SUSTAINABLE MINING AND GEOINFORMATION

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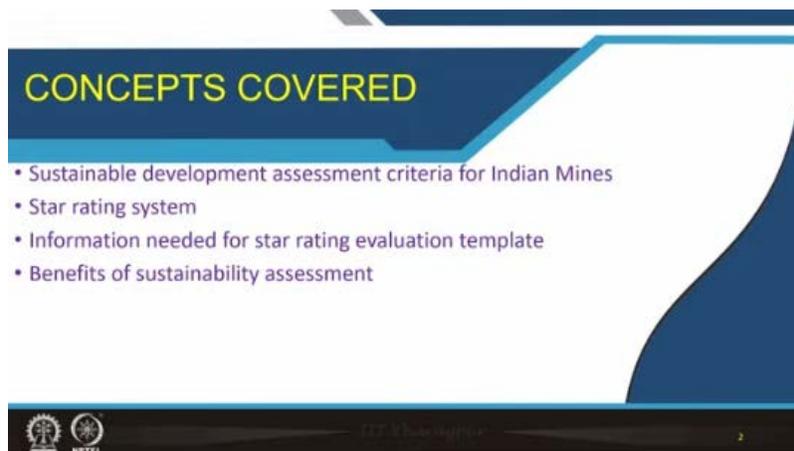
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Lecture 58: Sustainability Assessment for Indian Mines

Welcome, students, to lecture number 58 of the NPTEL course on sustainable mining and geo-information. Today's title is Sustainability Assessment for Indian Mines. For the last two to three classes, we have been discussing sustainability reporting for mines and metal industries, and we have discussed different standards or disclosures, GRI standards. We have discussed the Sustainable Mining Index. Those standards that we have discussed are used worldwide by different mining companies across the world. Now, as you might remember, we talked about this at the beginning of these classes: the Ministry of Mines has developed the Sustainable Development Framework. As per that framework, SDF, in our country, we have also developed a sustainability assessment system, both for coal mines and non-coal mines. In fact, the sustainability assessment system, or sustainable development assessment system, was first notified by the Ministry of Mines for non-coal mines and then extended to coal mines.

CONCEPTS COVERED

- Sustainable development assessment criteria for Indian Mines
- Star rating system
- Information needed for star rating evaluation template
- Benefits of sustainability assessment

Basically, we call it the star rating system. The star rating system is nothing but the sustainability reporting system for Indian mines. So, in today's topic, we will discuss the

sustainable development assessment criteria mentioned in the star rating system for Indian mines. We will also talk about the template to collect the information. The information will be provided by the mines. There is a certain format or template provided by the Ministry of Mines through the Office of the Indian Bureau of Mines. So, what information is needed in that star rating evaluation format or template? Methodology for star rating evaluation: the mine provides the information, conducts self-evaluation, and then it is evaluated by the Indian Bureau of Mines. The IBM assigns a star rating—1 star, 2 stars, 3 stars, 4 stars, or 5 stars (the maximum). When we rate all the mines, what is the benefit of such an evaluation system, a sustainable development evaluation system for the mines? To introduce the topic, as per the National Mineral Policy 2008, the definition of sustainable mining is that a miner shall leave the mining area in a better ecological state compared to when mining started.

That means after mining, when you close the mine and hand over the land to society or the state, the ecological condition should be better than before. That is the principal objective of the National Mineral Policy. Now, how do we know this? How do we ensure this? For that, there must be an assessment—an assessment of the sustainable development of that mine. Whether the mine operation was carried out sustainably or not. Unless we assess, we cannot reach any meaningful conclusion. So, the sustainable development assessment system is essential. For this requirement, the Ministry of Mines, through the Office of the Indian Bureau of Mines, has developed the star rating assessment system, which will be applicable for the Indian non-coal mines, and later, this system was also adopted by coal mines. The star rating system is a web-enabled online system for evaluating measures undertaken by the mining industry to achieve sustainable mining. It is a two-layered system. First, self-evaluation: there is a template provided by IBM. The mine must fill in all the information in the template and conduct a self-

evaluation. Then, it submits through the IBM portal, and IBM, through a committee, assesses or validates the self-evaluation of the mines and provides its opinion or evaluation.

Then the final star rating will be awarded to the mine. So, this star rating system is a sustainable development assessment system, and because of this star rating system, it will help establish the credibility of the mining industry among different stakeholders, the government, regulators, NGOs, and social organizations. So, through the star rating system, if the mine achieves a higher star rating, 4-star or 5-star, then it will gain credibility among the stakeholders, regulators, NGOs working in the environmental domain, and society, and it will help in maintaining the social license to operate. So, in the sustainable mining assessment system, the star rating system has seven main criteria, and information is collected against these seven main criteria or principles. So, what are they? Criterion number one is environmental and social sensitivity in the decision for mining leases. So, the sustainable development of mining starts from the beginning when the mining lease is granted to a mine. So, what is the governance system for granting the mining lease or the prospecting license? The core issues in this criterion are the system of classification of mining areas based on social parameters, environmental parameters, logistics in that area, and technical parameters. So, for this, when the mining or the state government wants to grant the mining lease, it has to develop some objective criteria, and these criteria will be finalized after adequate engagement between the state government and the central government to develop a transparent protocol.

So, engagement of the central government, different ministries where the mineral deposits are located, like the Ministry of Environment and Forest for environmental issues, the Ministry of Tribal Affairs for tribal issues, the Ministry of Rural and Urban

Development with respect to land acquisition, project-affected persons, and R&R issues. So, sufficient engagement between the central government, the state government, civil society, and the mining company is essential to develop a transparent mechanism through which the decision-making regarding the granting of mining leases has to be made. This is the first link for sustainable development. The second criterion is strategic assessment in the key mining region. So, the core issues are the identification of key thrust areas regarding environment, ecology, logistics, infrastructure, socio-economic conditions, socio-economic developmental issues of the region, as well as the carrying capacity of that mining region—to what extent mining can be allowed. What will be the maximum production level within the carrying capacity of the region? What is the pollution load that the region can take? So, all these in the key mining regions, you have to carry out the mining within the environmental carrying capacity. So, for this, social and environmental impact assessment studies are very essential from time to time, and evaluation of the mining process on the regional impact of the mining region. So, this is the second criterion for strategic assessment of the key mining regions, and for this action, a Regional Coordination Committee (RCC) for the mineral-bearing zone or mining cluster, RCC, has to be set up within a mining zone or a mining cluster.

This RCC is to consist of experts in technical domains—mining experts, environment experts, ecosystem experts, development experts, social scientists, tribal experts—all technical domains, and different technical domains that will be members of the Regional Coordination Committee for the mineral zone or the mine cluster zone. The third criterion or principle is managing impact at the mine level through sound environmental management systems. Now, whatever policy you have, ultimately, the mining has to be carried out in the mine, and the impact—mining impact, environmental impact, and social impact—will be in the mining area. Regarding policy, you may have a policy at the corporate level or at the state government level. But that policy has to be tweaked and accommodated for the mine area, so that it will be implemented effectively on the ground. So, for this, the core issues are a well-defined sustainable development policy at the mine level. At the corporate level, we have a policy, but at the mine level, we have to come up with the exact details. At the corporate level, we will have policy guidelines, but at the mine level, we will have criteria—exact criteria to be followed. We have to set goals, take periodic reviews, and do conflict management at the mine level. We have to give training, sensitize the workers and employees, and other stakeholders about what they have to do for sustainable development at the mine level. And also, there has to be regular interaction between the stakeholders.

Sustainable Mining Assessment Criteria

3. MANAGING IMPACTS AT THE MINE LEVEL THROUGH SOUND MANAGEMENT SYSTEMS

Core Issues:
• Well defined Sustainable Development Policy in each mine.
• Setting goals, periodical reviews, conflict management mechanism,
• Sensitization of employees, stakeholders about Sustainable Development.
• Stakeholder consultation and disclosure reports.

Action:
• Setting up dedicated Sustainable Development Unit to undertake steps for implementation of SDF at Mine in line with benchmark parameters as envisaged by RCC.

Also, different disclosures such as: environmental disclosure, social disclosures, that the mine has to prepare and submit from time to time. For this core issue, the actions to be taken, are setting up a dedicated sustainable development unit in the mine. So, this dedicated sustainable development unit in the mine will implement steps that are necessary to achieve the sustainable development framework parameter and benchmark parameter as advised and suggested by the regional coordination committee. Criteria 4 or principle 4 addressing land resettlement and other social impacts. As we have discussed in mining, particularly open-cast mining, land acquisition, resettlement, and rehabilitation with respect to the project-affected persons are very important and critical social impacts. They have a big control over the success of sustainable development. So, the core issues here are the protection of the rights of the project-affected persons, a proper compensation package for affected local communities, and how to provide a sustainable livelihood for the project-affected persons. There has to be minimal or no conflict during the land acquisition and resettlement, and rehabilitation. Of course, within the standard rules that have been provided by the state government or the central government. So these are the core issues, and actions to be taken are: a social impact assessment study by an expert agency to identify issues. Critical social issues to identify the expectations of the people, and accordingly, our land acquisition, resettlement, and compensation, everything has to be planned as per the local social profiling.

And we also have to have a monitoring system and assessment system, whether our land acquisition, resettlement, and rehabilitation scheme is implemented properly, and the project-affected persons are getting the due benefit which is mandated in these rules and regulations. Principle 5 or criterion 5 is community engagement, benefit sharing, and contribution to socio-economic development. How will the mining company or the mines engage with the local community? How will they share the benefit with the PAP and the local community? How can they contribute to the socio-economic development in the mining area? So, here the core issues are: defined goals about how the benefits will be transferred, what are the socio-economic development projects to be implemented by the mining company? After stakeholder consultations, we can identify their requirement and we can develop our program and schemes. Now, for developing and implementing the programs or the schemes, you require financial support. So, financial commitment as well as the administrative commitment from the mine management is required to implement this socio-economic development benefit-sharing project. Then identify the community engagement parameter, governance structure, and indicator to assess whether we are doing this engagement consultation in a productive manner or not. Community engagement and public disclosure: From time to time, you have to engage with the people and you have to provide the social disclosure, environmental disclosure to the community and to the PAP. Actions to be taken: monitoring of socio-economic development projects in the mining area through the regional coordination committee or the sustainable development unit of the mine and ensuring that benefits are shared with the local community, benefits are shared with the PAP, benefits shared through different schemes, different socio-economic development projects for the benefit of the community.

Criterion six, that is, the mine closure and post-closure: This is very, very important for sustainable development. The core issues are: developing a mine closure plan based on local aspirations, legacy, and the ground reality of that particular mine. We can have mine closure guidelines. But, mine closure plan for a particular mine has to be designed taking into account the problem of socio-economic composition profiles in that area for that particular mine. So, once you develop the mine closure plan, you must have a system for monitoring. various indicators of the performance of the mine closure planning. So, evaluation of the post-closure mine, the success of the mine closure planning, and the benefits accrued to society and the local community because of the implementation of the mine closure planning. So, we have to do regular monitoring to see whether our mine closure planning is working effectively or not. So these are the issues and actions taken: we have to develop a well-defined mine closure plan specific to that mine project as a part of the mine plan. Second, the post mine closure audit is very essential for continuous assessment of the effectiveness of the mine closure planning, whether it is giving the desired benefits to the local community and to the society in the mining area. Principle 7, and this is the last one. It is the assurance and sustainability reporting. So here the core issues are to develop parameters for sustainability reporting, monitoring of those parameters at the mine level, at the regional level, and also monitoring by the state sustainable development framework offices that are available in the state capital, and also the National Sustainable Development Centre, National Nodal Sustainable Development Centre.

So, how this reporting has to be done and it has to be submitted to the various offices, to the RCC, to the State SDF Centre, Central Nodal SD Centre, and all other stakeholders. Now, once we have this reporting, this reporting will ensure the credibility of the reporting, as these reports also have to be audited by an independent third party because the reports are prepared by the mines, by the mining company. So, the information that is provided—its accuracy or credibility—has to be established by a third-party audit. Then, disclosures, particularly different environmental and social disclosures, are to be given by the mining company. So, responsible mining is possible only through transparent and public disclosure. So, actions to be taken: develop a system and format for multi-level reporting. Of course, we have discussed different reporting standards—GRI, SDM, HDMI—previously. So, we have a different reporting format. So, in Indian conditions, we have taken the reporting standards from different agencies and developed our own system through IBM. Then, develop systems of rating to judge the purpose. Now, the reporting is provided by the mining company following a protocol, following a standard guideline. But it has to be judged. It has to be evaluated. So, what are the evaluation

criteria? So, we also have to identify. Then, auditing mechanism: once the report is submitted, the credibility of the report has to be audited by an independent third-party auditor. So, these are the seven criteria that have been taken by IBM for this star rating system.

You know, this star rating system was developed by IBM for non-coal mines, and it was notified by the Ministry of Mines in the year 2016. A similar system was adopted by the Ministry of Coal. Then, they notified the implementation of the star rating system for coal mines in the year 2019. So, now the star rating system is implemented both for the metalliferous mines and for the coal mines. Now, of course, here you have to remember that the implementation of the star rating system for non-coal mines, metalliferous mines, is done by IBM as the nodal agency, and the implementation of the star rating system for the coal mines is done by the Coal Controller's Organisation (CCO). CCO is the nodal agency for implementing the star rating system for the coal mines. In the star rating system, as you know, I will discuss just after a minute the format of the different information that is required to be filled out by the mines. Now, depending upon the information that is given, the mines have to do a self-assessment, and then the validation is done by either the IBM office or the CCO office. Now, when the self-evaluation is done by the mine itself with respect to different criteria, they have to give the marks. Now, if the mines achieve more than 90 percent marks in all or many parameters, they will get a 5-star rating, and this is the highest rating that a mine can achieve.

Now, all the mines have to achieve a 4-star or 5-star rating. So, at minimum, the mine has to obtain a 4-star or 5-star. If the mine gets less than a 4-star rating, then notice will be given to the mine by IBM or CCO, and the mine will be given some time to rectify or to execute remedial measures so that their rating goes up to 4-star. Otherwise, some penalty

will be imposed on the mine. Now, we talk about what the template is, and in the template, what information is needed for a sustainable development rating in the star rating system. The star rating system format template has two parts. One part is general information about the mine location, reserve position, the method of mining, and so on. The main part is part two, which is the evaluation template, which will contain information about the environmental impact, social impact, governance impact, etc. Part two is the main part for the sustainable development evaluation. It has four modules. Information is required to be filled out by the mine for all four modules. Module one is managing impact at the mine level. So, what information is required? I have listed some of them. You can go through the template reference. I have given the template here, so that you know exactly what information is required and how it is to be filled out. All the information is there in the template. So, for managing impact at the mine level: spending towards sustainable development, CSR, exploration activity, spending for mineral conservation, environmental compliance, topsoil utilization, tailings utilization, water usage, quantity of recycled water.

Environmental monitoring: air, water, groundwater, noise, vibration; green energy sourcing, climate change initiatives, energy conservation, energy consumption, energy auditing, and environmental compliance. So, Module 1 is with respect to the environmental aspect of the mine. Now, Module 2 is the final or progressive mine closure and landscape restoration. Information required is about backfilling, groundwater recharge, rainwater harvesting, landscape restoration, rehabilitation, ecology and biodiversity, afforestation or plantation, and soil remediation. Dump area stabilization and creation of ecotourism. Now, Part 2 evaluation template Module 3: It is with respect to the social impact, resettlement and rehabilitation, community engagement, and welfare programs. Here you give information about the PAP, number of jobs given, skill training

studies provided by the company, alternate livelihood created by the company, the public grievance redressal mechanism, stakeholder consultation and participation, any welfare socio-economic developmental program carried out by the mines for the local community, water supply, health and medical services, public health and sanitation facilities. Skill training center, education center, schools, livelihood, and socio-economic projects carried out by the mine for the community; support to the social, cultural, and recreational activities of the community; transportation services, including roadways, bus services, and infrastructure improvement in transportation that is done by the mine for the community. Sourcing of manpower among the locals. So, how many people have been employed in the mine, or have been given some contract in the mine, or have been given supply facilities in the mine? So, these are the information for Module 3. Module 4, which is assurance and reporting. Reporting basically consists of the availability of a sustainability report on the company's website, mine's website, public display at prominent locations at the mine site, and display of the ambient air quality level, report on the website and at prominent locations in the mine, mine gate, offices, etc.

Adoption of different standards, international standards related to the environment, occupational health, and safety, etc. For example, Quality Management System, ISO 9001, Environmental Management System ISO 14001, and Occupational Health and Safety Standards, that is ISO 18001. So, has the mine adopted these international standards? These standards improve the credibility, improve the reputation of the mine with respect to assurance and reporting. Now, these are the four modules in Part 2. These four modules require information about the mine, which is provided by the mine, and the mine makes the self-evaluation, which is then uploaded to the website of the Indian Bureau of Mines (IBM) and CCO. The IBM and CCO constitute a technical committee to go through this information, and they also validate the evaluation, and they will give

marks. So, the percentage of marks obtained: 90 to 100% - 5 star, 80 to 90% - 4 star, 60 to 80% - 3 star, 50 to 60% - 2 star, 25 to 50% - 1 star, and so on. So, you have 1, 2, 3, 4, and 5-star classifications. As per the regulation, it is expected that the mines have to achieve either a four-star or a five-star rating. If they are not able to achieve a four-star or five-star rating, they will be given a notice to take remedial action so that they can achieve a four-star or five-star rating. Otherwise, some penalty action will be taken by IBM or CCO. Now, if you do the sustainability evaluation, why the star rating system? What are the benefits that will come to the mine or to the mining industry? Some of the benefits are: Reduced environmental and social conflict in the mining area. Because the mine is doing so many works for the betterment of society, the protection of the environment, and transferring benefits to society. So, improved environmental and social protection in the high-risk mining areas.

Regional mineral development plan for selected mining areas addressing key regional and cumulative impacts. If all the mines in a region provide this sustainable reporting, we can all collate that information to know what the risk areas are, and the developmental

requirement, and the government can prepare a regional mineral development plan so that the mining region will benefit from that plan, providing opportunities for clustering small mines to become competitive and environmentally and socially compliant. We can develop a robust environmental and safety management framework for the mining industry. The disclosure process provides stakeholders with timely information, allowing them to raise critical issues during the engagement forum. So, intensive use of geospatial and geoscientific information at the mine level will be helpful for the assessment of reserve issues, planning of the mining management of the resource, environmental monitoring, social monitoring in the mining sector, and a stronger monitoring system, reporting system, and assurance system will help in the sustainable development of the mines and the mining area. Overall, with a successful implementation of sustainable development reporting and evaluation, for the mining company, it will be easy to achieve the social license to operate. Therefore, if we continue to carry out sustainable development in the mining area, then the overall mining region will benefit from the mining activity, and the whole mining area will benefit, as well as the state, and society will benefit. So, to summarize, in this class we discussed the sustainable development assessment criteria for the Indian mines, particularly the star rating system, the information that is needed for the star rating evaluation, and the benefits of the star rating evaluation system. These are the two references.

These are government documents. The first is a document taken from the Indian Bureau of Mines, which is about the star rating system. The second is a template format to be filled out by the mining company to provide the information. Both are public documents available in the public domain on the internet. That is all for today's class. Thank you very much.