analysis with field validation.

Conclusions

The following conclusions can be made:

1. As of the date of study in the year 2020 and in comparison with the previous study done in 2017, there has been a change in areal extent and disposition of the fire affected areas. On the other hand, persistent subsidence is seen in the Moonidih area due to underground mining activities.
2. Compared to 2012, the eastern flanks (Lodna, Tisra, Bhulanbarai areas) show considerable decrease in fire disposition and the western flank (Shatabdi and Block II area) show diminished fire presence.
3. The fires are continuation of existing fire affected areas as seen in the 2017 study.
4. The mines in Kusunda remain to be the worst affected with maximum presence of active fires.
5. There is a decrease in areal extent of the fire from 2017 to 2020. As compared 2017, when the total fire affected extent of the JCF was about 3.28 km² ; in 2020 total fire affected extent is about 1.89 km² (including TISCO mines). Within the mining lease of BCCL (excluding TISCO) in comparison 2017, when the total fire affected extent of the JCF was about 3.27 km² ; in 2020 total fire affected extent is about 1.86 km² .