In February, the Geological Survey of India (GSI) announced the discovery of 5.9 million tonnes of lithium-inferred resources in the Salal–Haimana region of Jammu and Kashmir's Reasi district.

The discovery is expected to be critical in achieving future sustainability goals. While lithium is a key component in electric vehicle (EV) batteries, the World Economic Forum (WEF) warns that "global supplies are under strain because of rising EV demand". According to the **International Energy Agency**, achieving net zero emissions by 2050 would require around 2 billion EV, but 2021 sales were only 6.6 million. The WEF highlights that lithium supply is challenged by rising demand and limited geographical availability with more than 50 percent of the current production located in areas with high water stress. However, the **WEF** suggests that advancements in battery technology or manufacturing methods could address lithium shortage issues. Besides EVs, lithium is used in rechargeable batteries in mobile phones, laptops, digital cameras, power tools, and energy storage for wind and solar power.

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This underscores the economic viability of the newly discovered lithium reserves. Nevertheless, as the economy grows, the potential hazards posed to the environment cannot be ignored.

India is a rapidly growing market for electric vehicles and other clean energy technologies. Lithium mining could provide the raw material to produce lithium-ion batteries, used in electric cars and other applications. It could create jobs, promote innovation and boost economic growth.

On the other hand, lithium mining can have significant environmental consequences, including loss of water and biodiversity, ground destabilisation, increased salinity of rivers, soil contamination and toxic waste. Irresponsible mining could adversely affect the environment and public health. Increasing lithium demand could exacerbate these challenges with India already facing water scarcity and energy shortage in some regions.

Internationally, lithium extraction has significantly impacted Bolivia's indigenous Aymara community, particularly regarding water loss. The community lives and works near Salar de Uyuni, the world's largest salt flat, relying on traditional income generation methods such as growing quinoa, raising camelid livestock and selling salt and flamingo eggs. Lithium mining has adversely affected their livelihood, which has sustained them for hundreds of years.

Rolando Humire, an Aymaran leader, cautions that lithium mining is not sustainable and must be re-evaluated.

Environmental concerns surrounding lithium mining

Lithium mining can severely impact local ecosystems and wildlife if proper measures are not taken to mitigate the effects. Some of the key impacts include:

Water scarcity and contamination: Lithium extraction requires a large amount of water, which can strain local water resources and lead to water scarcity. Besides, the process can also increase pollutants in nearby water bodies, affecting the quality of water available to wildlife and potentially poisoning aquatic species.

Habitat destruction:

Lithium mining often involves excavating large areas of land and destroying wildlife habitats. This leads to animal displacement, plant species destruction, and food chain and ecosystem dynamics disruptions. For example, the construction of infrastructure required for lithium extraction, such as pipelines and processing plants, has damaged the flora and fauna of Salar de Atacama, a salt flat located in Chile, one of the world's lithium sources. This has resulted in a decline in the population of flamingos, listed as a vulnerable species by the International Union for Conservation of Nature.

Air pollution:

Dust and emissions generated by mining cause air pollution, which impacts the health of wildlife and other species in the surrounding area, and emits greenhouse gases.

Noise pollution:

The sound of heavy machinery and other equipment during mining results in significant noise pollution, which is stressful and disruptive for wildlife, particularly sensitive species like birds and bats.

Energy consumption:

Lithium production requires a significant amount of energy, often derived from fossil fuels like coal, oil and natural gas. This results in the release of additional greenhouse gases and causes local air pollution.

It is pertinent for mining companies to consider these impacts and implement measures to minimise or avoid them. Measures can include conducting environmental assessment, developing and implementing best management practices and convening stakeholder meetings with local communities and environmental organisations.

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Water usage and scarcity in lithium extraction

Lithium extraction requires a significant amount of water, which can be challenging in water-scarce areas or areas that have limited access to freshwater resources. In India, water-scarcity is a primary concern in several regions, particularly in arid and semi-arid areas, where lithium deposits are often found.

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Approximately, 2.2 million litres of water is needed to produce one tonne of lithium. The extraction process typically involves pumping brine from underground wells to the surface, where lithium is separated and purified. This process can be highly water-intensive, requiring large volumes to extract a relatively small amount of lithium. Besides, the brine pumped to the surface can contain impurities such as magnesium and calcium, leading to increased water salinity and rendering it unusable for other purposes.

To address these challenges, lithium extraction companies in India can explore alternative methods that use less water or involve water recycling—for example, the use of evaporation ponds, which allow the water in the brine to evaporate and lithium to be collected. This can significantly reduce the amount of water required for extraction.

Role of governments and companies

Governments and companies have a critical role in promoting sustainable lithium mining practices. Governments can create policies and regulations that encourage adopting sustainable practices and hold companies accountable for their actions. For instance, the government can set standards for water usage, waste management and environmental protection in the mining industry. It can also offer incentives to companies that adopt sustainable practices and penalise those that violate environmental regulations.

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On the other hand, companies can lead the way in sustainable practices by investing in research and development of new technologies that reduce the environmental impact of lithium mining. They can also implement best practices in water management, waste management and energy usage. Additionally, companies can engage in stakeholder consultation and transparency initiatives to ensure that the impact of their operations is well understood and that they are held accountable for their actions.

Both governments and companies have a critical role in promoting sustainable lithium

mining practices in India. By working together, they can help ensure that natural resources are used responsibly and sustainably while also providing economic benefits to local communities and the country as a whole.

The lithium discovery in **Kashmir** is a significant opportunity for India to establish itself as a major player in the global lithium market.

Lithium is crucial in meeting the increasing demand for sustainable energy solutions. The lithium discovery in Kashmir is a significant opportunity for India to establish itself as a major player in the global lithium market. Developing these mines responsibly and sustainably will be essential, ensuring that the economic benefits are shared fairly among all stakeholders and that the environmental impact is minimised. India can benefit from the economic opportunities presented by these reserves and contribute to the global shift towards sustainable energy solutions.

Source: The Leaflet