

Sustainable mining practices at BALCO- Bodai Daldali mines, BALCO

BALCO, a Vedanta Group company, is committed to Group's sustainability philosophy of ZERO Harm, ZERO Waste, ZERO Discharge. BALCO commenced its journey on sustainable development in 2013 with roll out of Vedanta Sustainability Framework at all its operations including Bodai Daldali mines. The sustainability performance at Bodai Daldali has seen significant improvement over the period for which details are given in this document. We also regularly evaluate feedback received from our stakeholders and assessment reports with a view to continuously improve and evolve our sustainability performance in line with international standards. A gist on our efforts towards improving sustainability performance at the Bodai Daldali mines of BALCO is listed below:

- To reduce the incidents of fugitive dust emissions from mining operations, we introduced internal checks and controls to ensure that bauxite is transported in properly covered trucks. Additionally, wet drilling practices and levelling of reclaimed area were taken up as a priority. Reclamation is mostly complete now except in 10-15 hectares, which are the running faces of the mine. We are looking at technological interventions/ solutions to manage dust from blasting operations.
- The 42 KM road maintenance from Bodla to Daldali through the government is in final stage of completion (pending few patches in the Ghat portion).
- Bodai Daldali mines of BALCO undergoes an annual sustainability assurance process by an independent external agency. The findings are discussed at the BALCO executive committee and the Vedanta group executive committee to ensure year on year improvements.
- In FY 19, we completed 1,000 man-days of safety training for workers and a health check-up or pre-medical check for all employees and contract workers, except loading workers, in line with the group safety procedures.

As recognition of our efforts in FY 19, the Mines won the National Environment Excellence Award, organized by the Indian Chambers of Commerce. At regional level, our Resettlement and Rehabilitation practices were recognized at "The Mines Environment and Mineral Conservation event" organized under the aegis of the Indian Bureau of Mines and Safety Education and

Management. Our practices of the mineral transportation and overburden management were recognized at a regional mine safety event by DGMS.

While we have covered a lot of ground, we continue to strive to become best-in-class in sustainable mine management practices. We assure our stakeholders that BALCO is committed to become a world class integrated aluminium and power producer generating sustainable value for all stakeholders.

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1 Stakeholder Engagement

1.1 Introduction

At Bodai Daldali, stakeholder engagement is an integral part of our operations, guided by the Vedanta Sustainability Framework (VSF) and BALCO standards. Responsibility for engagement is assigned to the stakeholder relationship manager who interacts with the concerned stakeholder and addresses any grievances received in our grievance management system. This continuous engagement approach has helped us to evolve and strengthen our relationship our stakeholders.

Through the structured stakeholder engagement, we also seek input and feedback about our planned and operating community development activities in the area. The meetings are recorded for internal purposes and audited on an annual basis during Vedanta Sustainability Assurance Program (VSAP). In FY 19, we conducted 193 stakeholder engagement meetings which included face to face meetings, group discussions and meetings with community and local representatives.

1.2 Grievance Handling Procedure

Our grievance procedure is in line with the BALCO's procedure on grievance handling. As a practice, it enables stakeholders to freely submit the grievances with an acknowledgment within 24 hours of its receipt. Grievances of minor nature are investigated and resolved within fifteen days and the progress update is shared with the grievance holder within the fifteenth day of the receipt of the grievance. This includes an update on resolvable and rejected grievances to the grievance holder. A written report is shared with the grievance holder upon closure. This year, maximum grievances were received from our contract workers. All the accepted grievances for FY 19 were resolved through engagement between the grievance holder and the concerned representative from the mine.

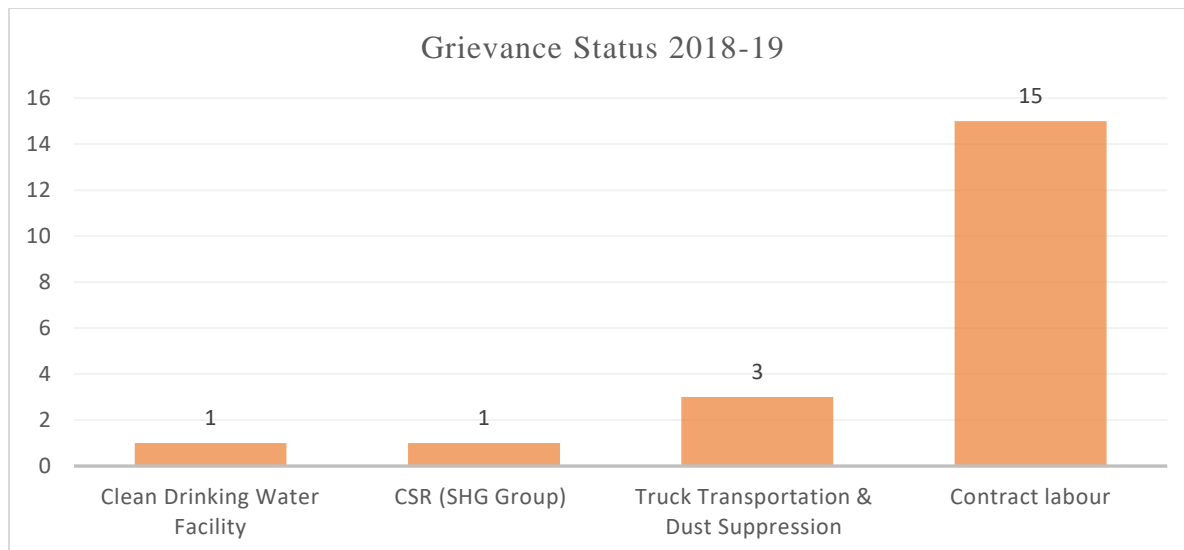


Figure 1: Grievance Management System Performance, FY 2019

1.3 Local Economy and Empowerment

We believe that in the remote area of our operations, providing communities with opportunities of livelihood can empower them in immense ways. We also encourage our contractors to employ people from the local community. In FY 19 at our operation at Bodai Daldali, we employed 76% of the people from the local region i.e., within 10 Km of the mining area.

Geography	0-10 Km Radius from Mining Area	Rest of Kabirdham District	Rest of Chhattisgarh State	Indian Nationals	Manpower
Category	Local		Regional	National	Total
BALCO Employees	0	3	15	13	31
Contract Employees (Contractor Staff, includes mine workers)	535	18	4	65	622
Private Security	0	0	8	42	50
Total	535	21	27	120	703

Figure 2: Local Employment at Bodai Daldali Bauxite Mines, FY 2019

Apart from employing people directly in mining-related jobs, in 2016 we extended the flagship skill development of BALCO and started a skill center (Bodai Daldali Bauxite Mines) in Kabirdham district to impart vocational skills to Rural Youth and link them with assured employment avenues. Rural Youths residing in and around Mines and Project affected villages are getting mobilized & counselled at skill school. After that, they are admitted for 40 days free boarding and lodging training at Kharoda. Once the course is complete, BALCO organizes a placement drive and an industrial placement is offered in companies with remuneration of Rs.10000 to 12000 per month.

The skill school program is a small step towards generating employment beyond mining related jobs. BALCO skill school enables skill development and creates job offers by generating a platform where employers meet the potential employees at the end of the program. Last Year, 96 Youths were trained in Industrial Stitching trade and out of this, 48 got placed in Vishnu Clothing & Network Clothing Companies, Tiruppur, Arsh Fashion Pvt. Ltd. Gujrat. We also engage as project-based CSR volunteers.

Bodai Daldali mine is situated in an area where essential goods and services for the operation are in acute shortage. We have taken the development of the local market as one of our key focus areas under CSR. In FY 19, we sourced services worth Rs. 1.3 Cr. from the area. Major goods and services sourced through local vendors were diesel fuel, water supply for sprinkling, food materials, road construction and repairing, etc. In the year 2016, we started the Kodo Kutki livelihood program. This program is focused towards empowering tribal women with the support of self-help groups, local gram panchayat (lowest body of governance at village level) and a partner NGO.

We started one of our first PPE (Personal Protection Equipment) vending initiatives this year in the mine premises which is led by women from Darai village. This initiative focuses on providing safety helmets, jackets and shoes at affordable prices on rent to the truck drivers, daily workers and other visitors. These shops help both, the SHG group and supports our commitment to safety standards. An average monthly income of INR 15000 was generated by this PPE shop in FY2019.



Figure 3 : PPE rent shop run by women Self Help Group at the Semsata mining office

1.4 Health Safety Environment Practice

Safety - Our First Value

Safety of our employees is the first value of Vedanta and group companies. Safety standards are provided in Vedanta's sustainability framework and the employees are regularly trained to ensure a zero-harm work culture. Storage and handling of explosives and blasting operations at mine is one of the significant safety risks. We have developed a formal blasting and communication procedure and on-site Emergency Preparedness and Response Plans to manage such risks. Mock drills are conducted on a bi-annual basis every year. The offsite risk is managed through support of the local administration as per the state's rule.

1.5 Water

At Bodai Daldali, mining activity takes place at a maximum depth up to 8 m below surface level. Depth of water in the lease area ranges from 25 to 30 m below the ground and found in basalts formation. Consequently, there is no intersection of the mining operation with the water table. Hence, with shallow open cast mining of bauxite at Bodai Daldali mines, the water regime is not possible to be affected, disturbed or polluted. The ground water in general, is suitable for drinking and irrigation purposes. All the constituents like chloride, sulphate, fluoride, nitrate etc. are well within permissible limits of drinking water standards as per ISO10500 –1991 and ICMR 1975.

We have also taken measures to monitor and reduce our water consumption. Earlier, the water quality was monitored by the third party on a bi-annual basis, but this has been made a monthly activity since May 2019. The site-based team also performs a monthly analysis of water and air quality. Both internal and independent agency's data has consistently shown 'no impact' on the water or air quality due to our presence in the area. As Bodai Daldali operates in a water-stressed area, we continually strive to reduce our water consumption. We have reduced our specific water consumption from 0.0051m³/MT in FY 18 to 0.0049m³/MT in FY 19. There is no surface water source in the mines. The mine has set up a Sewage Treatment Plant in the lease area with a capacity of 10,000 LPD. This treated water is used for horticulture activities.

Monitoring of particulate matter for dust is carried out on regular basis and results are found below the prescribed limit. Ambient air quality monitoring stations are established in the core zone as well as

buffer zone. The location and number of the ambient air quality stations were decided based on meteorological data, topographical features, environmentally and ecologically sensitive area and as per suggestion of the State Pollution Control Board. The monitoring data on air and water quality is regularly submitted to the State Pollution Control Board, Ministry of Environment at its Regional Office at Bhopal and Central Pollution Control Board. Latest six-monthly compliance status is uploaded on the Company's website under Environment Compliance in Sustainability tab.

Parameter	UOM	Requirement (Acceptable Limit)	Permissible Limit in absence of alternate source	Concentration on 17-07-2019
pH	-	6.5-8.5	No relaxation	6.89
Turbidity	NTU	1.0	5	4
Fluoride as F	mg/L	1.00	1.5	0.5
Manganese as Mn	mg/L	0.1	0.3	0.01
Sulphate as SO4	mg/L	200.0	400	1.2
Nitrate as NO3	mg/L	45.0	No relaxation	2.3
Chloride as Cl	mg/L	250.0	1000	8.4

Figure 4: Water Quality Analysis Report by independent agency

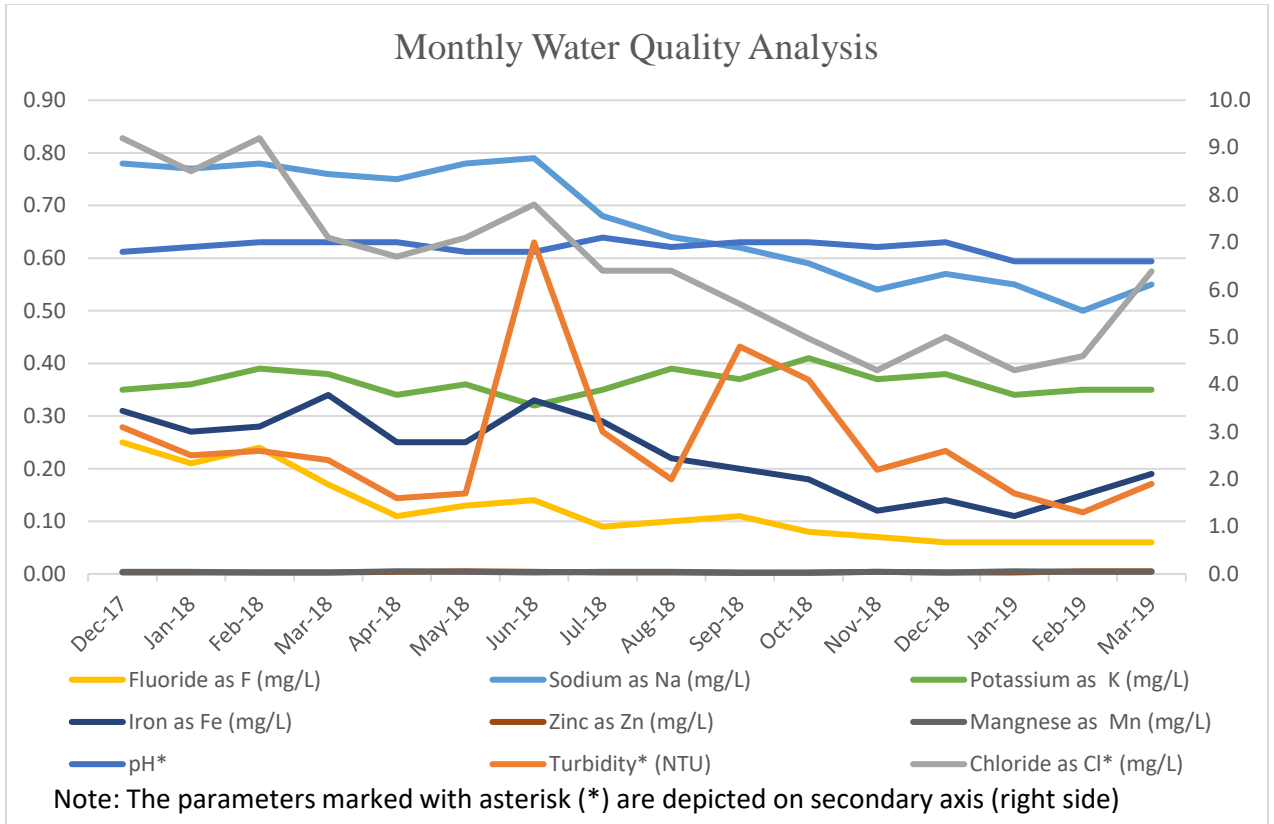


Figure 5: Water Quality Analysis

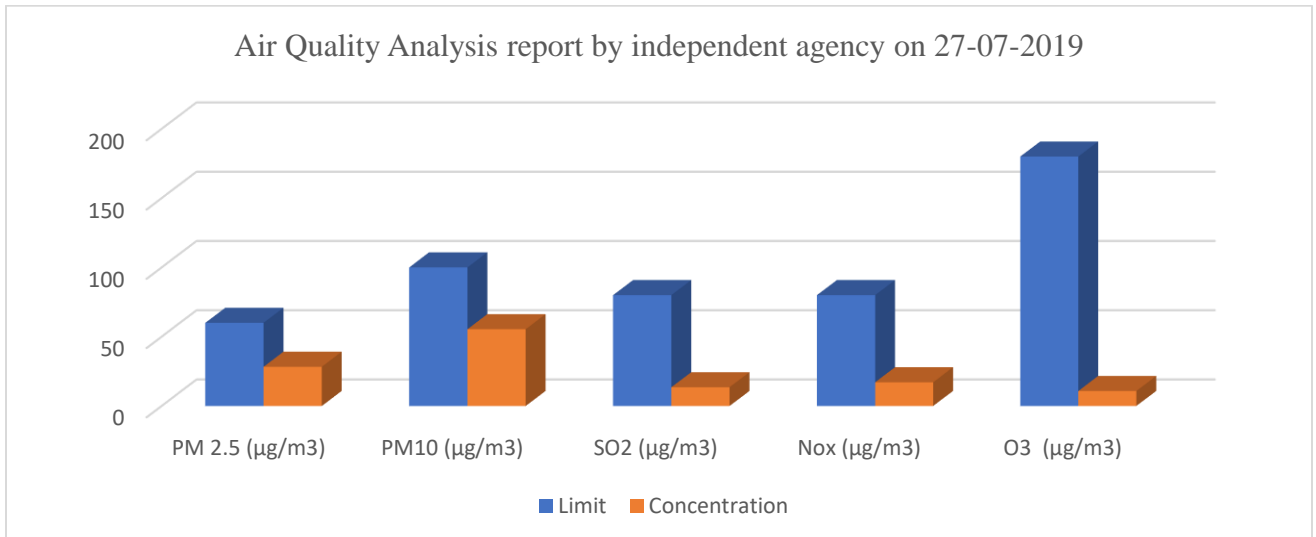


Figure 6: Air Quality Analysis Report by independent agency

The above analysis shows a consistent performance of water quality parameters. It assures that the water quality is well within the limits prescribed by the government bodies.

There also lies a risk of pollution from run-off water from open cast mining, especially during monsoons. To arrest these risks, we have built garland drains and check dams along the entire mine periphery and the diversion drains are installed ahead of the mine face which creates a barrier to runoff water that may lead to contamination.



Figure 7: Check Dams Developed to mitigate run off during monsoon

One of our environment clearance conditions states to reduce water dependency through the construction of harvesting systems. Consequently, we have developed six ponds in mined out area and constructed one water reservoir for rain water storage which help in reducing our ground water dependence and recharge the groundwater. The six ponds have a cumulative area of 5.33 Ha. and can store up to 53300 m³ of water.



Figure 8 : Rain Water Harvesting Ponds at Bodai Daldali



Figure 9: Sprinkling Practices and wet drilling practices are followed at Bodai Daldali

Supporting access to drinking water

One of the key focus areas under our community programs is to contribute towards improving the availability of water for daily needs of the community. In the year 2016, we worked with the village representatives and identified the water-related needs of communities. This engagement led to the identification of potential areas for water-related community intervention. In consultation with the representatives and partnership with a local NGO, since then we have set up 4 solar-based drinking water systems, 1 each at Darai, Bhursipakri and 2 in Daldali village. The maintenance of this system is

given to CREDA (Chattisgarh Renewable Energy Development Association) for the next 5 years after which the units will be entirely managed by the community.



Figure 10 : Solar Powered Drinking Water Facility

1.6 Reclamation

Bodai Daldali mine was leased to BALCO in 1997 when it was a fully government-owned and operated entity. Like many parts of the world, the land in India is a state subject and the resettlement and rehabilitation processes are government-led. The benefits and resettlement were planned and implemented by the district administration under the Land Acquisition Act 1894. Beyond the requirement of the act, the government offered a compensation package which was five times the applicable land rate and a commitment was made by the government to the communities in 2007 that the reclaimed land will be returned to the land owners when reclaimed. Living up to this commitment and resolving the differences using good-faith negotiations, A resolution was passed in February 2018 in this regard by the local administration which provides an amicable solution to people's wish to stay on their original lands and strengthens our social license to operate.

Our Mine Plan is approved by the government. Our internal standard on Mine Closure and regulatory requirement guides our land reclamation and mine closure practice. We follow a progressive closure plan for simultaneous backfilling and reclamation. To date, we have reclaimed 363 Ha of land out of 374 Ha of mined-out area. Around eight hundred thousand saplings (800,000) have been planted in the reclaimed area. The plantation growth was hampered initially due to the soil texture and a weak monsoon in 2016. We have updated our contract terms to include after care measures and linked the

payment with the species survival performance to ensure and enhance better survival rate. As on date, the reclaimed area of 147 Ha is progressively converted into green belt with around 4.5 lakh saplings. As a part of the approved plan, resettlement colonies have been earmarked in an area of 188 Ha. We have completed mining operations in most of the area at Rabda & Keshmarda Villages and have started facilitating resettlement of the original land owners to the reclaimed area. The process is completed with consultations between the villagers and our dedicated Rehabilitation team at site. The initial idea to involve architecture expertise for construction was not realized. It was realized through discussions that the people prefer and find it convenient to own the responsibility of the design and construction of their house. The team is now facilitating with funds (in a phased manner) and advising on quality aspects of house building like the choice of construction material etc. An internal milestone-based procedure is implemented to monitor both progress and effective implementation of commitments. Resettling is a challenge affecting communities and it is our responsibility to ensure that the villages are better off than before. We are working as per schedule and are proud to share that our resettlement program is contributing to improving the lives of the original owners of the land. There are some operational challenges and there is a positive story too, for example in the Rabda village a few families have started paddy farming in the reclaimed area and have harvested a good produce. A few others in Keshmarda have also initiated corn farming. Supporting local infrastructure is one of our priority areas for community programs and a rapid assessment of needs is conducted to facilitate improvement in the local infrastructure. As a practice, we provide the basic infrastructure before the construction of houses in the reclaimed area. The scarcity of water was identified as one of the problems for farming and water management interventions were needed to reduce the labor in fetching water. Villagers walked miles, from plateau to plain, to fetch water from natural resources (Jhiria) near villages. We have completed construction of 3 wells & digging of 6 tube wells in new R&R sites and further wells as well as tube wells are planned in upcoming R&R site. These are being done in close consultation with the local representatives as well as local administration.



**Shukloo / Kareya
Village – Rabda
(Rice Crop)**



**Heera / Sunher
Village – Rabda
(Rice Crop)**

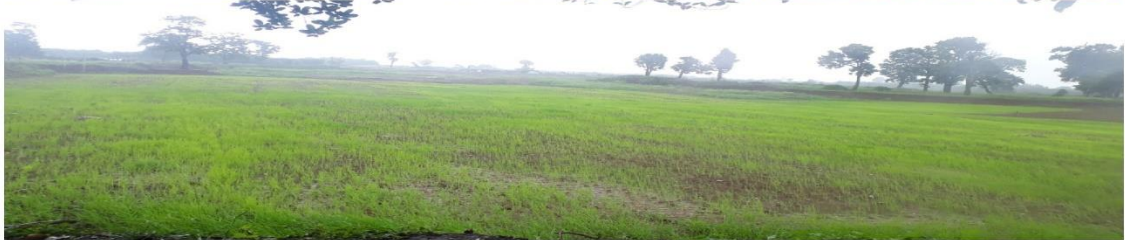




Figure 11: Rehabilitated Areas on Reclaimed Land, 2019

The community buildings for local gatherings and events, primary schools and health facilities are planned to strengthen local infrastructure and retain the social identity of the villages in the reclaimed area as a part of our commitments signed in 2018.

Our mining operations are ongoing as per approved mine plan and are in last phase of life of the mine. We are concurrently working for closure of mine as per mine closure plan as per the regulatory requirements and for meeting with the societal aspirations.