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STUDY ON PRE-FEASIBILTY REPORT FOR STONE MINING PROJECT

Dissertation
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The Degree of Master of Science
In
Environmental Science

By

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2023

DECLARATION BY CANDIDATE

I hereby declare that the project work entitled **"STUDY ON PRE - FEASIBILITY REPORT FOR STONE MINING PROJECT "** is my own work conducted under the supervision of **Dr. Sadhana Chaurasia**, Department of Energy and Environment , Faculty of Science & Environment , Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya Chitrakoot Satna (M.P.)

I further declare that to the best of my knowledge, the dissertation does not contain any part of work which has been submitted for the award of any degree either to the university or to any other university / Deemed university.

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The work incorporated in this dissertation has not been submitted earlier, in part or in full, for the award of any other degree or diploma to this or any other institution or university.

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ABBREVIATION

CRZ	Coastal Regulation Zone Information System
EIA	Environmental impact assessment
EPA	Environmental Protection Agencies
ESIA	Environmental and Social Impact Assessment
HFL	High Frequency Laser
HP	Horse Power
ISR	Initial screening report
KLD	Kilo Liter Per Day
MSL	Mean Sea Level
PWR	Pressurized Water Reactor
QL	Quarry Lease
SEIAA	State Level Environmental Assessment Authority
TOR	Terms Of Reference

Chapter-1

INTRODUCTION

Environment

An Environment is everything that is around us, which includes both living and non-living things such as soil, water, animals and plants, which adapt themselves to their surroundings. It is nature's gift that helps in nourishing life on Earth. Ecology and Environmental science are the branches of life science, which mainly deal with the study of organisms and their interactions with other organisms and their environment.

Importance of Environment

Environment plays an important role in healthy living and the existence of life on planet earth. Earth is a home for different living species and we all are dependent on the environment for food, air, water, and other needs. Therefore, it is important for every individual to save and protect our environment.

Environmental Pollution

Environmental Pollution is not a new phenomenon, yet it remains one of the greatest threats to the health and well-being of humanity and one of the major environmental causes of death and morbidity. For example, substances such as plastic materials, heavy metals, etc., once released into the atmosphere. By natural processes, it cannot be degraded and are harmful to living organisms. In environmental pollution, pollutants originate from a source, are transported by air or water, and are dumped into the soil by human beings.

The long-term impacts of pollution are still being felt despite global attention to the issue. Day by day, our atmosphere is becoming more and more polluted due to anthropogenic activities. It is usually due to the pollutants released into the air, water, soil, etc., through many human activities.

Types of Environmental Pollution

Based on the part of the environment that is polluted, Pollution is of the following types:

1. Air Pollution
2. Water Pollution
3. Soil Pollution
4. Noise Pollution
5. Radioactive Pollution

EIA (Environmental Impact Assessment)

Environmental Impact Assessment (EIA) is the formal process used to predict the environmental consequences (positive or negative) of a plan, policy, program, or project prior to the decision to move forward with the proposed action. Formal impact assessments may be governed by rules of administrative procedure regarding public participation and documentation of decision making, and may be subject to judicial review. An impact assessment may propose measures to adjust impacts to acceptable levels or to investigate new technological solutions (Encyclopaedia, 2015). It is anticipatory, participatory, and systematic in nature and relies on multidisciplinary input (Glasson, The rival, & Chadwick, 1994).

EIA is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural, and human-health impacts, both beneficial and adverse. EIA is a tool used to assess the positive and negative environmental, economic, and social impacts of a project. This is used to predict the environmental impacts of a project in the pre-planning stage itself so that decisions can be taken to reduce the adverse impacts.

Scope of EIA

Environmental

Figure: 1 Scope of EIA

The main goal of EIA is to conserve the environment and bring out the best combination of economic and environmental costs and benefits.

Benefits of EIA

- EIA links environment with development for environmentally safe and sustainable development.
- EIA provides a cost effective method to eliminate or minimize the adverse impact of developmental projects.

- EIA enables the decision makers to analyse the effect of developmental activities on the environment well before the developmental project is implemented.
- EIA encourages the adaptation of mitigation strategies in the developmental plan.
- EIA makes sure that the developmental plan is environmentally sound and within limits of the capacity of assimilation and regeneration of the ecosystem.
- Some general benefits of an EIA include cost saving and reduced time of project implementation and adhering of legal regulations. EIA is economically feasible because it takes relatively minimal time compared to other environment assessment techniques which might not be precise and might not be advantageous to the organization. Another benefit of EIA is that it if it is followed according to the methods involved, it can be used to protect the forestry, trees, water, waste, agriculture, recreational and cleanliness of cities. These are very important benefits for positive and vibrant city planning. There will also be increased communal activity and knowledge about the resources that are involved during the assessment of the EIA. For important environmental concerns such as climate change, the society and community can largely be involved in assessing the methods used to combat such challenges.

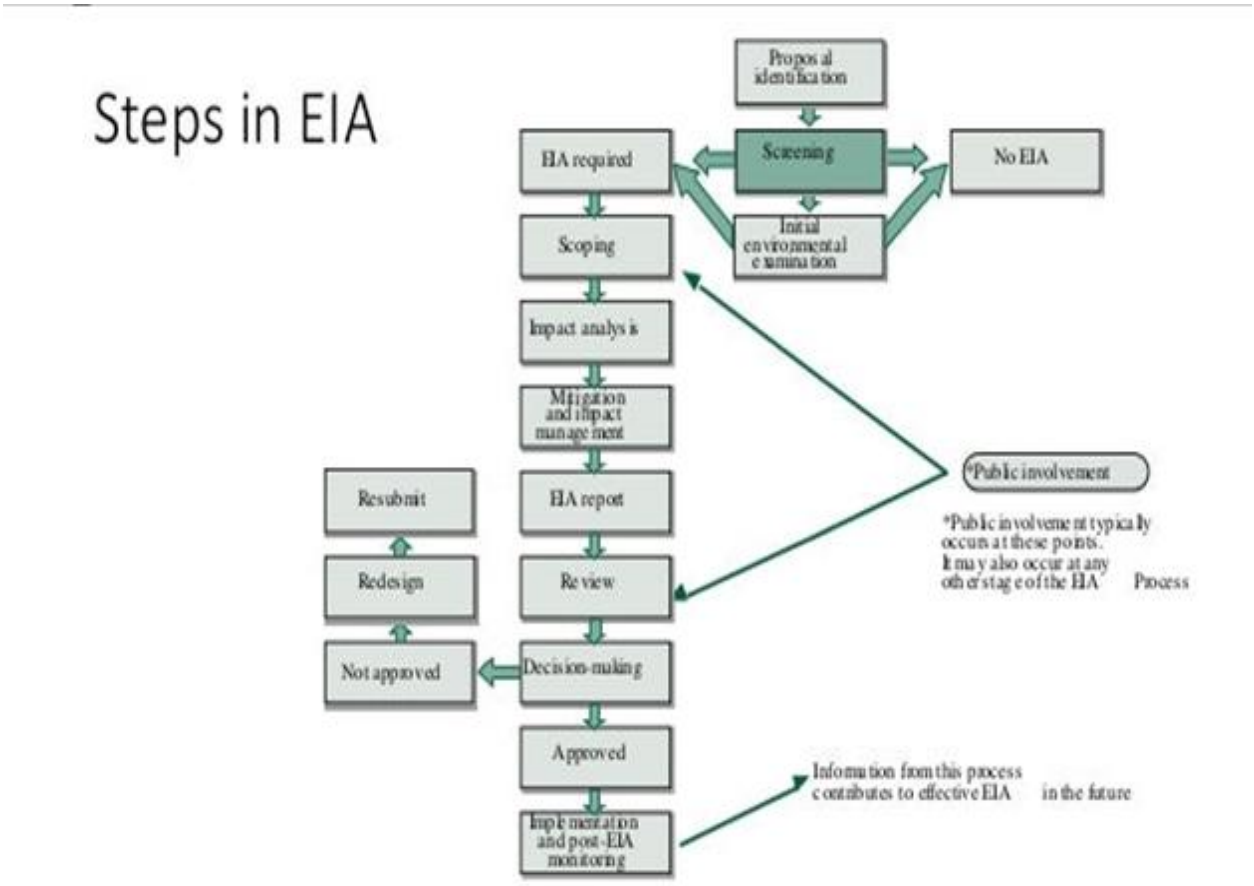


Figure 2: Generalized process Flow chart in EIA

Pre-feasibility report

Preliminary feasibility studies or pre-feasibility studies are increasing worldwide due to the trend in research and development that various companies, institutions, and government agencies in many countries are conducting as they generate new strategies and technologies for competitive growth. Project managers and developers work on a pre-feasibility study to investigate the key function of a proposed project. What are the different areas of a feasibility study, the basic elements of a pre-feasibility report, and the fundamental steps in preparing for a well-structured pre-feasibility report?

A pre-feasibility report is a clear and detailed report that outlines the preliminary evaluation or initial assessment conducted on a proposed project to determine if the research and development activities and tasks meet the application requirement in the first stage. Project managers, consultants, supervisors, and evaluators undertake a pre-feasibility study to review the major aspects of the proposed project and select the best option to address a specific issue. They prepare a Product Feasibility Report on the preliminary project analysis to demonstrate its advantages and viability and guide them in a proper and reasonable decision-making process on whether to proceed with the proposed project plan or not. The Pre-Feasibility Report is sometimes called an Initial Screening Report (ISR).

Basic Elements of Pre-Feasibility Report –

Conducting pre-feasibility studies is a vital method involved in the business and strategic planning processes of many companies and organizations. Project managers, product designers, and system developers examine the viability, of the proposed project by observing various options to narrow down potential ideas.

Basic Information/Introduction: Indicate the name of the department or team assigned to work on the proposed project. Write the title and acronym of the project. Describe the departmental and agency priority. Add the approval signatures of the executive project management approval team.

Project Summary: Create a clear and engaging executive summary of the proposed project as you describe the purpose, goals, objectives, and vision. Include the contact information of the project manager and other key professionals of the project. Explain the relevance of the project to the state and departmental plans. Construct a simple project schedule and budget information to execute the project plan. Also, include the project budget information of the vendor, details of the quality risk assessment, and the project profile.

Business Case Information: Describe the background of the business or program. Specify the problem or opportunity of the proposed project as you identify the main objectives and functional requirements.

Baseline Analysis: Clarify the existing method used while performing a pre-feasibility study. Explain the technical environment that exists and the current infrastructure.

Proposed Solution: Add a clear description of the solution for the issues that the proposed project will resolve. Create a rationale for the initial assessment and selection process. Elaborate on other alternatives that are considered.

In order to assess the success factor of a proposed project, it is integral to work on a pre-feasibility study and structure a well-detailed pre-feasibility report. This document provides basic information on the key components of a proposed project which includes economic, environmental, financial, and legal considerations, and a comprehensive analysis and evaluation of the merits and viability of the proposed project. If you need to determine the effectiveness of your proposed project, conduct a pre-feasibility study and make an informative pre-feasibility report.

Stone

A stone is a piece of rock. It is a mass of hard, compacted mineral. The word is often used to mean a small piece of rock. Stone can be used to build things, such as in this dry stone wall the word "stone" also refers to natural rock as a material, especially a building material. Natural stones used as building material include granite, marble and sandstone. Manufactured, artificial products, such as concrete or clay bricks, are not stone. Stone takes a while to heat up, and stays hot for a while. It does not conduct electricity well Stone was one of the first materials used to make tools and buildings. It is a very sturdy material. It is less affected by weather than wood or brick. Depending on the type of rock, stone weathers away much more slowly. A stone in the river is reshaped by the water and sediment flowing around it. Stones can be used as primitive weapons. A person can throw it at an enemy or animal, or use it to cause more damage in hand-to-hand combat.

Mining

Mining is the extraction of valuable minerals or geological materials from the earth, usually from an ore body, vein or coal seam. Materials recovered by mining include bauxite, coal, copper, gold, silver, diamonds, iron, precious metals, lead, limestone, magnetite, nickel, phosphate, oil, shale, rock salt, tin, uranium and molybdenum.

Minerals are indispensable components of the national economy of any country. India is endowed with significant mineral resources. More than 0.8 million hectares of land is under mining – a substantial portion of which lies in forest areas. There are about 20000 known mineral deposits in India and as many as 89 minerals (4 fuel, 11 metallic, 52 non – metallic and 22 minor minerals) are produced worth Rs. 73944.59 crore. (Annual Report 2004 – 05, Ministry of mines). There are about 3000 working mines in the country (excluding crude petroleum, natural gas, atomic and minor minerals) including 350 opencast mechanized mines of which two thirds belong to limestone and iron ore. There is a progressive increase in average size of mine due to adoption of heavy earth moving machinery with increased production of overburden thus aggravating the existing environmental challenges. Opencast mining operation result in dumping of huge volume of overburden on unminds land in addition to pit – scarred landscape. This overburden originates from the consolidated and unconsolidated materials overlying the minerals and coal seams, and is required to be removed. One of the major environmental challenges is

to manage the huge volume of overburden generated in these opencast mines which is associated with the problems of aesthetics, visual impacts and landslides, loss of top soil, soil erosion, safety, risk and health etc. In addition, open cast mines makes a marked change in the land use and the challenge lies in developing suitable post – mining land.

Impacts of Stone mining –

I. Visual impacts

Among the potential negative impacts of Stone mining, the visual impacts of opencast Stone mining (over burden dumping, etc.) deserve special attention. Visual impacts include aesthetic & scenic and landscape aspects. Visual and land use compatibility of rehabilitated mined land is the single most important consideration in designing a combination of landforms and revegetation processes. While there can be occasions where a change to a completely different land use is beneficial, for example from previous agriculture to industrial real estate. Generally speaking, the significance of the change is linked to the topography of the area and to the type of landscape and vegetation. The significance of the visual impacts depends on the distance. The weather conditions and the height of the view point.

In any case visual impact is not easily discussed in absolute terms. Whether or not an over burden dump is unpleasant to the eye besides the subjective dimension of the question is very much a matter of integration into the surrounding environment (Jain, 2003). Physical screening, screen planting, landscaping and the use of existing features contribute to local surroundings. Clearly, it is difficult to measure visual impacts quantitatively through standards and regulations. It is generally agreed, that the value placed on a certain type of landscape is a subjective issue and in some cases, for example, authorities have refused permits for landscape reasons, when in fact, there is no opposition from local residents.

II. Erosion and sediment

Degradation due to erosion starts right from the source viz., rain splash on overburden dumps induce erosion which goes on increasing in the form of sheet, reel and gully erosion. Gully erosion affects the aesthetic quality of the site as well as stability of the dumps. Nutrient value of the dumps goes down which might be helpful in revegetation of the dump top and dump slopes. Along with these the material is also lost from the dumps. Because of the large area of land disturbed by mining operations and the large quantities of earthen materials exposed at sites, erosion can be a major concern at hard-rock mining sites. Consequently, erosion control must be considered from the beginning of operations through completion of reclamation. Erosion may cause significant loading of sediments (and any entrained chemical pollutants) to nearby water-bodies, especially during severe storm events and high snowmelt periods.

Sediment-laden surface runoff typically originates as sheet flow and collects in rills, natural channels or gullies, or artificial conveyances. The ultimate deposition of the sediment may occur in surface waters or it may be deposited within the flood plains of a stream valley. Historically, erosion and sedimentation processes have caused the build-up of thick layers of mineral fines and sediment within regional flood plains and the alteration of aquatic habitat and the loss of storage capacity within surface waters (Brave,

2011). The main factors influencing erosion includes the volume and velocity of runoff from precipitation events, the rate of precipitation infiltration downward through the soil, the amount of vegetative cover, the slope length or the distance from the point of origin of overland flow to the point where deposition begins, and operational erosion control structures. Major sources of erosion/sediment loading at mining sites can include open pit areas, heap and dump leaches, waste rock and overburden piles, tailings piles and dams, haul roads and access roads, ore stockpiles, vehicle and equipment maintenance areas, exploration areas, and reclamation areas.

III. Impacts on water quality

a. Surface Water

One of the problems that can be associated with mining operations is the release of pollutants to surface waters. Many activities and sources associated with a dumpsite can contribute toxic and non-toxic materials to surface waters. The mobility of the pollutants from these sources is magnified by exposure to rainfall and snowfall. The eventual discharge of surface runoff, produced from rainfall and snow melt, is one mechanism by which pollutants are released into surface waters. Impacts to surface waters include the build-up of sediments that may be contaminated with heavy metals or other toxic products, short and long-term reductions 3 in pH levels (particularly for lakes and reservoirs), destruction or degradation of aquatic habitat, and contamination of drinking water supplies and other human health issues.

b. Ground Water

Stone Mining operations can affect ground water quality in several ways. The most obvious occurs in mining below the water table, either in underground workings or open pits. This provides a direct conduit to aquifers. Ground water quality is also affected when waters (natural or process waters or wastewater) infiltrate through surface materials (including overlying overburden waste or other material) into ground water (Thakur, 2013). Contamination can also occur when there is a hydraulic connection between surface and ground water. Any of these can cause elevated pollutant levels in ground water. Further, disturbance in the ground water flow regime may affect the quantities of water available for other local uses. Finally, the ground water may recharge surface water down-gradient of the mine, through contributions to base flow in a stream channel or springs. Dumping of overburden should be avoided from mines in valleys or depressed tracts on the side of mined area that constitute the basic source of water supply either from surface or groundwater bodies (Noriega, 1988). In Jamarkatra phosphorus mines, this impact is reflected as the major waste dumps made in the southern valley that contains the shallow groundwater and surface water for providing water supplies.

IV. Impacts on air quality

Air erosion on the dump is very low compared to water erosion but it also degrades the air environment of the mine leasehold area as well as outside the boundary (Noriega, 1988). During the course of 4 water erosion, material gets loosened and makes it susceptible to

air erosion. The primary air pollutant of concern at mining sites is particulate matter. US/EPA has established National Ambient Air Quality Standards for particulate matter with a diameter of less than 10 microns. Operation of heavy earth moving machinery in the overburden dumps generate huge amount of dust and the high wind velocity moves the dust particle to the nearby residential areas which creates a lot of problems.

- The generation of dust particles can be controlled with the help of following methods: Water sprays can be used for control.
- The slope of the haul road in the dump should be optimized for the smooth movement of the dumper and that reduces the dust generation.
- Height of the waste rock dumping should be minimized to reduce the dust generation by wind erosion.
- The dumps should be, wherever feasible, made in such a manner that the impact of predominant wind direction is minimum.
- Wind also entrains dust from overburden dumps and spoil piles (either dry as disposed or the dry portions of impoundments), and other disturbed areas. Sprays from water trucks are often used when the mine is operating.
- During temporary closures, particularly after the active life, stabilization and reclamation should be aimed in part at reducing fugitive dust emissions. Rock and/or topsoil covers, possibly with vegetative covers, can be effective controls.

V. Noise pollution

The heavy earth moving machinery operations in the overburden handling leads to an increase in the noise levels in the nearby residential areas also. However, at the planning stage the proper selection of the dumpsite can eliminate noise impacts to the residents. During the operation stage the noise level in the overburden dump sites can be minimized by the following methods:

- Minimize the haul road gradient in the dump as far as possible. Since the noise level of the dumper depends upon the power required by the engine. Lower the gradient of the haul road, lower the power needed and hence the noise level can be minimized to some extent.
- Reduce the overburden material falling during the dumping operation.

VI. Ecological disruption/ impact

Opencast Stone mining activities cause severe changes to the landscape. Overburden dumps are man-made habitat causing multifarious environmental problems ranging from erosion and enhancing sediment load in receiving water bodies, dust pollution, damage to visual & aesthetics, fragmentation of habitat and overall disturbance of ecosystem in the entire area. The magnitude of ecological impacts depends upon existing ecological setting of the area where mining activities are taking place. Sediments deposited in layers in flood plains or terrestrial ecosystems can produce many impacts associated with surface waters, ground water, and terrestrial ecosystems. Minerals associated with deposited sediments may depress the pH of surface runoff thereby mobilizing heavy metals that can infiltrate into the surrounding subsoil or can be carried away to nearby surface waters.

The associated impacts could include substantial pH depression or metals loading to surface waters and/or persistent contamination of ground water sources. Contaminated sediments may also lower the pH of soils to the extent that vegetation and suitable habitat are lost.

VII. Effect on aquatic life

The nallas ultimately terminate into river or reservoir. There the water pollution is caused due to increase in total solids, other minerals and leachates from the dumps. This results in reduction of dissolved oxygen of water. This in turn affects the aquatic life. Discoloration of water is another facet of pollution from aesthetic point of view. The types of impacts associated with erosion and sedimentation are numerous, typically producing both short-term and long-term impacts. In surface waters, elevated concentrations of particulate matter in the water column can produce both chronic and acute toxic effects in fish and other aquatic life.

Objective of the study

- To learn howto prepare pre-feasibility report.
- To collect base line data in study area regarding environmental aspects.
- To suggest environmental management plan
- To identify potential challenges or risk.

Chapter - 2

REVIEW OF LITERATURE

Shah, (2019) observed that making policy decision on size and nature of an international airport and its facilities, alternative locations avoiding ecologically sensitive area, and source of funding. It proposed to conduct a comprehensive Environmental and Social Impact Assessment (ESIA) complying with national and international environmental and social safeguards, before making any decision to fell trees.

Jayasugiththan, et. al.,(2018) reported that Sri Lanka had paid a close attention on nuclear energy with the intention of adopting a nuclear power plant to county in the distance future. Concerning the reactor safety goals, previous operational experiences and reliability VVER-1000 and AP-1000 that based on PWR technology could be recommended as suitable reactor models for Sri Lanka. We identified some favorable locations in North-west and South-east regions of the country which could be used for nuclear power plant establishment. In terms of nuclear safety, nuclear security, radiation protection and human resources Sri Lanka had yet to launch several initiatives with the intension of achieving the adequate levels of international standards. None the less further studies must be launched focusing on the issues related to nuclear waste disposal, nuclear technology, nuclear safety, security, radiation protection and human resources to arrive at a prudent decision.

Haq, (2016) reported that Mining in a wider sense comprises extraction of any non-renewable resource e.g. petroleum, natural gas. Mineral resources are vital for the economic growth and development of the country. Opencast mining operations to result the minerals like limestone, bauxite, iron, chromite, copper- ores and coal are getting more emphasis because of obvious reasons but are associated with various environmental concerns. One of the major environmental challenges is to handle and manage the huge volumes of overburden generated in the opencast mines.

Hong, (2021) suggested to improve the economy, a mining subsystem based on mechanical lifting and small-scale collectors is proposed and the preliminary economic feasibility is examined in this study. The benefit was at a favorable level compared with that using hydraulic lifting with bulk-scale collector. From the viewpoint of environmental impact assessment, environmental considerations of deep-sea sediment plume are explained.

Khobragade, (2020) reviewed that mineral is very important for any country to progress and their economic wealth therefore many mines developed, open and underground both but on another hand it is affected our environment directly and indirectly both. Due to adaptation of heavy machinery with increased production of overburden thus provocative the existing environmental challenges. The environmental problems increases due to mining activities such as Land degradation ,loss of forest and biodiversity ,Soil contamination, Air pollution, Surface and ground water pollution, noise pollution. For

decreasing the problem Stakeholders and Government should aware about the Rules and Regulation which comes under "The Environmental Protection Act, 1986". Management of a country's mineral resources must be closely associated with overall economic development, environmental protection & preservation strategies. Most countries throughout the world require some form of environmental impact assessment (EIA) of major mining projects expected to have significant impact on the quality of the human environment, before such projects can be approved and undertaken.

Ruffies (2012) this paper reviews the Ethiopian Environmental Policy with focus on the institutional set-up and implemented Environmental Impact Assessment (EIA) procedures. The evaluation of EIA is done against a set of evaluation criteria. Specific legal provision for EIA application is well documented and the Environmental Protection Authority exists as the legal body. A chronological evaluation of the establishment of the environmental policy reveals that this process was more a result of donor requirements than of political will. Inconsistency on institutional level, non-existence of complementarities between institutions, and of environmental and investment policy and proclamations, contradict the enforcement of the EIA law. Furthermore lack of multidisciplinary experts, missing environmental baseline data, and lack of monitoring and post-auditing adversely affect the effectiveness of the EIA law. The paper concludes that, besides other important measures, the Ethiopian EIA law needs to be adapted.

Brent & Petrick, (2012) studied that environmental impact assessments (EIAs) were usually required for all projects in the raw materials processing industry of the South African energy sector; they range in comprehensiveness from screening or abridged to full EIAs. Technical projects are typically on extremely tight schedules and project managers were tasked to properly align project lifecycles with the EIA process. Possible solutions were discussed and a stage-gate model was subsequently proposed, whereby the proper alignment of the South African EIA process and a typical project lifecycle was ensured for the energy sector.

Arun, (2013) observed that EIA is among the well-known policy innovations of the 20th century and is currently practiced in more than 100 countries of the world, but its form varies globally due to different economic, social, political and environmental circumstances. Governmental priorities and environmental awareness levels often decide the efficiency of EIA process in a country. This has negatively affected and weakened the EIA process in many developing countries. In India the EIA process is in existence since 1994. There were serious lacunae in the legislation and implementation of EIA in the country. Improving the legislation and adopting better methodologies and institutional mechanisms are suggested to improve the scenario.

Balasubramanian, (2016) reported that Mining was the extraction of economically valuable minerals or other geological materials from the earth surface. It might be from an ore body, lode, vein, seam, and reef or placer deposits. Since the beginning of civilization, people had used stone, ceramics and, later, metals found close to the Earth's surface. Minerals are the major sources of energy as well as raw materials for industries. Earth's

natural materials were used as fertilizers and for the production of metals like steel. These were used to make early tools and weapons. This report provided the details of the widely adopted methods of mining, both surface and underground and to have an overview of all the operations that were made to explore the economic mineral resources.

Yadav, (2018) reported that Environmental Impact Assessment (EIA) process is an interdisciplinary and multistep procedure to ensure that environmental considerations are included in decisions regarding projects that may impact the environment. It contains a brief overview of international law providing for Environmental Impact Assessment. It presents a critical study of laws and governmental policies relating to Environmental Impact Assessment in India.

Chowdhury, (2014) reviewed that two decades of significant case law developments in the environmental impact assessment process in India. EIA was first introduced as a regulatory requirement in 1994. EIA reflects the constant struggle to balance economic development has developed a rich jurisprudence thereby considerably deepening and widening the EIA process.

Anshu, (2019) studied that data mining was the process of extracting hidden and useful patterns and information from data. Data mining was a new technology that helped businesses to predict future trends and behaviors, allowing them to make proactive, knowledge driven decisions. The aim of this paper was to show the process of data mining and how it could help decision makers to make better decisions. Practically, data mining is really useful for any organization which has huge amount of data. Data mining helped regular databases to perform faster. They also helped to increase the profit, because of the correct decisions made with the help of data mining.

Jain & Watve, (2019) observed that the main aim of the case study was to integrate vulnerability concepts in assessment of socio-ecological, cultural and livelihood parameters in the Environmental Impact Assessment done as a feasibility study for large-scale projects. Sustainable livelihood framework was re-interpreted through the study to assess livelihood vulnerabilities by development of an ordinal scale. The study concludes incremental change in vulnerability from 2016 to 2017 through field assessments using qualitative methods of research in a politically sensitive time period and location of Mopa Greenfield International Airport site in Barazan plateau of Northern Western Ghats, India.

Razif, (2016) reported that Environmental Impact Assessment study on Krian - Legundi-Bunder, East Java, was created in 2014 and it had the feasibility and environmental permit. From the EIA study, one of the negative impact from the operational stage was explored from the emission from vehicles, which they use this toll road. This research was aimed to study in more detail on the prediction of CO, CO_2, CH_4 and N_2O emission by using the traffic prediction data, which was performed in the feasibility process. The prediction produced the passenger car unit (PCU)/day.

Rathoure, (2021), studied that the Ministry of Environment and Forests vide number S.O. 1533 (E) dated the 14th September, 2006 (hereafter EIA Notification, 2006), the Central Government imposed certain conditions and thresholds on the undertaking of some projects or expansion or modernization of such existing projects entailing capacity addition, in any part of India listed in Schedule to the EIA Notification, 2006 unless Prior Environment Clearance had been accorded by the Ministry or the State Level Environment Impact Assessment Authority or District Level Environment Impact Assessment Authority, as the case may be, in accordance with the procedure specified in the EIA Notification, 2006 and subsequent amendments.

Meena (2019)observed that mining was viewed as one of the important economic activities which had the potential of contributing to the development of economies. At the same time, the environmental and health impacts of mining on surrounding communities had been a major concern to governments. All of these processes produce huge amount of mining dust. A high percentage of silica presence in mining dust and the particle size distribution further suggest that the occupational environment of the workers and surrounding areas might be hazardous to human health. A high volume air sampler was used for sampling of RSPM (PM10) from various locations and the Questionnaire health survey conducted on 50 quarry workers at the mining area, which results indicated that the observed dust may be harmful to respiratory system and health.

Sati (2014) reported that this paper examined the socio-economic and environmental impacts of stone mining in Shivpuri district. A large number of people were dependent on stone mining activities for carrying their livelihoods as stone mining was one of the most economic activities after agricultural practices in Shivpuri district. This study also attempted to penetrate the exclusive solutions that supported both mining activities for carrying livelihoods and environmental restoration through large-scale plantation campaign. It revealed that if appropriate measures were taken place, mining practices and environmental restoration could go parallel. This study was conducted through collection of data from the primary sources.

Chapter-3

METHODOLOGY

The contents of the pre-feasibility report though are generally understood; however, in order to ensure that the contents of pre-feasibility reports are comprehensive enough and provide necessary information required for scoping the project, following guidelines are provided. The pre-feasibility report should invariably provide a broad outline of the following aspects; however, should details of same of the aspects listed hereunder are not available, projects proponents should clearly indicate so and provide an indicative/representative information on such aspects. While the pre-feasibility report should be brief, the minimum information required for scoping and prescribing TORs should be made available there in.

Requirement for PFR-

1. Background information

- Identification of project and project proponent. In case of mining project, a copy of mining lease / letter of intent should be given.
- Brief description of nature of the project.
- Need for the project and its importance to the country and or region.
- Demand – supply gap.
- Imports vs. Indigenous production.
- Export possibility.
- Domestic / export Markets.
- Employment Generation (Direct and Indirect) due to the project.

2. Project Description

- Type of project including interlinked and interdependent projects
- Location (map showing general location, specific location, and project boundary & project site layout) with coordinates.
- Details of alternate sites considered and the basis of selecting the proposed site, particularly the environmental consideration gone into should be highlighted.
- Size or magnitude of operation.
- Project description with process details (a schematic diagram / flow chart showing the project layout, components of the project etc.)
- Raw material required along with estimated quantity, likely source, marketing area of final products, mode of transport of raw material and finished product.
- Resource optimization / recycling and reuse envisaged in the project, if any, should be briefly outlined.
- Availability of water its source, Energy / power requirement and source should be given.

- Quantity of wastes to be generated (liquid and solid) and scheme for their management / disposal.
- Schematic representation of the feasibility drawing which give information of EIA purpose**.**

3. Site Analysis

- Connectivity
- Land form, Land use and Land ownership.
- Topography (along with map).
- Existing land use pattern (agriculture, non- agriculture, forest, water bodies (including area under CRZ), shortest distances from the periphery of the project to periphery of the forests, national park, wild life , sanctuary, eco sensitive areas, water bodies (distance from the HFL of the river), CRZ. In case of notified industrial area, a copy of the Gazette notification should be given.
- Existing Infrastructure.
- Soil classification.
- Climatic data from secondary sources.
- Social Infrastructure available.

4. Planning Brief

- Planning concept (Type of industries, facilities, transportation etc.) Town and country Planning / Development authority classification.
- Population projection.
- Land use planning (Breakup along with greenbelt etc.)
- Assessment of Infrastructure Demand (Physical & social).
- Amenities / Facilities.

5. Proposed Infrastructure

- Industrial Area (Processing Area).
- Residential Area (Non Processing Area).
- Green Belt.
- Social Infrastructure.
- Connectivity (Traffic and Transportation Road/ Rail/Metro/Water ways etc.)
- Drinking Water Management (Source & Supply of water)
- Sewerage System.
- Industrial Waste Management.
- Solid Waste Management.
- Power Requirement & Supply / source.

6. Rehabilitation and Resettlement Plan

- Policy to be adopted (Central/State) in respect of the project affected persons including home oustees, land oustees and landless laborers (a brief outline to be given).

7. Project Schedule & Cost Estimates

- Likely date of start of construction and likely date of completion (Time schedule for the project to be given).
- Estimated project cost along with analysis in terms of economic viability of the project.

8. Analysis of proposal (Final Recommendation)

- Financial and social benefits with special emphasis on the benefit to the local people including tribal population, if any, in the area.

Chapter-4

RESULT & DISCUSSION

1. Background information

The proposed Stone Quarry project of Shri Kapil S/o Shri jay Shankar of covers an area of 1.998 hectares located in Village - Rojana, Tehsil-Jaora, and District - Ratlam, Madhya Pradesh.

- **Identification of project:**

Name	Rojana Stone Quarry
Location	Near Village –Rojana, Tehsil - Jaora Dist.–Ratlam(M.P.)
Proposed Production	7600 m^3/year Stone
Applied Area	1.998 hectares

- **Identification project proponent:**

Name	Shri Kapil S/o Shri Jay Shankar Patel
Address	Village - Rojana, Tehsil -Jaora District - Ratlam(M.P.)
Designation	Owner

- **Brief description of nature of the project:**

Mining of stone is proposed in the lease area of 1.998 hectares at Village - Rojana, Tehsil – Jaora, District – Ratlam (MP). Quarry Lease area is a non – forest Private land and lease has been granted for the period is for 10 years.

Mining will be carried out by Semi-mechanized opencast method.

The total mineable reserve of stone estimated to be 1, 37,750 m3 and maximum annual production Capacity is 7,600 m3/year Stone. Geological Reserve of the area is 2, 99,700Cu.mt. and the total mineable reserve of stone available estimated to be1, 37,750 Cu.mt. Proposed production of Stone estimated to be7,600 Cu.mt/year. As per The Gazette of India, Department of MoEF & CC dated 15/01/2016 and SEIAA O.M. No. 12576, Date 24/03/2016the project falls under B1 Category and Environmental Clearance is required from SEIAA.

- **Need for the project and its importance to the country and or region:**

The basic objective of the project is to effective utilization of material in the region. Crushed stone is one of the most accessible natural resources, and is a major basic raw material used in construction, agriculture, and other industries and will be sold to nearby markets to cater the demand of local population. The proposed Stone Quarry will also marginally benefit the local people by way of direct and indirect employment. State Government will also be benefitted by the mining through royalty.

- **Demand – Supply gap:**

Considering sufficient availability of the mineral in the area, it is essential to have Stone mine to sustain the supply of mineral for various purposes verses demand. The Stone is partly used in road filling and foundation. Therefore, partial demand of the required material used in such industries can be accomplished from this mine.

- **Imports v/s Indigenous production:**

This is indigenous production. No import has been proposed for the Stone as state as well as country has enough reserve.

- **Export Possibility:**

Export possibility is neither conceivable nor there is any such demand currently.

- **Domestic / Export Markets:**

The stone is of good grade and have regular demand in nearby industries associated with construction material suppliers.

- **Employment Generation (Direct and Indirect) due to the project:**

The mine will provide direct and indirect employment. As the mining will be performed Semi mechanized, the total number of persons engaged in the mining operation will be ~15 persons including skilled and unskilled and will be deployed from nearby villages.

2. PROJECT DESCRIPTION

- **Type of project including interlinked and interdependent projects:**

The mining of stone is carried out by open-cast Semi-mechanized method with controlled drilling and blasting using sand bags. The extracted stone boulder will be resized and transported to crusher unit for further crushing for resizing the stone. This is an independent project and not proposed to be linked to any other project.

- **Location:**

State	Madhya Pradesh
District	Ratlam
Tehsil	Jaora
Village	Rojana
Khasra No.	17/1

- **Satellite Image of the mining area:**

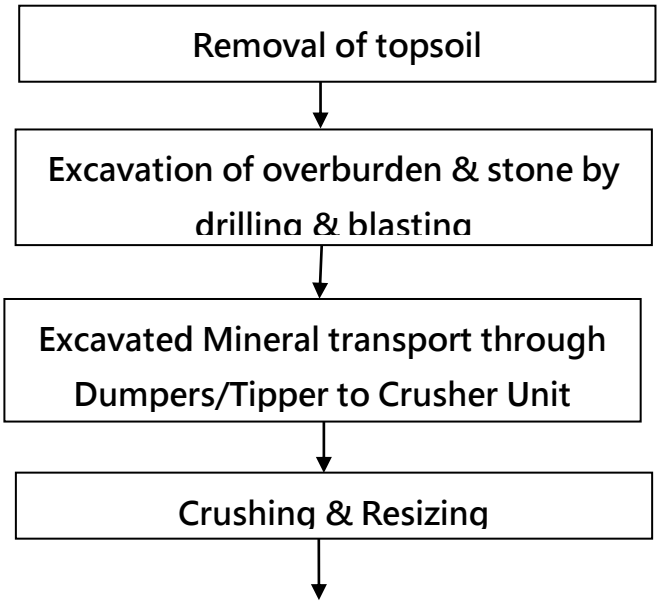
Location map showing project boundary and surrounding land use is given below:

Fig.-1 Satellite image

- **Details of Alternate Site Considered and the Basis of Selecting the Proposed Site**

Mining is site specific project hence no alternate site is considered.

(i) Project process detail:



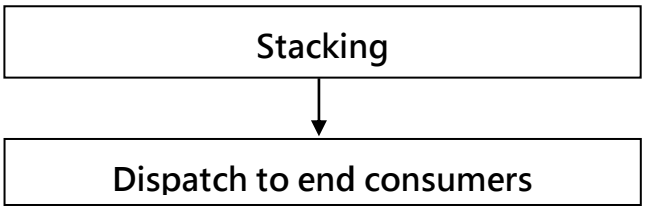


Fig-2.Process flow chart of mining

Mining Method & required Machineries -

Mining/excavation will be undertaken according to the proposed Manual & Semi Mechanized methods. Equipment & Machineries like Wagon Drill, Hydraulic Excavator, Loader, Jack Hammer, Rock Breaker, Water Tank, Dumpers and Tractors etc. will be required to deploy on hire & owned basis for mining works.

All mining operations will be undertaken by Semi-Mechanized Method by deploying machineries

Table-1 Required Machine

Machinery	Size/Capacity	HP
300 Loader	Capacity front bucket 200 kg	175
Dumper	10 m^3	150
Water tanker	3.5 KLD	20
Water Pump	0.5 inch	05
Air Compressor	7.5 hp	7.5
Drilling machine / jackhammer	34mm	11

- **Availability of water its source, energy/power requirement and source**:

The total water requirement for the project estimated to be 3.5 KLD for mining, spraying, greenbelt development and domestic uses and will be sourced from the nearby available water source and accumulated rain water in mined out pits. The Quarry activities are envisaged to be carried out only during day time by semi-mechanized method.

- **Table of Water Requirement**

Table-2 Water Requirement

S. No.	Head	Basis	Quantity
1.	Drinking & Domestic Purpose	For Mining Workers: 15X 40 LPD =600 LPD/~0.6KLD For Visitors: 4 X 15 LPD=60 LPD/0.06 KLD Total –0.6 +0.06= 0.66 KLD = ~0.7 KLD Note: average proposed visitors (4) Guidelines/NBC2016	0.7KLD
2.	Dust suppression	Approach Road = 200 m X 5.5m (excluding shoulders) = 1,100 m^2. water required for sprinkling in approach road = 1.0 L/m^2X 1,100 m^2= 1,100LPD/1.1KLD = ~1.1KLD	1.1KLD
3.	Green belt development	Water requirement 0.70 LPD/plant, For 2400plant 2400X 0.70 = 1.68KLD= 1.7KLD	1.7
	Total		3.5 KLD

- **Quantity of wastes generated (Liquid and solid) and their management/disposal**

a) Liquid Effluent

No effluent will be generated from the mining operation. Small quantity of sewage generated from the domestic use which will be treated and disposed in soak pit.

b) Solid Waste

Soil- During the proposal period no soil will be generated within the mine lease area.

Overburden- During the proposal period approx. 1,600m^3overburden generated which will be used for making ramp, repairing and maintenance of road in every few months and rest will be used for back filling.

Waste- During the proposal mining about 2000 m3 mine waste (5 %) is likely to be generated in 5 year period will be used for the repairing of the approach road at regular basis. Approximately 5% waste likely to be generated during mining.

3. SITE ANALYSIS

- **Connectivity:**

The proposed mine area is connected by road to the nearest village Rojana, located about 1.8 km South-East. The districts headquarter Ratlam city is about 39.91kmNorth-West from this village and is well connected by road. The nearest Railway Station Jaora Railway Station located about 6.8Km South-West from mine site. Indore is the closest airport located about 126 km West from mine site. It's Plain land.

- **Land use & land ownership**

The lease area is plain undulated barren/waste land. The proposed mine area is private land.

- **Topography:**

The topography of the land of QL. is almost plain land, with slope towards the East side of the area. The average elevation is 496m above MSL. The quarry lease area is a barren non forest land of Madhya Pradesh Private land covered with mainly Basalt rock.

Topographically the lease area is andulatory. The drainage is controlled by small gullies are joining the seasonal nallas. The drainage pattern is dendritic.

- **Soil Classification:**

No soil present at the mine lease area.The district is covered by medium black soils which are rich in lime and lime nodules.

- **Social Infrastructure:**

The nearest village is Rojana, where primary health & educational facilities (in the form of primary and secondary schools) are available.

The infrastructure like site office, temporary rest shelters with first aid facility and toilets already at mine site for mine workers for entire duration of mining.

Post office and telephones services are accessible via nearby villages. Most of the villagers have mobile phones.

4. Planning Brief

- **Planning Concept:**

The quarry lease for crusher stone will be developed by opencast Semi-mechanized method by forming benches. Stone production of 7,600cubic meter/year has been estimated from the mining area.

- **Population Projection:**

Man power requirement for mining is estimated to be ~ 15 Nos. Most of the employees will be recruited from neighboring villages depending upon the availability of skilled & unskilled people. No significant influx of people is anticipated in the area.

- **Land use Planning:**

The proposed mine area currently is an undeveloped undulated land.

The land use of the proposed area will change once mining is over with the creation of mined out pit and dumping site.

The mined out pit will be utilized as water reservoir and would act as recharge structure for the local aquifer.

By the end of project completion, plantation will be grown on dumping site and around quarry land area and will form the green belt.

- **Assessment of infrastructure demand (physical and social):**

The existing road network will be sufficient to meet the proposed production capacity. However, required infrastructure for transport within the leasehold area will be further strengthened and improved as needed. No new routes or alternations are required.

5. PROPOSED INFRASTRUCTURE

S. No.	Particulars	Details
1.	Industrial Area (Processing Area)	Lease area is 1.998 Hect. The mining activity will be carried out within mine lease area and no processing area is proposed.
2.	Residential Area	No residential area is proposed for mining project; only temporary rest shelters will be established.
3.	Road Connectivity	The Village-Rojana Nearest population center is 1.8 km away from the mining area, it is connected by roads. The District Headquarters of Ratlam is at a distance of 39.91km.
4.	Green Belt	Green belt development program will be made in successive phase depending upon the immediate need, priority, availability of land and sufficient ground water. A total no of proposed plantation is 2400 a plings in 2 year.
5.	Social Infrastructure	Physical & Social Infrastructure will be provided, and if necessary other facilities will also be provided by mine's proponent.
6.	Water Management	3.5KLD, Source: nearby village.
7.	Sewerage System	Generation of sewage waste is not expected from the mining process. However the domestic waste from the toilets will be stored in septic tank.
8.	Industrial Waste	No industrial waste will be generated.

	Management	
9.	Solid Waste Management	No waste will be generated.
10.	Power Requirement	N.A.

6. REHABILITATION & RESETTLEMENT PLAN

There is no human settlement within the mining area so disturbance would due to mining activity. Therefore, no Rehabilitation or Resettlement is proposed.

7. PROJECT SCHEDULE

❖ **Proposed schedule and approval for implementation**

The Proposed project shall be established after getting the Environmental Clearance from SEIAA.

❖ **Project cost estimation**

Estimated Project Cost for the proposed project is Rs. ~18Lacs.

8. ANALYSIS OF PROPOSAL

Project will create direct & indirect employment opportunities within the surrounding region. Mining proponent would employ local people from the nearby villages depending upon the availability of skilled & un-skilled man power surrounding the project site.

Creation of water reservoir from open mined pit would assist in recharging the local aquifer system and may enhance irrigation capacity in the neighborhood.

Distribution of plants among the local villagers to plan to plant more and more tree species so raising the aesthetic beauty of the area.

CHAPTER-5

CONCLUSION &RECOMMENDATIONS

Conclusion-

The base line studies relents no hazardous levels of dust and noise and prevailing at the project area. A well implemented environmental management plan is will help in mitigation andthe adverse impacts due to quarrying activities.

The movement of vehicles is very minimal. The entire vehicle used should be periodically maintained by well experienced mechanic and kept under standards, emission testing will be carried out periodically and water will be sprinkled periodically to prevent dust into air.

The small quantity of humus rich surface soil should be removed and preserved in the boundary barrier to facilitate the afforestation.

Environmental care and attitude of preventing environment should be inducted to mitigate the minor impacts due to quarrying.

Financial and social benefits to the local people including tribal population.

- Project will create direct & indirect employment opportunities within the surrounding region. Until will use good faith efforts to employ local people from the nearby villages depending upon the availability of skilled & un-skilled man-power surrounding the project site.
- The project will benefit marginally to the state revenue through royalty on the mineral and other taxes.
- The mine owner will carry out various socio-economic welfare activities in the nearby villages.
- An added benefit to the proposed project will result in considerable growth of stimulating the industrial and commercial activities in the state. Small and medium scale industries may be further development as a consequence.
- The mined out area should be developed into a water body and thick plantation, which will be helpful for improving the aesthetics of the area and also in improving the ground water recharge in the area.
- From the assessment of proposed Stone Quarrying project, there shall have no adverse impacts on the surrounding environment.

Recommendations-

- The project will bring economical benefits to the state by the way of Royalty.
- Improvement in irrigation capacity in the form of mined out pit acting as a recharge structure for the local aquifer system and enhancing the aesthetic beauty of the area by greenbelt development etc.
- The Stone Quarry lease project will result in the growth of the surrounding areas by increasing direct and indirect employment opportunities including ancillary development and surrounding infrastructure.
- Development of social amenities in the form of medical facilities and providing other facilities to schools.

CHAPTER-6

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APPENDIX

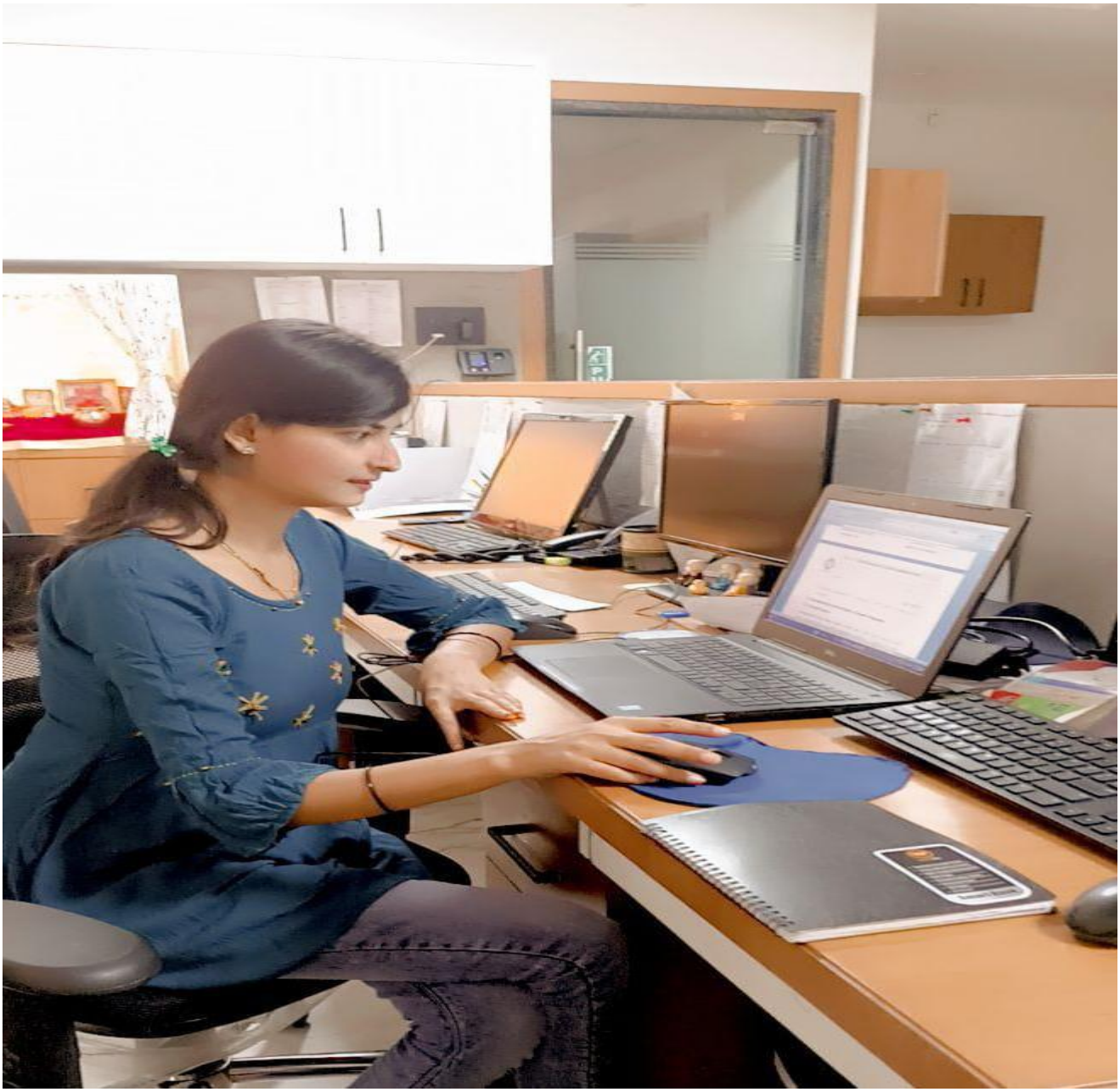

Plate 1- Working in super tech. environmental services lab

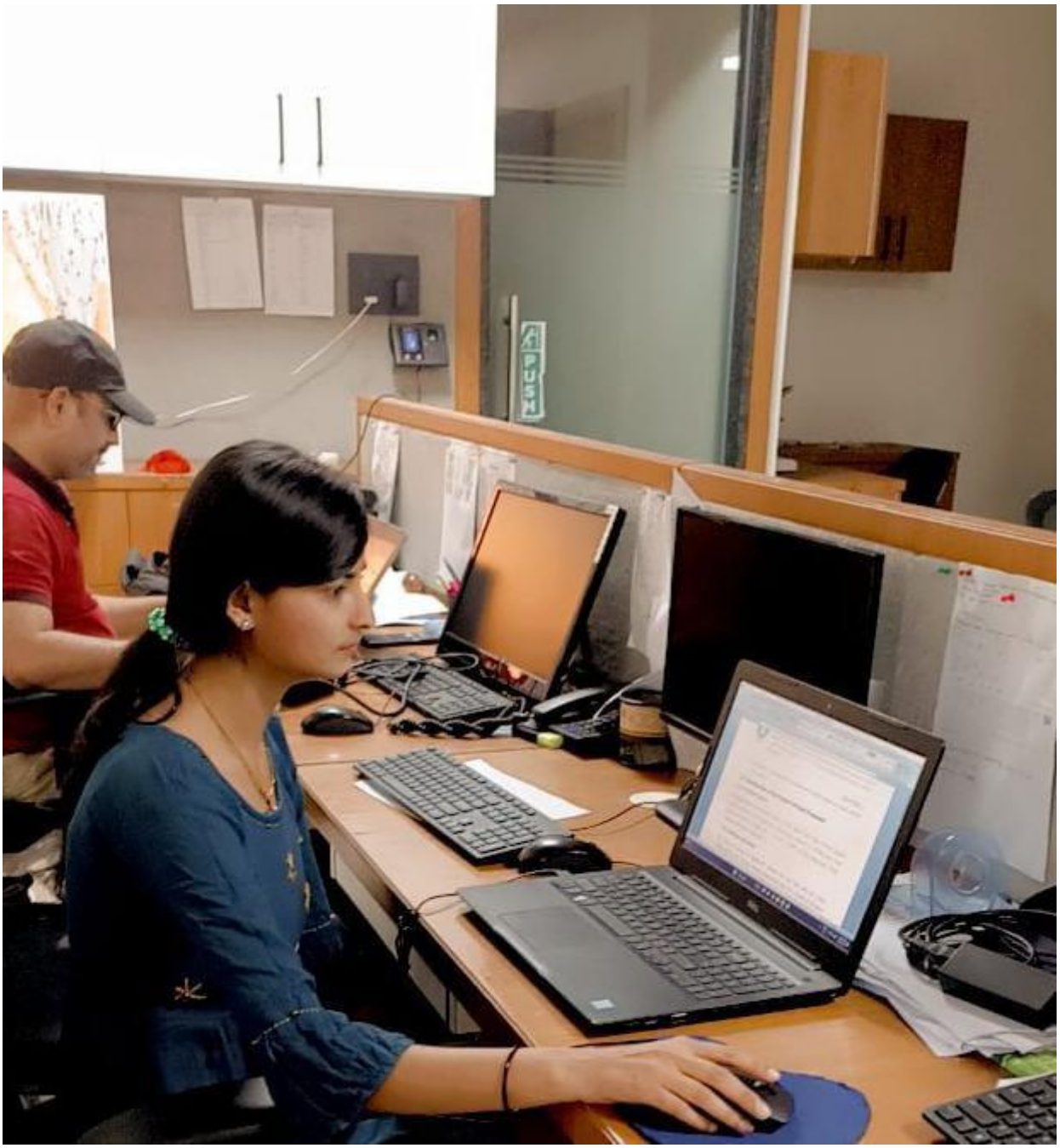

Plate 2- Working in super tech. environmental services lab

Plate 3 – Working in super tech. environmental services lab