

## Land Use Land Cover Change by Opencast Coal Mining and Its Impact on Environment: A Case Study of Pandabeswar Block, West Bengal, India

**Bishnu Santra<sup>1,\*</sup>, Deb Prakash Pahari<sup>1</sup>, Sourav Mukherjee<sup>2</sup>**

*Department of Geospatial Science, The University of Burdwan, Rajbati, Burdwan-713104, West Bengal, India*

*<sup>1</sup>bishnu.santra86@gmail.com, <sup>2</sup>debprakashpahari@gmail.com, <sup>3</sup>mukherjee824@gmail.com*

### Abstract

Dynamic uses of coal as a non-renewable resource for industrial purposes, thermal power generation and domestic consumption make it a precious resource. It is generally extracted by using two types of methods, one is underground mining method, and another is opencast method. Due to reduced production cost, opencast method of mining is getting more importance than underground method. In opencast coal mining method, huge waste materials are accumulated due to the removal of overlying rock & soil materials. These waste materials (also called overburden) are dumped near the mining site. Thus, anthropogenic or manmade landforms like depressions, impoundments, spoil dumps, overburden dumps etc. are formed and topography of the mining site changed. After extraction is over, mining sites are left, without restoring the topography, which resulted land degradation. Beside land degradation, opencast coal mining also creates a number of environmental problems such as changes in land use and land cover of the mining site, destruction of vegetation, soil, agricultural land, rivers and the ecosystem of the adjacent areas.

Present study area is the Pandabeswar Block (Lat: 23°38' 30'' N to 23°44'30''N, Long: 87°10'00''E to 87°30'45''E). It is situated within the Paschim Bardhaman District of the West Bengal, India. Having an area of 97.89 km<sup>2</sup>, the Pandabeswar Block falls within the Raniganj Coalfield, the oldest coalfield of India. This block also experienced such environmental degradation by opencast coal mining. Rapid and widespread growth of opencast mines within the Pandabeswar Block puts negative impact upon the environment.

In present study main objective is to identify nature and extent of environmental impacts of opencast coal mining with the help of Remote Sensing and GIS technique. All the GIS related work was done in QGIS 2.8.1 Wien software. Study reveals that rapid growth of opencast coalmines within the study area changed the land use land cover, topography, vegetation, soil, settlement areas. Growth of opencast mines along channel caused degeneration of rivers of the study area. Thus, sustainable management plan is needed to protect the environment and to prevent the environmental degradation.

*Keywords: Open cast mining, land degradation, Pandabeswar Block, Raniganj Coalfield*

## References

1. De N. K. & Taraphdar A. (2003). Land and Land Degradation : Conceptual Overview. Published article in the book Land degradation and desertification. Edited by V.C. Jha. Rawat Publication, New dehl-110002.
2. Lahiri Dutt K. & Jana P.K.(2003). Land degradation issues in the Coal mining regions of West Bengal. Published article in the book Land degradation and desertification. Edited by V.C. Jha. Rawat Publication, New dehl-110002
3. Sarkar D. (2003). Mining of Coal and land Degradation: A Review. Published article in the book Land degradation and desertification. Edited by V.C. Jha. Rawat Publication, New dehl-110002.
4. Lahiri Dutt K. .(2001). Mining and Urbanization in the Raniganj Coalbelt. The World Press Private Limited, Kolkata7000073
- 5 .De N. K. & Taraphdar A. (2003). Land and Land Degradation : Conceptual Overview. Published article in the book Land degradation and desertification. Edited by V.C. Jha. Rawat Publication, New dehl-110002.

\*Corresponding author. Tel.: +91-9474484735

E-mail address: [debprakashpahari@gmail.com](mailto:debprakashpahari@gmail.com)

Bandyopadhyay.S,Mukherjee.D and Pahari. D ‘Coastal Erosion and its Management at Digha, Medinipur, West Bengal ‘ Geomorphology in India (Prof Savindra Singh Felicitation Volume) editors H.S.Sharma and V.S.Kale 2009,pp. 287 – 302

Pahari D and Bandyopadhyay.S ‘Detection of pollution from Ferro- Alloy Industry Using Remote Sensing: A case study from Bardhaman, West Bengal, Abstract volume 22<sup>nd</sup> IGI, 2009 pp 221

Sivaramakrishnan.L,Pahari.D and Sarkar.R ‘The role of Urban Forest in Making cities Sustainable. Krishnanagar Govt. College



Dr. Deprakash Pahari

Scientific officer,

The University of Burdwan

West Bengal ,India



## BIOGRAPHY

1. Name: Deb Prakash Pahari

2. Designation: Scientific Officer

3. Date Of Birth: 10th October, 1972

4. Qualifications: M.Sc.in Geography, PhD (on the verge of submission)

5. Diploma & Special Course:

Diploma in Remote Sensing and GIS from Geoinformatics Division, IIRS, Deheradun.

Special Course on Radar Remote Sensing and Application ( RISAT-UP-IIRS-01)

6. Service Experience:

Five years Experience in Cartographer post in Vidyasagar University

Ten years Experience in the post of Scientific Officer in The University of Burdwan

8. Sanctioned Research Projects: As Co investigator

i) DTRL Sponsored Remote Sensing Based Soil Moisture Estimation in Lower Deltaic

West Bengal-September 2003 – May 2005.

ii) DTRL Sponsored Project on Formulation of Working Experimental Prototype for Landform, Land use and Soil Character in Deltaic and Coastal Plains of West Bengal, July 2005 – August 2006.

iii) UGC Sponsored Project on Role of Urban Forestry in Environment Enhancement and Use of Modern Techniques in Its Management: A Case Study of Kolkata Metropolitan Area.2010

iv) DST Minor Research project on Tank Water Resource of Bardhaman Town and

Expendiency of Modern Technology in Its Appraisal, 2010

9. Other Curricular Activities: Extend help different Projects out side the Department related to application of Remote Sensing and GIS, help Departmental Scholars in Data analysis through RS

& GIS Techniques. Preparation of Property Map in Burdwan University, act as a Coordinator in Chapter 10 in Burdwan District Human Development Report & Hooghly District Human Development Report. Selected Best Director in Inter University Drama Competition, Joint organising Secretary National seminar on Geospatial Technology and Research in Geography.

10. Any other Relevant Information: Extent helps in Teaching and Conducting Examinations in various Educational Organization (NSOU, IGNU, Kalyani University, Vidyasagar University, Krishnanagar Govt. College Chandernagar Govt. College, and DDE Burdwan University etc.)