



Short Review Paper

Environmental Panorama of Sukinda Valley – a critical study

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Abstract

Sukinda Valley of Odisha is well-known for its all-embracing chromite ore deposits. The rate of chromite ore extraction, although mining is being carried out in this region since independence, has been amplified during 1980's in consequence of its sky-scraping demand and subsequently its surrounding environment is also deteriorating day by day. This study will focus various destructive effects of chromite mining in Sukinda Valley on its immediate surroundings and will try to mitigate these problems as far as possible.

Keywords: Chromite Mining, Damsal Nala, Environmental Pollution, Sukinda Valley.

Introduction

Sukinda Valley of Odisha, a well-known chromite hub in the world, is endowed with vast deposits of chromite ore reserves. Chromite mining, although contributing radically towards the economic enhancement of Odisha and India, is continuously degrading the surroundings of Sukinda Valley. This area is facing serious threat of environmental pollution due to extensive chromite mining. The research findings of different authors have shown that the aquasystem of Sukinda Valley is deteriorating endlessly as a result of chromite mining and is gradually turned into a place which is unsuitable for all organisms including the human being¹⁻¹⁰. Present study will argue diverse detrimental consequences of chromite mining especially on society, culture and health status of the local residents of Sukinda Valley and will try to ease these issues.

Materials and methods

The methodology of this paper is solely empirical and is prepared on the basis of various available literatures. The data were secondary in nature and were taken from different journals of national and international repute, Ph.D. thesis, proceedings of national as well as international conferences, workshops, seminars *etc.* Further author's own observation and outlook concerning this issue have been included while writing this manuscript.

Description of the study area: Sukinda Valley region is positioned in the Jajpur district of Odisha, India and is confined in the south-western quadrant of topo-sheet no. 73G/12 and 73G/16. Sukinda Valley is encircled by two hill ranges namely Daitari and Mahagiri. Damsal nala (the only lotic stream of Sukinda Valley), after originating from Daitari hill, flows through the entire study area containing toxic substances of all

the chromite mines of the province and eventually congregate the river Bramhani (one of the main river of Odisha).

Chromite mining – The need of the hour

Forms of chromium: In nature chromium is found in different oxidation states ranging from minus two to plus six. But only two forms are very much abundant and stable. Chromium, as trivalent state, is naturally present in rocks which are made up mainly with chromite ore. Chromium, as hexavalent form, is produced generally due to the industrial activities of human being and is highly water soluble in nature.

Industrial uses of chromium: Chromium has wide industrial implications (mainly in metal manufacturing units) due to its excessively elevated melting point and corrosion resistance nature.

On Economy: Each year, by exporting chromium to the overseas countries, enormous amount of foreign exchange is earned by Odisha and India which in turn definitely strengthen the economy.

Generation of employment: A huge number of people (in terms of labour, crane driver, computer operator, factory supervisor, guard, accountant, manager, safety engineer *etc.*, and many more) are required to run a chromite mine successfully.

Other beneficial impacts: Apart from that a lot of other beneficial effects can also occur due to chromite mining which includes amplification of GDP (Gross Domestic Product), balance of payment *i.e.*, equal distribution of money within all states of a nation by internal (between different parts of a country) trading and improvement of surrounding

infrastructures like improved connectivity (rail, road or air), establishment of recreation facilities, health as well as educational facilities *etc.*

Environmental consequences and concerns

But probably all developmental activities have some ill-effects on the surrounding society, culture and environment as a whole¹¹⁻¹². The environmental consequences and concerns of chromite mining in Sukinda Valley will be discussed in detail.

Water scarcity: Traditionally different parts of Odisha are devoid of sufficient amount of natural water resources and suffer from scarcity of water (except in rainy season) and the Sukinda Valley is not an exception to it. A huge amount of water is required to run a chromite mine successfully. Apart from that dirty and poisonous waste waters of various mines are constantly polluting the water resources of the surrounding region. These phenomena lead to severe water scarcity in the Valley.

Soil erosion: The soil quality of Sukinda Valley is also degraded and contaminated as a consequence of different chromite mining activities like dumping, excavation *etc.*, resulting into erosion of surrounding soil.

Air pollution: The quality of nearby atmosphere is continuously deteriorating during various phases of mining. Generation of dusts (containing toxic elements) of varying sizes initiate pollution of contiguous air.

Noise pollution: Excessive irritating sound could be produced due to various activities like operating explosive experiments for cutting of rocks and using heavily equipped machines for drilling as well as for excavation during different phases of chromite mining.

Food chain contamination: Air, water and soil of Sukinda Valley is being polluted every moment as a result of chromite excavation. Hexavalent state of chromium is the main culprit. From water and soil the responsible agent (toxic metals) is entering into microscopic living organisms and from there it is coming into the body of different higher order organisms and finally is becoming a part of human body tissues.

On health status: Chromium, when found as trivalent state, is less water soluble and has some beneficial metabolic role in human body. Deficiency of trivalent chromium can lead to several disorders in humans. Hexavalent chromium, on the other hand, exerts severe adverse effects on living organisms including human beings (even if it is present in very scanty amount within their body).

Threat to forest canopy, wildlife community and biological diversity: These days many new chromite mines, which are held in densely forest zones, are excavated to coupe up with

high demand of chromium and these activities are decreasing the forest canopy in one hand and on the other hand diminishing the wild community and biological diversity.

On society and culture: Chromite mining in Sukinda Valley is also making bad impression on the surrounding society and culture. Age-old traditional culture is lost and a kind of mixed society and culture is developed¹³.

Remedial Options

From the above discussion it is clearly evident that chromite mining exerts certain serious damage to the surroundings of Sukinda Valley although it also adds to some important beneficial aspects. Hence we have to continue mining of chromium ores with taking due care of the surroundings. For that we must have to adopt some necessary steps which will be chat about now comprehensively.

Source reduction and recycling of waste water: There is no doubt that prevention is always better than cure and hence 4R (*i.e.*, reducing, reusing, recovering and recycling of wastes) concept is becoming very popular nowadays and this path is very much correct as far as environmental sustainability is concerned. All the chromite mining authorities should give stress on the reduction of mine wastes at its every source point (*i.e.*, as and when it is produced) and also try to recycle the waste water as many times as possible.

Chemical treatment: It is a kind of end of the pipe treatment where treatment and degradation of wastes (solid, liquid and gaseous) are carried out with the application of different chemicals. A lot of chemicals are now available in the market to treat the waste water which are generating from chromite mines.

Biological implications: Scientists throughout the world including India are constantly looking for biological options to treat the waste water. It is gaining tremendous attention because it is cheap as well as ecofriendly in nature. A developing country like India should always go for biological options. But this process has some limitations although constant efforts are being made by some researchers^{3-4,6,8-10, 12}.

Corporate Social Responsibility (CSR): Nowadays CSR has emerged as a very important research topic in the discipline of environmental management. The management authorities of every mining company should take the responsibility of environmental safety, societal security and cultural stability of the surrounding region apart from common goals of the company like production enhancement, branding, market sharing, making financial profit *etc.* It is their duty to contribute something towards the betterment of the socio-cultural environment.

Role of Government and NGO's: Government (Central as well as State) has to take the parental (just like a guardian of the

family) part in this regard. But the government also cannot do it alone and requires some active support and this additional job can be completed by various NGO's (local, regional, national and international). Government should allot necessary funds to the NGO workers for the benefit of the surrounding society, region and environment as a whole.

Environmental laws: There are so many laws available according to the Indian constitution to safeguard the environment from the damage created due to mining of chromium. But the fact is that nobody is properly obeying these laws. Necessary steps and proper actions should be taken by the regulatory authorities to implicate these laws strictly.

Role of common people and women: Common people, especially the women of the surrounding region, have to play a decisive role in the protection of the adjacent area. They have to raise their voice against any unfair activity made (intentionally or unintentionally) by the mining authorities and have to transmit that news to the doorstep of the competent authority so that they could take necessary steps to stop the situation. Here the role of the women cannot be ignored¹⁴.

Conclusion

Chromite mining in Sukinda Valley, even if contributing drastically towards the economic upliftment of our country, is endlessly mortifying the adjacent region. If this situation persists for long it will surely threaten the survival of every single life in Sukinda Valley. Here comes the concept of carrying capacity and sustainability *i.e.*, there must be a delicate balance between development and environmental protection. We have to keep the production rate within a certain level so that it could not harm our environment. The production of chromite ore should be done in such a pace so that it could not be able to leave any permanent scar on society, culture as well as public health status of the surroundings. We have to imply new and innovative environment friendly technologies for the safeguard of our ecosystem and also have to allow sufficient time to our immediate surroundings so that it can heal itself through its self detoxification process.

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