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Coal Mining Workers and the Social and Economic Conundrums

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Abstract – The paper is a review article that looks into the challenges faced by the workers in the Coal mine industries. It includes social, economic and environmental risk involved in addition to occupational health risk and related diseases, presence of public health facilities for mining workers etc. It also looks into other types of risk met by workers such as accidents and disaster in Coal Mining. It lastly suggests for reduction and control for occupational diseases and the challenges in Coal Mining with a sustainable mode of development in mining industry.

Key Words: Coal Mine Workers, Occupational Health Risk, Public Health

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1. INTRODUCTION

Mining is an earliest occupation, long acknowledged as being dangerous and liable to injury and diseases (Agricola 1950, Rammazzini 1940). Mining is also one of the earliest human activities, with evidence of mining dating back thousands of years (UCSD 2008). The Khirbat en- Nahas, situated in Jordan was built approximately 3000 years back and is one of the largest copper mining and smelting sites in the ancient world. In lack of effective management, rainfall and other natural transportation agents may transfer liberated minerals beyond their sources. Air pollution is also part and parcel of mining. If it is not managed properly it is hazardous to environment and people of the area. Excavation and transport of coal is dusty and grimy activity. In addition with this, various mining process like crushing, grinding, washing, milling and smelting produces several types of emissions such as particulate matter, combustion products, noxious air pollutants, greenhouse gases and different types of air pollutants. Another significant issue related with mining are storage and management of waste rock piles and tailings. These waste materials are much cost consuming because they are transported through trucks needs to be placed in engineered structure. Tailing poses very serious environmental threat because it is made up of very fine particles that seep water. This type of seepage has detrimental effects when it is exposed with oxygen and water. The similar effects can be observed in waste rock piles.

Occupational accidents, injuries and health risks involved in coal mining are another significant area of concern for mining industry. Occupational diseases, injuries and health risks have enormous social and economic underpinnings and implications at individual, family and community levels. Its economic impact is manifested in the form of direct and indirect cost for industry and society as a whole. The direct cost of occupational diseases and health risks includes cost related with damage in the work place, compensation cost and the expenditure of disturbance in the production. Indirect cost include the expenditure incurred on health and medicine, man days lost, livelihoods lost and the cost associated with care and look after given by families and community. Occupational health risks can also distress public health and wellbeing of people, costs to national economy and impacts on the environment. Total cost of occupational health risks, diseases, accidents and injuries have been calculated at between one and three percent of GDP in various countries (Rikhardsson 2004, Leigh et al 1992).

The health, safety, creativity and ingenuity of workers lead to effective and proficient utilization of all other resources and to accomplishment of the economic and societal goals of the organization. Safety and security of workers from hazards and health risks in the occupational ecosystem is crucial both from the humanitarian point of view and for the overall welfare of the industry. The most fundamental challenge for mining industry is the sound management of the health and safety of the miners. It is also imperative for survival of the company in a competitive world.

1.1 Coal Mining Induced Social, Economic and Environmental Risks

It is evident that, even though mining has provided the opportunity for better infrastructural advancement or development and increase of financial capital, at the same time it is also liable for range of socio-economic issues. Mining can be believed and seen answerable for feasible economic development of a region. However, many times it fails to bring equality among the coal mining project induced affected communities (Perry, 1982). With improved employment opportunity, mining has a very disastrous impact on environment and coal workers; thereby it also affords the expenditure on varieties of aspects such as health and housing. Fundamentally, mining is a profitable and gainful venture for state and central level economic prosperity and development but its local impact is very harmful and constrained in nature (Rolfe et al., 2007). On the other hand, mining demands mass level acquirement of land which decreases the accessibility of affordable housing and also responsible for loss of agricultural land and resultant loss of livelihood. Concurrently, mining affected local people fells neglected and remain marginalised. At this front, mining companies are showing very selfish attitude. They are merely spreading the awareness among the local community about the short-term profits and benefits and intentionally overlooks and ignores the spreading of any alertness and awareness concerning harmful outcomes of mining such as displacement, diseases, relocation and pollution (Badera & Kocon, 2015).

Many scholars have investigated the social impact of mining on local community. Mining induced social challenges includes negative impacts of displacement and resettlement, loss of cultural identity, social structure, and productive land, sources of subsistence, community identity, and loss of physical and non-physical assets and marginalization. Morrice and Colagiuri (2013) opine about mining-related social, environmental and health injustices. Coal mining industries always poses social injustice on local community. It consists of environmental contamination and degradation, harmful health impacts and hazards on small and large scale. In many developing society, the mining industry and functionaries 'agenda undermines communities' constitutional power. Mining industries universally exhibit the dichotomy and tension between place and health vs. wealth generated by mining. In developing countries mining industry has very insincere, hallow and fake approach about social side effects of mining. Displacement plans and action is implemented without social preparation. All policy, decision and plan undertaken by these industries are made without prior information and consultation with affected peoples.

1.2 Coal Mining and Public Health Conundrums

Health is an ultimate human right and a world-wide social goal. It is also crucial for fulfilment of basic human needs and to a better quality of life. In India, health continues to be a neglected entity despite lip service. At the individual level, it cannot be said that health occupies an important place; it is usually subjugated to other needs defined as more important, e.g., Wealth, power, knowledge, security. Health is a very important and crucial matter of interest in most cultures. In fact, all communities have their concepts of health, as part of their culture. A very simple understanding of health is "absence of disease".

The widely acknowledged definition of health is that given by world health organization (1948) in the preamble of its constitution, which is as follows- "Health is a condition of total physical, psychological and societal wellbeing and not just an absence of illness or infirmity". In recent years, this statement has been amplified to include the ability to lead a "socially and economically productive life".

Public health refers to "the science and art of preventing disease, prolonging life and promoting health through organized community effort" (Winslow, 1920). In 1988, the prestigious institute of medicine (IOM) offered a useful definition in its landmark study of public health in the United States. The IOM report considered public health's mission as fulfilling society's interest in assuring condition in which people can be healthy. This definition directs our attention to the many conditions that influence health and wellness, underscoring the broad scope of public health and legitimizing its interest in social, economic, political, and medicinal care factor that effect health and illness.

According to Takala (2012) economic costs of occupational injury and diseases fluctuate between 1.8 and 6.0 percent of GDP in various country estimates, the average being four percentage according to the ILO. The ILO estimates that each year about 2.3 million workers die from occupational accidents and diseases. One million workers will suffer a workplace accident at the end of the day. One thousand workers die for injuries and 5,600 for diseases every day.

Coal is accountable for over 800,000 untimely deaths per year worldwide and numerous severe diseases, injuries and minor illness. According to "coal kills" report in India coal contributes to between 80,000 to 115,000 early deaths per annum. Coal mining and its burning releases harmful air pollutants that can extend for thousands of kilometres. Major pollutant includes suspended particulate matter, sulphur dioxide, carbon dioxide, nitrogen oxides, mercury and arsenic. Continued exposure to these contaminants can leads to various respiratory and cardiovascular diseases. It

damages nervous system, increases the risk of lung cancer, heart diseases, chronic respiratory diseases and lethal other infections. In addition to these, the transportation of coal and the disposal of coal ash waste can have very serious detrimental impacts on public health.

The public health challenges of coal mining are very diverse and dangerous. Coal miners are killed, injured and sickened by their occupation (Wagner 2018). It has been observed by many researchers that community living near coal mining regions are facing numerous health problems. They have poorer health status when compared with residents of non coal mining areas. The problem gets more worst due to unavailability of proper health facility in mining areas. The mining regions are generally backward, least developed and high poverty rates. It has also high death rate due to various diseases caused by deteriorated environment (Tabuchi 2017). Continued silica exposure to the workers and residents living near by coal mining regions had resulted into the rise of deadliest form of coal workers pneumoconiosis (CWP), progressive massive fibrosis and other forms of progressive pneumoconiosis (Blackley et al 2014, Blackley et al 2016). Extraction and transportation of coal has also results in considerable destruction to environment and public health but its cost is not added in over all mining cost of coal (Epstein et al 2011). Transportation of coal by railways and trucks has substantial negative impact on environment and public health. This entire process is dust releasing and extensively adds particulates, numerous poisonous contaminants and green house gases to the atmosphere (Thurston et al 2016). Coal mining culminates in large scale deforestation, water pollution, increased flooding, surface sliding, air pollution and release of methane and other green house gases (Palmer et al 2010). Coal mining is hazardous, deadly and destructive occupation (Wagner 2018). Noise pollution is significant problem in coal mining industry. Workers and local public living in the vicinity of coal mines are continuously exposed to high level of noise that ultimately leads to severe hearing losses. Coal mining requires heavy equipment that is generally very noisy. The major noise producing processes are drilling, blasting, rock breaking, transportation and sorting.

1.3 Occupational Health Risks and Diseases

Occupational diseases cause enormous suffering and damage in the world of work. Occupational or work-associated diseases continue on mostly invisible in comparison to industrial accidents, even though they kill six times as many people each year. More significantly, the nature of occupational diseases is changing rapidly with technological and social changes; along with global economic conditions which area aggravating current health hazards and producing new ones. Occupational diseases are diseases contracted as a result of an exposure to risk factors arising from work. An estimated 2.34 million people die each year from work- related accidents and disease. The ILO estimates that 160 million cases of non- fatal work related disease occur annually. Occupational disease imposes enormous costs. They deprive workers and their families, reduce work capacity and dramatically raise health care expenditure. The ILO estimates that occupational accidents and diseases results in an annual percent loss in global gross domestic product (GDP), equivalent toUS$2.8 trillion, indirect and indirect costs of occupational injuries and diseases.

Work offers a number of economic and additional profits and benefits. At the same period, individuals at work face a range of hazards in arrears to biological agents, chemicals, bodily factors, hostile ergonomic conditions, allergens, intricate net of security risks, and numerous and wide-ranging psychosocial factors. In addition to injuries, more than 100 occupational diseases have remained classified according to the tenth revision of the **International Classification of Diseases and Related Health Problems** (ICD-10). Largely, these comprise respiratory, cardiac, reproductive, musculoskeletal, neuro toxic, skin and psychological sicknesses, hearing injury and cancers. Exposure in the direction of occupational hazards can harmfully affect the human body. Unfavourable effect ranges from biological, functional and bio-chemical alterations to signs of sickness, to detected diseases and lastly to death. For certain risk issues there are a very strong linking between the exposure and the disease.

The term "**occupational risk factor**" is defined as a chemical, physical, biological or other agent that may cause harm to an exposed person in the workplace and is potentially modifiable.

An **occupational disease** can be defined as a disease which rises from work or is intensified by work. The International Labour Organization (ILO, 1964) defines occupational disease as a disease contracted as a result of an exposure to risk factors arising from work activity. The World Health Organization (WHO, 1999) states that an occupational disease is not characterized purely by the disease itself but by a combination of a disease and an exposure as well as an association between the two parts.

1.4 Occupational Health Risks, Accidents, Disaster and Diseases in Coal Mining

Scott and Grayson (2004) define mining health issues are as "some disease or illness workers agreement while in employment as miners and which might be caused by mining activities." Last (1988) has distinguished variety of health risks illness and contact as both chronic and severe. A

severe or accelerated health risk is one developed over a short period of time and is usually severe in character; a little exposure of high concentration. A chronic health risks develops over a long period and is normally of low concentration. The U.S. National Centre for Health Statistics defines "chronic" as a situation enduring three months or more (Last, 1988).

Health concerns are most important and burning issue in the mining industry. Health risks and hazards caused by dusts, gases, chemicals, noise, extreme temperatures, and other physical circumstances have been obvious to coal miners and the mining industry for a long period, consequential in several unremitting, unrelenting, chronic and intermittently fatal sickness.

Most important health risks come upon in mining industry, especially coal mining industry include airborne pollutants such as silica dust and coal dust, heat, noise and vibration (Hermanus, 2007). Other important health risks include chemical induced risks, which are related to underground air pollutants or gases, skin disorders, ergonomic stresses, ionizing radiations.

Respirable dust exposure has extensively been identified to be a crucial and serious health threat to coal miners in mining industries. In coal mining, overexposure to respirable coal mines dust can lead to coal workers' pneumoconiosis (CWP). CWP is a lung disease that can be deadliest and fatal in its most harsh form. Furthermore, coal miners can be exposed to elevated levels of respirable silica dust, which can cause silicosis, a different disabling and fatal lung disease. Miners are regularly exceedingly exposed for long periods of time to loud noise that can cause incapacitating hearing problems and lead to industrial deafness. In mining industry especially, in coal mining major health risks and diseases are respiratory diseases, noise induced hearing loss, traumatic injury, cumulative musculoskeletal injury, mine disasters, ground failure and adverse outcome from changing work condition in the industry (NIOSH, 2005). Mining-related illness and disease are caused by exposure to chemical or physical hazards, the most severe of which are chronic. Extensive exposure periods are required to catch the diseases, and in the same way prolonged periods are required for observation, prevention and control. The major serious diseases and occupation health risks in coal mining are coal worker's pneumoconiosis [CWP], silicosis, chronic obstructive lung disease, and lung cancer), noise-induced hearing loss, and musculoskeletal disorders associated with repetitive motion, awkward postures, and other physical stressors among the mining-related illness and disease requiring attention (NIOSH, 2007). A **mining disaster** is defined as "an incident claiming five or more lives". Mine disasters such as fires, inundations, explosions and roof falls are the most deadliest and frequent in coal mining. Fatalities have occurred as a direct result of these events and also occurred when coal workers were unable to successfully escape during mine disasters.

1.5 Occupational Diseases, its Reduction, Control and Challenges in Coal Mining

Worker health is the most important asset and advantage of coal mining industry. The first and foremost imperative goal of the coal mining industry occupational diseases control program should be the absolute, total and complete elimination of mining induced disease and injury. To achieve this goal, we need scientific and comprehensive research on various health risk and diseases induced by coal mining. The perfect and best disease control and prevention strategy includes identification and detection of the source and root cause of disease, exposure monitoring and examination, exposure control technology improvement and implementation, and surveillance of disease progression and follow up, as well as intervention efficiency research. Occupational health risks will be effectively minimized and eradicated by regular surveillance for hazards, fatalities, and injuries and the interventions planned for their prevention and control.

Data on health-related diseases and sickness in the coal mining industry are insufficient and inadequate, and information on rates and costs is not easily available Scott and Grayson (2004).

According to Worker health chart book (2000) "There are many limitations on the correctness of sickness coverage." Defining what comprises fine health or sickness and what is an injury is uncommonly mystifying and frequently depends on what organization or institute is reporting the data. One of the biggest problems in coal mining occupational accidents, illness and disease in mining are not reported or under reported. There is very complex situation of reporting or not reporting occupational diseases by coal miners. They show a puzzled and dilemmatic attitude towards occupational diseases.

2. NEED FOR SUSTAINABLE DEVELOPMENT FRAMEWORK

The concept of sustainability now has become the pivotal element of global environmental efforts. After the series of initiative taken by United Nations in broadening the concept of sustainability, it smartly reached and spread into business world including mining. Continuous efforts of universalising the concept of sustainability have advanced the understanding of mining companies about safeguarding environment and minimizing its negative impacts. Mining companies have taken this concept more inclusively and responsibly.

In the beginning of 21st century mining industry embarked on to address the social (including safety

and health), economic and environmental issues raised and risks associated with mining activities. In the year 2002, the International council on mining and metal (ICMM) initiated the first attempt to standardize, regulate, and adopt sustainability inside mining industry. Sustainability in mining is generally encompass the careful, judicious and sensible management and monitoring of social, economic and environmental impacts and issues associated with mining activities.

2.2 Diffusion of Sustainability Concept in Mining Industry

Nowadays, mining industry is working very hard to explore the new ways to modify mining practices to efficiently manage social and environmental impacts. The term sustainable mining has been widely criticised as an oxymoron (Kirsh 2010), however the use of the term 'sustainable' in mining industry is not intended to call upon the most famous Brundtland definition of sustainability. Extractive industries like mining leave smaller quantity of resources for upcoming generation by their very nature. Sustainable mining in true sense means that companies can identify and categorize the most pertinent social, economic and environmental risks and plan strategies to handle probable impacts.

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