# STOP Approaches of Green Issues in Indian Mining Industries Towards Sustainability Development: A Critical Future Issue

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**Abstract**
Green is the talk of the day. Strategic, tactical, and operational approaches are the key parameters for balancing the financial, social, and environmental performance towards sustainability development. Therefore, in green generation the critical factors which influence the implementation of green supply chain in mining industries are crucial issues in a developing country like India. This paper has attempted to identify the key factors that contribute tothe green supply chain management (GSCM) performance in Indian mining industries. The study presented here will help themining industries in identifying the areas in which they need to focus their attention inorder to improve GSCM performance.

**Keywords**
GSCM, Key Factors, Indian Mining Industries, Sustainability

## I. Introduction

Strategic, Tactical, and Operational (STOP) approaches are the key parameters for balancing the financial, social, and environmental performance towards sustainability development.The term 'green' has been used in literature as conjunction with various activities such as green design, green purchasing, green packaging and green supply chain management, those encompass concern for energy efficiency, environment, water conservation, use of recyclable products and renewable energy (Mudgal et al., 2010).The creeping in of the global meltdown five years ago decelerated the growth of almost all leading and developing industries worldwide. The mining industry was no exception and also had to bear the brunt of the global recession. Nevertheless, with passage of time, the availability of fine quality resources, increasing domestic demand and high economic growth has transferred the mining activities to emerging economies like ours. Today the scenario has reversed completely where developing nations like ours are holding the reigns in order to meet the growing global demand for minerals.

Mining is an important sector of the Indian economy. Production of almost 89 minerals is indigenous which includes fuel minerals, non-metallic minerals, atomic minerals and minor minerals. India is currently among the top ten mineral producers across the globe. Going by statistics, the Annual Report FY13 of the Ministry of Mines, Government of India, stated that India is the largest producer of sheet mica in the world. It ranks third internationally in production of coal and chromites, fourth in the production of iron ore, fifth in the production of manganese ore and sixth when it comes to production of bauxite. The metal and mining industry of India was approximated to be around 106.4 billion dollars in 2010. This contributes significantly to the Indian economy. The GDP contribution of the mining industry varies from 2.2-2.5% only but if we were to consider the GDP of the total industrial sector, it contributes around 10-11%. The mining industry is also a blessing in disguise as it has created job opportunities for more than seven lakh individuals.

However, the mining industry of India has a dark side to it as well. It has become a famous platform for environmental pollution and human rights violation. The nation already faces acute environmental issues and the mining industry is also to share blame for it(Botta et al., 2009). The Indian mining industry has given birth to numerous ecologically stressed regions which are in desperate need of pollution management and environmental impact assessment projects. There are several abandoned sites in the country which affect the environment in an adverse manner. Some of the potential impacts on our surroundings are erosion and sedimentation, fugitive dust emissions, habitat modification, surface and groundwater and cyanide and other chemical releases(Hilson and Nayee, 2002). The focus has always been on land degradation, deforestation, water logging, salinity, loss of biodiversity and air pollution to name a few.

Our nation has definitely become aware of the present environmental situation and its sensitiveness is clearly evident in the examples stated below:

- In a recent judgment passed by the Supreme Court, world's leading natural resources company, Vedanta's Niyamgiri mining future lies in the hands of the gram sabha as the court was sensitive enough to take into consideration the religious beliefs and social concerns.
- The Government of Orissa has extended help to Posco India to conduct immediate Environment Impact Assessment (EIA) and prepare an Environment Management Plan (EMP) and also take the approval of environmental bodies and forest clearances from the Union government.

Such incidents prove that inappropriate and illegal mining is being practiced in full swing and cannot be put to an end overnight. But it also shows that the government has become more alert than before and is taking appropriate action to curb such practices as much as possible.

We should have this embedded in our minds that nature has ample resources to fulfill our need but not our greed. Therefore, Sustainable Management comes to the rescue of the Indian Mining Industry and is the need of the hour.Sustainable management of the mining industry aims at providing an atmosphere within the various mining organizations such that they begin to value nature by efficiently collaborating economic, environmental and social considerations. Sustainable management provides a very holistic and logical approach in achieving these goals. Its focus is on the three basic management functions: corporate strategy, human resources and operation. Therefore STOP (Strategic, Tactical, and Operational) approaches are significant for green issues in Indian mining industries for betterment of financial, social, and environmental performance (Fig. 1)

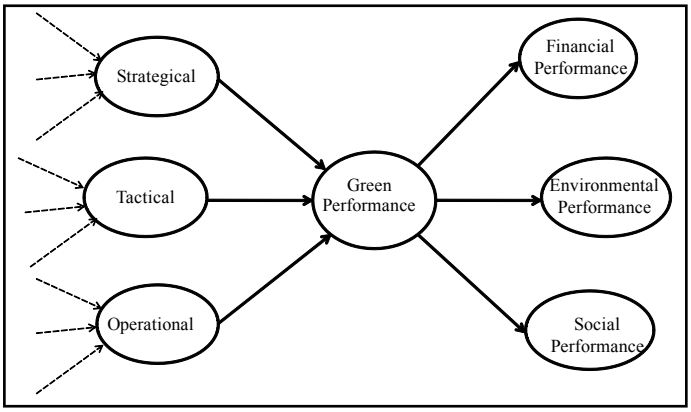


Fig. 1: Purpose of STOP Approach in sustainability development

### A. Future Research Direction

The kinds of problems a mining industry may encounter during green practices are many and complex in nature, involving not only the ability to use internal resources and processes but also to manage and measure the green capabilities successfully. Although green practices have been adopted that has driven productivity growth with social acceptance over the last decade by majority of the manufacturing industries, however no such attempt has been made to investigate the identifying factors that influence green practices in Indian mining industries in strategic, tactical, and operational levels.

On the basis of the research issues as identified and in consideration of priorities to be given, the following objectives should be set specially for green issues in mining industries in Indian scenario:

1. To identify factors of strategic, tactical, and operational levels (STOP) planning that governs green practices in Indian mining industries and to establish a relationship among the factors.
2. To develop a structural model of critical success factors and barriers in strategic, tactical, and operational levels for green practices in Indian mining industries.

The research framework will be adopted for achieving the objectives of the research work is shown in Figure 2. The research work will be organized in two stages.


Fig. 2: Details of Research Methodology

In the first stage, abroad survey will be carried out by conducting a questionnaire survey among a select group of mining industries in India, in order to study the status and factors affecting green practices. The aim will be to find the critical factors of green practices in Indian mining industries and establish the relationship among them. The generic framework of investigating into this aspect of the study is shown in fig. 3. In the second stage, critical success factors of R&D performance will be categorized and their interdependencies will be explored by using different models. Conduct the strategic analysis and measures for potential improvements.

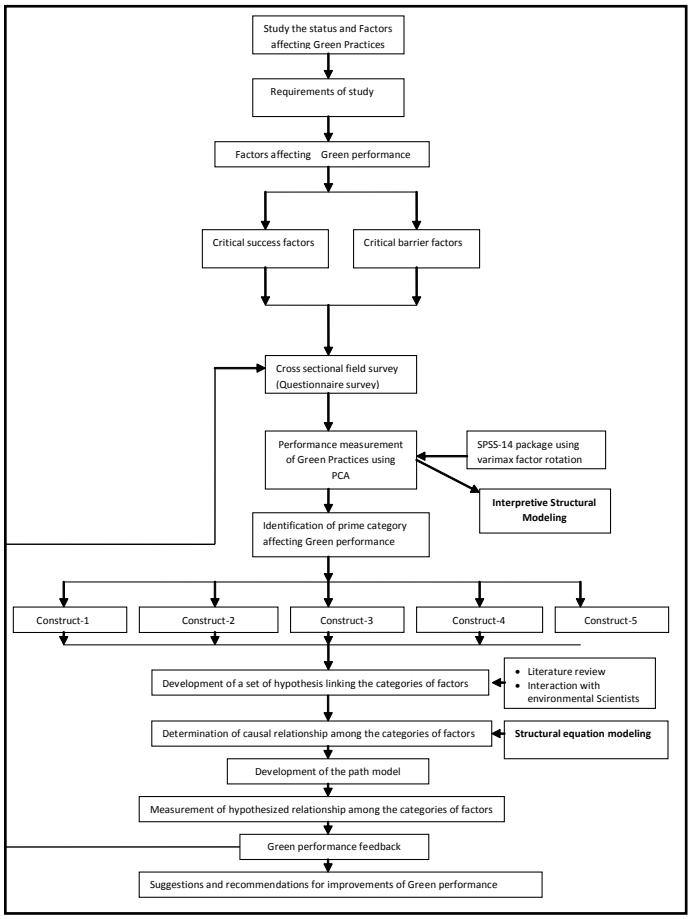


Fig. 3: Framework for STOP Approaches of Green Practices in Indian Mining Industries

### B. Expected Research Outcomes

The research will focus the key factors of STOP level decisions, which will influence the green practices in Indian mining industries. This study will identify broad categories of factors, establishing causal relationships among them and quantifying their effect on green practices in Indian mining industries. This study will also recognize various driving factors and develop a structure of interrelationship among the identified critical factors of STOP approach for the implementation of green practices in Indian mining industries. The research output will indicate the enabling factor, which will be held as key to achieve the green practices in Indian mining industries. The result of this research will assist the managers to take appropriate strategic, tactical, and operational decisions to incorporate environment friendly practices along with their traditional practices which will turn into critical success factors in companies' sustainable development today.

### C. Expected Impact and Possible Application

The strategic, tactical and operational managers of the Indian mining industries are unaware of various critical success factors along with the potential barriers. A systematic approach will be required for identifying them, and as these factors may have complex interrelations between them for analyzing green performance in Indian mining industries, it is essential that such an approach acts as an important tool to achieve organizational goals. The results may be used as a guideline for strategic, tactical and operational level, when they discover what kind of barriers are making their mining industries to be less eco-friendly. The mining industries will be able to eliminate those barriers and balance the financial, social and environmental components towards

sustainable development. Consequently, the STOP approaches may be suggested as key indicators of green issues in Indian mining industries, focusing on what impact the Indian mining industries' efficiency has on the environment.

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