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**Title of the Thesis: Health Impact of Air Pollution in Coal Mining Area: A Case Study of Angul-Talcher Region of Odisha.**

### **Abstract**

In this study, a trial has been attempted to explore the linkages between the ‘environment’ and ‘health’ in opencast coal mining area, in the Talcher region of Angul district Odisha, India. “Health” is a precious asset in itself and an absolutely essential factor for human development and productivity (Grossman, 1972). Good health with mental well-being is termed as both a ‘resource’ and ‘means’ for stimulating economic development and also as an outcome of economic development (Brundtland, 2002). It is highly paradoxical why many of the developing economies with abundant mineral reserves are trapped in the low level equilibrium with abject poverty, unemployment, ill health and low education. This concept is well documented in the literature as “*resource curse hypothesis*” (Sachs and Warner (1997, 2001). It has been widely observed that in the post liberalization period, many of the Indian states are encountering voracious appetite for energy and infrastructure, for the purpose of attracting investments, needed for boosting growth. This has led to the rampant extraction and utilization of mineral resource in those states which are abundantly endowed with mineral resources. Coal Mining as a decisive economic activity mostly in developing countries, creating some irreversible damage to the local environment, producing huge amount of wastage and pollutants which can have dangerous effects for human health in the neighboring regions of the opencast coal mining belt. The health risk due to air pollution is highly prevalent in the regions where the open caste coal mining activities are rampant.

Therefore keeping in mind, the coal has an insatiable appeal for transitional economy and thus the deliberation about coal mining –induced environmental, social, health impacts remains remarkably weighty for policy concern. The objectives of this study are: 1- to find out the environmental and socio-economic determinants affecting the health status and their impact on mitigating expenditure, 2- to capture the impact of exposure of air pollution on respiratory health status among the residents of Angul-Talcher Coal mining region of Odisha, 3- to estimate the

relationship between the mitigating expenditure related to respiratory illness and the level of air pollution.4- to measure the welfare gain due to the reduction in air pollution.

This study uses a simplified version of the general “Health Production Function” proposed by Freeman, (1993) to analyze the relationship between the air pollution and human health. This study uses two-stage stratification sampling method for selecting households. Total 210 households from 10 villages & 855 household members were surveyed. Out of 855, 254 members were suffered from respiratory illness. Secondary data on weekly air pollution level has been collected from Odisha Pollution Control Board. Different statistical method including percentile, mean, standard deviation, variance, minima and maxima are used to find out the environmental and other socio-economic and demographic factor’s relations with the health. To estimate the health impact of air pollution (dose-response function), the Poisson and Negative Binomial regression model were used. While to calculate the health care medical expenditure demand function, the Tobit model were used. In later part, for comparison purpose, the Probit and OLS regression model were also used.

The findings of the study consider there is a positive and statistical significant association between the respiratory illnesses (RI) related sick days and the ambient air quality level in opencast coal mining belt in Odisha. It depicts that when we reduce the air pollution level to standard level (prescribed by Pollution Control Board), definitely there will be positive health gain to local people. This study also established that there is a positive and significant affiliation between the air pollution level and the demand for health care expenses (or mitigating expenses for avoiding the RI), which reveals that out of pocket expenditure for health care treatment falls when the air ambient quality improves to national standard prescribed level. By reducing the air pollution level (PM<sub>10</sub> level) in Angul-Talcher coal mining belt of Odisha from current average PM<sub>10</sub> level (159 µg /m<sup>3</sup>) to standard prescribed level (90.4 µg /m<sup>3</sup>) a representative individual can save 0.43 days annually from reduction in RI related sick days. Similarly a household member can gain Rs. 372 annually from the reduction in RI related mitigating expenses .By extrapolating these values for Talcher coal mining area, the entire population (144935 populations as per the 2011 census) can gain the monetary benefits Rs. 60,55,62,70.6 per annum due to reduction in PM<sub>10</sub> level to prescribed standard level by Pollution Control Board.