



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 11, Issue 6, June 2022

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.118

 9940 572 462

 6381 907 438

 ijirset@gmail.com

 www.ijirset.com

Social and Environmental Impact of Minor Mineral in Rajasthan

Vikash Singh¹, Anand Sharma², Abhishek Vyas³, Vikas Suwalka⁴, Saurabh Singh⁵,
Mukul Gagrani⁶

Diploma Student, Department of Mining, Sangam University, Bhilwara, Rajasthan, India¹

Assistant Professor, Department of Mining, Sangam University, Bhilwara, Rajasthan, India²

Assistant Professor, Department of Mining, Sangam University, Bhilwara, Rajasthan, India³

Diploma Student, Department of Mining, Sangam University, Bhilwara, Rajasthan, India

Diploma Student, Department of Mining, Sangam University, Bhilwara, Rajasthan, India⁵

Diploma Student, Department of Mining, Sangam University, Bhilwara, Rajasthan, India⁶

ABSTRACT: The State Board has issued detailed guidelines from time to time to facilitate the process of grant of consent to establish/ consent to operate and to suitably guide/ advise the industries for taking appropriate measures for abatement of pollution. The purpose of developing sector specific guidance manual for Mining projects is to provide clear and concise information to all the stakeholders i.e. project proponent, environmental consultant, Rajasthan State Pollution Control Board officials and the public to have a better understanding on the relevant environmental aspects in the initial stage itself. This Guidelines covers the legal requirements, clearance process, environmental standards and maintenance of statutory records. The manual will also cover the environmental concerns related to mining of minerals. The project proponent may use these Guidelines to ensure that all the aspects of the environment due to the project are addressed and adequate mitigation measures are planned in the environmental management plan and project proponent will be fully aware of the environmental process and requirements. Public who are concerned about mining of minerals, should have information about the environmental aspects, standards, regulatory requirements etc., and have a better understanding about the mining activity.

KEYWORDS: Mining activities, , Environmental issues, Affecting human rights, Legal Aspects.

I. INTRODUCTION

It mentioned that the whole universe together with its creatures belongs to the Lord (nature) implicit in this thought is that no creature is superior to any other and that a human being should have absolute power over the nature. Let no one species encroach over the right and privilege of the other species. No one can enjoy the bounties of nature by giving up greed. This shloka of Isho-upnishad gave same message that I want to give in my paper because Mining in Rajasthan (India) is creating many problems on earth. Rajasthan is a largest state of India with total area of 3, 42,239 square kilometres of land within its domain. Out of this, three fifth of the land in the state is sandy desert. Fore stand land under pasture is gradually shrinking in the state, due to population pressure and unsustainable practice of mining. Mining sector in Rajasthan is another pre-eminent sector next to Agriculture. In Rajasthan highest number of mining leases in the country for major and minor minerals. Most mineral deposits in Rajasthan are concentrated in all along the Aravali range²

Rajasthan holds reserves for 44 major and 28 minor minerals and is the only producer of garnet, jasper, selenite, wollastonite and zinc concentrates. It is also the leading producer of calcite, lead concentrate, ball clay, fireclay, ochre, phosphorus, silver and steatite. But it is best known for its production of marble, sandstone and other stones. It produces 10 per cent of the world's and 70 per cent of India's output of sandstone. , and greatest producer of non-ferrous metals such as copper and zinc and accounts for 40% of the country's copper production and 100% of zinc production. The state also accounts for 85% of lead production, 94% of gypsum, 76% of silver ore, 68% of feldspar, 84% of asbestos and 12% mica.³

In Rajasthan Ajmer, Bhilwara, Bikaner, Dungarpur, Jaipur, Pali, Rajsamand, and Udaipur are its main mining districts. But major minerals do not reflect the true picture of mining in Rajasthan; minor minerals and stone quarries do. This sector provides employment to more about three million workers throughout the state.⁴ Rajasthan has thousands of unorganised mines, which can be as small as one-twentieth of a hectare. They fall out of the purview of government control and there are no accounts of these mines and The state government has failed to regulate illegal mining in forest areas because many unauthorised small illegal mines are also there and these mines located in remote areas, including in forest area are very difficult to monitor and another reason is the lack of assessment of Rajasthan's natural resources. A number of areas remain unexplored and the mineral resources in these areas are yet to be assessed. In Rajasthan mining activity continuously increases due to demands of minerals. We need minerals to make cars, computers, appliances, concrete roads, houses, tractors, fertilizer, electrical transmission lines, and jewellery. Without mineral resources, industry would collapse and living standards would plummet. Mineral resources are essential to our modern industrial society and they are used everywhere. For example, at breakfast we drink some juice in a glass (made from melted quartz sand), eat food in a ceramic plate (made from feldspar and quartz).

Dr. Bhupendra kumar Soni⁵, said that-Due to illegal and excess mining arrangements of plate tectonics is disturbs and chances of earth quick and volcanic activity increases. There are no provisions in any Indian law that what extant mining can be excavate. Greedy mine owner excavate mines more than 80 to 100 meter deep beyond the legal norms. These greedy owner influence mining engineers are being offered very handsome amount by mine owners. This amount is 4 to 5 times higher then what they get in their entire tenure of service.

There are so many laws for regulation of mining industries. But due to improper execution and disobeying provision of laws, ultimately environment adversely effected and mine workers suffered.

II. ENVIRONMENTAL ISSUES

The meaning of environmental is “All or any of the following media, namely the air, water and land and the medium of air includes the air with in other natural or manmade structures above or below ground.”

Virendra gour v. State of Hariyana⁶, declared that word environmental is broad spectrum which brings with its ambit hygienic atmosphere and ecological balance.

The problem of the issue is the impact of mining on the environment vs. Necessity of the minerals mined. These practice called Mining Pollution. Mining pollution can be defined as an undesirable change in the physical or biological characteristics of the air, water or land that can harmfully affect health, survival or activities of human or other living things.⁷

The main impact on environment by mining is - Land degradation, Degradation of forest and loss of biodiversity, Soil contamination, Air pollution, Surface and ground water pollution, noise and vibrations, Deterioration of natural drainage system. **Land degradation** is one of the significant impacts of mining activity which is mainly in the form of alteration of land structure due to excavation, interference with natural drainage, ground water depletion, stacking of mine waste, loss of fertile top soil, degradation of forest land, adverse effect on aquatic biodiversity and public health.

The fine dust, generated and released in the atmosphere, leads to surface scaling of the adjacent land after it settles down, consequently the infiltration rate is reduced and the run-off increases.

In Rajasthan, extensive mining of sandstone, marble and other minerals has converted the Aravallis into a rocky wasteland. Soil erosion is rampant, natural recharging of groundwater has been affected, and riverbeds have been flooded with coarse sand. This is despite they being notified as an ecologically sensitive area (ESA) in 1992. Despite Supreme Court orders and threats since 1996, mining has continued unabated in the Aravallis.

In spite of ban on any mining activity in forestland envisaged in Forest Act, 1980, Government of Rajasthan granted nearly 400 leases of marble mines in and around Sariska Tiger Reserve. Thiming activity caused havoc to the environment by way of deforestation, degradation of agricultural land, pastures and hydrology of the area resulting in loss of conventional employment and hence income of the local people. Air and noise pollution due to mining activity affected the health of the mine workers. Noise due to blasting accompanied by deforestation affected the habitat of the tiger and other wild animals in the Sariska Tiger Reserve .Local people led by Tarun Bharat Sangh (NGO), went to the

Supreme Court of India against his illegal mining activities which threatened to jeopardize the ecosystem of the Tiger Reserve and its inhabitants. The highest court ordered for closer of 262 mines falling within the buff zones of the national park. Government of India⁸

Aravali region (in which also falls Bijolia as an eco-sensitive area in general and banning mining activities in Sariska area in particular Since then mining activities has come to a close but the mining lobby is still active to get the stay vacated and carry out mining illegally at some place. Political leadership of Rajasthan is also keen on reopening of the mines.

III. LOSS OF BIODIVERSITY

Biodiversity is defined by Janet N Abramowitz and Robert Nicholas is “The sum of genes, species and ecosystem coexisting on earth at any point in time.”⁹ Rajasthan is always famous for its attachment’s towards environments. The world’s famous Chipko movement was witness of this. Chipko Movement of village Kherjarilli of Rajasthan where Amrita bai and her four family members and other person sacrificed lives to save trees of the village they all stuck with trees to protected trees from cutting (properly known as green Khjarilli) the episode took place in 1731 A.D. thus we have a culture where trees are regarded more precious and revered then our lives but now a days situation is going change. Due to excess and illegal mining biodiversity is directly affected and Being rich in mineral resources, Aravali hills also have witnessed years of illegal mining and illegal mining creates mining pollution.

This area is rich in floral diversity mainly medicinal rich plants like Kadaya (giving medicinal gum) Gugal (use in dental and stomach medicine), Amla (for antioxidant and cancer), and Moosli (for physical stranth). The main trees are khair, salai, Modad, Dhavada, khakhara and **Timru**. In Rajasthan the main species occurring in the forests during 1969-70 was *Anogeissus pendula* (Dhokra). The other species in the forests were *Acacia leucophloea* (Aranja), *Acacia catechu* (khair), *Holoptalia Spp.* (Chural), *Butea monosperma* (Palas) and *Zizyphus jujube* (Ber) etc. However during 1992 main species found in the area were *Anogeissus pendula*, *Acacia catechu* and *Buteamonosperma* (Sinha 1994). According to District Gazetteer of Bhilwara the main species occurring in the forests during 1969-70 was *Anogeissus pendula* (Dhokra). The other species in the forests were *Acacia leucophloea* (Aranja), *Acacia catechu* (khair), *Holoptalia Spp.* (Chural), *Butea monosperma* (Palas) and *Zizyphus jujube* (Ber) etc. However, during 1992 main species found in the area were *Anogeissus pendula*, *Acacia catechu* and *Buteamonosperma* (Sinha 1994). The rare animal comprise Sloth bear, striped hyena, Leopard, Blue Bull, porcupine, fox, numbers of reptiles, the rare bird of this area are stork spoonbill, osprey, white backed vulture and black vulture but now some of flora and fauna species vanished due to mining. With the loss of trees and forest and animals we loss the valuable drugs like anti-cancerous and anti-AIDS drugs worth millions of dollars and some species of animals which helps in our eco-system and for food chain.¹⁰

IV. EFFECTS ON WATER SYSTEM

Rig vedas¹¹, Manu Smriti¹², Charak Sanhita¹³ have emphasized on the purity of water and healing and medicinal value of water because of these injections a system of MARYADA (code of conduct) developed in Indian society to keep the water clean and wholesome but due to excess mining activities hydrological system of earth is going imbalance. Mining in the catchments has also played its part in threatening the region’s water bodies. In Rajasthan due to mining average water level fall down 40 feet to 400 feet. Mining activity restricts the sub-surface movement of water. With the removal of vegetation, the rate of evapotranspiration is reduced and as a result, there is a change in the hydrological balance in the Rajasthan.

The Hydrogeological survey shows that the mining has affected the course of main stream The ground water table fell up to 2to 3 meter down wards. The marble slurry imposes serious threats to the ecosystem in the state. When dumped on land , it adversely affects productivity due to decreased porosity, water absorption and water percolation. Slurry dumped areas cannot support any vegetation and remain degraded. When dried, the fine particles become air-borne and cause severe air pollution. During the rainy season, the slurry is carried away to rivers, drains and local water bodies, affecting the quality of water, reducing storage capacities and damaging aquatic life. Near around mining area ground water is unfit for drinking and cooking and food cooked in such water literally churns the stomach.

The Government Higher Secondary School at Senti, a nearby village, had the Public Health Engineering Department laboratory test its groundwater. The level of total dissolved solids was found to be 5,040 milligram per litre (mg/l) when the acceptable limit is 500-1,500 mg/l. Total hardness (calcium carbonate) was 2,550 mg/l when the acceptable limit is 200-600 mg/l,” says the report.¹⁴

V. AIR POLLUTION DUE TO MINING

We can defined Air Pollution as the presence of materials in the air such concentration which are harmful to man and his environment. The Mining and its associated activities of drilling, Blasting and transportation increase the suspended particulate matter in the air which is harmful to the health of the workers exposed to the mine environment. These activities adversely effected both to flora and fauna. A high volume sampler was used for collecting air samples from different mines, which gave SPM values ranging from 411 to 467 mcg/m³. One sample was collected far away from the mining area to obtain the background figure of fresh air which gave SPM value of 199 mcg/m³. Though the value of 411 to 467 mcg/m³ is well within Central Pollution Control Board (CPCB) standards for areas coming under industrial and mixed us(i.e. 500 mcg/m³), it is more than double of 199mcg/m³ coming from fresh air which the villagers would be exposed to but for working in the mines.

The maximum SO₂ and NO₂ values varied between 30 and 70 mcg/m³ while CO levels were below detectable limits. Results show that all the values for SO₂ and NO₂ and CO are well within the CPCB standards for areas coming under industrial and mixed use (i.e. 120 mcg/m³ for SO₂ and NO₂ and 5000 mcg/m³ for CO) Fine dust inhaled by workers leads to diseases related to lungs and liver such as “silicosis”, “bronchitis”, “asthma” and “tuberculosis.

VI. AFFECTING HUMAN RIGHTS

Mining is one of the most hazardous professions because of safety as well as health concerns. Most of mine workers are from rural areas and not very well educated. Bhils, Gameti, Khardi, Koted, Pargi, Meghwal, Gujjar, Khatik, Regar, Kholi, Balai, Banjara, Meena, Kumhar and other cast/tribes living in the Aravalis constitute, due to poor economic condition they were bound to work in mining sector, where unregulated mining is not only destroying nature’s fine equilibrium but is also threatening the life, culture and social milieu of the Adivasis.

These and other human rights problems in the mining industry are linked to deep-rooted government failures of oversight and regulation, Human Rights Watch said. Some key regulatory safeguards are virtually set up to fail because of poor design. But in many cases, the problem is that implementation is so shoddy that it renders relatively good laws ineffective, Human Rights Watch found.

Mine Worker’s habitations, safety, wages and medical facilities are always trifling matter to mine owners. Workers habitation is often haphazard shanty-towns, tiny cubicles covered with tin-sheets on stone pillars, most of them just about two-and-a half feet high (one has to crawl into it to gain access). These are the only shelters available to the mining work force come sweltering summer or freezing cold and Conventional mining safety gear like boots and helmets are unheard of and people in these mines work barefoot, with bare hands because they were illiterate they did not know about their safety of life . In most of open cast mines, workers are made to toil even in temperatures as high as 45 to 47degrees Celsius. Instead of using shafts, these mines deploy cranes to lower workers 300 metres or more below the ground level. Every time a mine is blasted, workers have to huddle together in the open, taking shelter behind rocks. Injuries are common, due to the unscientific and crude methods adopted by the mine owners and contractors. No trained and licensed workers are employed for blasting; instead labourer themselves fix the explosives in the drilled pit. Mine workers thus have to come out of 300 plus feet deep mine pits within five minutes. Missing even seconds in this process can cost them their life. During the rainy season, mine collapses tend to increase. The ropes become slippery as fine marble dust stick to them, causing accidents. 50-60 deaths occur every year here. Mine owners usually settle compensation through middlemen by giving few thousands rupees to surviving family members and get done with it. Mines here also resort to the illegal practice of employing children for working in some hazardous operations. While deployment of child labour in the mines is common knowledge, collusion between the government machinery and the mine-owners/contractors have meant that not a single mine-owner or contractor has so far been arrested. The deaths and injuries caused by accidents go the same way. Basic facilities such as toilets and water do not exist, nor do safety procedures or compensation for accidents. employer for other mine owners.

The condition of women workers are worst then men.

The age-wise distribution of women mine-workers in the state is an interesting indicator of the extent of women's exploitation in mining. According to Article 39(e) of the constitution mentioned the health and strength of workers. Women should not be forced to work under inhuman and hazardous condition. In the small private or unorganised mining sector, where majority of women workers are employed, there are no work-safety measures worth mentioning, and the women are susceptible to serious health hazards which also affect their reproductive health, and more often than not, they are also exposed to sexual exploitation.¹⁵ In the case of **Vishaka vs. State of Rajasthan**¹⁶ has held no sexual harassment at work place.

If there are accidents like mine collapse, where the women are killed or disabled, these are most often hushed up by the families themselves, for fear of police action or facing the company's wrath. Women are required to work long hours even in advanced stages of pregnancy, have no leave entitlement or crèche facilities, and are always under threat of being thrown out. In the stone crushers, most women have contacted and suffer from tuberculosis (and so are their infants who are brought to the work place and left around to fend for themselves in the quarrying sites while their mothers are working). Even this work is but seasonal for them. Wages of women workers are almost always less than those for men. Women do not get even a weekly off, leave alone a paid holiday. Even pregnancy or childbirth is not considered. Article 42¹⁷ and section 5¹⁸ related to maternity benefits and right to payment of maternity benefits but these provisions are not followed by mine owners. No work equipment is provided to them, and there are no proper toilets or rest shelters or facilities. **Section 19 (f)(b),sec 19 (2) ,sec 27 and sec 42(1)**¹⁹ provisions are related to working facilities to women but not followed in mining industries.

The women are exposed to the exploitation, physical and sexual, of the mine-owners, contractors and other men, having to walk back several kilometres to return to their villages and are vulnerable to assault on the way. Women workers in the mines, like all other workers are also susceptible to and suffer from several occupational illnesses right from respiratory problems, silicosis, tuberculosis, leukaemia, and arthritis. These types of human rights problems are solve by the education and awareness of their mining rights.

VII. LEGAL ASPECTS

To regulate the mining sector there are many laws are available. Honrable supreme court justice K.G.Balakrishnan gave many decision on environment protection and gave direction to stop mining activities near araveli range, The Mines and Minerals (Development and Regulation Act, 1957, ('MMDR') and the Mines Act, 1952, together with the rules and regulations framed under them, constitute the basic laws governing the mining sector in India.

The relevant rules in force under the MMDR Act, are the Mineral Concession Rules, 1960, and the Mineral Conservation and Development Rules, 1988. The health and safety of the workers is governed by the Mines Rules, 1955 created under the jurisdiction of the Mines Act, 1952.

The Mineral Concession Rules, 1960 outline the procedures and conditions for obtaining a Prospecting Licence or Mining Lease. The Mineral Conservation and Development Rules, 1988 lays down guidelines for ensuring mining on a scientific basis, while at the same time, conserving the environment. The provisions of Mineral Concession Rules and Mineral Conservation and Development Rules are, however, not applicable to coal, atomic minerals and minor minerals. The minor minerals are separately notified and come under the purview of the State Governments. The State Governments have for this purpose formulated the Minor Mineral Concession Rules. The mica mines labour welfare fund ,1946.the mines act,1952.the mines rules,1955.the Cole mines regulation,1957.the mineral concession rules,1960.the mines rescue rules,1985.the colliery control rules,2004 are the important acts. Section 19 to 27 of the mining act, 1952, mention the provision as to health and safety. Section 28to 48 deals with hours and limitation of employment, in section 49 to62 mentioned about leave and wages. In The mining rules -1955, section 21,22, related to court inquiry,sec,29a to29w related to medical examination of person employed or to be employed in mines.sec,62 to 74 related to welfare amenities. Mineral conservation and development rules,1988, section 31 to 41 related to environmental protection. With these acts labour welfare act, workmen compensation act, industrial dispute act are directly or indirectly related to regulate mining industries.

The Mines and Minerals (Development and Regulation) Act, 1957 does not provide for any profit sharing formula between Government and local people. But the draft Minerals (Development and Regulation) Bill (MMDR bill), 2011 provides some. There are so many Laws available for mining regulating mining industries and for protection of mining workers but proper implementation and well defined specific mining Laws are missing, due to this all in vain.

VIII. CONCLUSION AND SUGGESTIONS

To protect our earth from excessive mining and For the immediate remedy there is an urgent need of a well-defined specific mining law, based on conservation and Environment Management Plan with special reference to the site of mining activity, removal and disposal of surficial materials, blasting with special reference to the distance from the habitation, precautionary measures against accidents and health hazards, deforestation and afforestation, disposal of overburden, conservation of water channels and above all, the reclamation of the abandoned mining pits on one hand and the participation of local people vis-à-vis duty of mine owner on the other. For this well evolved Dumb-bells model for the development of both, natural as well as social environment must be worked out. The model emphasises the two ends of the dumb-bells as most active; one end being the site of a particular mineral and the other end is the seat of the human being.²²

I propose the following measures, which will go long way in establishing the environment safety and protection of mining workers' rights and protection of our earth-.

1. The maximum plantation, green boundaries and water reservoirs should be made for public interest.
2. The practice of dry drilling in the area should be completely stopped Provisions should be made on a joint basis that the water collected in the worked out areas during the rainy season is used for the purpose of drilling and sprinkling over waste dump.
3. Controlled blasting techniques are adopted to reduce damage to the rock and improved the competence of the rock at perimeter of the excavation.
4. The government department and NGO's should be involved to take up environmental awareness camps in mining area.
5. Bound to Mining Owners to Provide Medical Facilities to their workers.
6. All dump hills should be vegetated by native plant species like *Azadirachta indica*, *Withaniasomnifera*, *Aloevera*, *Commiphora Wightii*, *Dendrocalamus strictus* (bamboos) which are of high economic value and can thrive on all kinds of habitats.
7. Where the mined-out pits are deep and filled with water they should be developed for "pisciculture".
8. Dump material should be taken away for construction purposes and for making bricks.
9. Minerals should not be mined for immediate gain only. Present generation has to act as trustees of these natural resources for posterity. Mining of minerals for non – essential purposes which do not add to the development process and have devastating effect on the environment must be stopped. Karoli stone is a glaring example of such wasteful non –essential mining. These stones are used only for facing the walls of buildings constructed by rich people and is not essential. Mining should not be done for export, in raw form, to earn foreign exchange at the cost of environment.
10. The mine owners shall be made liable for compulsory maintenance of medical and life insurance policy for each mine worker at the mine owner's expense.
11. Effective coordination with Indian Bureau of Mines and Director General of Mines Safety shall be maintained in regular inspections of mines with a view to enforce safety standards laid down in various provisions of Rules and Acts.



12 Proper rest shelters and wash rooms shall be erected in Mining areas for workers. For this purpose separate guidelines shall be issued regarding concessionary land allotment in mining areas.

13. No mining activities shall be allowed within the notified boundaries of any wild life sanctuary /national park.

14. Effective implementation of existing provisions of various Acts and Rules related with Environment Protection and protection of human rights shall be ensured and for this purpose Department of Mines & Geology shall be strengthened accordingly.

15. Keeping in view the local requirement of minerals & employments, rationalization of wild life sanctuary boundaries shall be considered and a committee shall be constituted to recommend the cases of rationalization.

16. Zero waste mining principle shall be implemented in true sense.

17. Dumping area for waste generated during minor mineral production shall be earmarked. A penalty provision shall also be introduced for defaulters who are not dumping waste at earmarked places.

18. Norms and targets for plantation by mining lease holders. There are two main points that must be understand Firstly, the community must be convinced that something can be done about the existing situation and secondly, that it can happen only with their involvement. Awareness and efforts can save our Earth. There is still time to reverse the exploitative model of development and to evolve an Indian indigenous culture based developmental economy. Everything shall be well if “economy and ecology”, “development and environment” go hand in hand. The new legislation, new regulation and new hopes will save our environment and earth.

REFERENCES

1. The **Isho Upanishad** is one of the shortest of the Upanishads, in form more like a brief poem than a philosophical treatise, consisting of 17 or 18 verses in total.
2. Rajasthan is divided by the Aravali hills - on the West lies the arid to Thar desert and on the East lies the region of greener pastures, . The forest of Aravali’s play a significant role in conserving the depleting eco-system and in controlling the south ward development of the Thar desert.
3. Rajasthan annual mining reports 2012. 4.Rajasthan employment reports 2013.
4. Junior Scientific Officer in Rajasthan pollution Control Board, Udaipur (Rajasthan).
5. .Tarun Kanti Bose –Mining in Rajasthan-A study of Patterns and Paradigms
6. Dr. R. G Chaturvedi-bio diversity and Extinction of species.
7. Surender Singh Chouhan-Mining development and environment: A case study of Bijolia Mining Area in Rajasthan, India
8. The Rigveda is counted among the four canonical sacred texts of Hinduism known as the Vedas. It is compound of praise, verse and vedas (knowledge).



INNO SPACE
SJIF Scientific Journal Impact Factor
Impact Factor: 8.118



ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 **9940 572 462**  **6381 907 438**  **ijirset@gmail.com**



www.ijirset.com

Scan to save the contact details