

ECONOMIC & SOCIAL IMPACT OF VEDANTA



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SOCIO-ECONOMIC IMPACT ASSESSMENT OF VEDANTA

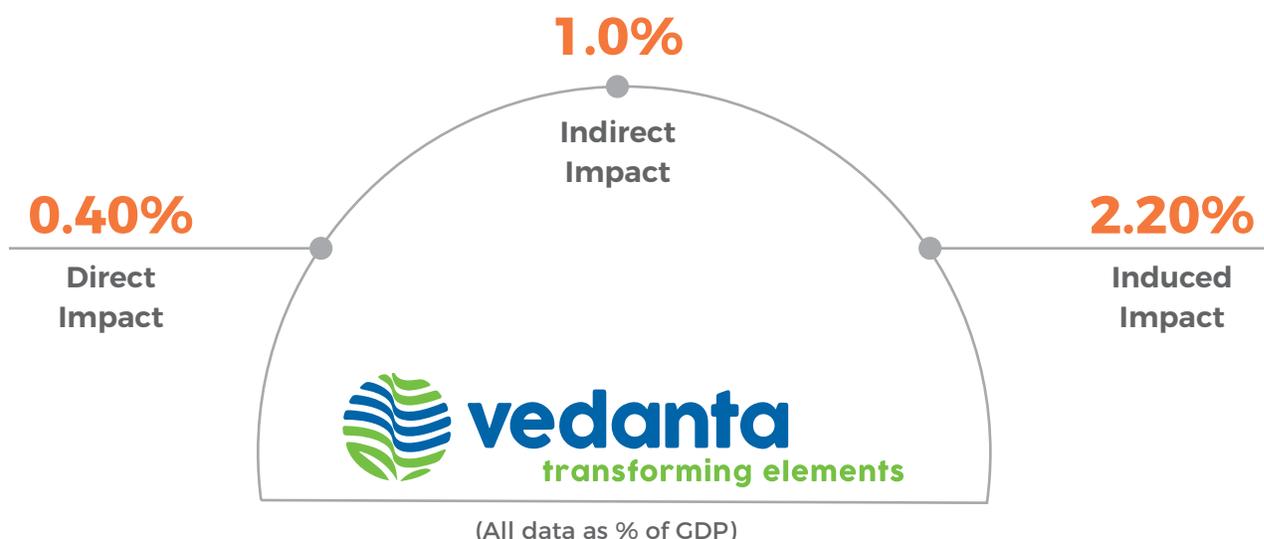
Businesses have a substantial impact on people's lives, whether as employees, suppliers, investors or consumers. They play a critical role in shaping people's well-being, generating employment opportunities and enhancing the economic prosperity of regions. This happens through the choice of products and services that they offer to the society, their investment decisions, the contribution to public finances, the opportunities they offer for skilling and training, their internal governance, or through their impacts on the physical space and the resources available to society and future generations.

The enhancement of community well-being and being mindful of their impact on environment is important for businesses not only on moral grounds but also economically. It provides them with potential opportunities to achieve greater commercial success. There are many studies advocating that engaging in sustainable practices make companies more competitive and resilient. In addition, many companies are now following the practice of shared value. They are finding business opportunities in social challenges faced by the society. The approach differs significantly from the idea of "giving back" to the society.

Companies practising shared value build their business model around some societal problem.

The study "Socio-Economic Impact Analysis of Vedanta" is aimed at analysing the impact of seven companies of Vedanta, namely, Hindustan Zinc Limited, Bharat Aluminium Company Limited, Vedanta Aluminium, Talwandi Sabo Power Limited, Sesa Goa Iron Ore, Sterlite Copper, and Cairn India. The analysis is divided in three sections - Introduction, Economic Impact and Social Impact.

The introductory part of every section presents an overview of the company and its operations, its growth over the years and its contribution to industry's overall output. The industry analysis that is examined through Diamond Model Framework and the Value Chain Framework is also a part of the introductory analysis. It helps in understanding the strategic position of India's industry and the competitive advantage available to the company. The economic impact analysis studies the change in economic activity due to company's operations. The social impact analysis examines the improvement in well-being of individuals through company's CSR activities and how the company is creating shared value.



Impact of Vedanta

Company	Direct Impact (Total Sales) (INR Cr.)	Direct Impact (As a % of GDP)	Indirect Impact (INR Cr.)	Indirect Impact (As a % of GDP)	Induced Impact (INR Cr.)	Induced Impact (As a % of GDP)
HZL	22,521	0.13	63,960	0.37	1,30,622	0.76
Cairn	9,536	0.06	18,786	0.11	48,729	0.29
Sesa	3,257	0.02	5,765	0.03	16,090	0.09
TSPL	4,207	0.02	11,106	0.06	23,936	0.14
Balco	9,023	0.05	15,971	0.09	44,574	0.26
Vedanta Aluminium	19,001	0.11	53,962	0.32	1,10,203	0.64
Total Impact of Vedanta	67,544	0.40	1,69,550	1.0	3,74,154	2.20

India's GDP 2017-18 (INR Cr.)- 1,70,95,005

Induced impact for 2017-18¹

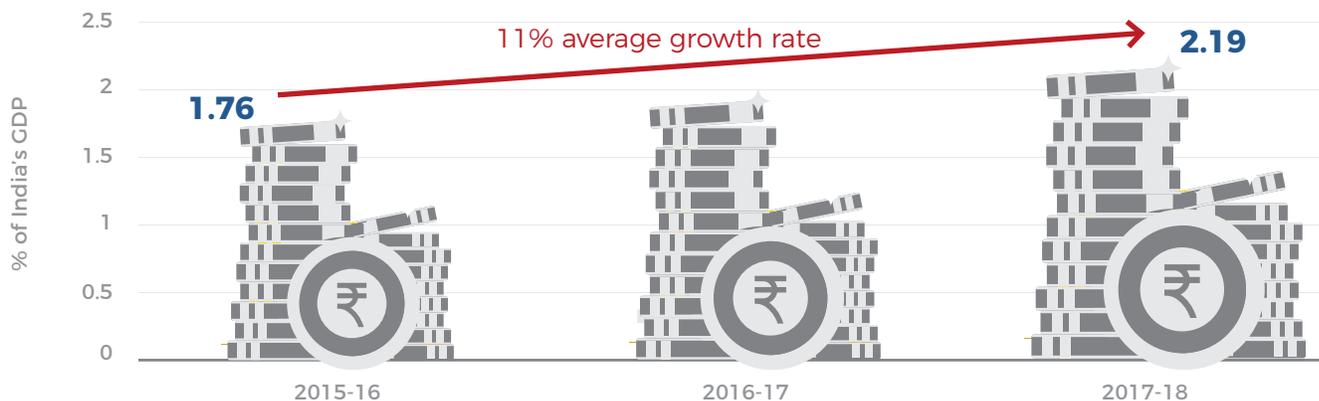


Figure : Change in Overall Induced impact of Vedanta Group as a percentage of India's GDP.

¹ To keep the year consistent across all firms for calculating the overall Vedanta' induced impact the above table is for 2017-18. For some companies the analysis is also done for 2018-19 and is present in their respective detailed reports.

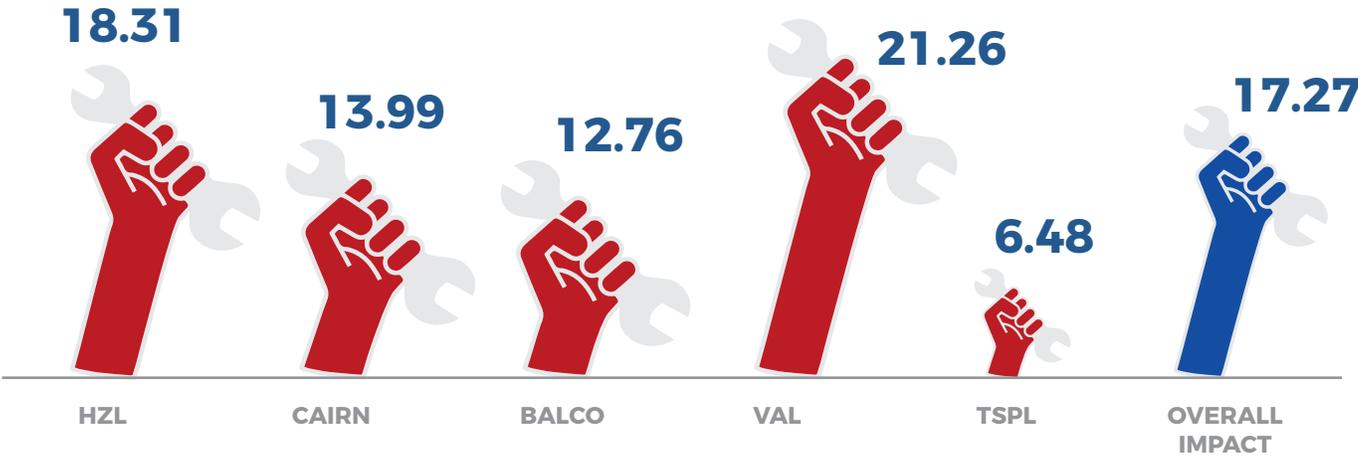
Overall Employment Multiplier: Vedanta Group Ltd.

Vedanta Aluminium has been a key player in generating employment through its various industries and as a result benefitting the economy and society. Ranging from industries like ore-mining to electricity, Vedanta has an

overall significant impact on employment by generating around 962824 man-year which translates to creating 17 job opportunities per employee of Vedanta Group Ltd.

Company	Impact On Employment	Total no. Employees	Employment Impact per employee of the Company
HZL	3,91,865	21,397	18.31
CAIRN	1,11,571	7,970	13.99
BALCO	1,19,103	9,331	12.76
VAL	3,30,609	15,549	21.26
TSPL	9,676	1,493	6.48
OVERALL IMPACT	9,62,824	55,740	17.27

Employment Impact per employee of the Company



HINDUSTAN ZINC LTD.



Hindustan Zinc Limited is the second-largest zinc-lead miner in the world and accounts for

80% of India's zinc demand.



ECONOMIC IMPACT OF HZL OPERATIONS

THE COUNTRY SAVES OVER

INR 10,150 Cr.

of foreign exchange through domestic production of zinc by HZL.

THE COUNTRY SAVES ABOUT

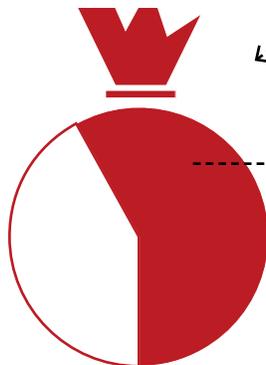
INR 2,100 Cr.

of foreign exchange through domestic production of lead by HZL.

THE COUNTRY SAVES OVER

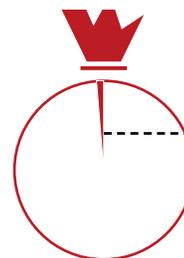
INR 2,200 Cr.

of foreign exchange through domestic production of silver by HZL



56%

of the company's revenue goes as contribution to **GOVERNMENT EXCHEQUER**



The induced impact is as large as

0.64% of India's GDP*

*For the FY19.

Potential Impact of Tax Contribution



EDUCATION
Support the primary education of **1.38 Cr.** students



HEALTH & WELLNESS
Support over **2 lacs** medical officers for a year



CONTRIBUTION TO GDP IS EQUIVALENT TO **0.13% of GDP**



6 TIMES

higher average remuneration of HZL than manufacturing employees in Rajasthan

Hindustan Zinc's impact on output is equal to

0.33 % of India's GDP



and its impact on income is equal to

0.10 % of India's GDP

SOCIAL IMPACT OF HZL OPERATIONS

HZL through its operations has impacted

64,000 children



until now and the gains of such intervention amount to **INR 1,497 Cr.**



The Siksha Sambal programme of HZL results in a cumulative income improvement of about

INR 20 Cr. on a yearly basis

THE UNCHI UDAAN PROGRAMME OF HZL RESULTS IN A WAGE BOOST OF

INR 160,000 per year on an average for each student.



INTRODUCTION

Just as steel plays a pivotal role in the development of a modern economy and its consumption is often taken as an indicator of economic development, zinc has an equally vital role in a nation's economic progress. This is because, among other uses, zinc is mainly used in galvanising iron and steel as a protection against corrosion. The non-ferrous metal is, thus, an indispensable part of a nation's infrastructure building. It also finds application in the electrical and chemical industry, light industry, military, medicine, and other fields.



In India,

zinc production is synonymous with Hindustan Zinc as the company accounts for all of the country's zinc production and cater to almost

80%

of the country's zinc demand.

Moreover, the company is the second largest zinc-lead miner and the fourth largest zinc-lead smelter globally. As a result of its immense production capacity and market footprint, the company has a leading role to play in defining India's socio-economic development. The country's appetite for zinc will only expand with the times considering the increasing expenditure of the government towards infrastructure development, especially on the urban front, with projects under initiatives like the Smart Cities Mission and Swachh Bharat.

Hindustan Zinc: A Privatisation Story

Hindustan Zinc Ltd. (HZL) was set up in 1966 as a public sector undertaking. However, as operations were becoming unviable for the government after a continuous downward trend in global zinc prices, it decided to privatise the company in 2001 as a part of Atal Bihari Vajpayee's disinvestment plan. In April 2002, the government sold its 26 percent stake in HZL to Sterlite Opportunities and Ventures Limited (SOVL) and transferred management control. SOVL acquired additional stake in 2003 and expanded its stake up to 64.92 percent. After a series of mergers, HZL is now a direct subsidiary of Vedanta Limited.

Figure 1 shows the transformation that has taken place in the financial performance of the company since the privatisation of HZL in 2002.

“The company, which was barely breaking even when it was government-run, witnessed a stark upswing in its revenue and profits after being taken over by Vedanta.”

Specifically, while the profit after tax rose from about INR 300 million to INR 1.6 billion under government control between 1989 and 2001, it shot up to INR 92.7 billion by 2018.

Since the disinvestment, the company has gone from strength to strength. HZL's ore production capacity has expanded about eight-fold from about



Meanwhile, the zinc, lead and silver metal production capacities through smelting have witnessed over a seven-fold increase since 2002. **The metal production capacity, which was at 204,000 tonne per annum in 2002, is now on track to achieve the million tonne mark this year.**

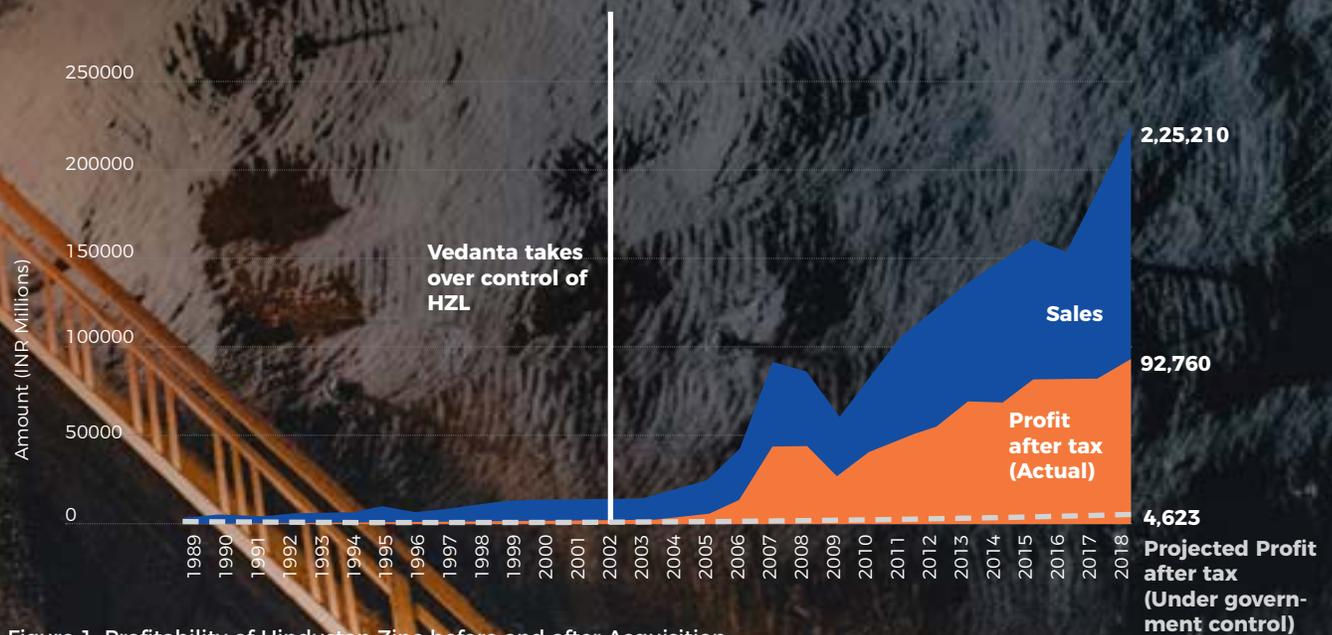


Figure 1: Profitability of Hindustan Zinc before and after Acquisition
Source: Institute for Competitiveness Analysis

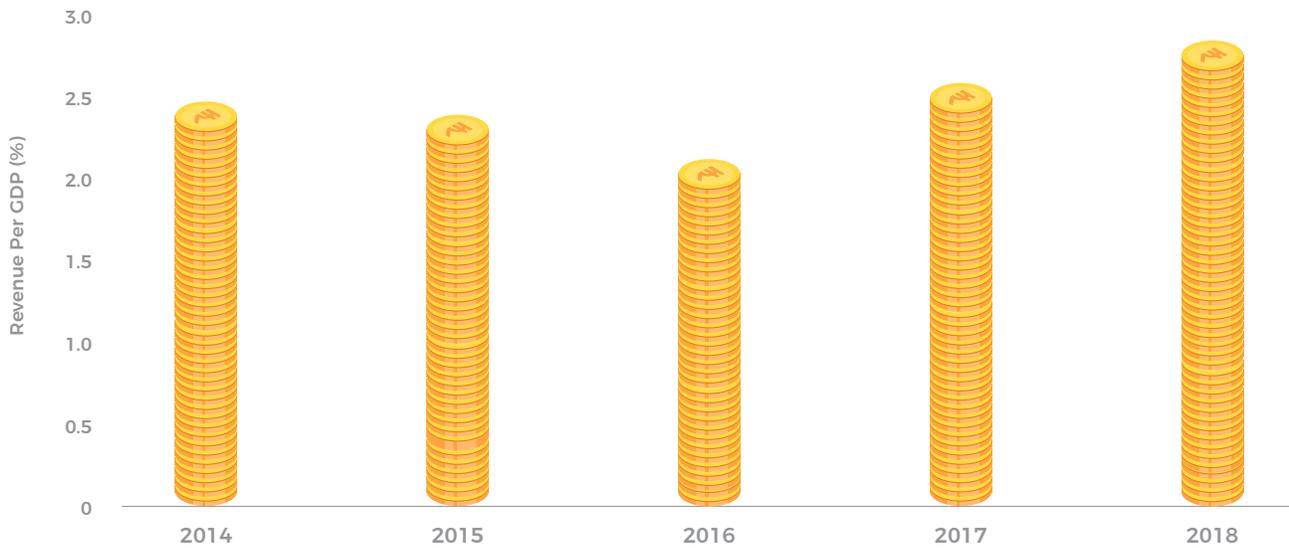


Figure 2: Revenue of HZL as a percentage of Rajasthan's GDP

Source: Central Statistical Organisation

Along with its being one of the largest names in the Indian zinc industry, HZL has also been an active contributor in the GDP of Rajasthan. The company has driven considerable growth in the regions it operates. HZL's revenue as a percentage of GDP of Rajasthan has been rising over time. In the year 2018,

around 2.73% of Rajasthan's GDP was contributed by HZL's revenue

This percentage is expected to rise even more due to the company's consistently improving performance.



THE ACTUAL PROFIT AFTER TAX IN 2018 IS

INR 92,760 mn.

while under government control this would have been **INR 4,622 million.**

The firm's operations are mainly centred in the state of Rajasthan spread across various districts. In all HZL has five mines and three smelters in Rajasthan along with processing and refining plants in the state of Uttarakhand. The company also has a few coal-based captive power plants for operation of its mines and smelters and also wind-based power plants spread across India. These are outlined below on a map along with the capacity of each operation.

HINDUSTAN ZINC OPERATIONS ACROSS INDIA

Rampura Agucha Mine

Reserves	46 mn MT
Resources	50.5 mn MT
Reserve Grade	Zn 13.8%, Pb: 1.9%
Ore Mined in FY18	3.9 MT

Kayad Mine

Reserves	5.5 mn MT
Resources	2.8 mn MT
Reserve Grade	Zn 4%, Pb: 3%
Ore Mined in FY18	1.2 MT

Sindesar Khurd Mine

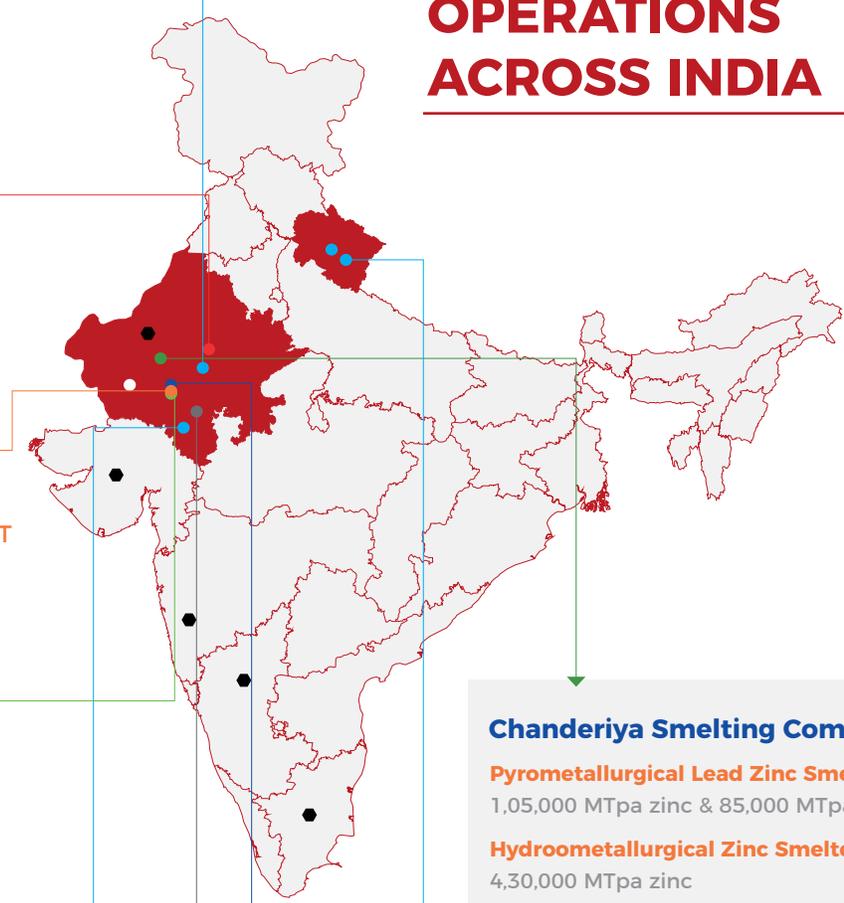
Reserves	34.6 mn MT
Resources	91.4 mn MT
Reserve Grade	Zn 4%, Pb: 3%
Ore Mined in FY18	4.5 MT

Rajpura Dariba Mine

Reserves	9.3 mn MT
Resources	50.7 mn MT
Reserve Grade	Zn 4.9%, Pb: 1.7%
Ore Mined in FY18	0.9 MT

Zawar Mining Complex

Reserves	10.4 mn MT
Resources	90.1 mn MT
Reserve Grade	Zn 3%, Pb: 2.1%
Ore Mined in FY18	2.2 MT
Captive Power Plant	80 MW



Chanderya Smelting Complex

Pyrometallurgical Lead Zinc Smelting
1,05,000 MTpa zinc & 85,000 MTpa lead

Hydrometallurgical Zinc Smelter
4,30,000 MTpa zinc

Captive Power Plant: 234 MW

Dariba Smelting Complex

Hydrometallurgical Zinc Smelter
2,20,000 MTpa zinc

Lead Smelting: 1,16,000 MTpa lead

Captive Power Plant: 160 MW

Debari Zinc Smelter

Hydrometallurgical Zinc Smelter
88,000 MTpa zinc

Pantnagar & Haridwar

Processing & refining of zinc, lead & silver

Wind Power

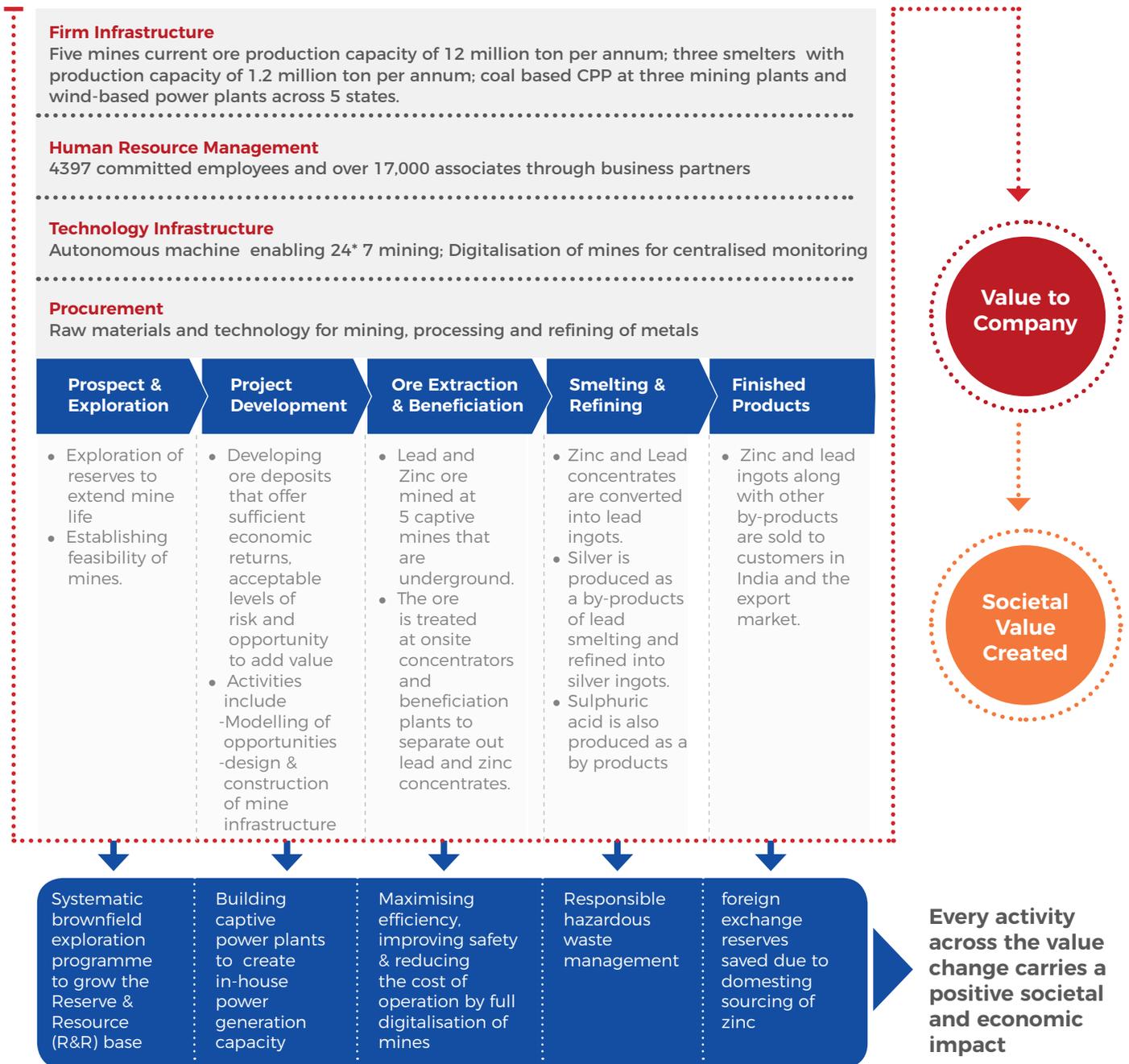
Rajasthan	88.8 MW
Gujarat	88.8 MW
Maharashtra	25.5 MW
Karnataka	49.4 MW
Tamil Nadu	21 MW

INDUSTRY ANALYSIS

Mining companies require planning to consistently deliver products that confirm to the quality and quantity requirements of customers throughout the life of the mine. The operational complexity of running modern mines extends

far beyond mere production activities and there is a need to find ways of analysing and managing it in a competitive environment.

Value chains are a useful concept to understand the competitive advantage by arranging value adding activities in a sequential chain. Competitive advantage can be derived from both the value adding activities and linking them to each other. The depiction below outlines the value chain of Hindustan Zinc.

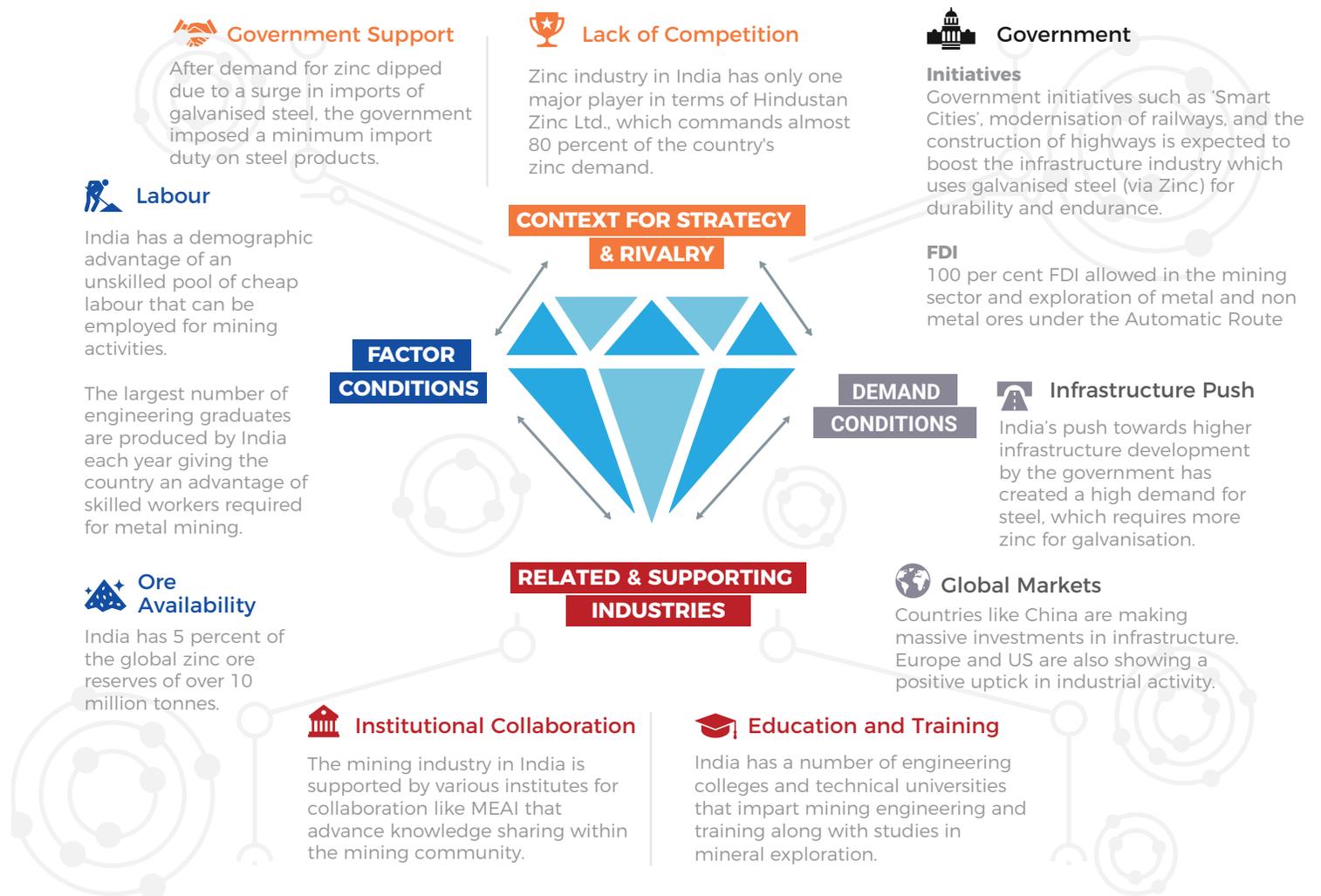


Value Chain of Hindustan Zinc

The value chain shows how the company attempts to maximise economic and societal value at every step of the value chain. Beginning with the process of exploration where it undertakes a systematic programme to expand mine life and ensure sustenance to the process of mining where the company has completely digitalised quite a few of its mines to infuse efficiency, HZL is creating immense value across its production process.

An accompanying diamond model is depicted below to show the strategic positioning of the Indian zinc industry and its future prospects. It shows that India has a competitive advantage in almost all aspects of zinc mining. The demand condition for the zinc industry are especially strong due to the infrastructure push provided by the government with initiatives like the Smart City Mission and Swachh Bharat. Such projects would ensure strong demand for iron and steel, and, hence, zinc for the purposes of galvanisation.

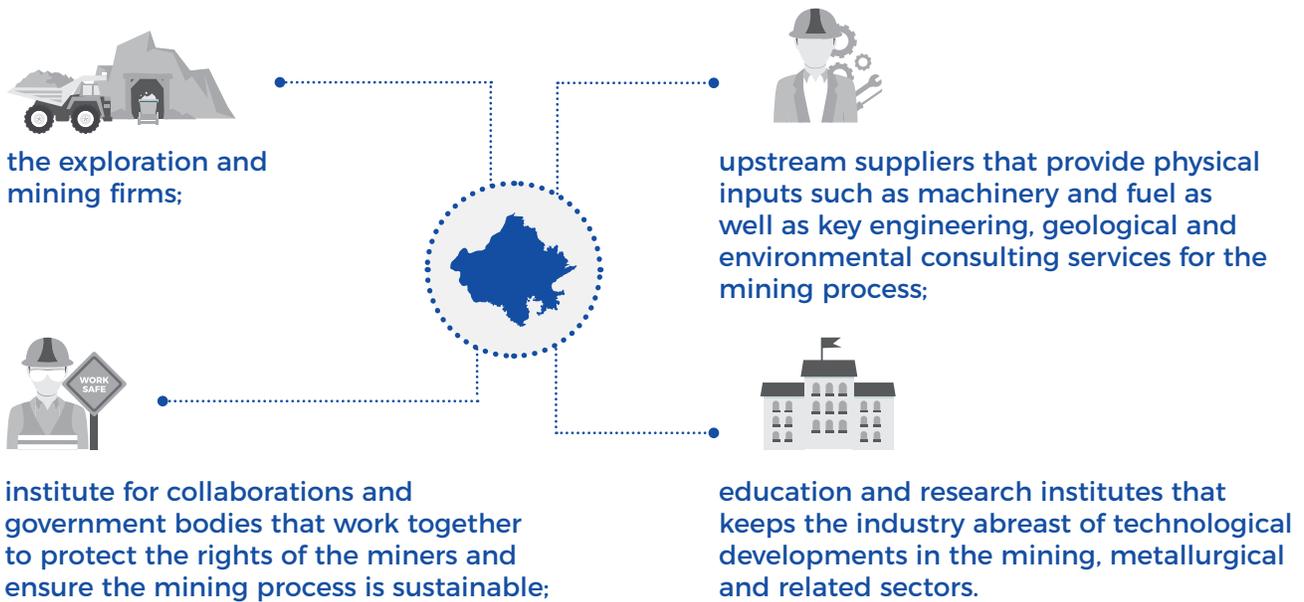
DIAMOND MODEL OF THE INDIAN ZINC INDUSTRY



India also has a competitive advantage over other countries due to its strong factor conditions. Apart from the availability of zinc ore reserves, the strength of the country lies in its vast pool of workers, both skilled and unskilled. Lastly, the country also has a strong presence of related and supporting industries

through educational institutions and institutes for industrial collaboration and development. Thus, India has a conducive environment for the growth and progress of zinc industry. With Hindustan Zinc at the very core of the industry, its growth prospects seem ripe for the taking.

The figure below is a visual of the mining and smelting cluster in Rajasthan. There are four main principal actors operating in the cluster –

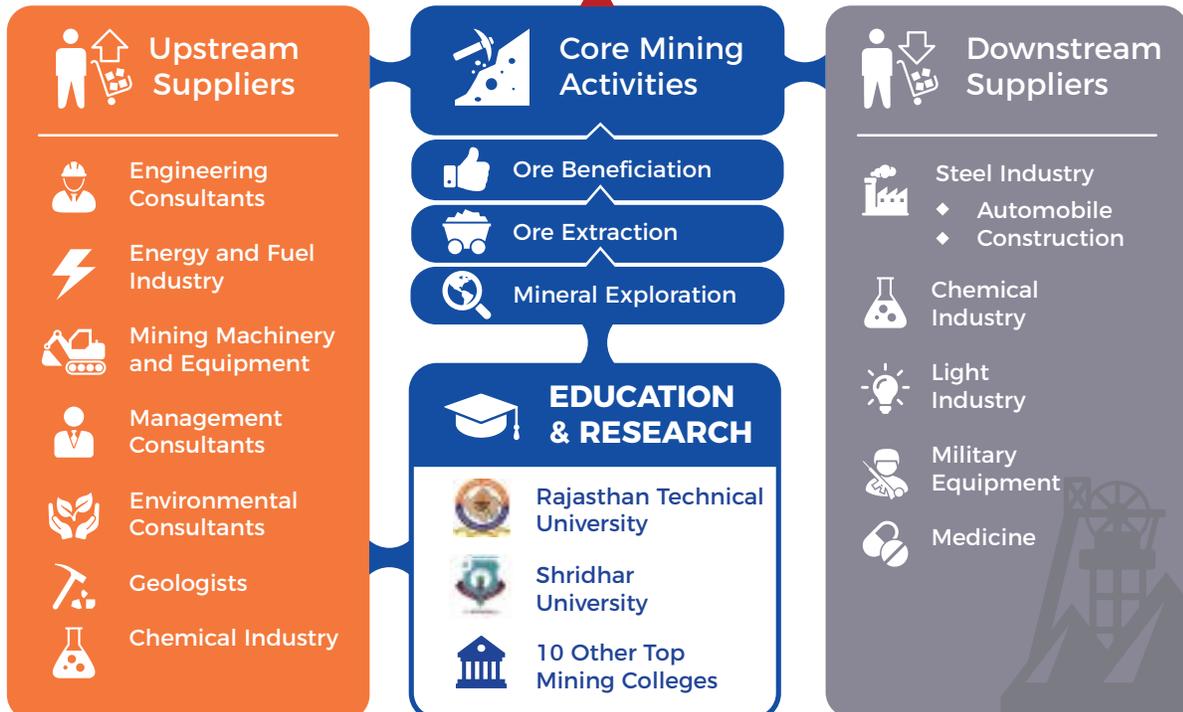


INSTITUTES FOR COLLABORATION AND GOVERNMENT BODIES

MINING ENGINEERS' ASSOCIATION OF INDIA

FEDERATION OF MINING ASSOCIATION OF RAJASTHAN

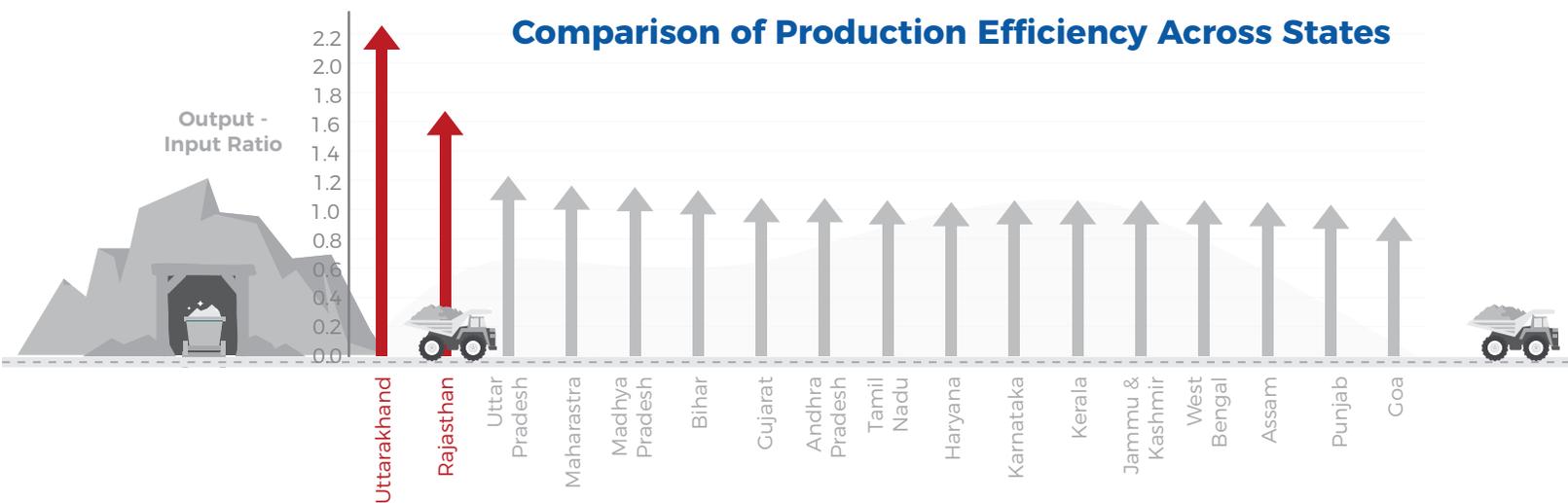
DEPARTMENT OF MINES AND GEOLOGY



Cluster Map: Mining Industry, Rajasthan

The performance of the cluster in Rajasthan can be compared to other states by using the output-input ratio. The figure below shows that the regions where HZL operates i.e.

Uttarakhand and Rajasthan, have the highest efficiency in the manufacturing of lead and zinc products.



To get a better idea of the efficiency a comparison can also be drawn across sectors. Figure 3 shows the state level production efficiency for five sectors – aluminium, copper, steel, zinc and lead and precious metals.

It can be seen from the figure that the states producing lead and zinc have the most efficient production processes.

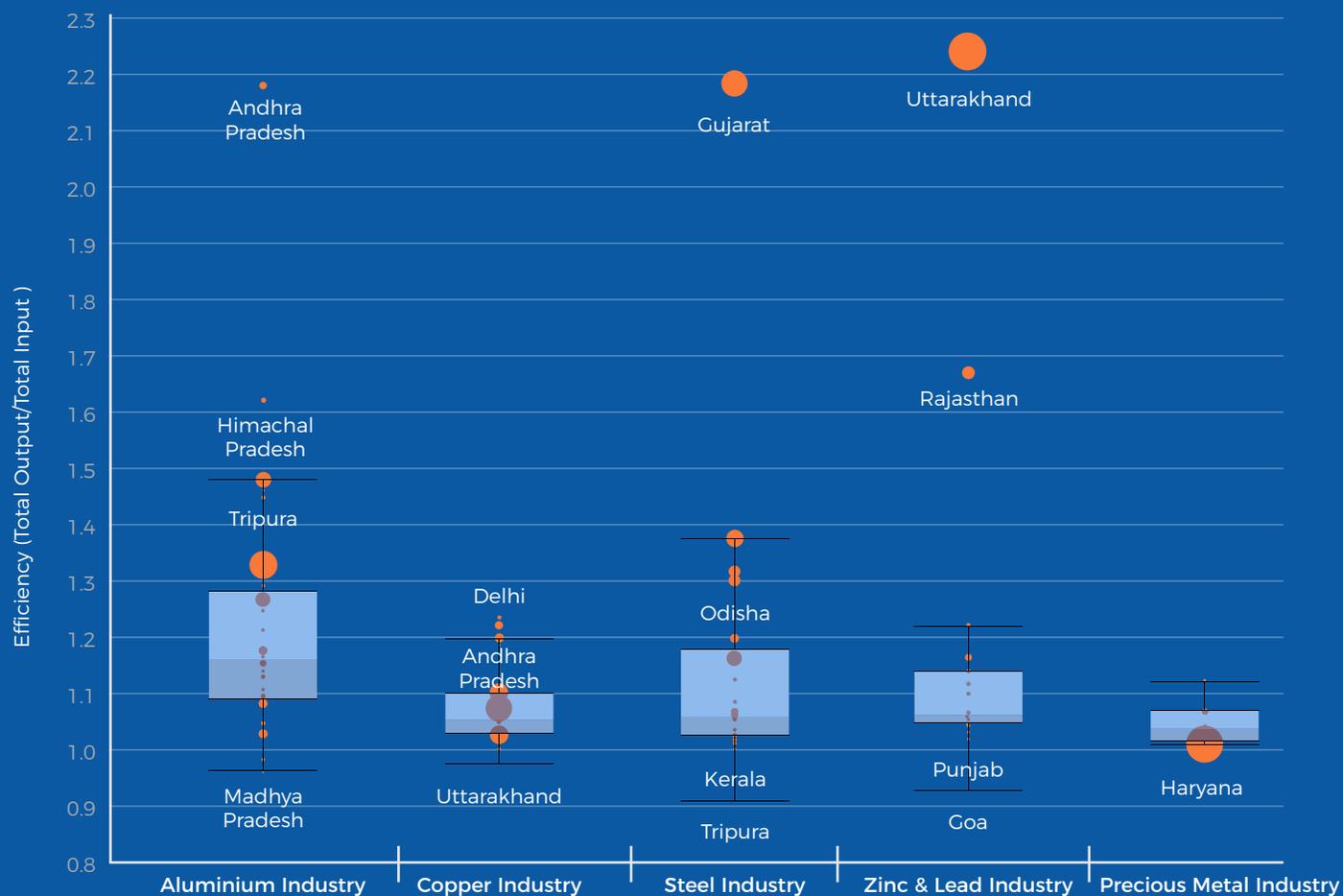


Figure 3: Industry-wise comparison of production efficiency.

Source: India Cluster Mapping Project, IFC



ECONOMIC IMPACT

HZL through its mining operations creates multiple levels of economic impact that do not necessarily pertain to metal extraction. These range from the impact created due to employment generated, contribution to the government exchequer, value added, labour income and so on.

Extent of Contractual Employment

HZL has a crucial impact on over 21,000 lives across the zinc value chain having a committed workforce of 4,397 employees and over 17,000 associates through business partners. The number of committed workers has been falling over time in the company in sharp contrast to the associates employed

through business partners. Therefore, more and more employment within HZL is being managed by specialized firms. However, Figure 4 shows that even the fall in employment in mines is an industry-wide trend. Moreover, the trend in fall for HZL workers is slower than that for the industry as a whole.

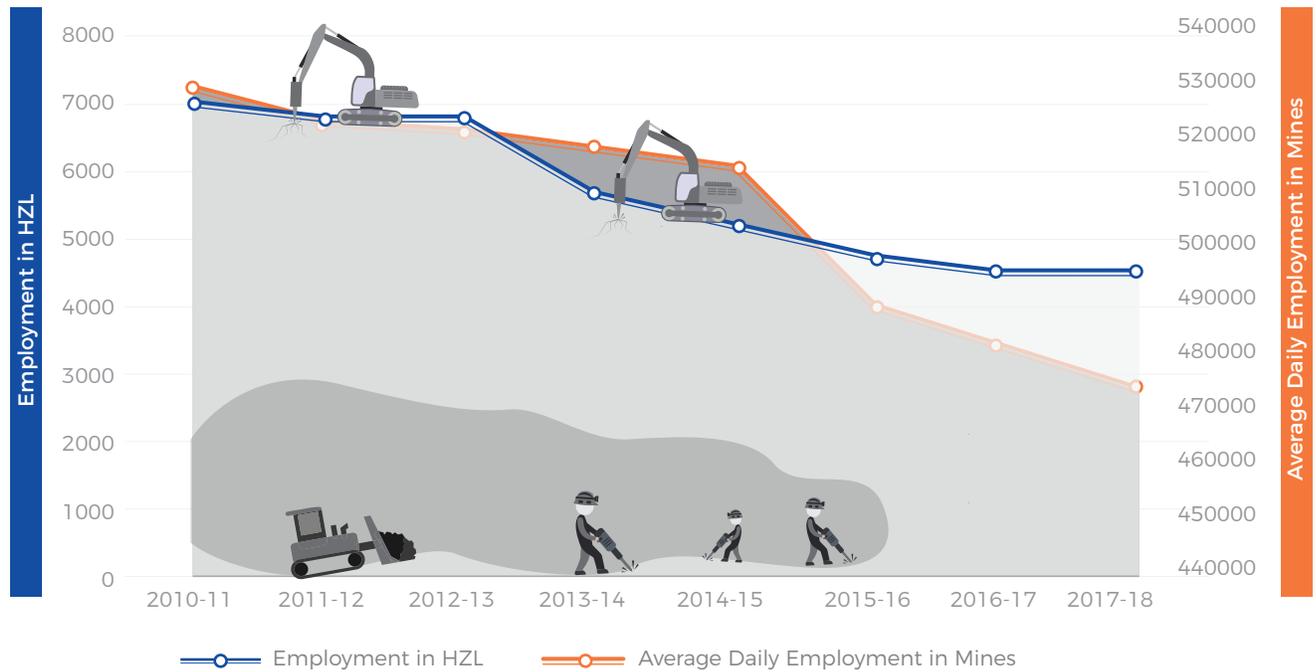


Figure 4: HZL Employment vs Average Daily Employment in Mines
Source: Vedanta Group Ltd and IFC Analysis | Indian Bureau of Mines.

A deeper impact assessment of HZL operations on creating employment opportunities is shown in figure 5. It shows the distribution between employees directly employed by HZL and the indirect employment it generates. The indirect employment consists of the contractual labors hired by the company. The given figure depicts the ratio of indirect to direct employment of HZL, which has jumped from 2.36 to 3.86 in a period of five years from 2014 to 2018.

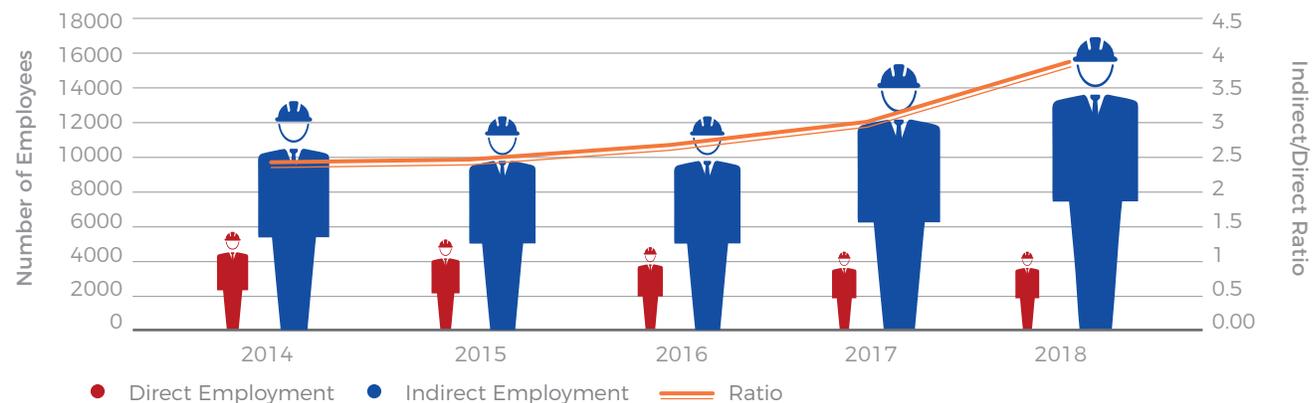


Figure 5: Employment Trends of HZL Operations

Source: Vedanta Group Ltd. and IFC Analysis

Forex Savings for the Nation

Zinc is primarily used in galvanising iron and steel to protect against corrosion of the metals. Therefore, Hindustan Zinc caters to such domestic demand of the upstream industries for the supply of refined zinc.



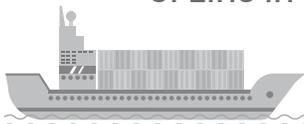
The refined zinc sales in the country by HZL amount to 515 kT.



As a result of the domestic production of zinc, the country is not dependent on foreign imports of the metal. Such an advantage allows the country to reduce its import bill and save precious foreign exchange reserves.

The data by Department of Commerce shows that India imported about

270 kT
of zinc in 2017-18



whose total import value amounted to
INR 5,332 Cr.

If the **515 kT** of zinc supplied by HZL is imported from abroad as well, the import bill will shoot up by an additional **INR 10,152 crore.**



THE COUNTRY SAVES OVER

INR 10,150 Cr.



of foreign exchange through domestic production of zinc by HZL.

On a similar note, the lead metal sales by HZL within the country amounted to



139 kT / Again, due to these domestic production advantages, the country manages to secure its foreign exchange reserves.

The data by Department of Commerce shows that India has imported



348 kT
of lead

at the cost of
INR 5,250 Cr.

Therefore, it can be imputed that as a result of domestic production of lead by Vedanta, the country saves **INR 2,096 crore** in foreign exchange.



THE COUNTRY SAVES ABOUT

INR 2,100 Cr.
of foreign exchange through
domestic production of lead by HZL.

Finally, HZL produces silver as a by-product of zinc mining. As of FY 2018, the company sold 556 MT of silver in the domestic market. In this case, considering the demand of the product,



India imported
6,942 MT
of silver during
the year,

which added about
INR 27,582 Cr.
to its import bill.

Therefore, as a result of the domestic supply of 556 MT of silver by Vedanta, the country saved about **INR 2,210 crore** in foreign exchange reserves.



THE COUNTRY SAVES OVER

INR 2,200 Cr.
of foreign exchange through
domestic production of silver by HZL

The total national savings of the country in foreign exchange due to the domestic production and supply of the three metals amounts to **INR 14,458 crore**.

The operations of Hindustan Zinc fall under the “Non-ferrous basic metals” industry. Based on the multipliers of that industry, Table 2 captures the direct, indirect and induced impact of Hindustan Zinc’s operations since 2011.

Direct, Indirect and Induced Impact of Hindustan Zinc’s Operations									
Year	India's GDP (INR Cr.)	Total Sales (Direct Impact) (INR Cr.)	Sales (as a % of GDP)	Type - I Multiplier	Indirect Impact (INR Cr.)	% Indirect Impact of Hindustan Zinc	Type - II Multiplier	Induced Impact (INR Cr.)	% Induced Impact of Hindustan Zinc
2012	87,36,329	11,405	0.13	2.84	32,390	0.37	5.8	66,149	0.76
2013	99,44,013	12,699	0.13	2.84	36,065	0.36	5.8	73,654	0.74
2014	1,12,33,522	13,636	0.12	2.84	38,726	0.34	5.8	79,089	0.70
2015	1,24,67,959	14,788	0.12	2.84	41,998	0.34	5.8	85,770	0.69
2016	1,37,71,874	14,226	0.10	2.84	40,402	0.29	5.8	82,511	0.60
2017	1,53,62,386	18,798	0.12	2.84	53,386	0.35	5.8	1,09,028	0.71
2018	1,70,95,005	22,521	0.13	2.84	63,959	0.37	5.8	1,30,622	0.76
2019	1,90,53,967	21,118	0.11	2.84	59,975	0.31	5.8	1,22,484	0.64

Table 2: Direct, indirect and induced impact of HZL operations



The induced impact of Hindustan Zinc on the Indian economy amounts to

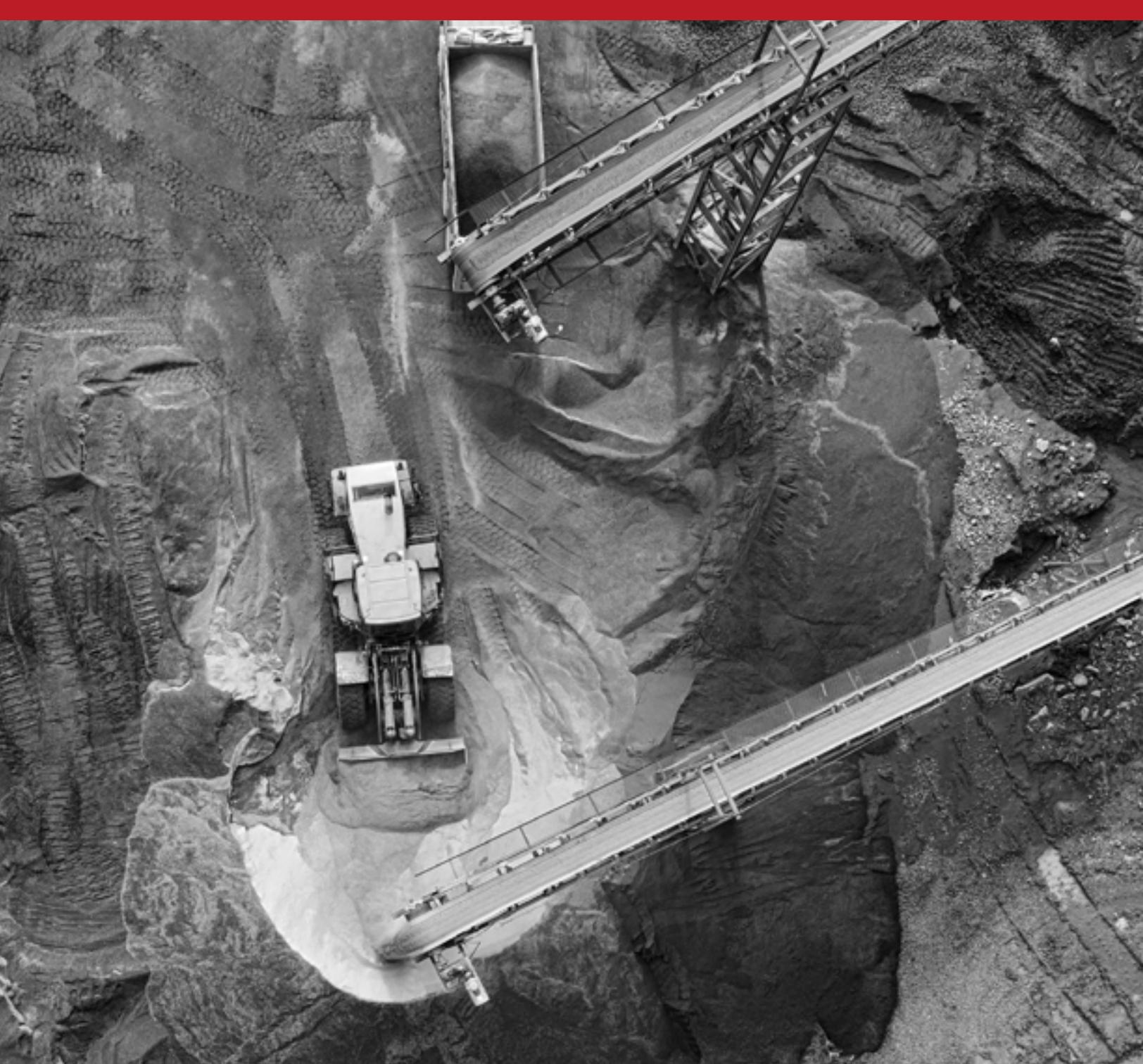
INR 1,22,484 Cr.



THAT IS
0.64%
of India's
GDP

The total sales of Hindustan Zinc, which reflects the direct impact on the economy amounts to 0.11 percent of India’s GDP in 2019. The indirect impact of the company’s operations in 2019 was almost INR 60,000

crores, or 0.31 percent of the country’s GDP. Lastly, the induced impact of Hindustan Zinc on the **Indian economy amounts to INR 122,484 crores, that is 0.64 percent of India’s GDP.**



“

The total sales of **Hindustan Zinc**, which reflects the **direct impact** on the economy amounts to **0.11% of India's GDP in 2019**.

Productivity Growth

Growing employment is only the first level of economic impact that a company can have in an economy. An even more vital contribution is in affecting a positive change in the productivity of those employees. A consistency in driving productivity of workers is what helps companies and even countries in general maintain a competitive edge.



Figure 6: Productivity Growth of HZL Employees

Source: Vedanta Group Ltd. and IFC Analysis

Figure 6 shows the productivity growth of employees at Hindustan Zinc. The productivity for HZL employees is measured by assessing the revenue generated per employee. It can be seen that between 2014 and 2018, the productivity of employees has more than doubled.



THUS, THE COMPETITIVENESS OF THE COMPANY IS ON THE RISE OVER TIME AS A TYPICAL

HZL employee is over **100 %**

more productive today than five years ago.

Contribution to Government Exchequer

An indispensable contribution that any business makes through its operations is through its tax contributions to the government. These tax contributions become a vital source of government revenue and advance the development and growth of the economy.

CONTRIBUTED

56 %

OF COMPANY'S REVENUE IN TAXES, THAT AMOUNTS TO AROUND 0.5 PERCENT OF GOVERNMENT'S TOTAL TAX REVENUE

Figure 7 shows the tax contributions made by Hindustan Zinc. It shows the contribution to government exchequer made by the company in the form of direct and indirect taxes on the mining and sale of zinc, lead and silver. A major portion of the contribution to government

comes from the indirect taxes and royalties paid by the company. In 2018, the total tax contribution of HZL to the government exchequer amounts to about INR 9301 crores (as of 2017-18), which accounts for about 42 % of the company's revenue.

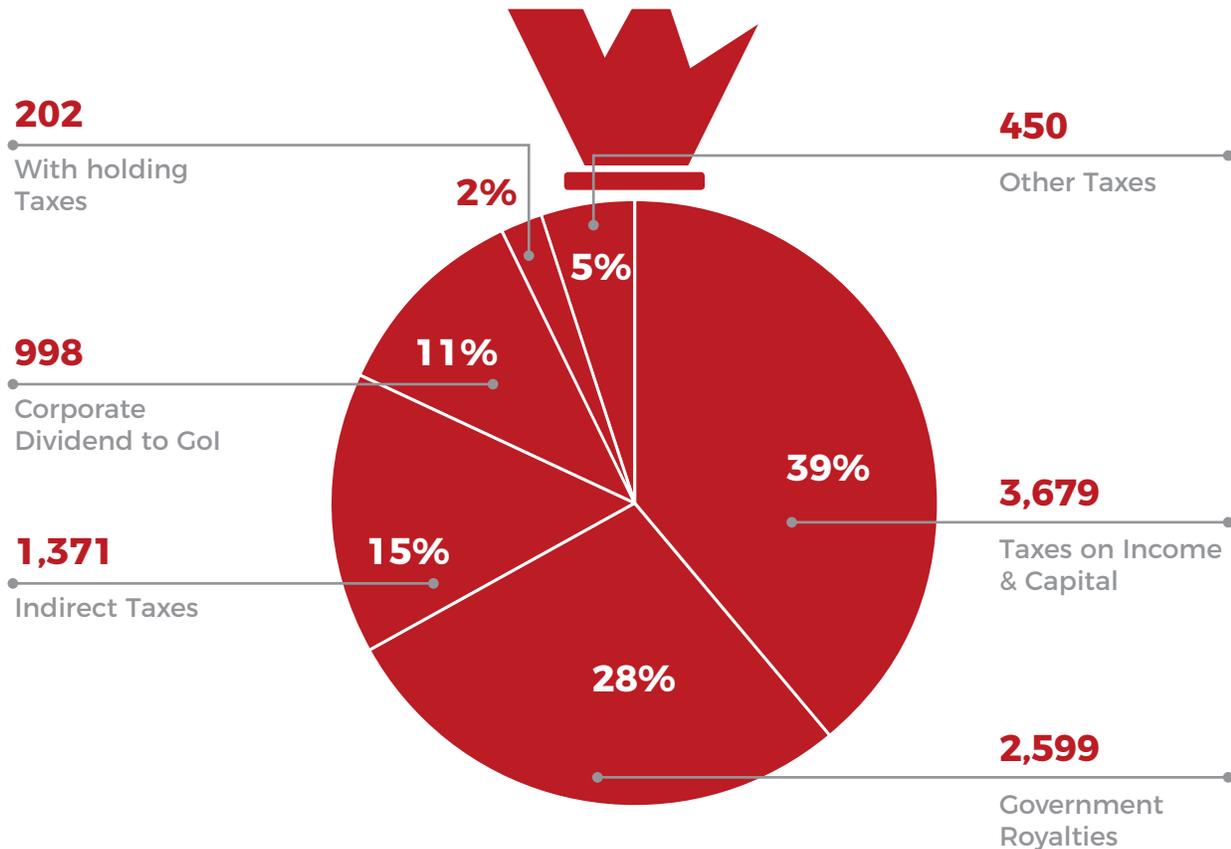


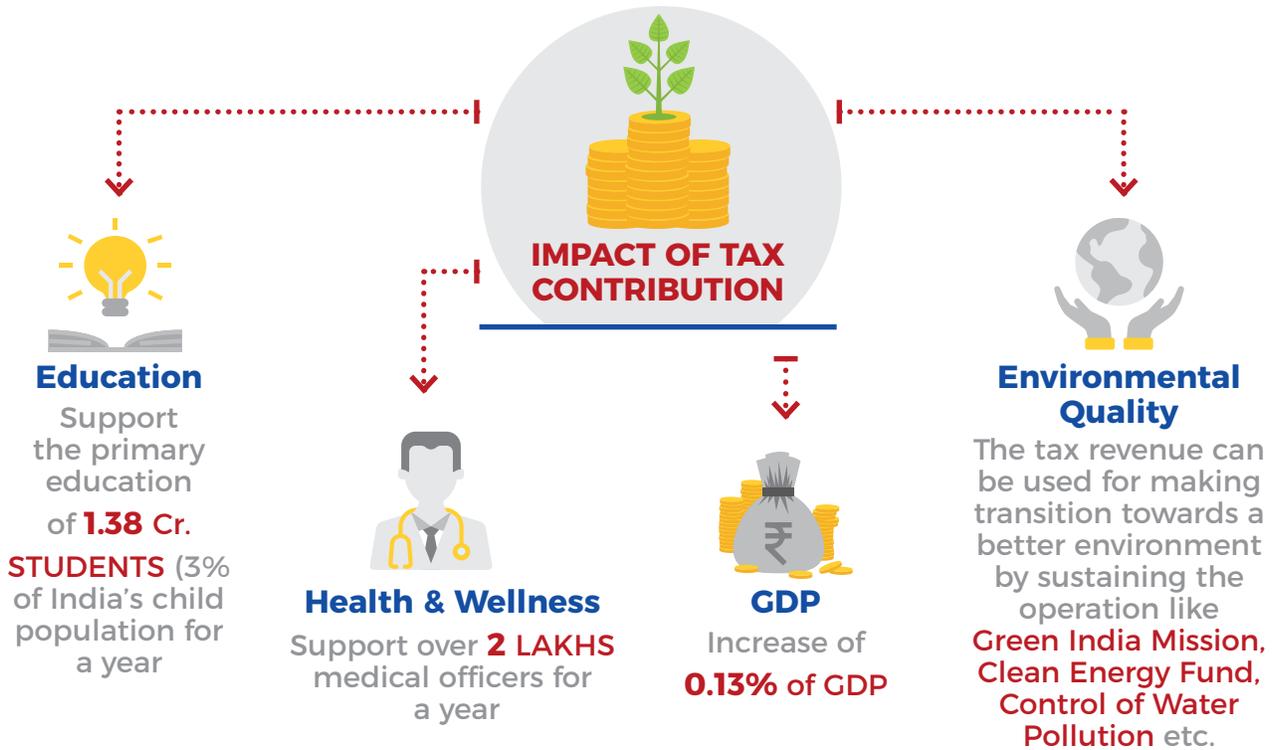
Figure 7: HZL Contribution to Government Treasury (INR Cr.)

Source: Vedanta Group Ltd. and IFC Analysis

56% contribution is an estimate based on 2018-2019 data. All the other estimates are based on data for the FY 2017-2018

Impact of Tax Contribution on Society

The tax revenue arising from direct and indirect taxes amounts to INR 9,301 crores. To put things in perspective, this section shows how this tax revenue can impact different sectors of the economy.



CAPITAL EXPENDITURE

If the entire tax revenue is used by the government as capital expenditure, then it will lead to a rise of INR 22,800 crores in GDP, given the capital expenditure multiplier for India is 2.45. This means an increase of 0.13 % increase in GDP

INR 9,301 Cr.



HZL's Contribution to Government Treasury

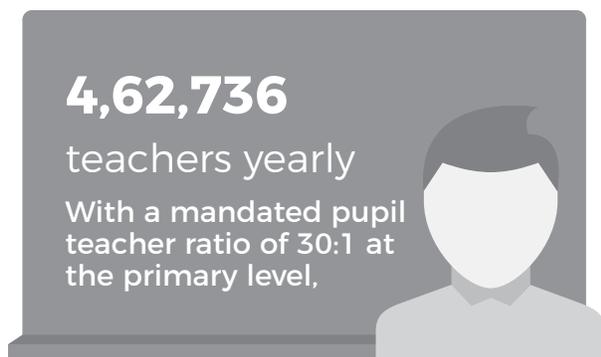
INR 22,800 Cr.



Rise in GDP if these contributions are made as capital expenditure

EDUCATION SECTOR

The entire tax revenue is enough to support



Hindustan Zinc can support the education of

INR 1.4 Cr.

students in the country for an year

HEALTH SECTOR

The cost of medical officers in India range between

INR 2.5 lakhs to INR 4.5 lakhs per annum.

This implies that the tax revenue by the company can support **2 lakhs to 3.72 lakhs** medical officers.



ENVIRONMENT, FOREST & CLIMATE CHANGE

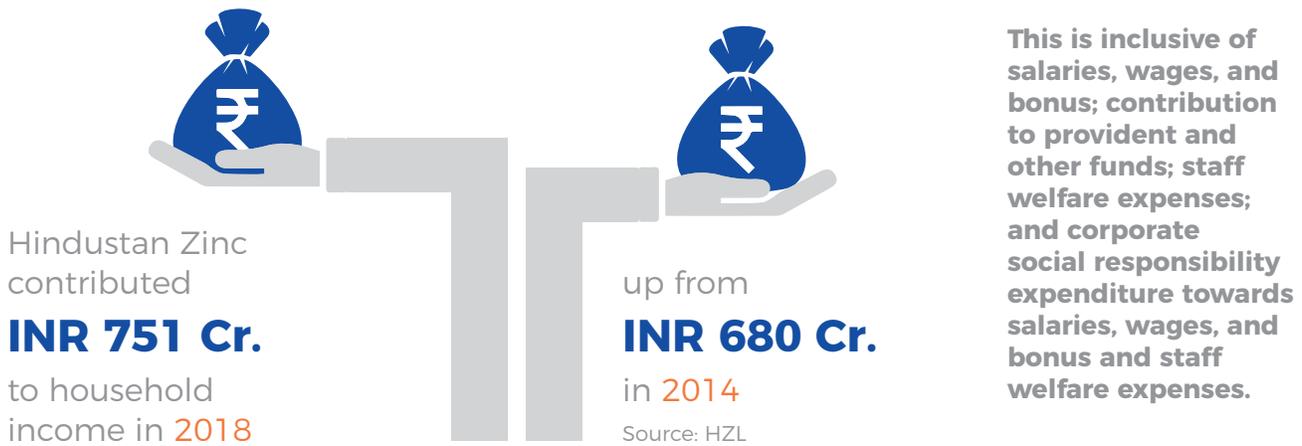


The total expenditure of the Ministry of Environment, Forests and Climate Change is

INR 2,626 Cr. per annum

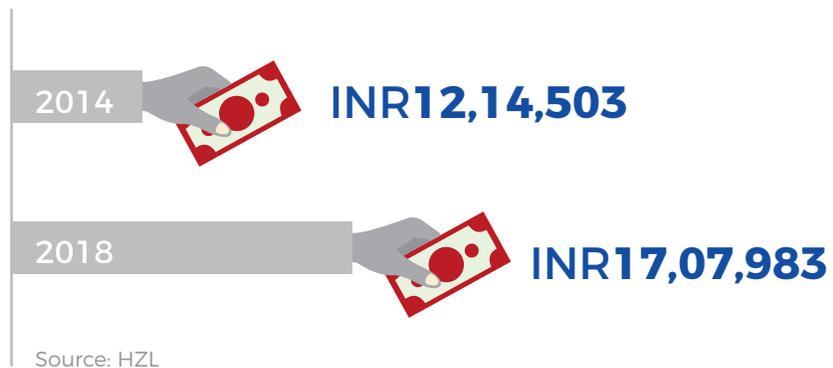
The tax revenue can be used for making this transition towards a better environment by sustaining the operations like Green India Mission, Clean Energy Fund, Control of Water Pollution etc.

Contribution to Labour Income



GENERATED LABOUR INCOME OF INR 751 CRORES IN 2018

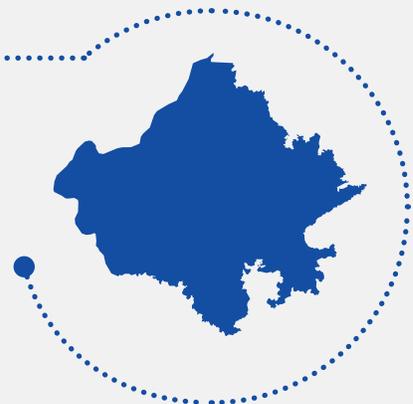
The employees of Hindustan Zinc earn significantly higher than the rest of the people employed in the manufacturing industry. The annual average wages of employees of Hindustan Zinc, calculated by dividing total remuneration by total employees, was



The annual average wages in Rajasthan (according to Directorate of Economics and Statistics, Rajasthan) were

INR 2,09,113

This implies that employees in HZL earn almost 6 times higher than the average Rajasthani manufacturing employee.



HZL wage comparison with average wages of the state

Year	2014	2018
Total Remuneration to HZL Employees (INR)	680 crore	751 crore
Employees of Hindustan Zinc	5,599	4,397
Annual Wages	12,14,503	17,07,983
Yearly Average Wage in Rajasthan (Manufacturing Sector)	2,09,113	2,94,080¹

Source: Vedanta Group Ltd and Directorate of Economics and Statistics, Rajasthan



THE AVERAGE REMUNERATION OF HINDUSTAN ZINC'S EMPLOYEES IS ALMOST

6 times higher

than the average wages of manufacturing employees in Rajasthan.

The employees of Hindustan Zinc earn significantly higher than the rest of the people employed in the manufacturing industry. The average monthly wages have increased from INR 1,01,209 to INR 1,42,332 during the period 2014-2018. This implies an annual rise of 9 %.

¹ The average wage of Rajasthan's manufacturing industry is not available for the year 2018. If one assumes that the wages in the manufacturing industry grew at the same rate as the wages in HZL, the figure turns out to be INR 2,94,080.



Sectoral Impact

The mining industry is considered to be a capital-intensive sector with strong backward and forward linkages with other industries. For instance, the mining process requires electricity from the power sector etc. Therefore, it is insightful to understand which sectors of the economy have benefitted most from Hindustan Zinc's indirect impact on

the (0.34 percent of India's GDP) economy. The figure below outlines these sectors. The highest impact - 31 percent - is on the "Non-Ferrous basic metals" industry. Apart from that, 9 percent impact is on "Supporting and auxiliary transportation activities" and 7 percent on the "Electricity" sector.

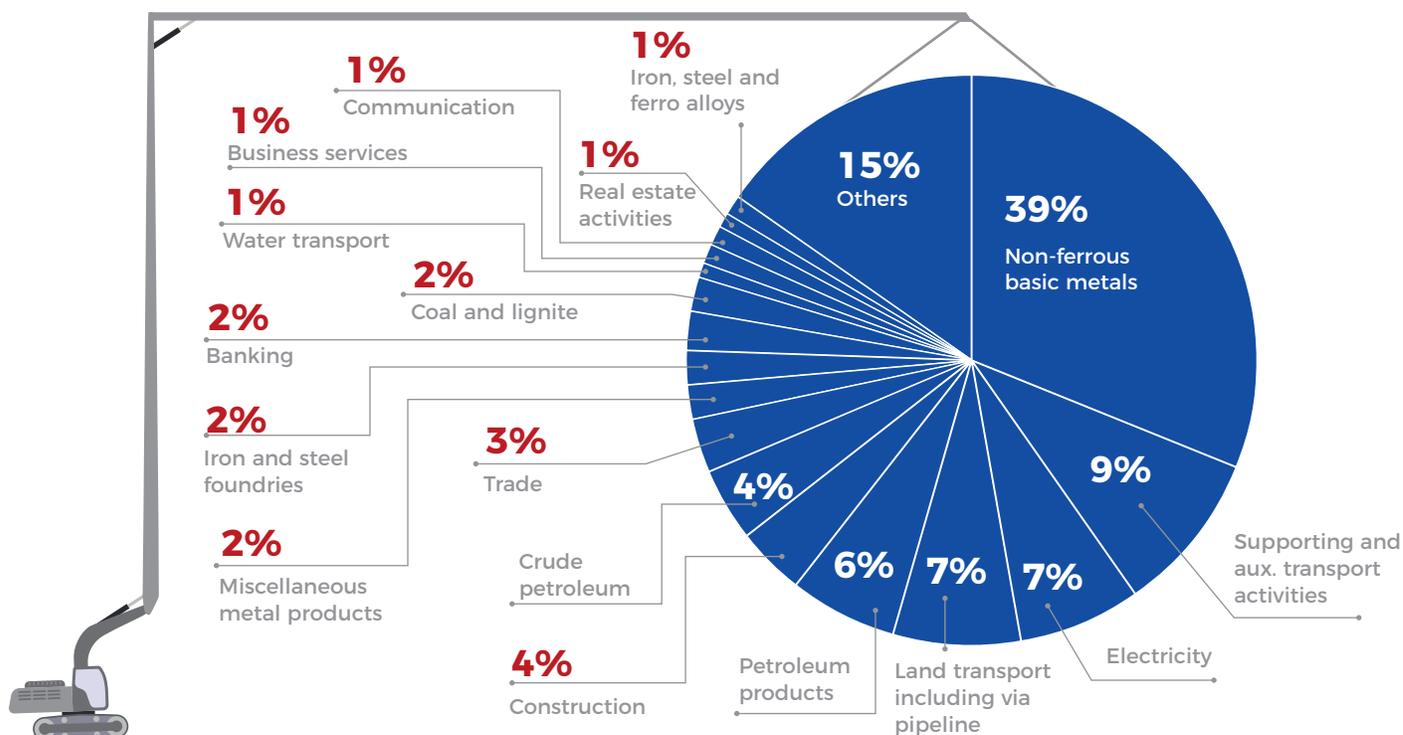


Figure 8: Sectoral Impact

Source: Vedanta Group Ltd and IFC Analysis

Output and Income Multipliers

The output multiplier for a given industry is the total value of sales by all industries necessary to deliver a rupee's worth of final demand for that industry's output. It is expressed as the ratio of change in direct and indirect output changes to direct output change due to a unit increase in final use. The value of this total business activity is larger than the market value of the currently demanded goods and services.

Therefore, multiplying Hindustan Zinc's total sales (INR 21,11,800 lakhs) by the output multiplier of the industry (2.95) gives us the

impact on economy's output. This is equal to **INR 62,29,810 lakhs**, that is **0.33 percent of India's GDP**.

The income multiplier translates the effect of change in demand into changes of household income. It basically looks at the consumption patterns. There are two types of income multipliers. First, the one that captures the change in income due to change in output. Second, the one that captures the change in income associated with an initial change in income.

²This includes direct impact on Hindustan Zinc as well as the impact on suppliers. Due to this the figure showing sectoral impact of Hindustan Zinc includes non-ferrous basic metal industry.

Impact of Hindustan Zinc on Output and Income								
Industry	India's GDP (INR Cr.)	Vedanta's Total Output (INR Cr.)	Output Multiplier of the Industry	Impact on Economy's Output (INR Cr.)	Impact on Economy's Output (As a % of country's GDP)	Income Multiplier of the Industry	Impact on Economy's Income (INR Cr.)	Impact on Economy's Income (As a % of country's GDP)
Non-Ferrous Basic Metals	1,90,53,967	21,118	2.95	62,298	0.33	0.92	19,429	0.10



Hindustan Zinc's impact on output is equal to

0.33 %

of India's GDP



and its impact on income is equal to

0.10 %

of India's GDP.



We calculate the impact of Hindustan Zinc's operation by using the first multiplier that measures the impact of change in income of households due to change in the company's sales. This change in income is driven by the increase in demand that impacts the demand for raw material supplies and hence the

employment. Multiplying Hindustan Zinc's total sales (INR 21,11,800 lakhs) by the income multiplier of the industry (0.92) gives us the impact on economy's income. This is equal to INR 19,42,856 lakhs, that is 0.10 percent of India's GDP.

Employment Multiplier

It is vital to assess how a company enables employment opportunities for people in the economy. Non-Ferrous Basic Metals has an employment multiplier of 0.17 which means for every 1 lakh of output there is a

generation of 0.17 jobs. Taking this value into consideration, HZL's output of INR 22,52,100 Lakhs has generated 3,91,865 jobs. Also, for every 1 employee of HZL there are around 18 jobs generated in the economy.

Industry	Employment Multiplier	HZL's Total Output (INR Lakhs)	Impact on Employment	Total number of Employees in HZL	Jobs generated per employee of HZL
Non-Ferrous Basic Metals	0.17	22,52,100	391,865	21,397	18.31

LOCAL IMPACT

The operations of Hindustan Zinc are scattered around five mines and three smelters in Rajasthan along with processing and refining plants in the state of Uttarakhand. Since across each of these locations the company has a prominent presence, it carries the potential to create substantial impact in local economies.

Figure 9 shows the longitudinal impact on local economies of four districts in Rajasthan (Chittorgarh, Bhilwara, Rajsamand and Udaipur) and one in Uttarakhand (Udham Singh Nagar). It maps the revenue of the plants in those districts with respect to the GDP of the district.

The figure shows that HZL accounts for almost half of the local economy in some regions. It is evident that Chanderia and Dariba smelting complexes have the strongest presence in their districts.

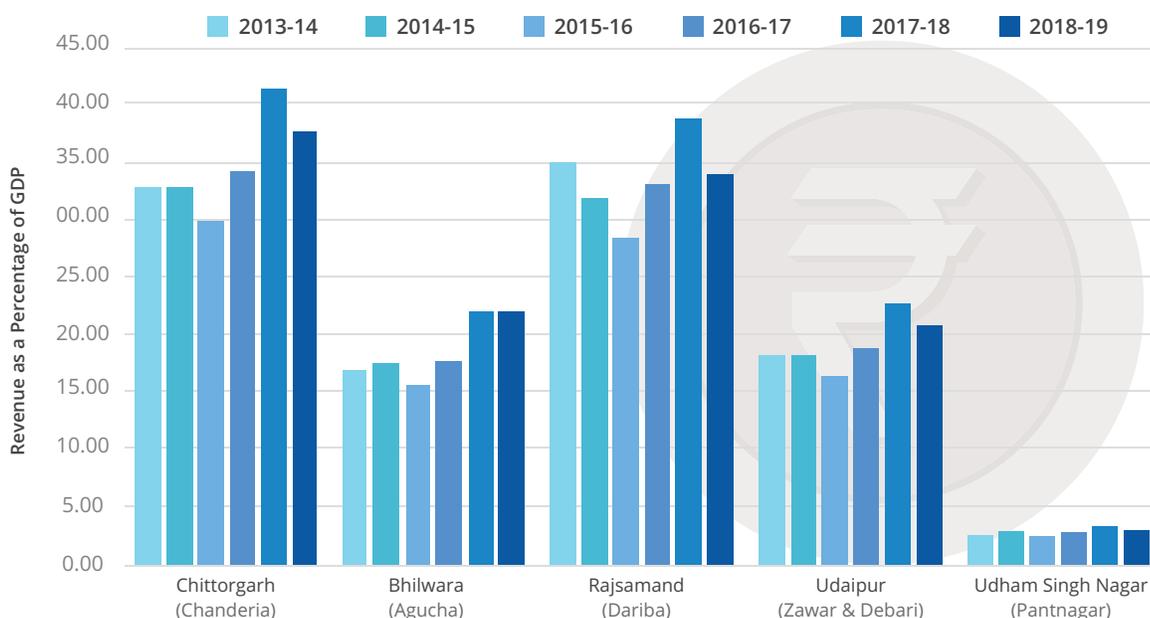


Figure 9: Local Impact of HZL Mines and Smelters

Source: Vedanta Group Ltd and IFC Analysis

Further impact of the company’s operations on local economies can be determined through their contribution to the District Mineral Fund (DMF). DMF is a trust set up as a non-profit body in districts where mining is predominant as an economic activity. The fund is meant to be used for interest and benefit of persons and areas affected by mining-related activities.

over the last four years at each district of operation. These contributions if used as capital expenditure by the government across these districts can exponentially expand its output. Figure 10 shows the impact on district economy output if the DMF fund contributed by the company is used as capital expenditure. As per RBI estimates, the capital expenditure multiplier for India is 2.45.

Table 3 shows the amount of DMF contributions made by Hindustan Zinc

Industry	District	2015-16	2016-17	2017-18	2018-19	Contribution to District Over Last 4 Years
DMF contributions by HZL (INR Cr.)	Chittorgarh (Chandera)	114.5	170	103	94	481.5
	Bhilwara (Agucha)	168	165	147	153.5	633.5
	Rajsamand (Dariba)	37	136	122	122.8	417.8
	Udaipur (Zawar & Debari)	114.5	200	147.7	211.4	673.6
	Udham Singh Nagar (Pantnagar)	56.11	83.3	191.1	75.22	405.72
	Yearly Contribution to DMF by HZL	490.11	754.3	710.8	656.91	2612.12

Table 3: Contributions by HZL to District Mineral Fund (DMF)

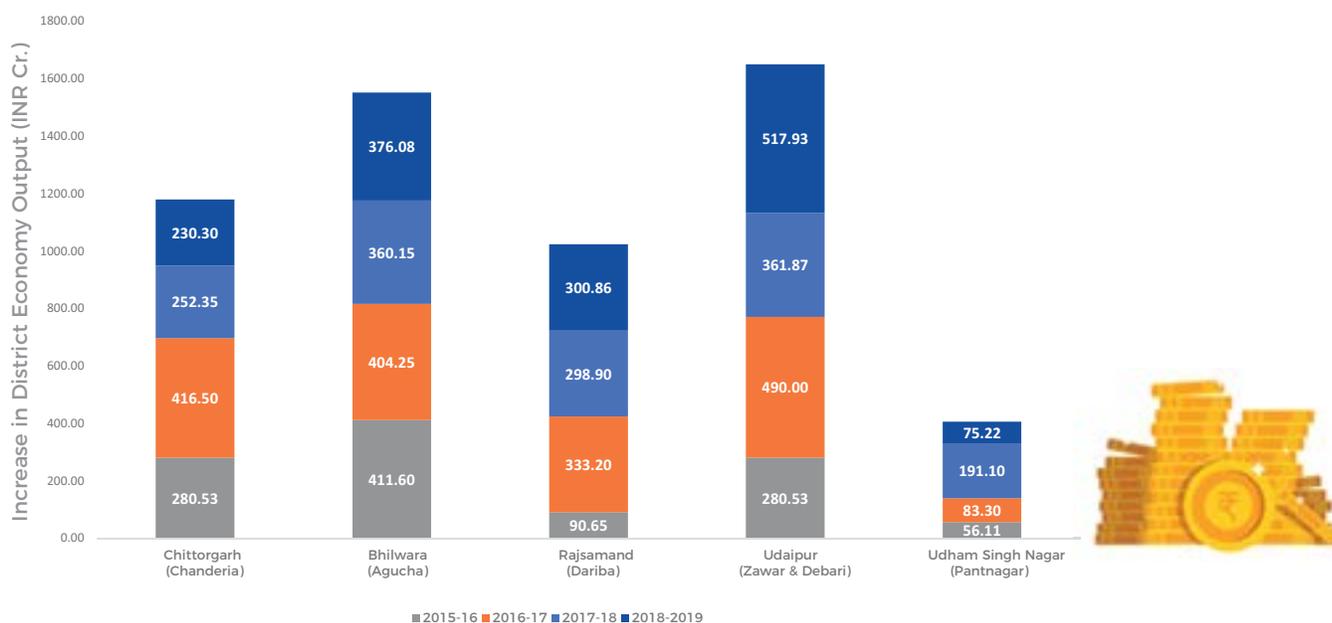


Figure 10: Impact of DMF Contribution on Local Economy

Vedanta Group Ltd and IFC Analysis

Therefore, it can be estimated that the DMF contribution to Udaipur district, for instance, can expand its economy by INR 1,600 crores

over the course of the last four years. The figure also shows that the impact of the company's contributions has been increasing with time.



SOCIAL IMPACT

The first level of societal impact that Hindustan Zinc has on the Indian economy is through its extent of tax contributions and dividends to the government. These tax contributions are then used by the government in priority sectors pushing development throughout society. The following section analyses the societal impact that HZL's tax contributions generate.

Creating Shared Value

Mining regions across the world are located in regions that are largely undeveloped. So, mining companies have immense opportunity to drive societal change in the regions they operate. A failure to do so results in real business costs; some of which are obvious like conflicts with local communities that fail to benefit from resource extraction while others are more subtle like the added costs of sourcing goods from uncompetitive suppliers.

Therefore, the interests of businesses are intricately tied with those of the community. Companies that profit from extraction of limited natural resources have to be particularly concerned about societal interests as their actions can quickly degenerate into

hostility in the surrounding community. As a result, in recent times, mining companies have started to invest in understanding the negative impact from their operations and improve their ability to address social issues.

However, these efforts are largely focussed on philanthropic spending by companies and what is paid in forms of tax and revenue sharing in exchange for extracting resources. Little effort is made to affect tangible social change. The idea of shared value is aimed at addressing these limitations. It encompasses policies and activities that unambiguously improve socio-economic outcomes along with the core business performance.

What is Shared Value?

The concept of shared value can be defined as the process of addressing societal needs and challenges through innovative business models. In simple words, it is a management strategy in which companies find business opportunities in social problems.

They enhance a company's competitiveness while advancing the economic and social conditions of communities around it. There are three levels at which shared value can be created: reconceiving products and markets, redefining productivity along the value chain and enabling local cluster development.

It is a more sustainable concept than CSR since it is very much integral to the process of profit maximisation.



Reconceiving Needs, Products and Customers

- Products and services that meet societal needs
- Providing products to unserved and underserved customers



Redefining Productivity in Value Chain

Accessing and utilising resources, energy, suppliers, logistics and employees differently and more productively



Improving the Local Business Environment

- Improving skills, local suppliers, and supporting institutions in areas where the company operates
- Enhancing cluster sophistication

Over the years, Hindustan Zinc has worked towards creating shared value through its operations. Being a mining company, there is little scope for the first level, viz. reconceiving products and markets. It is across the other two levels that HZL has had the maximum societal impact. For instance, the company has made continuous efforts to improve productivity

across its value chain by increased use of technology and training its workforce. Similarly, the company has made consistent efforts to develop the surrounding communities and build local clusters like training local youth for mining skills and supporting talented students into good engineering colleges.

HOW HINDUSTAN ZINC IS CREATING SHARED VALUE

Redefining Productivity Across Value Chain

TECHNOLOGY

- ◆ Autonomous machines that enable 24*7 mining
- ◆ Digitalisation of mines for centralised mining
- ◆ Solar power at mines to reduce power costs

LOGISTICS

- ◆ Load scanner in trucks to improve load carrying capacity of trucks and reduce hauling cost
- ◆ Treatment of ore, concentrate and WIPs at same location

WORKFORCE

- ◆ Development of young talent for enhanced leadership role
- ◆ Company-wide safety training of workers

ENVIRONMENT

- ◆ Setting up of the Waste to Wealth Committee to ensure waste reduction
- ◆ Conversion of smelter waste to paver blocks
- ◆ Focus on building renewable power capacity
- ◆ Installation of Continuous Ambient Air Monitoring Stations
- ◆ Efforts to reduce dust generation by water spray technology

Enabling Local Cluster Development

TALENT

- ◆ Training local youth for underground mining skills at Hindustan Zinc Mining Academy
- ◆ Support for talented students for local school students into good engineering colleges under Unchi Udaan

Local Community Development

- ◆ Efforts to create community assets like roads and public toilets
- ◆ SHGs to empower women in the local community
- ◆ Initiatives to better health, water and sanitation facilities

SOCIAL IMPACT

Hindustan Zinc’s CSR efforts are directed across various facets of societal development. They are directed at

189 villages near its operations including



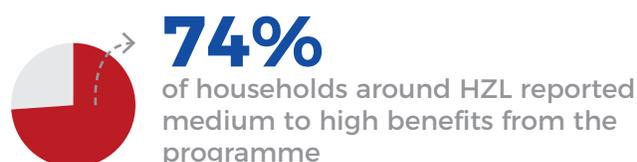
During the year 2018-19, the company spent INR 130 crores impacting the lives of over 5,00,000 beneficiaries.

AGRICULTURE

The agricultural sector is the backbone of the Indian economy and the neighbouring communities where HZL operates. Samadhan is the company's flagship programme for on-farm sustainable livelihoods reaching out to 8174 famers through agricultural interventions and 4295 families through livestock interventions during 2018-19.

The idea of the programme is to enhance the productivity of targeted farmers through application of modern and efficient farming techniques. The interventions made by HZL include horticulture development, improving farming practices, rain water harvesting, and improved animal breeding.

An impact assessment study shows that



HEALTH

Currently, the country is facing a growing demand to fix the basic concerns in the healthcare landscape. One of the biggest challenge is the provision of quality healthcare services to the citizens. With a low public health spending figure (1.1 - 1.5 percent of GDP), it is important for the private companies to work towards providing basic health facilities in the communities they are working.



HZL, through their Mobile Health Vans (MHV) initiative is working toward addressing this challenge. During the year, the Company re-launched MHVs around four of its locations to provide accessible and affordable medical care to neighbouring communities, that has impacted

42,000 patients.

By provision of quality healthcare facilities to the people, HZL has been able to prevent 173 deaths, given the death rate of 6.4 per 1000 population. This is under the assumption that the probable deaths taken into consideration are amenable, and not avertable.³

Table 4. Lives Saved due to intervention in Healthcare Services

Amenable Deaths due to use of poor quality of healthcare in South Asia (%) (2018)	64.4
Death rate in India (per 1000 population)	6.4
Number of people who had access to health care	42,000
Lives Saved in Rajasthan	173

³A Study by Lancet in 2018 which uses data from Report on Global Burden of Disease 2016, amenable mortality is defined as premature deaths (deaths under age 75) that could potentially be avoided, given effective and timely healthcare. As per the study, in South Asia, the 64.4% of the amenable deaths occur due to poor quality of services.



MALNOURISHMENT

Malnourishment is the underlying cause of

45% of the child deaths across the globe.

Malnourishment is the underlying cause of 45 percent of the child deaths across the globe. **The significance of problem is relatively higher in India as it is home to 20 percent of the world's child population, with the highest malnutrition rates.** The long-term consequences of this includes cognitive and educational failures that impacts children's ability to achieve their full potential later in life. There are various studies that have quantified the impact of malnutrition on learning abilities of children and how that impacts their lifetime earnings. **The loss in lifetime earnings is approximately 10 percent (World Bank Study).** The economic costs of such micro-nutrient malnutrition costs **India around 0.8 percent to 4 percent of its GDP according to various estimates.**

Hindustan Zinc Limited, through their Khushi Aanganwadi Program are working towards eradicating child malnourishment in the country. The project, focuses on supporting the government in improving the functioning of the Integrated Child Development Services (ICDS) program.

They are also working towards converting existing Aanganwadis into new age Nandghars, through their Nandghar program. It is being done in collaboration with the Ministry of Child and Family Welfare This model re-imagines existing Anganwadis into Nandghars equipped with state-of-the art infrastructure including access to e-learning, clean water, sanitation, perennial solar power supply and nutritious food.

Table 5: Conservative Estimates of Savings due to Interventions in Nutrition

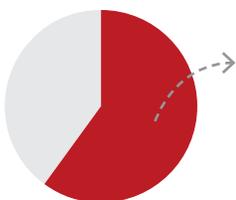
Average Per Capita Income (INR)	86,668
Years (20-65)	45
Lifetime Earnings (INR)	39,00,060
Loss due to Malnutrition (INR)	3,90,006
Children Impacted	64,000
Loss saved due to Intervention (INR)	1,497 Cr.

Currently, the total coverage of the program is

3,089 Aanganwadis

that reach out to 64,000 children in the age group of 3-6 years

According to HZL's studies,



60% of these enrolled students attend AWCs regularly. This implies that 38,400 students have been impacted successfully.

Table 5 provides the details of such interventions. The average per capita income of Indians is INR 86,668. Assuming an average person works for 45 years, his lifetime earnings are INR 39 lakhs. Going by the most

conservative estimates that the direct loss in productivity leads to 10 percent loss in average income, the loss due to malnutrition per person is INR 3,90,006.

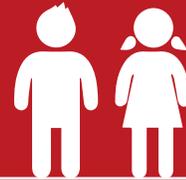


HZL through its operations has impacted

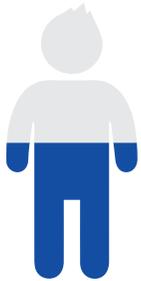
64,000 children

until now and the gains of such intervention amount to

INR 1,497 Cr.



EDUCATION



The dropout rates from Indian schools are extremely high. Even though India has achieved close to universal enrolment at the primary level,

almost half the children drop out before reaching Class 10

according to the UNICEF. The economic and social losses to the country are immense due to these trends as an entire generation fails to achieve optimal productivity levels.

HZL's **Siksha Sambal initiative** attempts to address this challenge at a local level in Rajasthan. The programme aims at empowering students from classes 9th to 12th studying in government schools to complete their secondary education. It has been implemented in 59 schools across 5 districts where the company operates and has impacted over 7800 children. Such an effort is bound to have increased the productivity of these students, and their earning capabilities.

The wage gap between a rural male who has completed his secondary education and one who has only completed his primary education has been estimated by ILO using NSSO data

for India in the India Wage Report, 2018. As per the estimates, the former earns INR 280 per day while the latter obtains a daily wage of INR 187 on an average. The difference, therefore, stands at INR 93 per day. The similar wage gap for rural females stands at INR 50 per day.

Since HZL has impacted 7,800 students and the state has a child sex ratio of 888 girls per 1000 boys, it can be assumed that the company has touched the lives of 3670 girls and 4130 boys. This would amount to a cumulative income boost of INR 567,000 on a daily basis for the students impacted by the programme, or a yearly improvement of INR 20 crores in the earning capacity of the children.



THE SIKSHA SAMBAL PROGRAMME OF HZL RESULTS IN A CUMULATIVE INCOME IMPROVEMENT OF ABOUT

INR 20 Cr. on a yearly basis



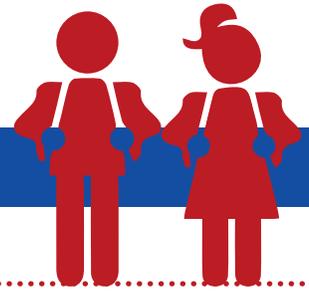
Another noteworthy programme of HZL that is built on the base created by Siksha Sambhal is the Unchi Udaan project, in which meritorious students from nearby communities are supported to get admission into colleges of national repute like IIT. About 50 students are currently involved with the programme.

This initiative should have two levels of impact on the wage level of a typical student. One the

student moves from a rural to an urban setting and, second, the student obtains a higher degree. As per ILO estimates, a male student will experience a wage growth of INR 455 per day while a female student will witness a daily wage growth of INR 416 per day. Therefore, it can be estimated that on an average a student under the Unchi Udaan programme will experience an income improvement of INR 1,58,775 per year.



THE UNCHI UDAAN PROGRAMME OF HZL RESULTS IN A WAGE BOOST OF



INR 160,000

per year for each student on an average

SPORTS



Hindustan Zinc's association with football goes back to 1976 when the company made a football stadium at **Zawar, Udaipur district in Rajasthan**. It has been organising All India **Mohan Kumar Mangalam Football Tournament** in the stadium since last 42 years

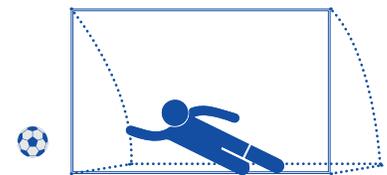


Given this tradition the company launched project "**Zinc Football**" that aims at providing professional football coaching to rural children in the age group 5-12 years. The Football Academy is equipped with interactive training technology that helps in fitness training, skill assessment, cognitive development, practice and also factor in important parameters like skills, nutrition, physical, psychological and mental development.

Apart from achieving the end goal of positioning India among the top-10 teams in Asia and top-25 in the world within the next five years, the project will help in raising the living standard of the children. The benefits achieved by children can be quantified by looking at the increase in their average wages due to training.

The average annual income of one player will go up by almost **INR 73 lakhs**.

Gains due to Football Academy	
Average Basic Annual First Team Pay in Super League (In INR)	74,69,271
Average Annual Income in Rajasthan	1,00,551
Increase in Yearly Income of one player	73,68,720



HZL is currently training 30 children and aims to train 10,000 children in total. The potential benefits of the project can go up to 22 crores, depending upon the number of children from the batch of 30 who play in the league.

WOMEN EMPOWERMENT



India took a lot of steps to enhance the provision credit to rural areas. One of the programs that yielded promising results was the efforts to establish Self Help Groups. The SHG-led approach differs from traditional programs of micro-finance in a number of ways. First, the focus of SHGs is not only on credit or savings. It also focuses on social

empowerment and capacity building. Second, SHGs don't aim to establish a separate micro-finance institution but to use the group to intermediate in dealings with the formal sector and help households to create a "credit history" that will eventually allow them to access regular sources of finance (Deininger and Liu, 2009).

THE PROJECT "SAKHI" BY HZL

is geared towards mobilizing rural women into self-help groups (SHGs) and developing their capacities around leadership, skill development, savings and entrepreneurship. Under this project, there are

1,922 SHGS WITH A MEMBERSHIP OF ABOUT 23,954 WOMEN

with total savings of INR 6.2 Cr.

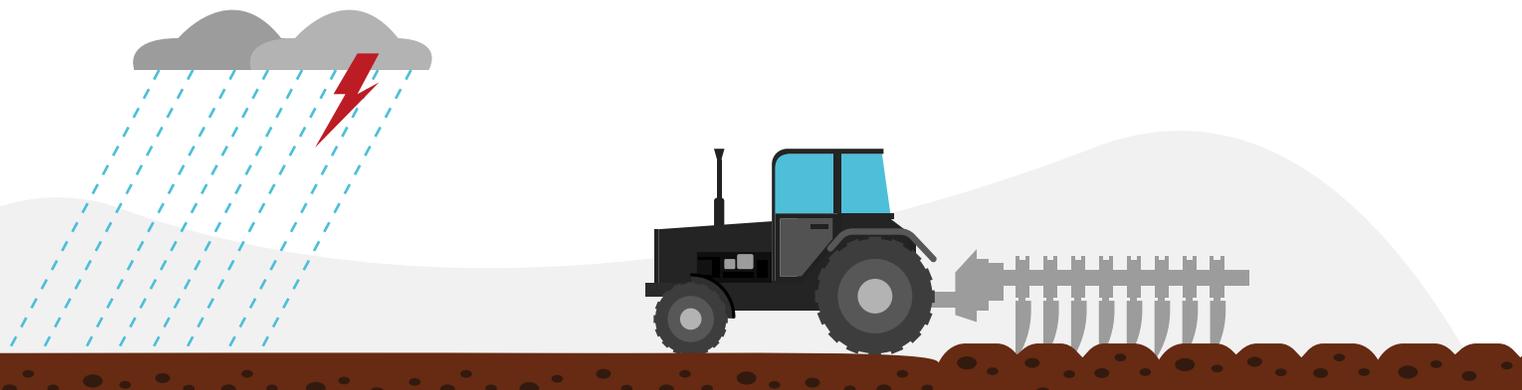
Source: HZL

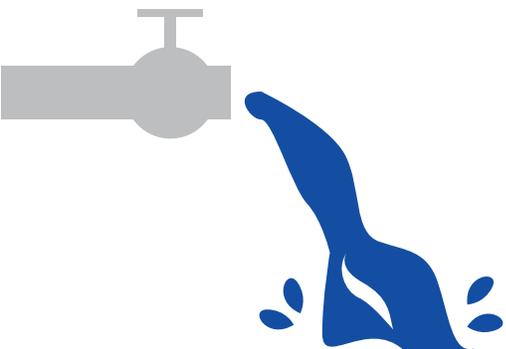
DRINKING WATER FACILITIES

As per a report of NITI Aayog, more than 600 million people face high to extreme water stress in India. Realizing this fact and that water is of utmost importance to support life, HZL has been trying to play a significant role in ensuring that this situation doesn't aggravate into acute water crisis. In partnership with the state government,

HZL HAS BUILT OR REPAIRED

34 harvesting structures with a capacity to hold 4,675 cubic meters of rainwater in Rajasthan.



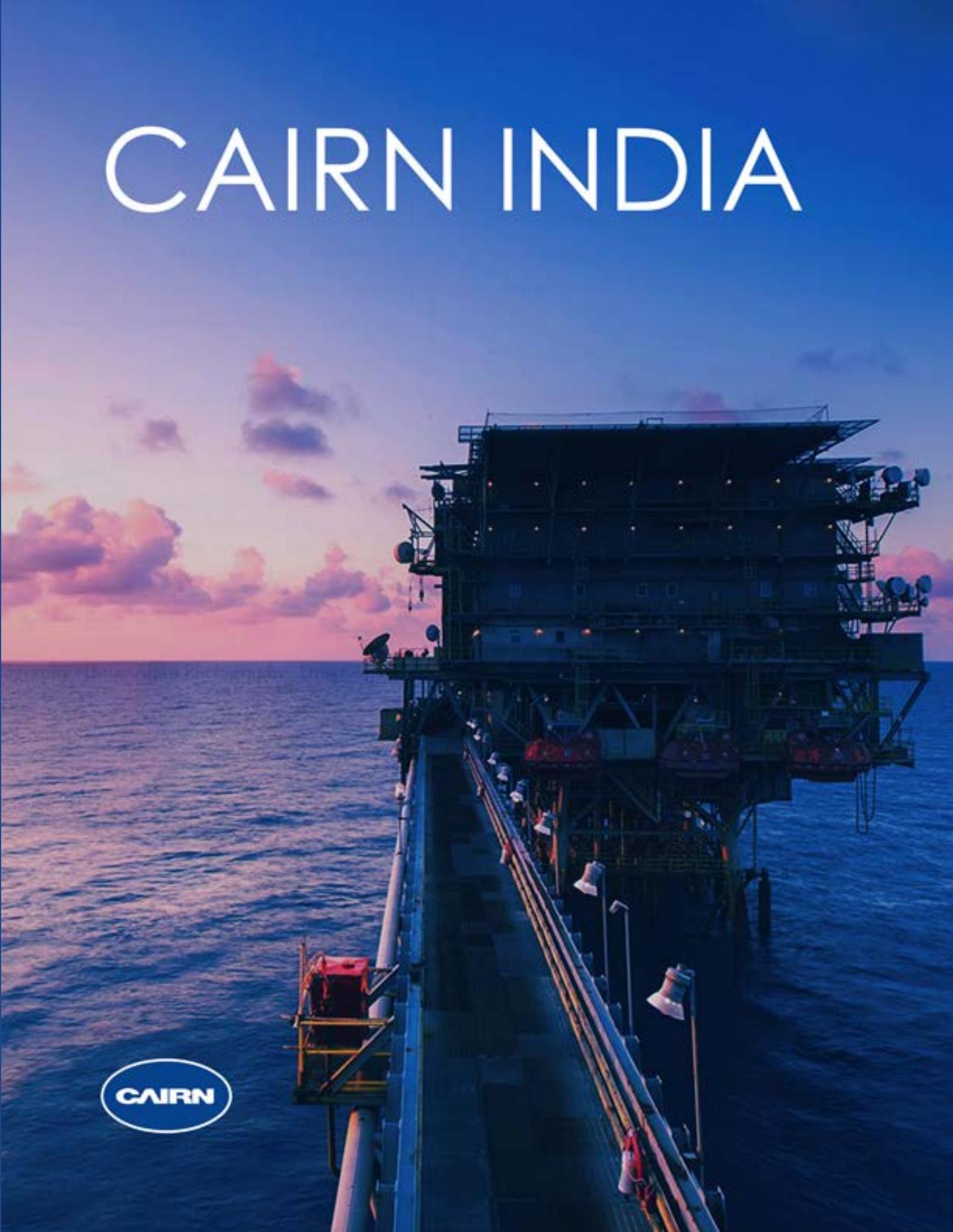


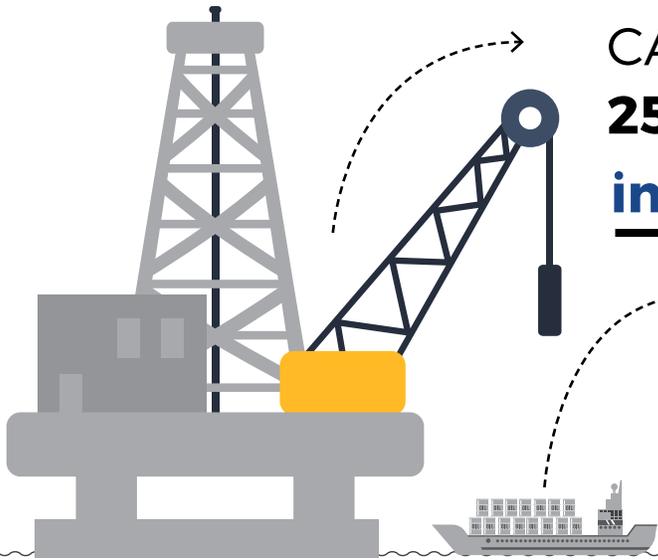
FOR DRINKING WATER PURPOSE, THE COMPANY HAS LAID 1,100 METERS OF PIPELINE IN SARLAI AND DELWAS VILLAGE IN CHITTORGARH.

Also, in partnership with local Gram Panchayats the company has **initiated community RO water plants along with 5 water ATMs.**

Source: HZL Annual Report

CAIRN INDIA





CAIRN INDIA operates **25%** of Crude Oil Annually **in India**



Case Of Barmer

Barmer has the highest per capita income in Rajasthan, which is **2X** the average per capita income across the state.

with a contribution of **7.11%** of state's GDP

ECONOMIC IMPACT OF CAIRN INDIA OPERATIONS

AN INCREASE IN PRODUCTIVITY HAS BEEN OBSERVED FROM

INR **5.42** Cr.

INR **6.26** Cr.



2016

2018

THE INDUCED IMPACT OF CAIRN INDIA ON THE INDIAN ECONOMY AMOUNTS TO

INR **48,729** Cr. that is as large as



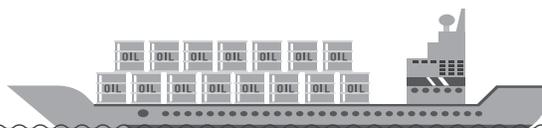
0.29% of India's GDP.

Cairn India's impact



ON OUTPUT IS AS LARGE AS **0.11%** of India's GDP.

ON INCOME IS AS LARGE AS **0.05%** of India's GDP.



SOCIAL IMPACT OF CAIRN INDIA OPERATIONS

CAIRN INDIA THROUGH ITS MOBILE HEALTH VANS HAS IMPACTED

3,50,000 people until now



and the intervention has prevented loss of **1,442** lives approximately via provision of quality health care.

CAIRN INDIA THROUGH THE NANDGHAR PROGRAMME HAS IMPACTED

1,500 children until now

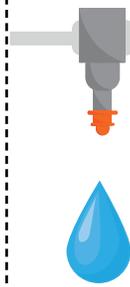


and the gains of such intervention amount to **INR 58.50** Cr.



Cairn through its activities under the ambit of water and sanitation has prevented a negative impact of

INR 34.44 Cr.



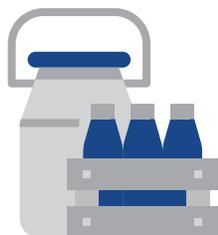
DUE TO THE FACILITATION OF DRIP IRRIGATION

it can be approximated that the total farmers income (targeted) has seen an increase of

INR 32 Lakhs annually

DUE TO CAIRN INDIA'S DAIRY INITIATIVES,

the dairy farmers are able enable to produce about



0.8%

of the total Milk in Rajasthan

DUE TO CAIRN INDIA'S SKILL DEVELOPMENT INITIATIVE

it can be approximated that the average annual wage of labour has increased by



INR 10.19 Cr. in India

INTRODUCTION

As global economies continue to grow, their dependence on crude oil and natural gas has been increasing with heavy reliance on petroleum-based products. Moreover, it directly impacts other sectors that contribute to infrastructural development and economic growth of a country.

India,

is the world's third largest consumer of energy such that

83% of its oil consumption

&

45% of gas consumption is met by imports



Therefore, deep commitment has been shown by the government to make it energy independent by reducing imports by

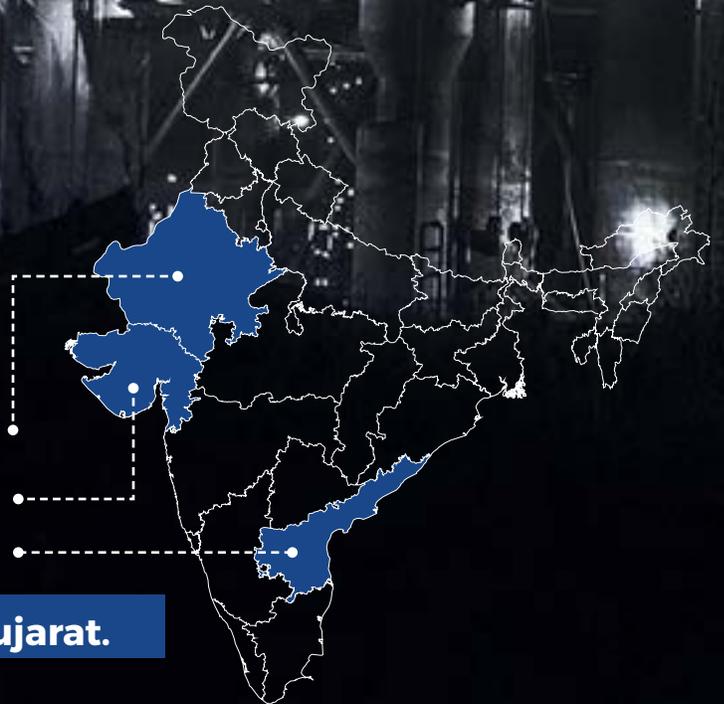
10% BY 2022

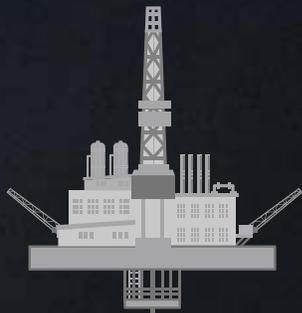
In order to achieve greater energy security, it is critical for India to boost its domestic production. Incorporated in 2006 as a subsidiary of UK-based Cairn Energy PLC, Cairn India has become the largest private sector producer of crude oil in the country.

Cairn accounts for

25% of India's annual operations of crude oil currently producing from assets in

Rajasthan, Andhra Pradesh and Gujarat.





1981

Cairn Energy PLC was founded



Acquired Conoco's UK onshore acreage and became one of the largest operators of UK onshore oil production



1988



1996



Expansion started with a substantial (non operated) gas discovery (East Cameron 331) Bangladesh near Chittagong

1997



1997

The agreement with Shell gave Cairn interest in Shell's huge acreage position in Rajasthan India

Sold half of all its Bangladeshi interests to Royal Dutch Shell in return for Shell assuming a \$330 million carry of Cairn's exploration & development costs

2010

Agreed to sell a stake of 58.5% of Cairn India, its India-focused subsidiary, to Vedanta Resources for \$8.67 billion



During the 1990s, UK-based Cairn Energy was focused on acquisition of oil and gas businesses across South Asia. In 1996, it successfully acquired an Australia-based petroleum company operating in India and started operation in the Ravva offshore field, Andhra Pradesh. Lakshmi gas field in Gujarat and Mangala oil field in Rajasthan were also explored in the year 2000 and 2004 respectively. The Mangala discovery in Rajasthan in 2004 was the largest onshore discovery in the country in the past two decades.

In 2010, with an aim to diversify Vedanta resources into oil and gas while capitalizing on

India's increasing energy demand, Cairn India's acquisition was approved by the shareholders of Vedanta. By 2017, a unanimous decision was made to merge Cairn India Limited with Vedanta limited with the vision to create long term sustainable value. Vedanta is well positioned to benefit from the Government's target to boost domestic production and to leverage India's oil and gas resource potential. Core operations include production of crude oil, which is sold to hydrocarbon refineries, and natural gas, which is primarily used by the fertiliser industry and power sector in India. Today, Cairn India is one of the biggest private players in the market.

Figure 1 shows the trend in the financial performance of Cairn India Limited over eight years starting 2009-10 to 2016-17. A sharp increase was observed in the profit after tax from INR 1052 Cr. in 2009-10 to INR 6334 Cr. in 2010-11. After which even though the rate of increase of **PROFIT AFTER TAX** remained relatively slower, it continued to increase till the year 2013-14.



A few years of global oil price stability was followed by a sharp fall in oil prices starting 2014 and continued to remain low. This led to

a significant fall in the profit after tax earned by the company post 2014.



Figure 1: Profitability of Cairn India

Source: Vedanta Group Ltd and IFC Analysis

By the end of FY 2016, the block's cumulative production was 343 million barrels of oil equivalent (mmbobe) and contributed 23% production of crude oil in India thereby reducing dependence on oil imports. Some of the other producing assets include offshore fields at Ravva in Andhra Pradesh and Cambay in Gujarat.

The Rajasthan block spread over 3,111 km² west of Barmer is considered of national

importance. The block consists of three major development areas. (i) Development Area (DA) 1, which includes Mangala, Aishwariya, Raageshwari and Saraswati fields; (ii) DA2, comprising the Bhagyam, NI, NE and Shakti fields; and (iii) DA3, consisting of the Kaameshwari West fields. These are outlined below on a map along with the capacity of each operation.



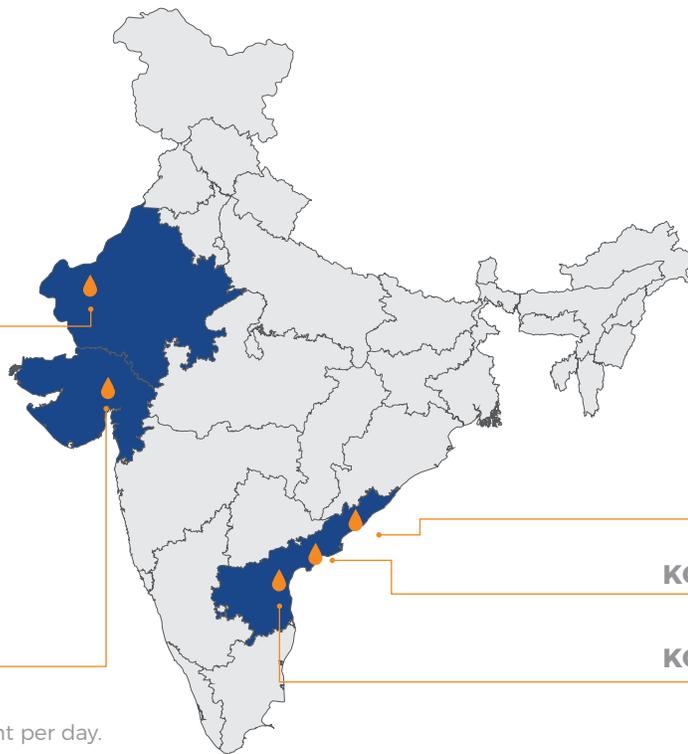
RAJASTHAN BLOCK

Production
1,57,983 (boepd)*



CAMBAY BLOCK

Production
10,408 (boepd)



RAVVA BLOCK

Production
17,195 (boepd)

KG-ONN-2003/ 1 block

KG-OsN-2009/ 3 block

*boepd: barrels of oil equivalent per day.

Apart from reducing oil dependence, Cairn has significantly contributed in driving regional growth where it operates. Barmer district in Rajasthan is an outstanding example. As shown in the Figure 2 below, the per capita income of Barmer district of Rajasthan has been consistently increasing since 2010. According to 2016-17 estimates,



Barmer has the highest per capita income in Rajasthan, which is

2X the average per capita income across the state.

The district is also the second-highest contributor after Jaipur to Rajasthan's GDP with a contribution of 7.11.

The exponential growth in the per capita income of the district has led to an increase in local demand for products and services, as well as increased spending on social infrastructure.

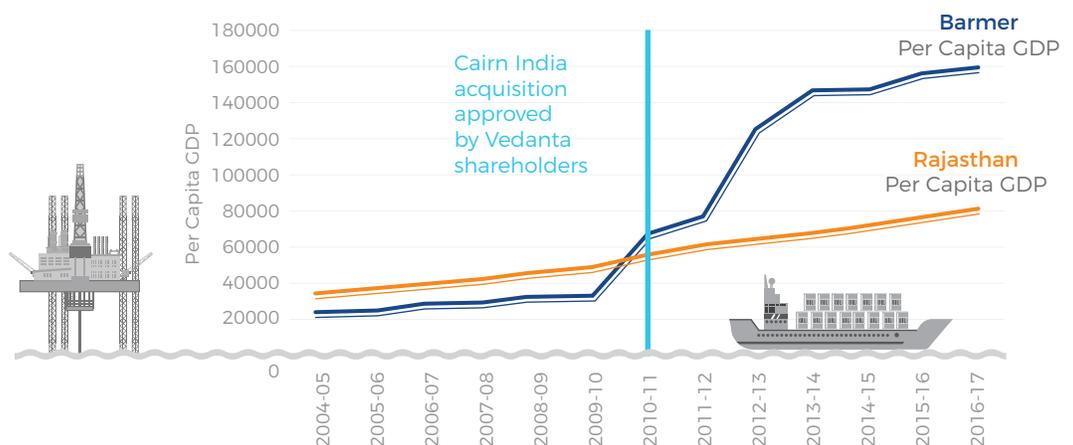


Figure 2: Comparison of per capita income of Barmer with the state of Rajasthan
Source: Directorate of Economics and Statistics, Rajasthan

INDUSTRY ANALYSIS

India is the third largest consumer of crude oil with a 4.1 percent share in global oil consumption in 2016-17. Given the country's economic growth and rapid urbanisation, the consumption of oil and petroleum products is likely to increase further. As an industry, there is immense opportunity for the public as well

as private players to fill the gap between supply and demand. Due to the volatility of global oil prices, the sector continues to face immense uncertainty. This has already been reflected in the changing employment and profit earned by the company over the last few years.

Value chains are a useful concept to understand the competitive advantage of a company by arranging value adding activities in a sequential chain. Competitive advantage can be derived from the value adding activities and linking them to each other. The depiction below outlines the value chain of Cairn India.

Firm Infrastructure

With the presence of 11 fields across three states, the average daily gross operated production of Cairn India is 189 thousand barrels of oil equivalent per day (kboepd).

Human Resource Management

1523 committed employees and over 6,400 contractual employees through business partners

Technology Infrastructure

Focus on adoption of technology and innovation; 3D Seismic, Hydraulic Fracturing, Mangala EOR.

Procurement

Alignment of manpower with the business plan at various levels for effective procurement, involvement of local vendors and local communities for procurement and supply chain management

Crude Oil Value Chain

Explorations	Production	Transportation	Refining	Marketing
<ul style="list-style-type: none"> Geophysical Evaluation & Design Field Development Drilling Operations 	<ul style="list-style-type: none"> Bringing the oil to the surface 	<ul style="list-style-type: none"> Gathering and transporting pipelines, tankers and trucks 	<ul style="list-style-type: none"> Fractionation of crude oil into petroleum products Product blending 	<ul style="list-style-type: none"> Retailing Trading

Natural Gas Value Chain

Explorations	Production	Processing	Transportation & Storage	End User
<ul style="list-style-type: none"> 3D Seismic Geophysical Evaluation & Design Drilling Operations 	<ul style="list-style-type: none"> Bringing the gas to the surface Field development Continuing drilling operations 	<ul style="list-style-type: none"> Gathering and processing Fractionation 	<ul style="list-style-type: none"> Transportation (Pipeline) Storage Liquefaction (for tanker transport) 	<ul style="list-style-type: none"> Industrials Power Generation Utilities - Residential and Commercial loads



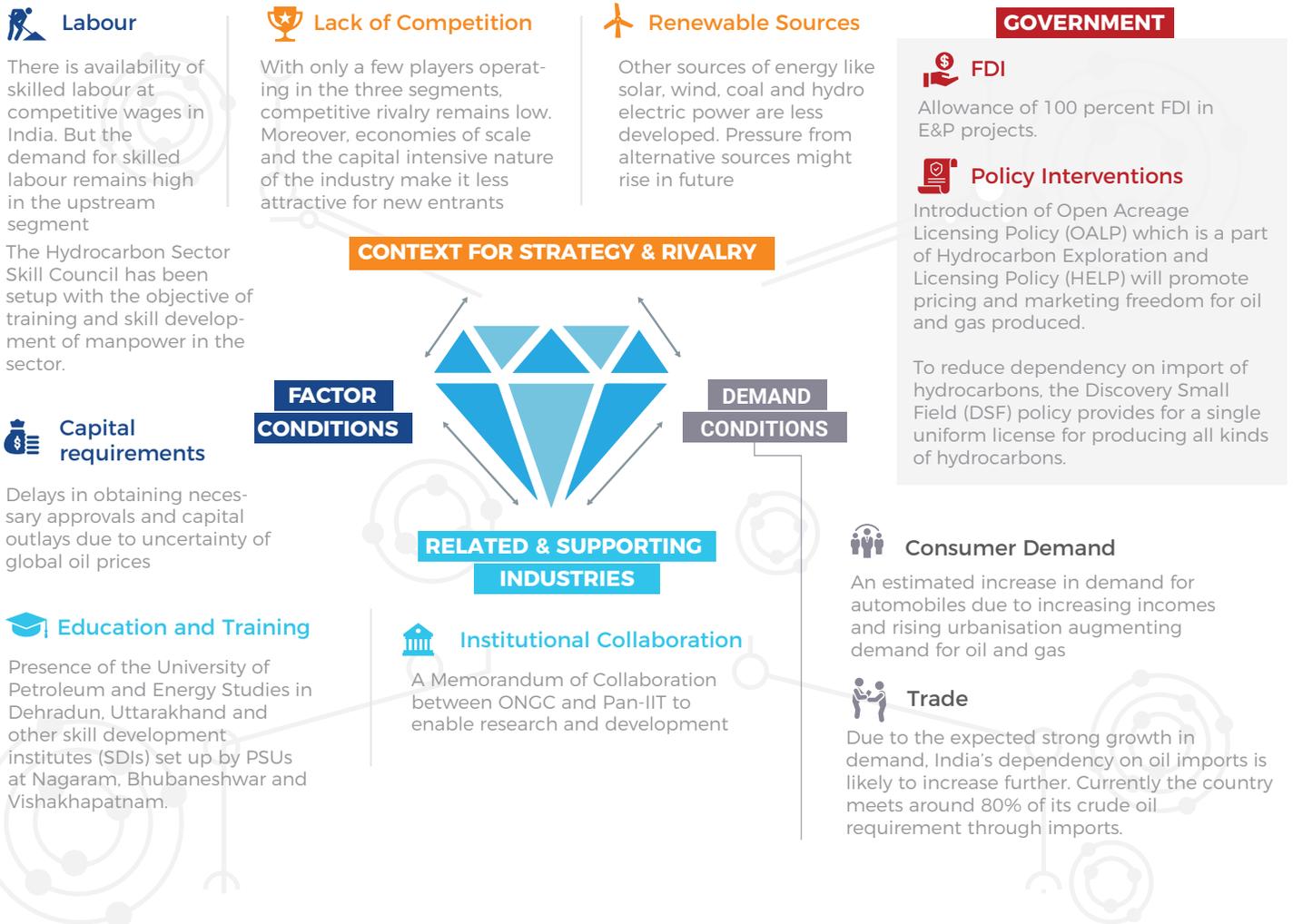
Value Chain of Cairn India

The value chain shows how the company attempts to maximise economic and societal value at every step of operation. The activities undertaken in the oil and gas industry can be understood by looking at the three phases of production process; upstream business, midstream business and downstream business. The upstream business involves extraction and production of oil and natural gas to the surface. The midstream business includes the transportation of extracted oil and natural gas to refining facilities, done through pipelines and trucks. The downstream business involves a combination of refining crude oil and natural gas as well as the distribution to end consumers.

An accompanying diamond model is depicted below to show the strategic positioning of the Indian oil and gas industry and its future prospects. It shows that India has a competitive advantage in almost all aspects of Firm Strategy, Structure and Rivalry; Factor Conditions; Demand Conditions; and Related and Supporting Industries.

The demand conditions for the oil and gas industry are favourable due to the country's economic growth accompanied by an increasing demand for petroleum products. With rising consumer incomes, this further translates into a positive impact on other industries.

DIAMOND MODEL OF INDIA'S OIL AND NATURAL GAS INDUSTRY





In case of factor conditions of the sector, apart from the deferment of capital outlays, India capitalizes on the vast pool of skilled and unskilled human capital. There continues to be high demand of skilled labour especially for upstream businesses.

Lastly, the country also has a strong presence of related and supporting industries through

educational institutions and institutes for industrial collaboration and development of related industries. High support from the government and low level of the competition adds to the competitive advantage of the sector. Thus, India has a conducive environment for the growth and progress of the oil and gas industry.



ECONOMIC IMPACT

Extent of Contractual Employment

The oil industry is primarily capital intensive. Cairn India, in 2018, has an overall employment impact on about 7,970 individuals across the value chain with direct employment of 1,523 personnel and over 6,400 contractual employees. This depicts that in 2018, around 4 jobs are generated indirectly by the employment of a single direct employee.

Comparing with the previous year indicates that direct employment fell, and the number of contractual employees increased by 6 percent.

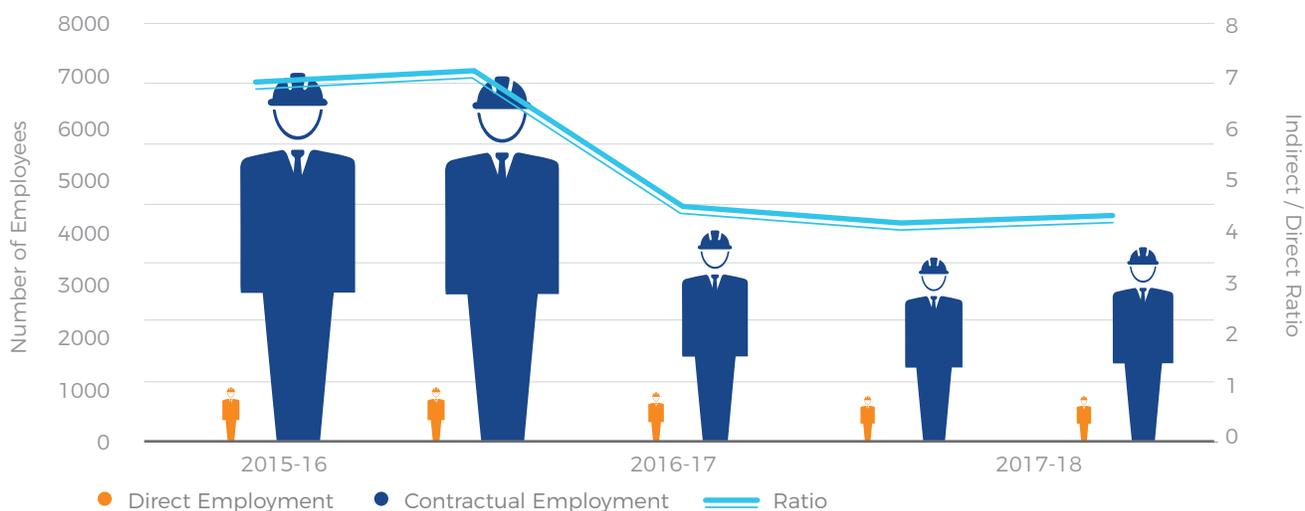


Figure 3: Employment Trends in Cairn India

Source: Vedanta Group Ltd. and IFC Analysis

However, Figure 4 shows a comparison of employment at Cairn and the average daily employment in oil mines in the states of Rajasthan, Andhra Pradesh and Gujarat. The employment trends in Cairn are significantly different from the industry trends, since 2014-15, Cairn India's employment is increasing.

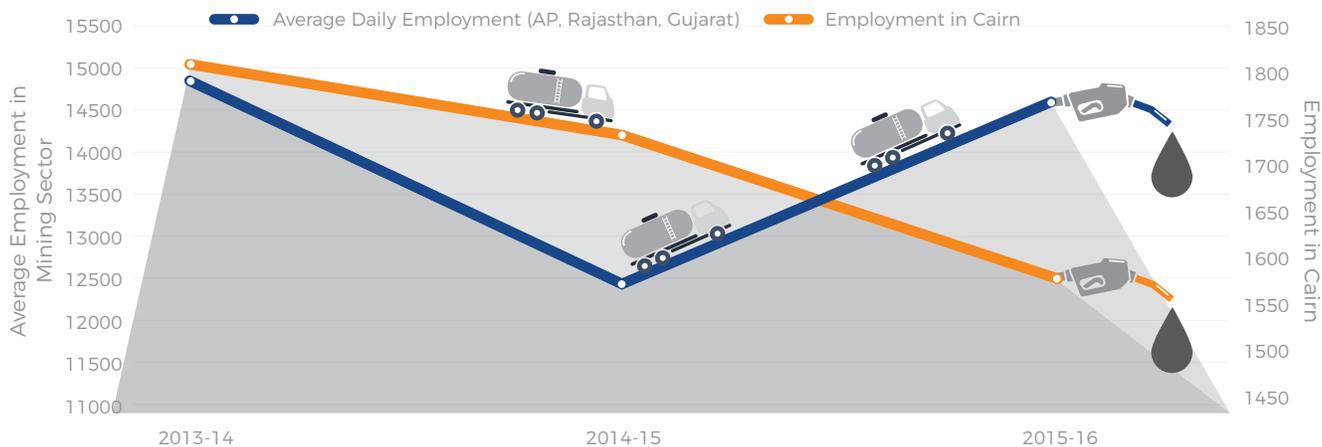


Figure 4: Employment Trends of Cairn India Operations.

Source: Vedanta Group Ltd | Indian Bureau of Mines

Productivity Growth

The productivity of employees plays a significant role in driving competitiveness of a company, among other things. Figure 5 shows the productivity growth of employees at Cairn India. The productivity for Cairn employees is measured by assessing the revenue generated per employee.



Figure 5: Productivity Growth of Cairn India Employees
Source: Vedanta Group Ltd and IFC Analysis



AN INCREASE IN PRODUCTIVITY
HAS BEEN OBSERVED FROM

INR **5.42 Cr.** in 2016 to
INR **6.26 Cr.** in 2018



Contribution to Government Exchequer

Another facet of economic impact by any business is through its tax contributions. Figure 6 shows the tax contributions made by Cairn India in the form of direct and indirect taxes. Profit petroleum, cess and royalty are key to the company's contribution to the government exchequer in addition to other taxes at the state and central level.

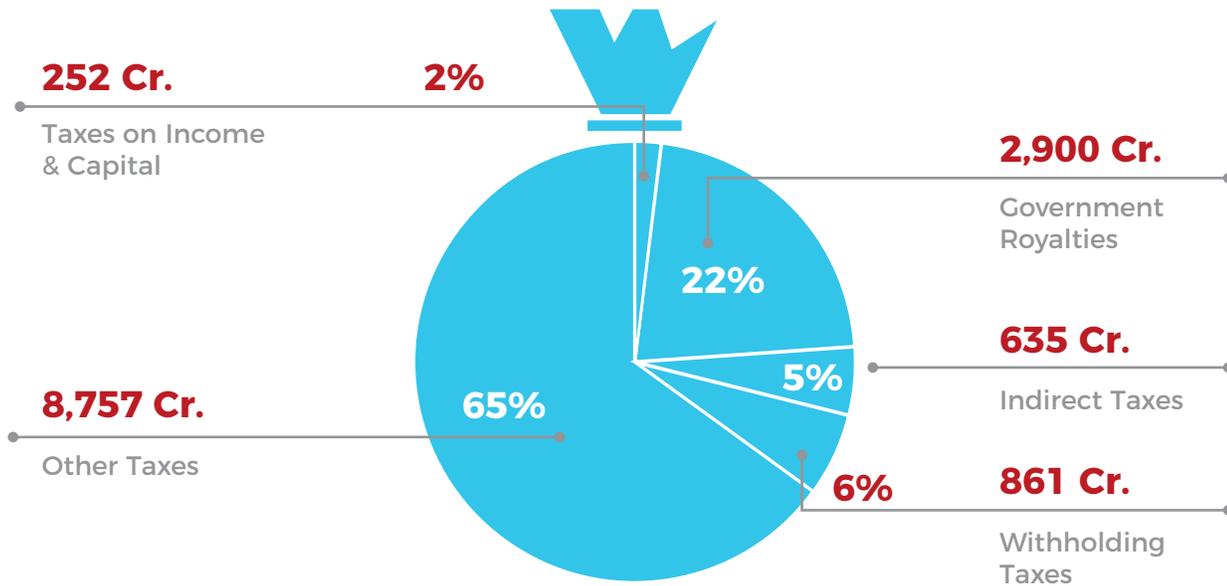


Figure 6: Cairn Contribution to Government Treasury (INR Cr.)
Source: Vedanta Group Ltd and IFC Analysis

Direct, Indirect and Induced Impact

The input output (IO) model provides a detailed picture of the flow of products within different sectors of the economy.

The operations of Cairn India fall under the "Natural gas and Crude oil" industry. Based on the multipliers of that industry, table below captures the direct, indirect and induced impact of Cairn's operations from 2016 to 2018.

Year	India's GDP (INR Cr.)	Direct Impact (Total Sales) (INR Cr.)	Direct Impact (As a % of GDP)	Type - I Multiplier	Indirect Impact (INR Cr.)	Indirect Impact (As a % of GDP)	Type - II Multiplier	Induced Impact (INR Cr.)	Induced Impact (As a % of GDP)
2016	1,37,71,874	8,626	0.063	1.97	16,992	0.12	5.11	44,077	0.32
2017	1,53,62,386	8,204	0.053	1.97	16,162	0.11	5.11	41,923	0.27
2018	1,70,95,005	9,536	0.056	1.97	18,786	0.11	5.11	48,729	0.29

Table 1: Typical structure of an IO table



**THE TOTAL SALES OF CAIRN INDIA,
THAT REFLECTS**

**the
direct
impact**

on the economy amounts to
0.05% of India's GDP in 2018

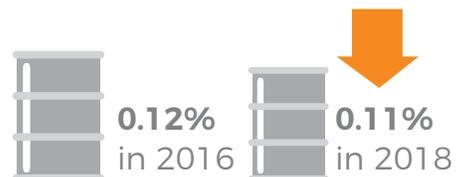


**the
indirect
impact**

of company's operations
in 2018 was

INR 18,786 Cr.
that is **0.11%** of India's GDP

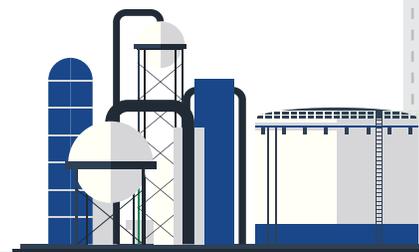
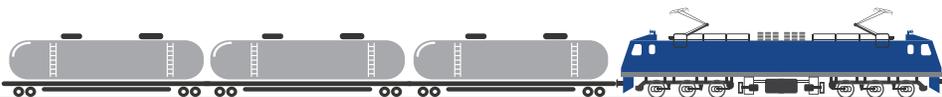
The indirect impact has
changed from



**The
induced
impact**

on the Indian economy amounts to

INR 48,729 Cr.
that is as large as **0.29%**
of India's GDP.



Sectoral Impact

The oil and gas industry is considered to be a capital-intensive sector with strong forward linkages with other industries. For instance, with rising incomes an increase in demand for automobiles has been estimated due to increasing incomes augmenting demand for oil and gas. Similarly it is important to understand the impact of the oil and gas industry on other sectors of the economy. Cairn India's indirect impact on the economy is 0.11 percent of India's GDP. The figure

below outlines the impact made by these sectors basis their total sales multiplied by respective crude oil multipliers for each sector. The highest impact of 36.4 percent has been observed on the Crude petroleum sector followed by a 8 percent impact on Supporting and auxiliary transportation activities.

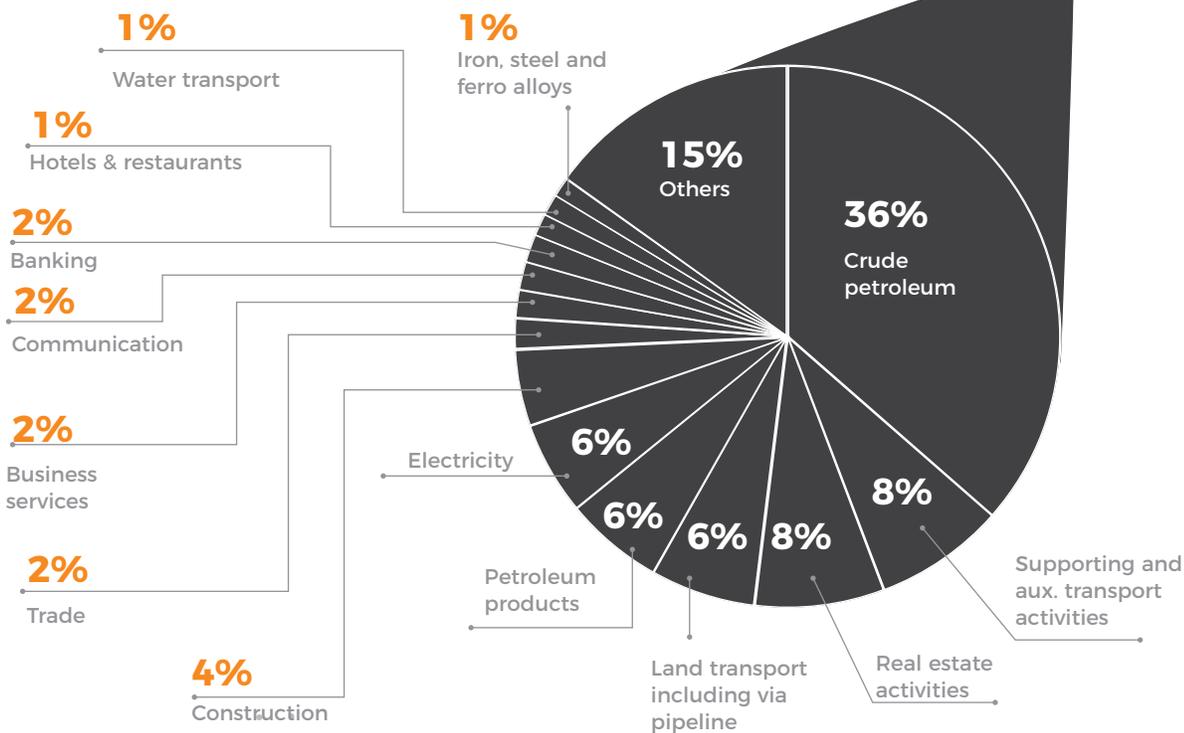


Figure 7: Sectoral Impact

Source: Vedanta Group Ltd and IFC Analysis

Output and Income Multipliers

The output multiplier for a given industry is the total inputs by all industries necessary to deliver a rupee's worth of final demand for that industry's output. It is expressed as the ratio of change in direct and indirect output changes to direct output change due to a unit increase in final use.

Therefore, multiplying Cairn India's total sales (INR 9,536 crores) by the output multiplier of the industry (2.037) gives us the impact on economy's output. This

is equal to INR 19,425 crores, that is 0.11 percent of India's GDP.

The income multiplier translates the effect of change in demand into changes of household income. It basically looks at the consumption patterns. There are two types of income multipliers. First, the one that captures the change in income due to change in output. Second, the one that captures the change in income associated with an initial change in income.

Impact of Cairn on Output and Income (Natural Gas)								
Industry	India's GDP (INR Cr.)	Cairn's Total Output	Output Multiplier of the Industry	Impact on Economy's Output (INR Cr.)	Impact on Economy's Output (As a % age of country's GDP)	Income Multiplier of the Industry	Impact on Economy's Income (INR Cr.)	Impact on Economy's Income (As a % age of country's GDP)
Oil & Gas	1,70,95,005	9,536	2.037	19,425	0.11	0.97	9,279	0.05



Cairn India's impact on output is as large as **0.11 %** of India's GDP



and its impact on income is as large as **0.05 %** of India's GDP.



We calculate the impact of Cairn India's operation by using the first multiplier that measures the impact of change in income of households due to change in the company's sales. This change in income is driven by the increase in demand that impacts the demand for raw material supplies and hence

the employment. Multiplying Cairn India's total sales (INR 9,536 crores) by the income multiplier of the industry (0.97) gives us the impact on economy's income. This is equal to INR 9,279 crores, that is 0.05 percent of India's GDP.

Employment Multiplier

The companies have a huge role in generating new job opportunities through their operations in order to improve the economy of the country. This can be done by both direct and contractual/indirect employment. Oil and Gas industry has an employment multiplier of 0.117 which means for every 1 lakh of output

there is a generation of 0.117 jobs generated. Cairn India, with its output of INR 9,53,600 Lakhs can impact the employment scenario of the Indian economy by generating 1,11,571 jobs. Also, for every 1 employed individual in Cairn India, there are around 14 jobs generated in the economy.

Industry	Employment Multiplier of the Industry	Cairn's Output (INR Lakhs)	Impact on Employment	Total Employees In Cairn India	Employment generated per employee of Cairn India
Oil & Gas	0.117	9,53,600	1,11,571	7,970	13.99



**SOCIAL
IMPACT**

Creating Shared Value

Cairn India has extensively worked towards creating shared value through its operations by redefining productivity across its value chain and enabling local cluster development. Being a company focusing on oil and gas, they have extensively worked in the sphere of enhancing technology and incorporated new techniques such as hydraulic fracturing, 3D cutting edge seismic technology. The company has also made efforts to improve the efficiency in logistics by engaging with GSPL to build pipelines and gird connections.

Alongside, the company has made consistent efforts to improve productivity across its value chain by increased use of technology and training its workforce. Similarly, the company has made efforts to develop the surrounding communities and build local clusters like establishing Cairn Centre for Excellence for provision of advanced training courses, enabling healthcare services via 'Mobile Health Vans (MHVs)', establishment of 50 Nandghars to cater to issues of nutrition and well-being of the targeted population.

HOW CAIRN INDIA IS CREATING SHARED VALUE

Redefining Productivity Across Value Chain



WORKFORCE

- ◆ Development of young talent for enhanced leadership role
- ◆ Company-wide safety training of workers



ENVIRONMENT

- ◆ 97% of produced water is recycled and reused
- ◆ Assurance through periodic audits of our energy and water usage.
- ◆ Part of several international efforts driving environmental best practices
- ◆ Electrification of Adarsh schools through solar power systems
- ◆ Provision of recyclable bags as a substitute for plastic bags



Enabling Local Cluster Development



TALENT

- ◆ Cairn Enterprise Centre (CEC) to develop the capacities for the local youth
- ◆ Cairn Centre for Excellence to provide advanced vocational training in various industrial trades



LOCAL COMMUNITY DEVELOPMENT

- ◆ Efforts to create public toilets
- ◆ Self Help Groups to empower women in the local community
- ◆ Initiatives to better health, water and sanitation facilities

HEALTH



Provision of Quality Healthcare Services

The issue of healthcare has been an aspect of the Indian economy where the outcomes have been primarily wanting. A primary reason for such basic deprivation is its low levels of public spending on healthcare, which amounts to 1.1 to 1.5 percent on an average. In such a scenario, private companies can play an indispensable role in narrowing the gap.

Cairn India via its initiatives of 'Mobile Health Vans (MHVs)' for the rural population is addressing this challenge. It has removed constraints of mobility for villages in



Rajasthan



Gujarat

and has positively impact 3,50,000 people. They have taken the healthcare facilities to the remote areas of Barmer, through their initiatives.

By provision of quality healthcare facilities to the people, Cairn India has been able to prevent 1,442 deaths, given the death rate of 6.4 per 1000 population.

Conservative Estimates of Lives Saved due to Intervention in Healthcare services

Amenable Deaths due to use of poor quality of healthcare in South Asia (%) (2018)	64.4
Death rate in India (per 1000 population)	6.4
Number of people who had access to health care	3,50,000
Lives Saved in Rajasthan and Gujarat	1,442

“ CAIRN INDIA THROUGH ITS MOBILE HEALTH VANS HAS IMPACTED

3,50,000 people until now



AND THE INTERVENTION HAS PREVENTED LOSS OF **1,442 lives**

approximately via provision of quality health care.

MALNOURISHMENT

Cairn India, through their “Nandghar” project are working towards eradicating child malnourishment in the country. The project, that is being done in collaboration with the Ministry of Child and Family Welfare, has been successful in building and operationalizing 50 Nandghars in the Barmer District of Rajasthan, and has benefitted 1,500 children and 500 women. This model re-imagines existing Anganwadis into Nandghars equipped with state-of-the art infrastructure including access to e-learning, clean water, sanitation, perennial solar power supply and nutritious food.

Cairn India’s distinguished contribution in establishing Nandghars has helped in eradicating malnourishment on one hand and has focused on capacity building of workers through Karyakarta-Sahaiyka Workshops on the other hand. So far, **around 1,500 women have been trained and more than 120 have successfully developed themselves into women entrepreneurs.**

Source: Cairn India website

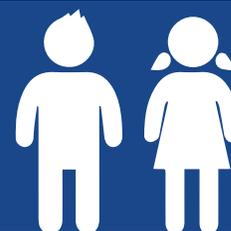
Conservative Estimates of Savings due to Interventions in Nutrition	
Average Per Capita Income in India (INR)	86,668
Years (20-65)	45
Lifetime Earnings (INR)	39,00,060
Loss due to Malnutrition (INR)	3,90,006
Children Impacted	1,500
Loss saved due to Intervention (INR)	58.50 Cr.

The table provides the details of such interventions. **The average per capita income of Indians is INR 86,668. Assuming an average person works for 45 years, his lifetime earnings are INR 39 lakhs. Going by the most conservative estimates that the direct loss in productivity leads to 10 % loss in average income, the loss due to malnutrition per person is INR 58.5 Crores.**



Cairn India through the Nandghar programme has impacted

1,500 children until now



and the gains of such intervention amount to **INR 58.50 Cr.**

To target the issue of malnourishment in Gujarat, similar initiatives have been taken up in 3 districts ,under the ‘PAHONCH’ Program, improving access to nutrition and health entitlements of

approximately 7,100 individuals with target stakeholders as - pregnant women, nursing mothers, young children and adolescent girls.

DRINKING WATER AND SANITATION

A major challenge for any developing economy is to provide adequate drinking water and sanitation facilities to its population that is increasingly urbanising and growing in affluence. The Indian case has been no different, where cities are under considerable water stress. The World Bank has estimated in a study, "The Economic Impact of Inadequate

Sanitation in India" that the per person annual impact of inadequate sanitation is INR 2,180. As the number of beneficiaries under the Water and Sanitation activities under Cairn India are 1,58,000, the estimated burden or the negative impact which has been prevented via provision of water and sanitation facilities is INR 34.44 crores.

Conservative Estimates of prevented Losses due to CSR activities in water and Sanitation

Per Person Annual Impact Due to Inadequate Sanitation (INR)	2,180
Number of Beneficiaries in 2017-18 under Water and Sanitation Program	1,58,000
Total Loss Prevented(INR)	34.44 Crores

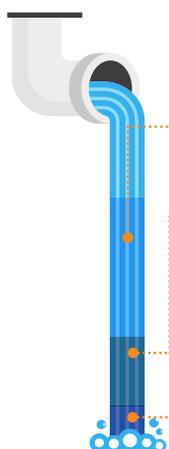


Cairn through its activities under the ambit of WATER AND SANITATION HAS PREVENTED A NEGATIVE IMPACT OF



INR 34.44 CRORE

CAIRN INDIA HAS ALSO SETUP A JEEVAN AMRIT PROJECT, which provides access to safe drinking water to local communities by setting up an RO plant in the vicinity.



Through this project, Cairn India has setup



114 RO plants in Rajasthan



10 RO plants in Gujarat



2 RO plants in Andhra Pradesh

allowing an impact on more than 16,300 families.

Cairn India has also setup solar-powered ATMs as well as 'Jal Rath' (mobile vehicles) to enable easier access to safe drinking water.

Cairn India has supported the 'total Sanitation Campaign' intervening in 27 schools and

impacted approximately 7000 students to provide basic health and sanitation facilities. The initiatives by Cairn India have also facilitated the government's effort to create Open Defecation Free (ODF) district of Barmer, Rajasthan.

SUSTAINABLE LIVELIHOOD - AGRICULTURE AND ANIMAL HUSBANDRY

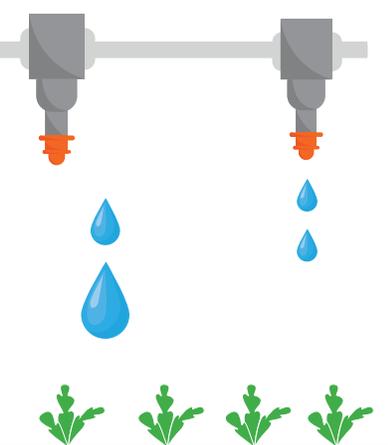
India is currently facing a twin challenge of water scarcity as well as the mammoth challenge of feeding an increasing population, as per a strategy paper by Grant Thornton, Irrigation Association of India and FICCI. The study highlights the challenge of water scarcity and the probable impact of establishment of micro-irrigation techniques in India. The result shows that the adoption of micro-irrigation technique will increase the farmer income by 43 percent.

To tackle the issues of water scarcity and low farmers income, Cairn India has supported

200 farmers through drip irrigation (micro-irrigation). The program under which such activities are being carried out is called the 'Barmer Unnati Program', which is aimed at increasing the income of farmers via enhancement of productivity and livestock.

Given that an annual farmers income is INR 36,398 (for 2012-13), as per NITI Policy paper: Doubling Farmers' Income, 2017 estimates, it can be stated that the initiatives by Cairn India have increased the total farmer's annual income in India by INR 32 lakhs.

Conservative Estimate of Farmers Income due to Drip Irrigation Initiatives	
Estimated Increase in Farmers Income in India due to Micro Irrigation (%)	43
Annual Farmers Income (for 2012-13) as per NITI Policy Paper: Doubling Farmer's Income, 2017 (INR)	36,938
Farmers Impacted due to Drip Irrigation by Initiatives of Cairn India	200
Increase in Farmers Income due to Cairn (INR)	32 lakhs



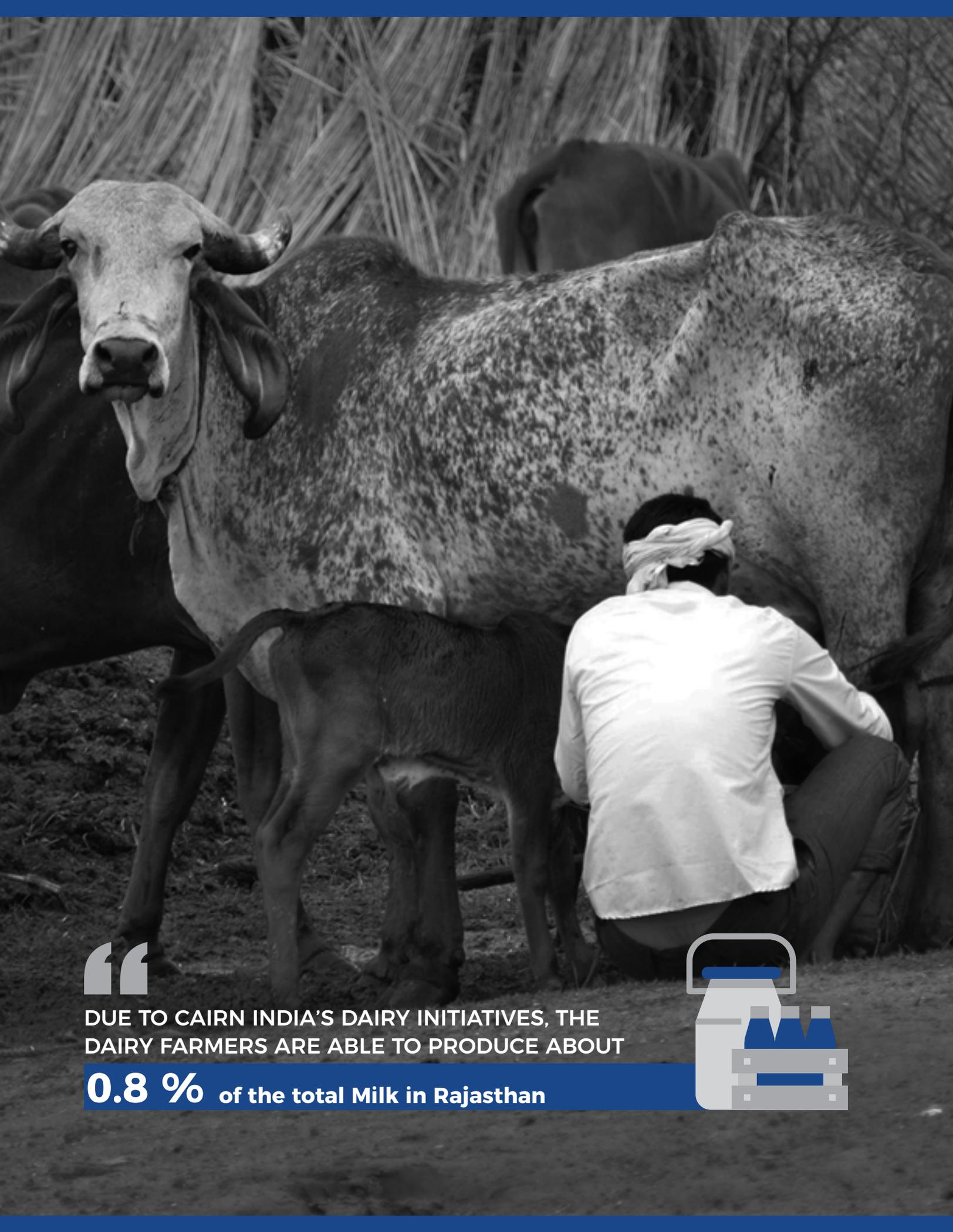

DUE TO THE FACILITATION OF DRIP IRRIGATION, IT CAN BE APPROXIMATED THAT THE TOTAL FARMERS INCOME (TARGETED) HAS SEEN AN INCREASE OF

INR 32 lakhs annually



Cairn India has also facilitated rainwater harvestation of about 15 lakh cubic metres of water via 12 community ponds and 681 khadins, and enabled rain water harvesting in 85 rural schools. Cairn India has impacted 5,000 farmers by linking them with Dantiwada Agricultural University for training on best agricultural practices. They have also linked 10,000 farmers through the Reuters Market Light program, which enables provision of regular agricultural related inputs, using SMS applications.

In terms of animal husbandry, Cairn India has setup a 'Cairn Dairy Development Board' in Rajasthan, which has enabled dairy farmers to generate a revenue of INR 46 crores. It has helped local farmers to get a price of INR 33 per litre of milk from previous rate of INR 8 per liter. The initiative under Cairn India has also aided the production of milk of about 1.82 crore litres. Given that Rajasthan's Milk Production is 22,427 thousand tonnes (as per National Dairy Development Board), it can be stated that Cairn India has been able to contribute 0.8 % of the total milk production in Rajasthan.



“

DUE TO CAIRN INDIA'S DAIRY INITIATIVES, THE DAIRY FARMERS ARE ABLE TO PRODUCE ABOUT

0.8 % of the total Milk in Rajasthan

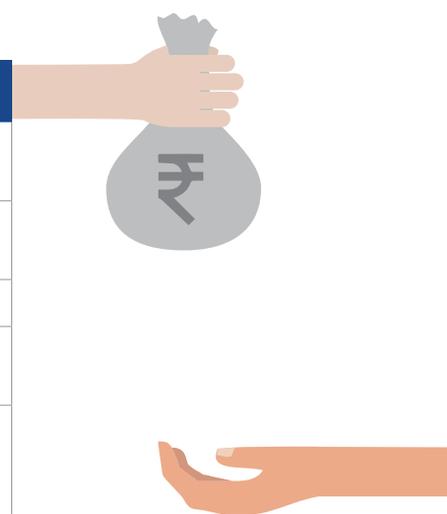


SKILL DEVELOPMENT AND YOUTH

With almost half of its population below 25 years of age, India has a rare opportunity to cash in on a massive demographic dividend. However, for this to materialise, the workforce needs to be adequately skilled, where India seems to be particularly lagging. To counter the concerns of an existing skill gap, Cairn India has setup a 'Cairn Centre for Excellence' in Rajasthan, receiving provisional affiliation from Rajasthan ILD Skill University. Cairn India has also facilitated skill trainings in Gujarat & Andhra Pradesh.

As per the Ministry of Labour's Annual report 2017-18, there exists a difference between the wages of a skilled and unskilled labour. Using the estimates, it can be stated that the average per day wage gap between a skilled and unskilled personnel is INR 75.5. Given that the Skill Development Initiatives have benefitted 14,000 people, it can be estimated that the average annual wage of these group of people has increased by INR 10.19 crores. This is under the assumption that the now-skilled worker is employed for a minimum of 100 days per year.

Conservative Estimate of Wage Increase due to Skill Addition	
Average Minimum Wage of Skilled Personnel (INR)	497.5
Average Minimum Wage of Unskilled Personnel (INR)	422
Value Addition as per Skill (INR)	75.5
Number of Beneficiaries of Skill Development by Cairn India	13,500
Value Addition to Annual Wages by Cairn India (assuming minimum 100 working days)	INR 10.19 Cr.



DUE TO CAIRN INDIA'S SKILL DEVELOPMENT INITIATES, IT CAN BE APPROXIMATED THAT THE AVERAGE ANNUAL WAGE OF LABOUR HAS INCREASED BY

INR 10.19 Cr in India

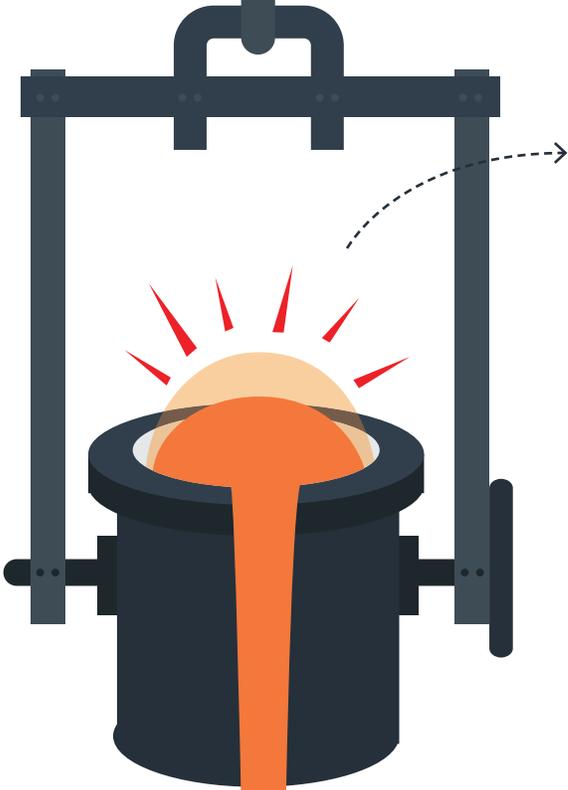


BALCO

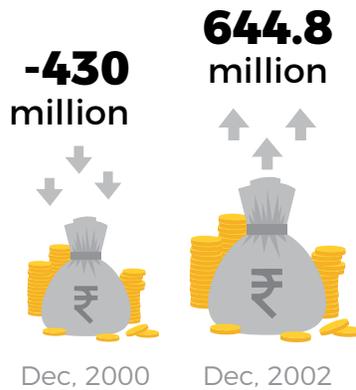


With a smelter capacity of 5.7 Ltpa

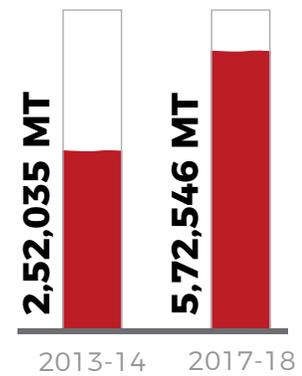
BALCO is one of the big names in Aluminium industry.



Profit After Tax

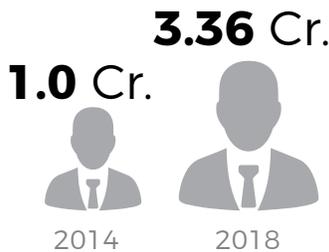


Production Levels



ECONOMIC IMPACT OF BALCO INDIA OPERATIONS

An increase in productivity has been observed from



If the entire revenue is used as a capital expenditure, it will lead to an increase of

INR 4,070 Cr.

which means an increase of 0.02% in India's GDP because the value of capital expenditure multiplier is 2.45.



The cumulative amount of taxes paid by BALCO Ltd. is

INR 1,661 Cr.



Gross Revenue of BALCO Ltd.

INR 9,023 Cr.



Annual wages per employee given by BALCO Ltd.



Balco's annual revenue amounts to **0.05%** of India's GDP



SOCIAL IMPACT OF BALCO INDIA OPERATIONS

Through the initiatives, Balco India has removed inaccessibility to quality healthcare and has positively impacted

11,30,000 people



until now and the intervention has prevented loss of **4,657 lives** approximately via provision of quality health care.



BALCO India through its operations has impacted

56,000 children

and the gains of such intervention amount to

2,184 Cr



Balco India through its activities under the ambit of sanitation has prevented a negative impact of

INR 12.43 Cr.



Women Empowerment

Balco India has helped increase women's collective income per year by

INR 0.79 Cr.



Due to Balco India's Skill development initiative

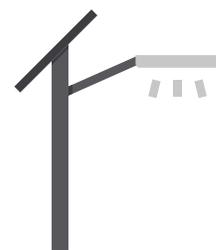
it can be approximated that the average annual wage of labour has increased by

4.62 Cr. in India



Planting of **74,410** plants on **132** acres of land.

The initiatives of Balco India have helped **2,900** farmers



582

solar streetlights in villages near their operations



adopt horticulture as well as floriculture as source of livelihood

INTRODUCTION

Aluminium is the second most used metal around the world and is a crucial player in laying out the foundations of a country's infrastructure, thus impacting its economic development. Not only this, the malleable nature of Aluminium has made it easier for people to use it in the automotive and aerospace industries. Its use is hidden in plain sight as well. Almost every household appliances and utensils are made out of Aluminium. The transportation industry consumes most of the produced aluminium and packaging industry comes second in aluminium consumption. Adding to this value, Aluminium conducts electricity well, which makes it more adaptable to use in electric wires and cables.

The Government objectives such as 'Make in India' and 'Electricity and Housing for all' also have a high reliance on aluminium for inputs like electrical power, construction activities, transportation activities etc. which would result in an increase in demand for aluminium. Aluminium also gives the downstream industries an opportunity to grow by developing value added products which include alloys for defense and automobiles. This shows that aluminium has a significant involvement in almost every industry directly or indirectly.

With a smelter capacity of 5.7 Lakh tonnes per annum (Ltpa)

BALCO is one of the big names in Aluminium industry.

It has played a pivotal role in enabling growth of the industries linked with the usage of aluminium and hence stimulating the economic development of our country. It operates through its plant at Korba in the state of Chhattisgarh. The plant has a smelter capacity of 5.70 Ltpa with capabilities to produce ingots, wire rods, billets, bus bars, and rolled products and thus catering to a variety of industries. It has a power generation capacity of 2010 MW and a bauxite production capacity of 6.8 MT per annum from its two Bauxite mines at Mainpat & Kawardha which have a capacity of 4.5 MT & 2.3 MT, respectively.



BHARAT ALUMINIUM COMPANY Ltd. – How privatization changed this company

Bharat Aluminium Company Ltd. (BALCO), was set up as a Public Sector Undertaking in 1965 and was the first public sector enterprise in India to start producing aluminium in 1974. In 2001, it was decided to privatise the company due to low profitability levels. The Government of India disinvested 51% of equity and management control in favor of Sterlite Industries India Ltd. BALCO Ltd. is now, after a series of mergers, under the banner of Vedanta Ltd.



Figure 1 - Total Revenue vs PAT

Source: Vedanta Group Ltd and IFC Analysis

The disinvestment of BALCO Ltd. by the government gave a boost to the company leading to a multi-fold increase in sales. From a sales value of INR 9,892.4 million, the sales, over the years, has risen to a staggering amount of INR 91,523.7 million. This implies

a 9-fold increase in the sales value since 2001. This was possible because of privatization as it enabled the company to work in an efficient manner by significantly reducing the production costs.

Profit after Tax is an important component to observe when talking about the growth prospects of the company. BALCO Ltd., has an increasing PAT value. Since the company was privatized, the PAT increased from INR -430 million to INR 644.8 million. A sharp increase in PAT was observed in 2006. The fall observed in the value during 2015 - 2016 is mainly because

of the decrease in global prices of aluminium along with increased depreciation because of new capitalization and obligatory provision of renewable purchase. Nonetheless, this did not prove to be a setback, as the company jumped right back up on track with increased profits in 2017 and has maintained this enhanced performance.

Another indicator of company performance - production level also have soared high. The impact of the acquisition by Vedanta has been a positive reinforcement resulting in an expansion of production capacity of BALCO Ltd. This takeover, as mentioned above, enabled the company to produce aluminium at a level which made BALCO Ltd. the largest producer of Aluminium in India.

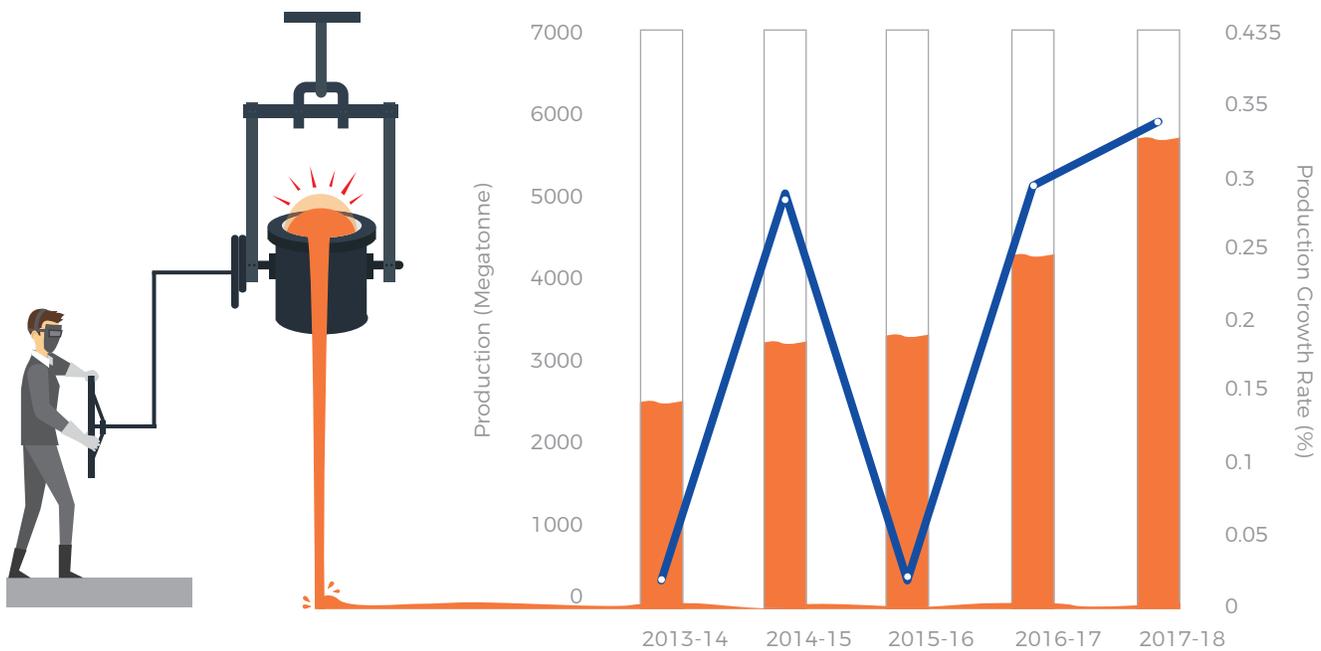


Figure 2- Production levels of Balco

Source: Vedanta Group Ltd and IFC Analysis

The trend change in the production is coherent with that of the sales achieved by BALCO Ltd. The production levels have increased from 2,52,035 MT in 2013-14 to 5,72,546 MT in 2017-2018. The growth rate of the production levels

is also increasing even after the production was constant for two consecutive years (2013-14 and 2014-15). These substantially improving values show an enormous growth by the company.

INDUSTRY ANALYSIS

The proficiency of mining companies truly depends on the consistent check of the quality and quantity of the delivered products that are required to fulfill the demand of the consumers. But the operational complexities of running such modern mines extends far beyond the production activities and its necessary to find ways of analysing and managing it in a competitive environment.

DIAMOND MODEL OF INDIA'S ALUMINIUM INDUSTRY

Infrastructure

The domestic aluminium industry is struggling to remain globally competitive due to increasing production costs that can be attributed to high power cost in India. Increase cost of Aluminium and Bauxite. Lack of robust geological database for bauxite reserves. High working capital blockage due to poor rake availability affecting movement of Bauxite.

Coal Tax

Taxes on coal in India raise the price by about 24% and impact the competitiveness of the aluminium sector already battling coal subsidies offered in China.

Land

Land accusations in mineral rich areas.

Labour

industry has direct and indirect employment

Costs

Capital and Energy intensive with alumina, power and labour accounting for around 80% of total costs

Competition

Cheap imports from China despite significant scrap generation and processing potential of the domestic industry. Aluminium imports from China into India are 30x of India aluminium exports to China.

Strategy

High linkages effects, immense market potential, high technological intensity and value addition make aluminium a strategic sector. Widespread application in other sectors have added to growth of aluminium industry.

GOVERNMENT

FDI

100 per cent FDI allowed in the mining sector and exploration of metal and non metal ores under the Automatic Route.

Policy Support

The principal user segment in India for aluminium continues to be electrical and electronics sector. Under the Union Budget 2018-2019, the Government added surcharge of 10 per cent on aggregate duties of customs on imported goods to strengthen the domestic industry.

High dependence on imports due to 42 percent demand being met by domestic players indicates government insufficient measures such as import duties, anti-dumping laws to counter cheaper imports and local mining.

Domestic Demand

Demand of aluminium in India is expected to grow at 17-18 percent per annum, driven by growth in sectors like electricity, transport, building construction and packaging.

Promotion of domestic electronic industry to further drive demand.

Trade

Aluminium exports grew from 1.22 million tones to 1.66 million tones between 2016 and 2018. With a share of 5.33 per cent in global aluminium production.

CONTEXT FOR STRATEGY & RIVALRY



Related Industries

Absence of railway connectivity and transport infrastructure in several mining rich areas of the country which are typically remote.

Increasing scope and focus on aluminium recycling.

Sectoral Linkages

Strong forward linkages with key sectors like aviation, defence, auto, electricity, construction, packaging, machinery, etc.

High backward linkages with mining, chemical industry, power, machinery.

The diamond model is used to analyse the strengths and weaknesses of India's mining industry. It can be observed from the above graph that the industry, that is being supported by related industries, is facing challenges

in managing its factor conditions. On the other hand, the demand conditions are very strong and offers numerous opportunities for businesses.

Value chains are a useful concept to understand the competitive advantage by arranging value adding activities in a sequential chain. Competitive advantage

can be derived from both the value adding activities and linking them to each other. The depiction below outlines the value chain of BALCO Ltd.

Firm Infrastructure

Five mines with current ore production capacity of 12 million ton per annum; three smelters with production capacity of 1.2 million ton per annum; coal based CPP at three mining plants and wind based power plants across 5 states

Human Resource Management

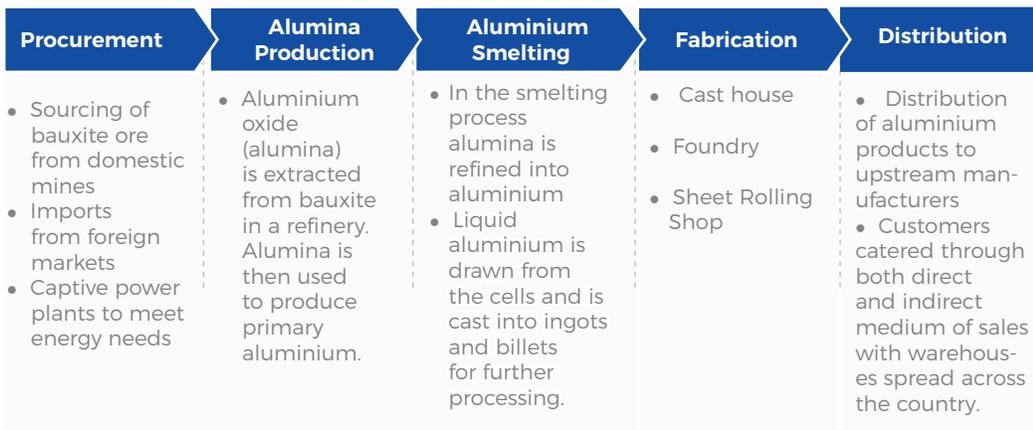
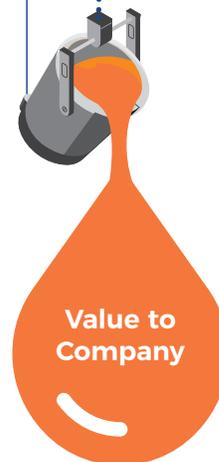
Skilled and trained pool of 2678 employees and over 6500 associates through business partners. Focus on employee welfare and safety measures via first aid centers, regular health check ups and training on safety and processes.

Technology Infrastructure

Focus on energy efficiency by setting up Graphitized Cathode Blocks across 100 pots. Smart Ore system setup for increasing operational efficiency by 10-15%. Incorporated Magma technology for conversion of red mud into pig iron. Launched the digital platform for crowdsourcing of innovative ideas from the employees.

Procurement

High-grade bauxite from mines situated at Kawardha and Mainpat and coal from Chotmine; bauxite imports.



Value Chain Analysis of Balco

The value chain of BALCO Ltd. depicts how the company maximises the economic and societal value at every step of the production and distribution process. The measures taken to ensure sustenance at each step for instance

exploration process to expand the lifetime of the mine through a systematic programme, the digitalisation of the mining process for enhancing productivity are included in the value chain.



**ECONOMIC
IMPACT**

Extent of Contractual Employment

BALCO Ltd. has always envisioned changing lives of people for the better. In 2017-2018, around 9,311 lives were positively impacted by making them a part of the labor force, both directly and indirectly with a ratio of 2 indirect employees to 1 direct employee.

There is an increase in both direct and indirect employment from 2016-17 to 2017-18.

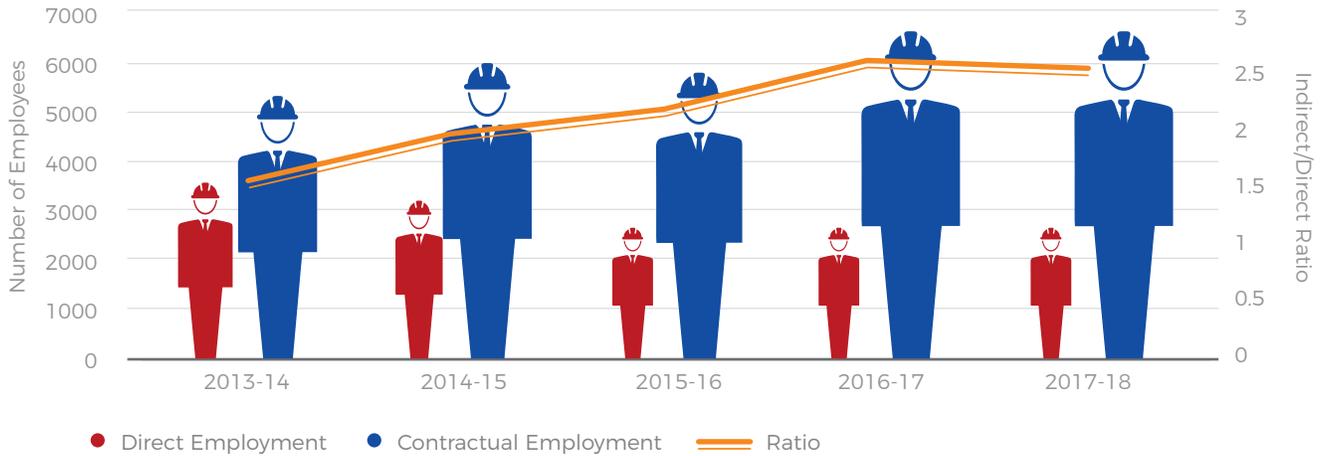


Figure 3: Employment Trends of BALCO

Source: Vedanta Group Ltd. and IFC Analysis

A major component while talking about a company's progress is the productivity level which corresponds to the production capacity of the company. BALCO has been a great example of the principle that supports, as mentioned above, cost-cutting for increased labour productivity and efficiency. As shown in the graph given below, the productivity has substantially risen over the period of their operations, from INR 1 Cr. in 2014 to INR 3.36 Cr. in 2018. The increase is multifold from 2017 to 2018 which can be accounted for the use of more advanced technology in mining as well as processing units

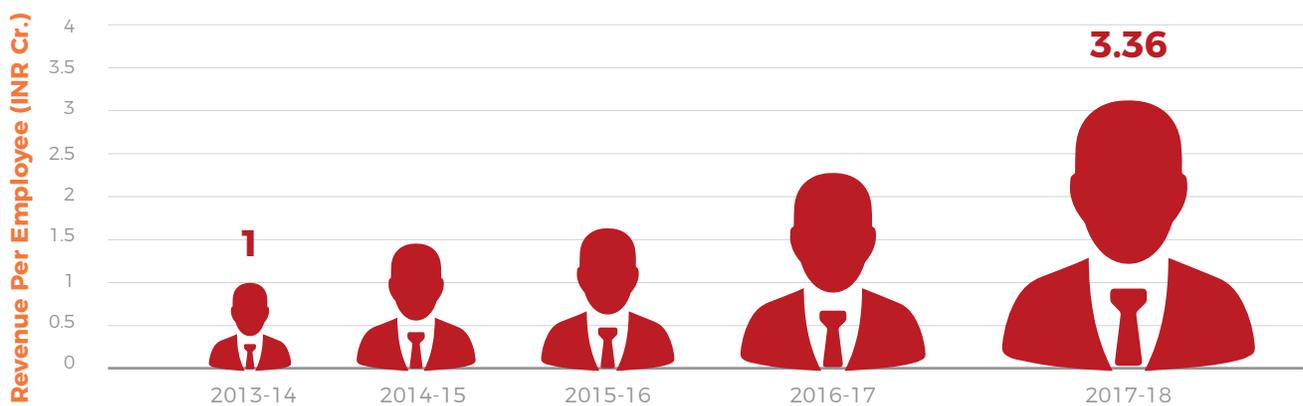


Figure 4- Productivity

Source: Vedanta Group Ltd and IFC Analysis

Contribution to Government Exchequer

The impact created by companies on the economy of the country is due to the direct or indirect taxes paid by the company. The tax contributions made by BALCO has had a major influence on the growth of the economy.

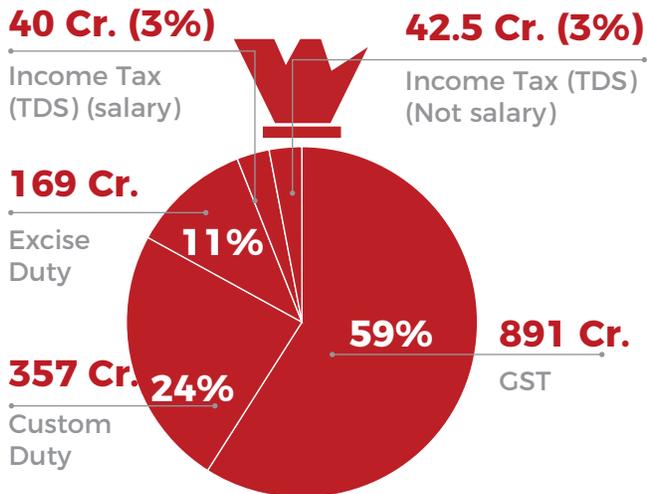


Figure 5- Taxation (Central)
Source: Vedanta Group Ltd and IFC Analysis

The tax contributions, in the form of state and central tax, are around 60% of the expenditure under the component of GST i.e. Central Tax whereas 50% of expenditure under SGST i.e. state tax. Around 25% and 24% is spent on royalty tax (state tax) and custom duty tax (central tax) respectively.

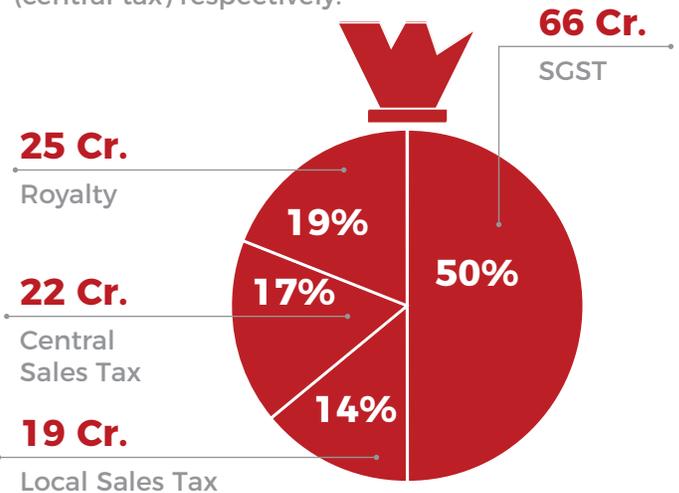
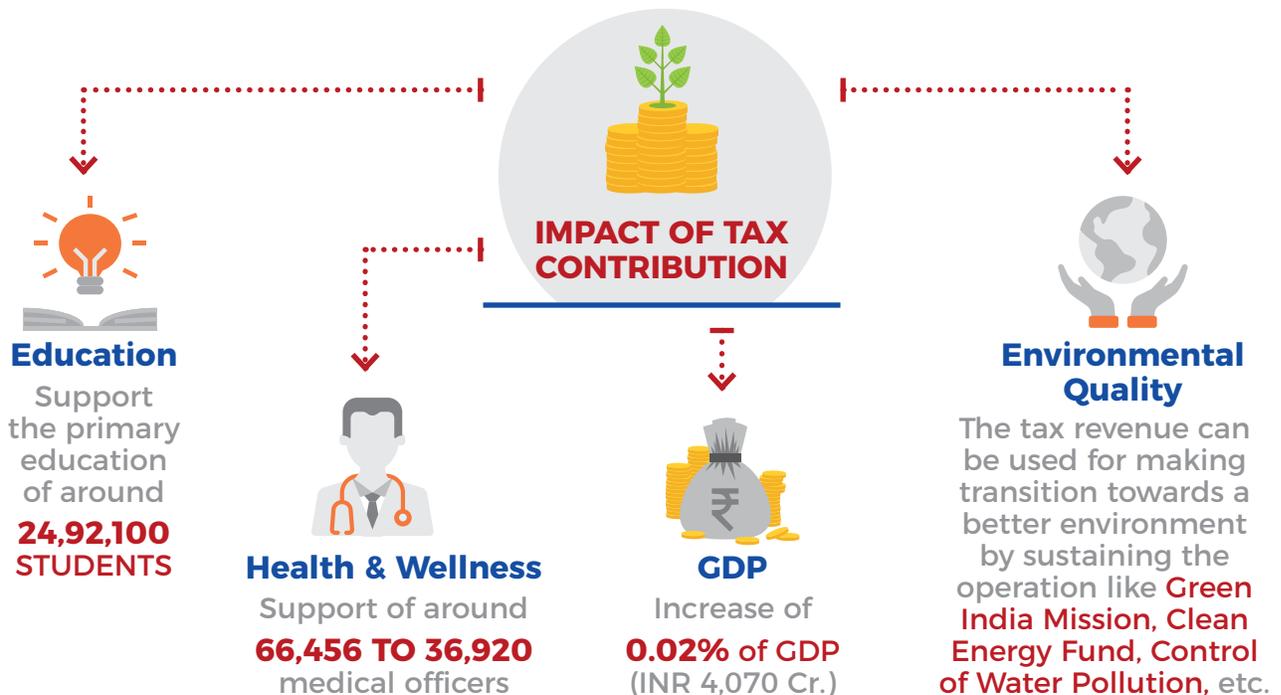


Figure 6- Taxation (State)
Source: Vedanta Group Ltd and IFC Analysis

Impact of Taxation on different sectors

The cumulative amount of taxes paid by BALCO Ltd. is INR 1661.4 Cr. This section sheds light on the impact of this revenue on different sectors if solely used for that particular sector.



CAPITAL EXPENDITURE

If the entire revenue is used as a capital expenditure, it will lead to an increase of

INR 4,003 Cr. in India's GDP

which means an increase of 0.02% in India's GDP (these estimates are based on the capital expenditure multiplier of value 2.45.)



EDUCATION SECTOR

Around

81,300 teachers

can be benefitted if all the tax revenue of BALCO is used in this sector yearly. With a mandated pupil teacher ratio of 30:1 at the primary level,



BALCO Ltd. can support the education of

24,39,000

students in the country.

HEALTH SECTOR

The cost of availing medical officers in India range between

INR 2,50,000 to INR 4,50,000.

This implies that the revenue by the company can support around 65,365 medical officers



ENVIRONMENT, FOREST & CLIMATE CHANGE



The total expenditure of the Ministry of Environment, Forests and Climate Change is

INR 2,626 Cr.

The tax contribution of INR 1,661 Cr. can be used for making this transition towards a better environment by sustaining the operations like Green India Mission, Clean Energy Fund, Control of Water Pollution etc. by providing for 63% of the total expenditure of the ministry.

Contribution to Labour Income

BALCO Ltd. has increased its employee benefit expenses from

in 2014



INR
325 Cr.

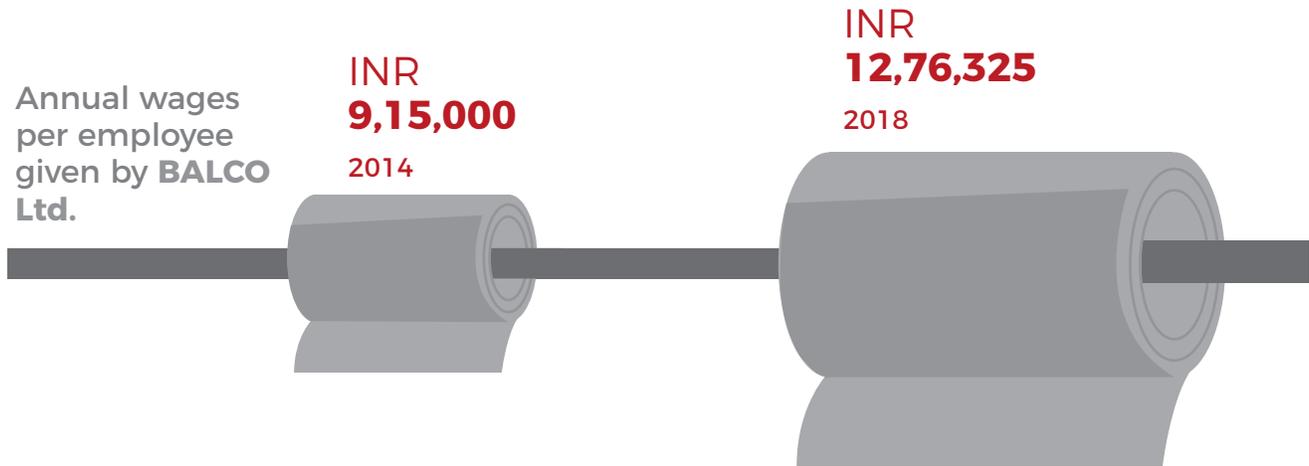
in 2018



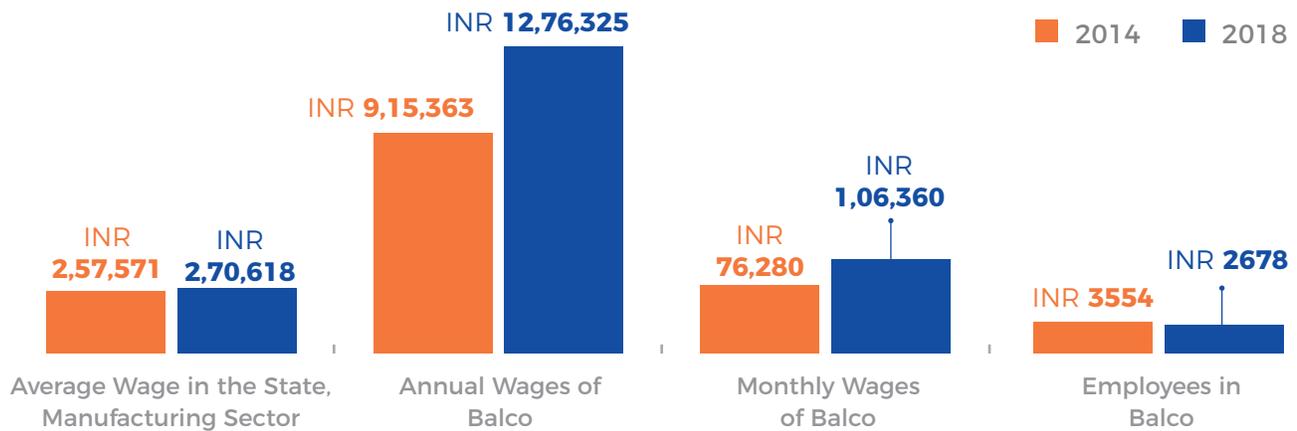
INR
341 Cr.

The employee benefits expense mainly includes salaries and wages, contribution to provident funds and other funds and staff welfare expenses.

Looking at the bigger picture, the annual average wage in Chhattisgarh and Orissa for the manufacturing industry was approximately INR 2,58,000 in 2014 whereas employees of Balco received an annual wage of INR 9,15,000 in that year. In 2018, the annual average wage in Chhattisgarh increased to INR 2,70,618 and along with this, annual wage given by Balco also increased to INR 12,76,325.



These figures depict that there has consistently been a considerable difference in the wages given to employees of Balco as they were earning 6 times more than the average annual income earned by an individual in the manufacturing industry.



Source: India Cluster Mapping Project, Institute for Competitiveness.

Direct, Indirect and Induced Impact

The operations of BALCO Ltd. falls under the 'Bauxite Mining Industry'. Based on the multipliers of that industry, table captures the

direct, indirect and induced impact of BALCO's operations from 2014-2018.

Year	India's GDP (INR Cr.)	Total Sales (Direct Impact) (INR Cr.)	Sales (as a % of GDP) - Direct Impact	Type - I Multiplier	Indirect Impact (INR Cr.)	% Indirect Impact of Balco	Type - II Multiplier	Induced Impact (INR Cr.)	% Induced Impact of Balco
2014	1,12,33,522	3,591	0.032	1.77	6,356	0.06	4.94	17,740	0.16
2015	1,24,67,959	4,796	0.038	1.77	8,489	0.07	4.94	23,692	0.19
2016	1,37,71,874	4,836	0.035	1.77	8,560	0.06	4.94	23,890	0.17
2017	1,53,62,386	6,361	0.041	1.77	11,259	0.07	4.94	31,423	0.20
2018	1,70,95,005	9,023	0.053	1.77	15,971	0.09	4.94	44,574	0.26

The total sales of BALCO Ltd. that reflects the direct impact on the economy amounts to 0.05 percent of India's GDP in 2018. The indirect impact of company's operation in 2018 was around INR 1,597 Crores that is 0.08 percent of India's GDP. The indirect impact has increased from 0.05% in 2014 to 0.08% in 2018. The induced impact of BALCO Ltd. on the Indian economy amounts to INR 4,457 Crores which is 0.23% of India's GDP.

Sectoral Impact

The aluminium industry is considered to be capital intensive and has linkages with various industries. Due to these linkages, aluminium prices or level of production plays a huge role in determining the output of such other-related industries, varying from

automobiles to kitchen appliances, thus making the aluminium industry a key player in the growth of this connected circle of different sectors. Talking about the level of impact that the Aluminium industry has, the following figure shows us the results.

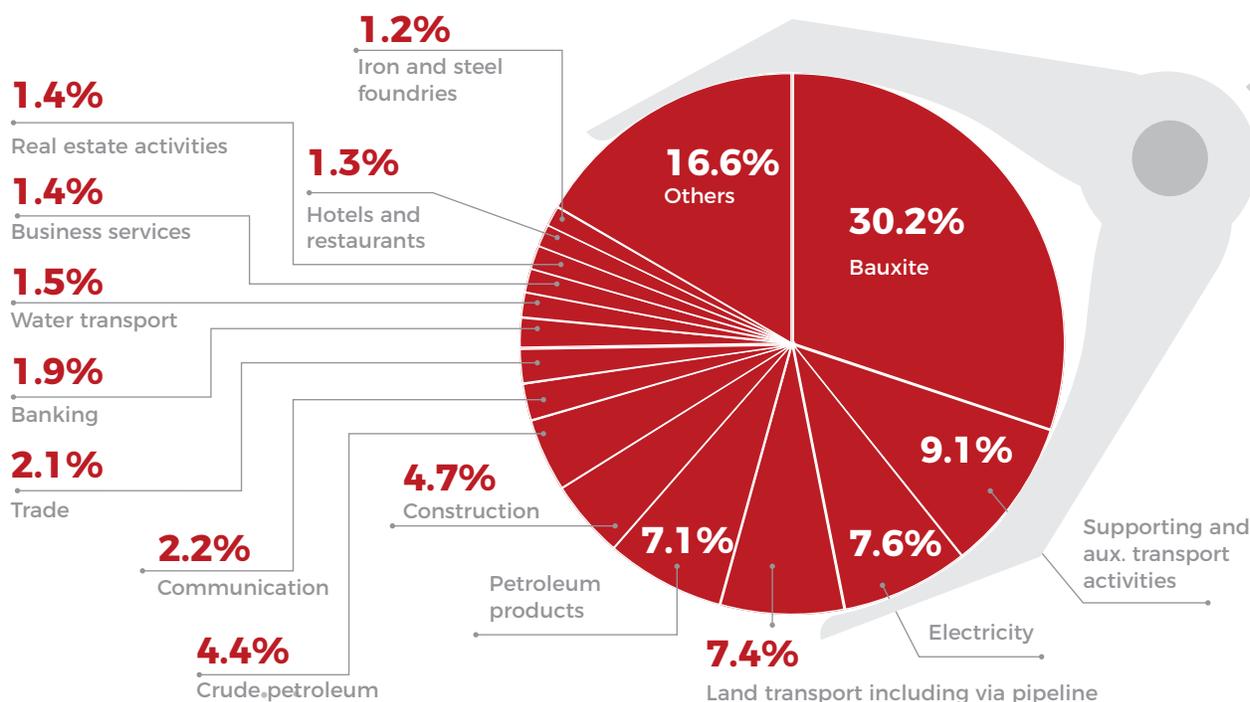


Figure 7- Sectoral Impact of Balco

Source: Vedanta Group Ltd and IFC Analysis

There is 9% impact on the supporting and auxiliary transportation activities. This can be explained by the use of aluminium for the manufacturing of cars, providing alloys for basic structure of any transportation vehicle. Electricity industry has 8% impact because of

use of aluminium for electrical appliances, live wires and optic fibres. There also exists 4.7% impact on construction sector as large amount of aluminium is used as a raw material for infrastructure development.

Output and Income Multipliers

The output multiplier for a given industry is the total inputs by all industries necessary to deliver a rupee's worth of final demand for that industry's output. It is expressed as the ratio of change in direct and indirect output changes to direct output change due to a unit increase in final use.

Therefore, multiplying BALCO's total sales (INR 9,023 Crores) by the output multiplier of the industry (2.017) gives us the impact on economy's output which is equal to INR 1,819

crores equal to 0.10 percent of India's GDP.

The income multiplier translates the effect of change in demand into changes of household income. It basically looks at the consumption patterns. There are two types of income multipliers. First, the one that captures the change in income due to change in output. Second, the one that captures the change in income associated with an initial change in income.

Industry	India's GDP (INR Cr.)	Balco's Total Output (INR Cr.)	Output Multiplier of the Industry	Impact on Economy's Output (INR Cr.)	Impact on Economy's Output (As a % age of country's GDP)	Income Multiplier of the Industry	Impact on Economy's Income (INR Cr.)	Impact on Economy's Income (As a % age of country's GDP)
BAUXITE	1,70,95,005	9,023	2.017	18,199	0.11	0.983	8,869	0.05

We calculate the impact of BALCO Ltd. operation by using the first multiplier that measures the impact of change in income of households due to change in the company's sales. Increase in consumption has an impact on the demand for raw material supplies, whose increase initiates a change in income as employment increases. Multiplying Balco's total sales (INR 9,023 Crores) by the income multiplier of the industry (0.983) gives us the impact of this industry on economy's income.



This is equal to
INR 8,869 Cr.



amounting to
0.05 %
of India's GDP.



Employment Multiplier

BALCO Ltd. has a potential of impacting the labor force and our economy on a large scale. Bauxite Industry has an employment multiplier of 0.132 which means for every 1 lakh of output there is a generation of 0.132 jobs. Balco, using the employment multiplier generates around

1,19,104 job opportunities with the help of its output of INR 9,02,300 Lakhs. Also, for every 1 employed individual by Balco, there would be a generation of around 13 jobs in the economy.

Industry	Employment Multiplier	Output (in INR Lakhs)	Impact on Employment	Total Employees in Balco	Employment generated per employee of Balco
Bauxite	0.132	9,02,300	1,19,104	9,331	12.76



**SOCIAL
IMPACT**

Shared Value

HOW BALCO INDIA IS CREATING SHARED VALUE

Redefining Productivity Across Value Chain



TECHNOLOGY

- ◆ Eureka, a digital platform for employees to come up with innovative ideas
- ◆ Creation of Smart Ore System to increase efficiency by 10 to 15 percent
- ◆ Magma : A technology that allows conversion of red mud into pig iron



LOGISTICS

- ◆ Replaced manual Excel based attendance system with System based Biometric at Kawardha & Manipal Mines



ENVIRONMENT

- ◆ Reduced water consumption by 44.27% from 1.31 m³/MT in FY 2018
- ◆ Reduced energy consumption by 2.61% from 54.36 GJ/MT to 54.92 GJ/MT in FY-18
- ◆ Piezometers provided around hazardous waste storage site.
- ◆ Vendors development for hazardous waste disposal (shotblast dust SPL)
- ◆ Secured Landfill (SFL) for disposal hazardous waste generated from plant operations



WORKFORCE

- ◆ First-aid centers manned round the clock with fully equipped ambulance facilities inside plant.
- ◆ An annual health check up program is organised
- ◆ Health record made by PANACEA
- ◆ 921,550 man-hours of training on safety

Enabling Local Cluster Development



TALENT

- ◆ Vedanta Skill School



LOCAL INFRASTRUCTURE DEVELOPMENT

- ◆ Rural Haat (NABARD)
- ◆ Community Buildings
- ◆ Passenger shelters
- ◆ Drinking water and Sanitation facility
- ◆ Vedanta rural health post, exclusive camps, mobile health unit



LOCAL COMMUNITY DEVELOPMENT

- ◆ Project Jagriti (HIV/AIDS awareness programme)
- ◆ Project Mamta (Women and childcare programme)
- ◆ Advocacy of education
- ◆ Vedanta mid-day meal kitchen
- ◆ Vedanta child care center
- ◆ Project Unnayan (School Upgradation Programme)
- ◆ Land and water management
- ◆ Project Wadi (Orchard Development), watershed project

Over the years, Balco India has worked towards creating shared value through its operations. Being an aluminium company, there is little scope for the first level, viz. reconceiving products and markets. However, in the process, of redefining the product in the value chain, it has been able to create innovations such as Magma and Smart Ore systems. The logistics have been improved, as the current manual excel sheet based attendance has been replaced by biometric system, making it automatic. It is across the other two levels that Balco India has had the maximum societal impact. For instance, the company has made

continuous efforts to improve productivity across its value chain by increased use of technology and training its workforce. Balco India has not just ensured the safety of the employees by providing medical care within the facilities, but also looked out for the environment by ensuring reduced water and energy consumption. Similarly, the company has made consistent efforts to develop the surrounding communities and build local clusters like training local youth for and setting up of health care facilities, and targeting diseases such as cancer to uplift the society.

HEALTH

Around 68% of the nation's population resides in rural areas, whereas around 70% of the health infrastructure, medical man-power and other health resources are concentrated in urban areas. There is a considerable need to improve the accessibility of these resources to the more backward areas of the nation. Balco India is doing their part as most of their operations are in areas where access to nutrition and sanitation facilities is scarce and their community health activities strive to improve the health and welfare through inclusion of medical infrastructure such as hospitals which are further supported by medical outreach services and health vans.

A Study by Lancet in 2018 which uses data from Report on Global Burden of Disease 2016, has categorized the deaths as avertable and amenable, wherein amenable deaths are

caused due to non-utilization of resources and poor quality of services. As per the study, in South Asia, 64.4% of the amenable deaths occur due to poor quality of services.

Balco India via its initiatives of providing Vedanta Rural Health Post, medical camps has aimed at increased accessibility to good quality health care services. The company has sponsored construction of State of Art Cancer hospital (Balco Medical Centre) at Naya Raipur and during the year



CONTRIBUTION MADE WAS INR 83.32 Cr. (UP TO MAR 31, 2018)

Through the initiatives, Balco India has removed inaccessibility to quality healthcare and has positively impacted 11,30,000 people. By provision of quality healthcare facilities to the people, Balco India has been able to prevent 4,657 deaths, given the death rate of 6.4 per 1000 population. This is under the assumption that the probable deaths taken into consideration are amenable, and not avertable.

Conservative Estimates of Lives Saved due to Intervention in Healthcare Services

Amenable Deaths due to use of poor quality of healthcare in South Asia (%) (2018)	64.4
Death rate in India (per 1000 population)	6.4
Number of people who had access to quality health care (Patients who benefitted by Balco's Initiatives)	11,30,000
Lives Saved in India	4,657



BALCO INDIA THROUGH ITS OPERATIONS HAS IMPACTED



11,30,000 people until now

AND THE INTERVENTION HAS PREVENTED LOSS OF **4,657 lives** approximately via provision of quality health care.

MALNOURISHMENT

Furthermore, Balco India has been successful in building close to 154 Nandghars in India. They are equipped with modern infrastructure including access to e-learning, clean water, sanitation and nutritious food. They aspire to improve the situation of malnourished children

in India by working with the Ministry of Child and Family Welfare. This is a major step in providing healthcare in a nation where every one out of three children under the age of 6 years are malnourished.

Conservative Estimates of Savings due to Interventions in Nutrition

Average Per Capita Income	86,668
Years (20-65)	45
Lifetime Earnings (INR)	39,00,060
Loss due to Malnutrition	3,90,006
Children Impacted	56,000
Loss saved due to Intervention (INR)	2,184. Cr.

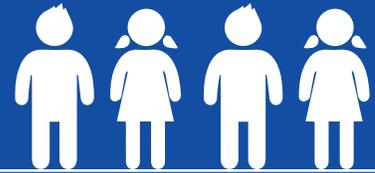
The table provides the details of such interventions. There are various studies that have quantified the impact of malnutrition on learning abilities of children and how that impacts their lifetime earnings. **The loss in lifetime earnings is approximately 10 percent (World Bank Study).** The economic costs of such **micro-nutrient malnutrition costs India around 0.8 percent to 4 percent of its GDP** according to various estimates. The average per capita **income of Indians is INR 86,668.** Assuming an average person works for **45 years**, his lifetime earnings are **INR 39 lakhs.** Going by the most conservative estimates that the direct loss in **productivity leads to 10 percent loss in average income**, the loss due to malnutrition per person in his lifetime is **INR 2,184 Crores.**





BALCO India through its operations has impacted

**56,000 children
until now**



and the gains of such
intervention amount to

INR 2,184 Cr.

DRINKING WATER AND SANITATION

For a nation which constitutes for around 40% of the total Open Defecation in the world, sanitation is of prime importance. To prevent the spread of diseases and further open defecation the nation battles with issues of inadequate sanitation, which costs India an astounding amount of INR 2.4 trillion per

year. When we further delve into this problem we gauge the cost of inadequate sanitation which comes to INR 2,180 as per the study 'The Economic Impact of Inadequate Sanitation in India' by the World Bank. Balco India through its sanitation scheme aims at bringing this massive percentage of open defecation down.

Conservative Estimates of prevented Losses due to CSR for Sanitation	
Per Person Annual Impact Due to Inadequate Sanitation (INR)	2,180
Number of Beneficiaries in 2017-18 under Sanitation Program	57,000
Total Loss Prevented (INR)	12.43 Cr.



Balco India through its activities under the ambit of SANITATION HAS PREVENTED A NEGATIVE IMPACT OF

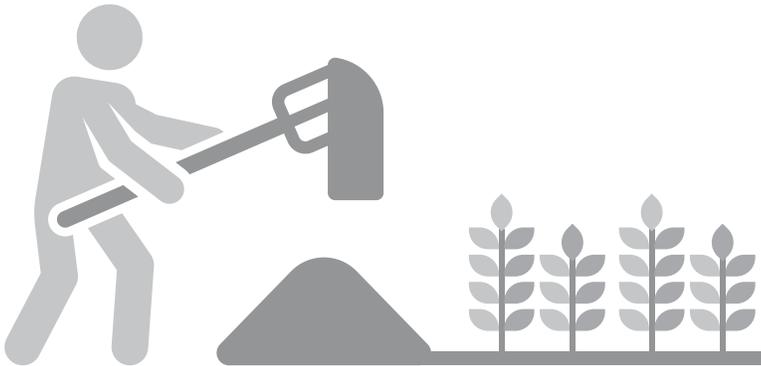
INR 12.43 CRORE



As the number of beneficiaries via construction of toilets (household and community) from the sanitation program under Balco India are 57,000 the estimated burden or the negative impact which has been prevented via provision of water and sanitation facilities is INR 12.43 crores.

Balco India at Chotia mines, has enabled potable water by water tanker in 6 villages, and 2,000 villagers at Kawardha have been provided Sudho tablet to purify water. 2,12,000 people have benefitted from safe drinking water initiatives.

AGRICULTURE



The improvement of water infrastructure in 4 villages has resulted in an

increase in the agricultural yield by almost 41%

Balco has the philosophy of partnering with communities with a focus towards creation of sustainable assets to enhance livelihood. To put this ideology into motion, “Jalgram” is one of the most significant projects undertaken by Balco in 2015. It has enabled adoption of high efficiency technology in the agricultural sector of Korba, Chhattisgarh. The improvement of water infrastructure in 4 villages has resulted in an increase in the agricultural yield by almost 41%. The provision of surface water has also

had a significant impact in cutting down the water usage as farmers saved almost 2,755 cubic meters of water in the subsequent year. Several other projects with NABARD have created water conservation structures like check dams, wells etc. increasing the area of land to 646 acres under secured irrigation. This in turn has helped the farmers to cultivate a second crop and increase their yield by 30% hence improving their livelihood economically



WOMEN EMPOWERMENT

India faces a challenge of gender inequality in terms of economic opportunities reflected in the gendered wage gap. Balco India through its initiative has reached out to 100 Self Help Groups (SHGs), impacted 1,144 women and provided 344 women with income generating activities.

Conservative Estimates of Increase in Women’s Collective Income Per Year

Daily Wage for Female (2011-12) (INR)	231
Number of Women generating Income due to SHGs	344
Increase in Women's Collective Income due to Balco India's Initiative (INR)	0.79 crore

The daily wage for females in 2011-12 was INR 231. Given that Balco India has been able to impact 344 by enabling them towards income-generation activities, it can be stated

that the Balco India has been able to increase women’s collective income in India by 0.79 crore annually. (Assuming minimum 100 days of employment)



“

BALCO INDIA HAS HELPED
INCREASE WOMEN'S
COLLECTIVE INCOME PER
YEAR BY

INR 0.79 Cr.

SUSTAINABLE LIVELIHOOD – SKILL DEVELOPMENT AND YOUTH

India is among the top five countries with highest skill shortages, wherein the demand for skill development and vocational training is on the rise. To counter the concerns of an existing skill gap, Balco India has setup a 'Vedanta Skill School', enhancing opportunities for sustainable livelihood for young people from underprivileged families enabling their

economic participation. As per the Ministry of Labour's Annual report 2017-18, there exists a difference between the wages of a skilled and unskilled labour. Using the estimates, it can be stated that the average daily wage gap between a skilled and unskilled personnel is INR 75.5.

BALCO INDIA HAS BEEN ABLE TO TRAIN

6,120 rural youth via Vedanta Skill School and extended the program to setup a Korba Skill Center.

It can be estimated that the average annual wage of personnel has increased by INR 4.62 Crores. This is under the assumption that the now-skilled worker is employed for a minimum of 100 days per year. This dystopian minimum has been chosen with respect to the National

Rural Employment Guarantee Scheme which guarantees 100 days of employment, and in the case of skill development and training initiatives we are assuming they are able to provide the same or better employment stability.

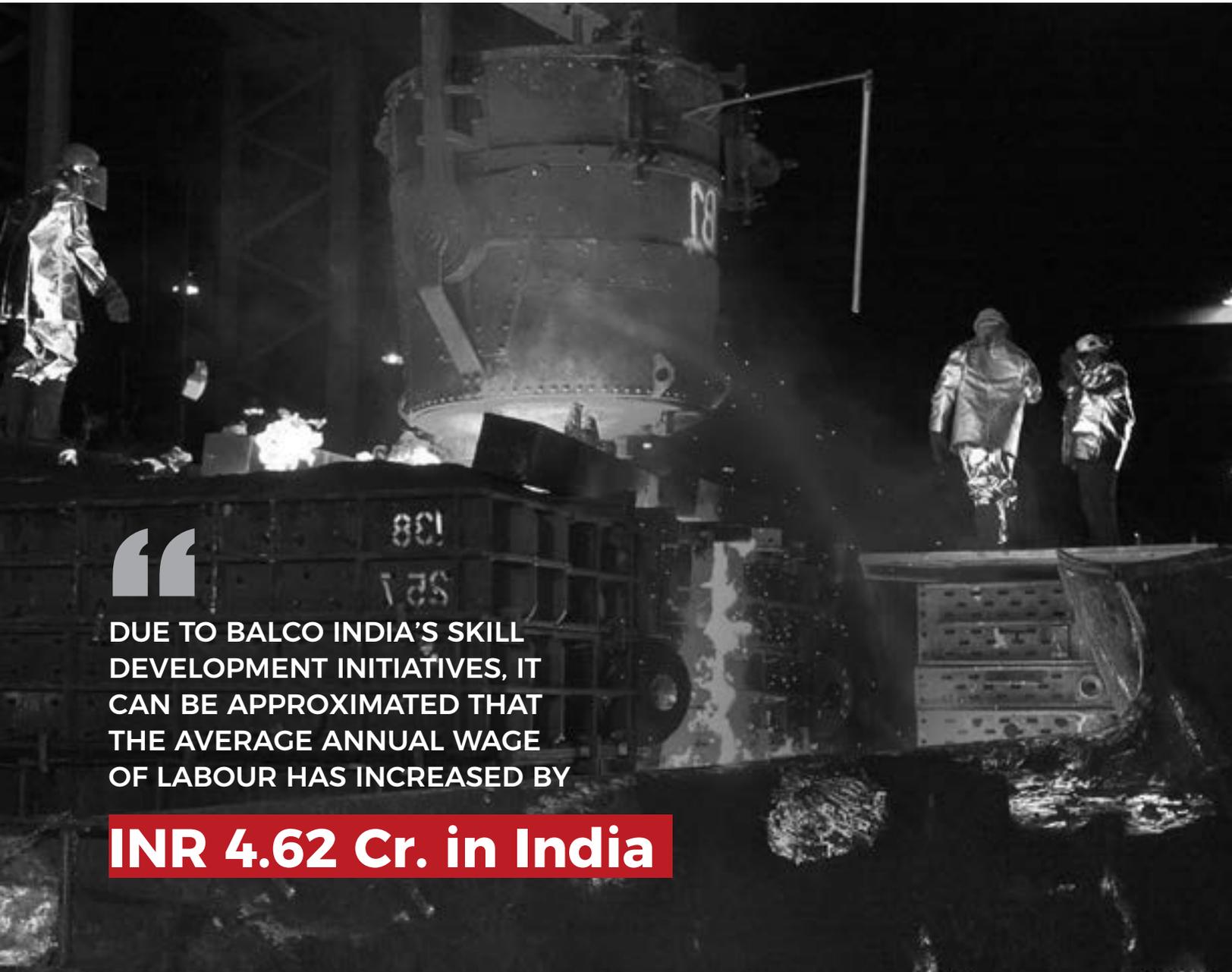
Conservative Estimate of Wage Increase due to Skill Addition

Average Minimum Wage of Skilled Personnel (INR)	497.5
Average Minimum Wage of Unskilled Personnel (INR)	422
Value Addition as per Skill (INR)	75.5
Number of Beneficiaries of Skill Development by Balco India	6,120
Value Addition to Annual Wages By Balco India (INR)	4.62 Crores
Female Wage Gap (INR)	50

“

DUE TO BALCO INDIA'S SKILL DEVELOPMENT INITIATIVES, IT CAN BE APPROXIMATED THAT THE AVERAGE ANNUAL WAGE OF LABOUR HAS INCREASED BY

INR 4.62 Cr. in India

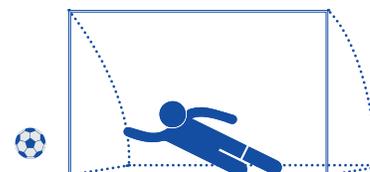


SPORTS EMPOWERMENT

Balco India through its sports outreach program has been able to extend training to around 175 young people in football and have reached out to almost 500 youth players. This initiative will help in raising the living standard of the children. The benefits achieved by children can be quantified by looking at the increase in their average wages due to training.



Gains due to Football Academy	
Average Basic Annual First Team Pay in Super League (In INR)	74,69,271
Average Annual Income in India (INR)	1,03,870
Increase in Yearly Income of one player (INR)	73,68,720



THE AVERAGE ANNUAL INCOME OF ONE PLAYER WILL GO UP BY ALMOST

INR 73 lakhs

OTHER INITIATIVES

India has two major let downs in their race to reach economic stability in the likes of environment and agriculture. With seven out of the top ten of India's cities featuring in the list of most polluted cities and with the nation on the brink of an agrarian crisis Balco India is

taking the required steps to curb the impact of such issues as much as possible.

In terms of saving the environment and ensuring efficient management of natural resources, Balco India has installed

- **582 solar streetlights** in villages near their operations.
- They have also helped in **planting of 74,410 plants** on 132 acres of land.
- The initiatives of Balco India have **helped 2,900 farmers** adopt horticulture as well as **floriculture as source of livelihood**.
- They have also aided in carrying out of veterinary camps and **benefitted 6,769 animals**.

Balco India has an initiative called 'Disha' implemented in village Dandro (Korba), focusing on women and child development aiming to improve various development

indicators of women, child and adolescent girls with respect to health, education, childcare, and livelihood.

VEDANTA ALUMINIUM

VAL production grew drastically from

2014-15

553 KT

2018-19

1,388 KT

A SHARP INCREASE
WAS OBSERVED IN THE
REVENUE FROM

INR **14,150** Cr.

INR **25,314** Cr.

ECONOMIC IMPACT OF VAL OPERATIONS

THE COMPANY ON AN AVERAGE HAVE BEEN GENERATING
LIVELIHOODS FOR

12,702 households
since FY2015



Over a course of five years, there has been a 50% increase in the
number of direct employees in the company from

2,758

4,150



Also, the number of associates
has been ascending at a rate
of 35% since 2014-15.

GENERATED LABOUR
INCOME OF

INR **369** Cr.

in 2019



THE INDUCED IMPACT OF VAL HAS
BEEN APPROXIMATELY

INR
1,46,821 Cr.
that is as large as



0.77 %
of India's GDP.

The income multiplier for the industry is 0.92, that implies that VAL's impact on the economy's income is

INR 23,289 Cr.



that is
0.12 %
of India's
GDP

SOCIAL IMPACT OF VAL INDIA OPERATIONS

WITH ITS INITIATIVES LIKE MOBILE HEALTH UNIT AND AMBULANCE SERVICES, VAL HAS BENEFITTED

23,282 Villagers until now



and the intervention has prevented loss of

96 lives



approximately via provision of quality health care.

VAL INDIA THROUGH ITS OPERATIONS HAS IMPACTED

14,000 Students until now



and the gains of such intervention amount to

INR 58.50 Cr.

VAL has come up with schemes like Vedanta Vidhyarthi Vikash Yojna. It's being expected that the scheme would translate into a monthly increase in cumulative wages by approximately INR 15.06 lakhs

WOMEN EMPOWERMENT



VAL India through their initiatives, has helped approximately

350 tribal women

creating an overall impact of INR 1.05 Cr. per annum.

INTRODUCTION

Vedanta Aluminium Limited or VAL as it is called, has always aimed at improving production of quality aluminium. Vedanta Aluminium's capacity has improved substantially since its first hot metal tapping in March 2008 which made VAL attain the position of the world's largest single-location aluminium smelter in Jharsuguda. The smelter with an installed capacity of 1.75 MTPA, boasting at a run-rate of over 1.35 MTPA, has helped them in fulfilling their objective by producing 40% of India's primary

aluminium together with occupying 40% of the domestic market share. These high production levels have made Vedanta Aluminium the preferred producer of aluminium to cater to a variety of industries like automobile, aviation, F&B packaging and so on. Similarly, the greenfield alumina refinery at Lanjigarh, Odisha is also on the list of one of the largest single location aluminium refinery. This plant through its economic activity provides employment to 6,000 people, directly or indirectly.



Figure-1. Aluminium production by Vedanta Aluminium (in KT)
Source: Vedanta Group Ltd and IFC Analysis

Aluminium, being a vital raw material, finds its presence in a number of industries, and hence, there is an upsurge in demand of the metal leading to higher production levels. As mentioned before, Vedanta Aluminium Limited has been one of the largest manufacturers of this silvery-white shiny metal and the company's production numbers validate the same. A persistent rise in the annual production of aluminium is evitable from figure-1.



THE COMPANY'S PRODUCTION ROSE DRASTICALLY FROM



The metal that is cumulatively produced at Lanjigarh and Jharsuguda has grown at a 25.87% CAGR between aforementioned period.

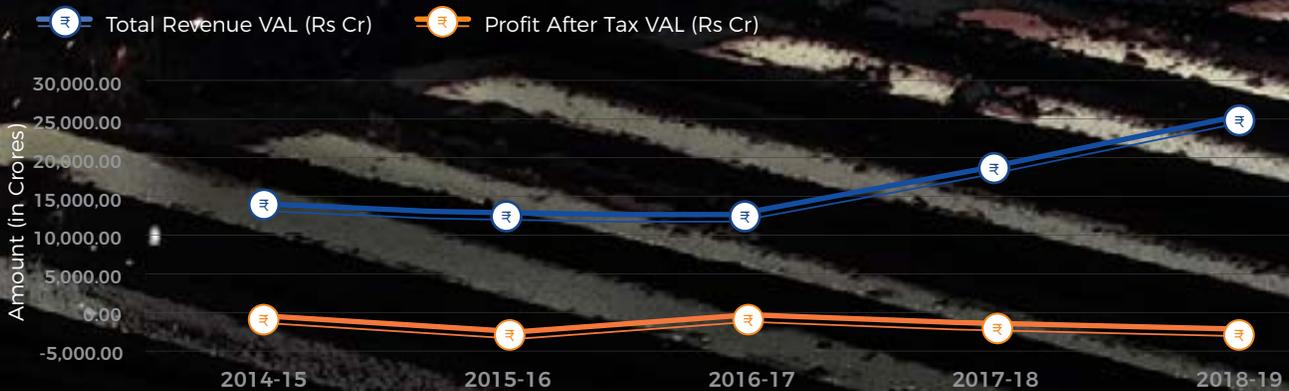


Figure 2. Profitability of Vedanta Aluminium Over Time
Source: Vedanta Group Ltd and IFC Analysis

With high levels of production, the revenue of VAL has also been rising. Starting from 2014-15 when the company produced relatively low levels of aluminium, the revenue growth was muted. But over the years, there has been massive growth. The revenue has been growing at a rate of 12% compounded annually. A sharp

increase was observed in the revenue from INR 14,150 crore in the year 2014-15 to INR 25,314 crore in 2018-19, which was anticipated by the firm due to rising levels of production. However, the company's profit after tax has remained into negative territory ever since 2014.



ECONOMIC IMPACT

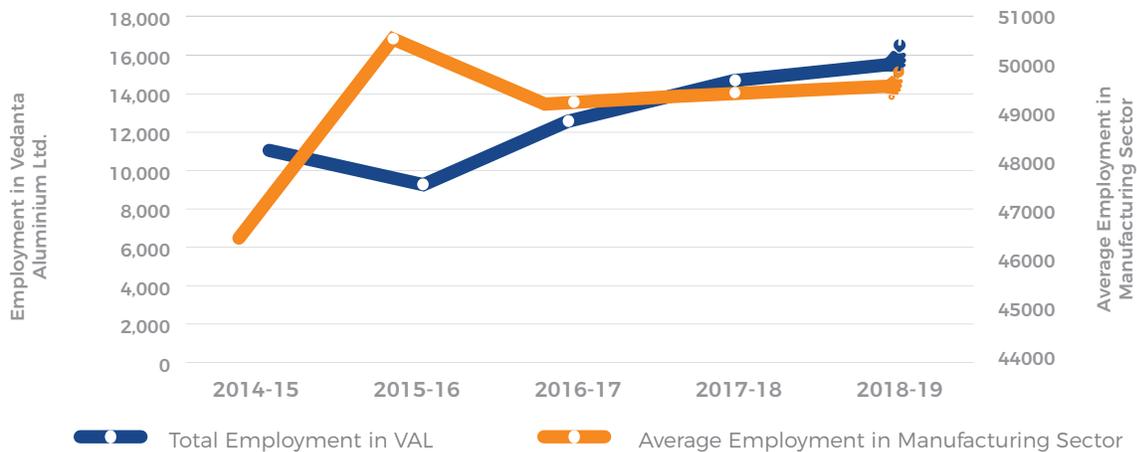


Figure 3. Comparative Employment Trends of VAL and the Manufacturing Sector
 Source: Vedanta Group Ltd. | India Cluster Mapping Project, IFC

“ THE COMPANY ON AN AVERAGE HAVE BEEN GENERATING LIVELIHOODS FOR **12,702 households since FY2015** ”

Extent of Contractual Employment

The company only experienced a one-time downturn in employment level in 2015-16. Since then, the company wise trends have become better than the employment trends in the manufacturing sector at large in India.

11,000 contractual employees for 2018-2019. The ratio of indirect to direct employment for the company is around 3 to 1.

VAL has an overall employment impact on around 15,500 across the value chain with direct employment of 4,150 personnel and over

Over the course of five years, there has been a 50 percent increase in the number of direct employees in the company from 2,758 to 4,150. Also, the number of associates has been ascending at a rate of 35% since 2014-15.

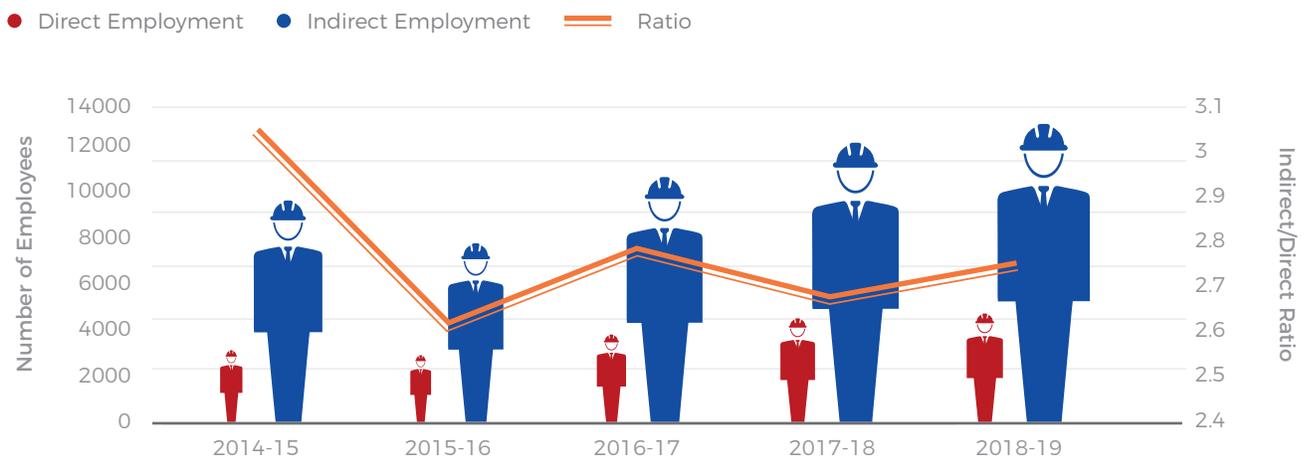


Figure 4: Employment Trends of VAL

Source: Vedanta Group Ltd and IFC Analysis

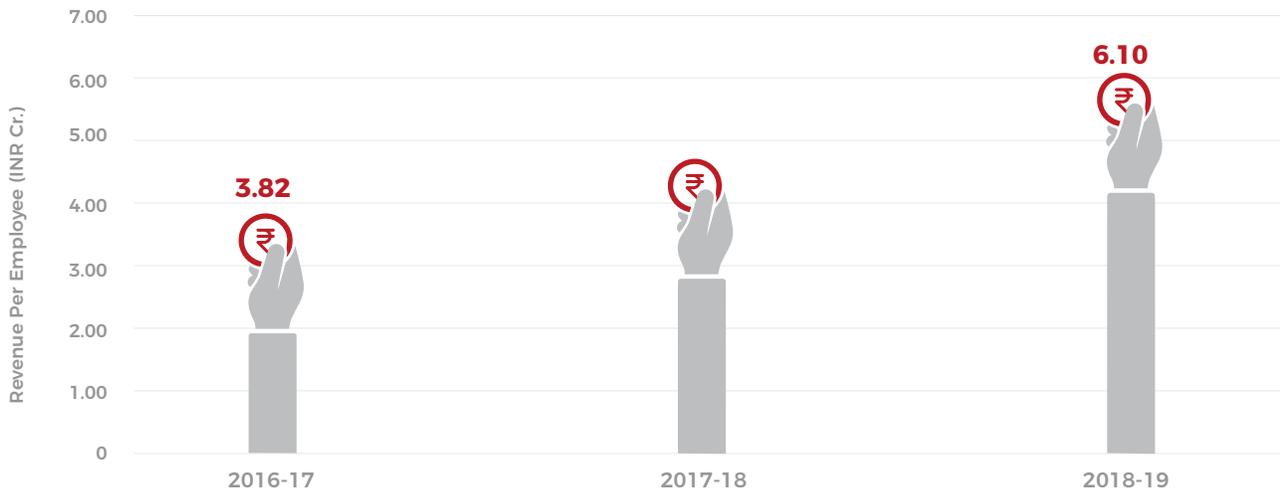


Figure 5: Productivity Growth of VAL Employees

Source: Vedanta Group Ltd and IFC Analysis

The productivity mainly depicts how efficiently can a company transform resources into goods potentially creating more from less. From a broader perspective, higher the productivity better is the driving power of the company. It is calculated as the revenue per employee.

For Vedanta Aluminium, the productivity level of employees has almost doubled over the last three years. Specifically, Figure 5 shows that the productivity of employees at VAL has jumped from INR 3.82 Cr. to INR 6.10 Cr. between 2016-17 and 2017-18.

Contribution to Government Exchequer

A pivotal contribution of a business towards economic progress, other than its own product and services, is its contribution towards government taxes and revenue.

The figure below paints the contribution of VAL towards government exchequer in the form of taxes, direct and indirect, and revenue.

A major contribution towards government exchequer comes in the form of indirect taxes and taxes falling under “others” category like Swachh Bharat Abhiyan Tax, Education Cess, Krishi Kalyan Tax, Infrastructure Cess, Municipal Tax etc. The Indirect Tax for period 2018-19 amounts to INR 907 Crores and “Other” Taxes amounts to INR 2,924 Crores.

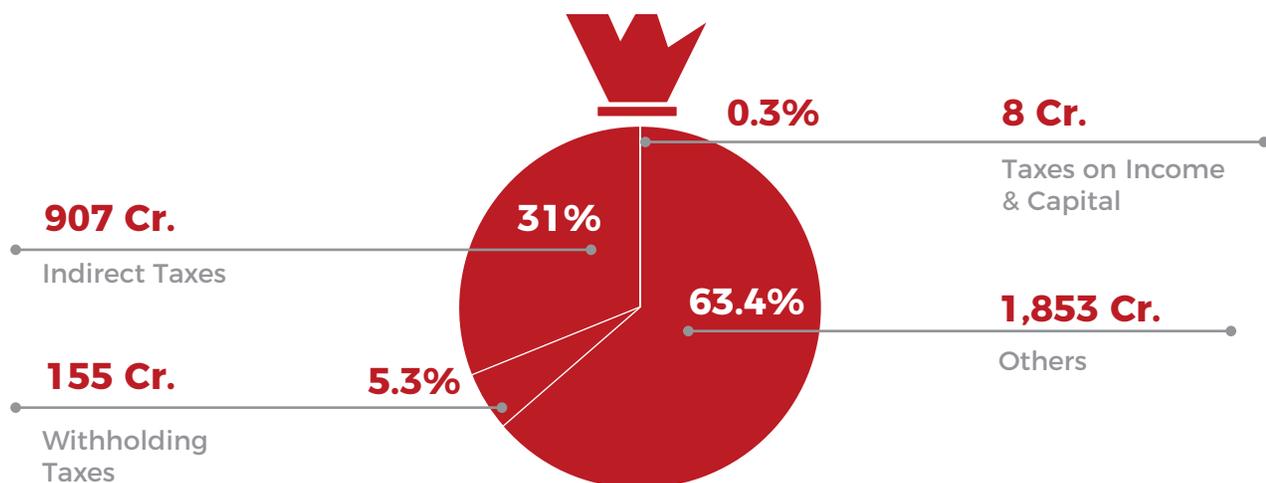


Figure-6. Contribution to Government Exchequer (INR)

Source: Vedanta Group Ltd and IFC Analysis

Impact of Tax Contribution on Society

Direct and indirect taxes, accumulatively, contributes INR 2,924 crores towards government exchequer. The Figure below presents the impact of VAL'S contribution towards government exchequer on the Society.



CAPITAL EXPENDITURE

If the entire tax revenue is utilized as capital expenditure by the government, it will cause the GDP to rise by

INR 7,164 Cr.

This is because India has a capital expenditure multiplier of 2.45.



EDUCATION SECTOR

The tax revenue by the company also suffices to support

1,45,472 teachers

yearly given that the average annual salary of a teacher in India is about INR 2 lakhs. Moreover, with a mandatory pupil-teacher ratio of 30:1 at the primary level,



VAL's tax contribution can help

43,64,179 students attain education.



HEALTH SECTOR

The total taxes paid by VAL can support employment of

1,16,960 medical officers

assuming that the cost of medical officers to ranges between **INR 2,50,000 to INR 4,50,000**. Such an investment could go a long way in addressing India's healthcare issues.

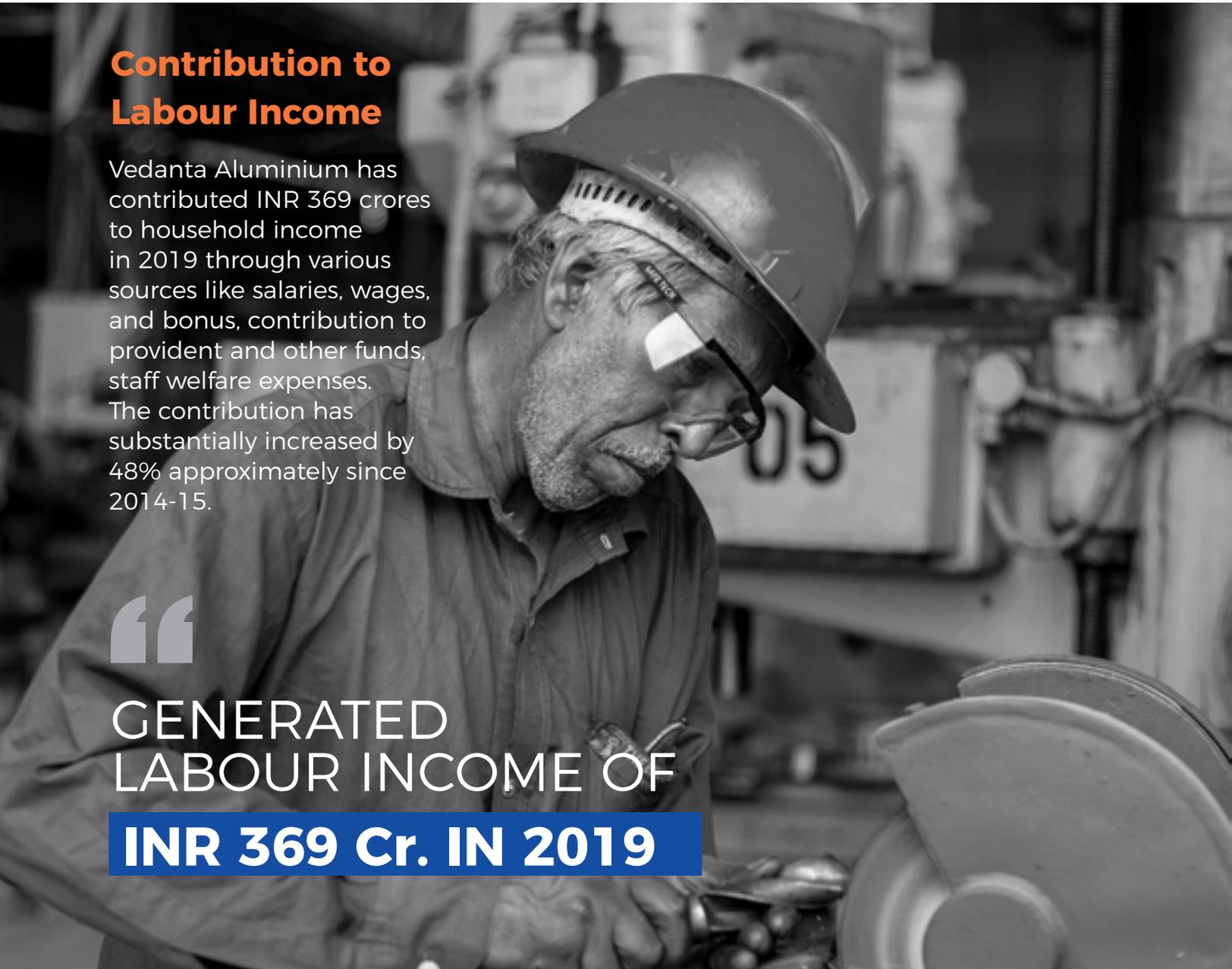
Contribution to Labour Income

Vedanta Aluminium has contributed INR 369 crores to household income in 2019 through various sources like salaries, wages, and bonus, contribution to provident and other funds, staff welfare expenses. The contribution has substantially increased by 48% approximately since 2014-15.



GENERATED
LABOUR INCOME OF

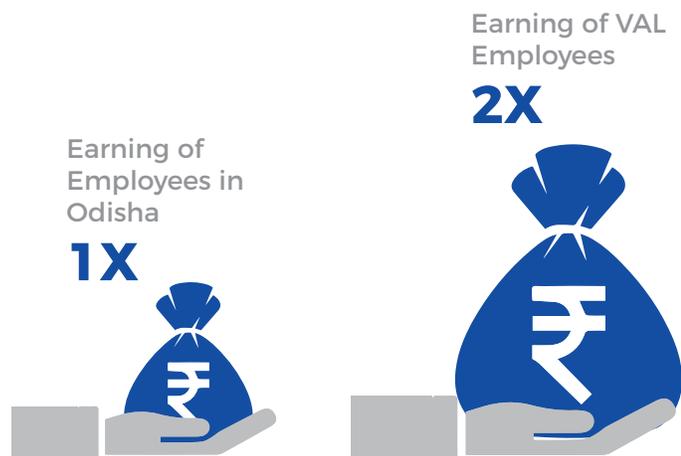
INR 369 Cr. IN 2019



The average wage of employees of VAL is significantly higher than the rest of the people employed in the manufacturing industry. The annual average wages of employees of Vedanta Aluminium, calculated by dividing total remuneration by total employees, was INR 8,89,137 in 2018-19. The annual average wage in the manufacturing sector (according to Indian Cluster Mapping Project, IFC) for the year 2014-15 were INR 2,40,000.



This implies that employees in VAL were earning more than twice than the average employee in the state of Odisha.



Year	2014-15	2018-19
Remuneration (INR Cr.)	248	369
Employees of VAL	2,758	4,150
Annual Wage in VAL (INR)	9,00,552	8,89,136
Monthly Wage in VAL (INR)	75,046	74,094
Average Wage in Odisha (INR)	2,40,000	2,36,957

Source: Vedanta Group Ltd and India Cluster Mapping Project, IFC.

Direct, Indirect and Induced Impact

Since VAL's main operation is the production of Aluminium which falls under the "Non-ferrous basic metals" industry, so the multipliers of

that industry have been taken to capture the direct, indirect and induced impact of the company's operations since FY2015.

Direct, Indirect and Induced Impact of Vedanta Aluminium's Operations (2015-16 to 2018-19)									
Year	India's GDP (INR Cr.)	Total Sales (Direct Impact) (INR Cr.)	Sales (as a percentage of GDP)	Type - I Multiplier	Indirect Impact (INR Cr.)	Percentage Indirect Impact of Vedanta Aluminium	Type - II Multiplier	Induced Impact (INR Cr.)	Percentage Induced Impact of Hindustan Zinc
2015	1,24,67,959	14,150.19	0.11	2.84	40,187	0.32	5.8	82,071	0.66
2016	1,37,71,874	2,285.03	0.09	2.84	34,889	0.25	5.8	71,253	0.52
2017	1,53,62,386	12,876.97	0.08	2.84	36,571	0.24	5.8	74,686	0.49
2018	1,70,95,005	9,000.55	0.11	2.84	53,962	0.32	5.8	1,10,203	0.64
2019	1,90,53,967	25,313.95	0.13	2.84	71,892	0.38	5.8	1,46,821	0.77

In the year 2018-19, the Vedanta Aluminium Limited's total sales had a direct impact of

0.13 % on India's GDP.



The economy gained

INR 71,892 Cr.

because of VAL's indirect impact on the GDP. There has been a noteworthy increase in the indirect impact on GDP from 0.32 percent to 0.38 percent since 2014.

The induced impact of VAL has been approximately

0.77 % of India's GDP

amounting to INR 1,46,821 crores.

Sectoral Impact

From kitchen utensils to window frames and beer kegs to aeroplane parts, Aluminium is the metal which finds its use in almost every industry. The non-ferrous metal can be recycled easily and thus has huge presence in almost every sector. This shiny metal is capital-intensive and because of its linkages in multiple industries it creates significant impact on industries. VAL has been able to create a remarkable impact of 31.28% on Non-ferrous basic metal Industry. Also, Supporting and auxiliary transportation activities is impacted by 8.65% impact closely followed by 7 percent on the “Electricity” sector.

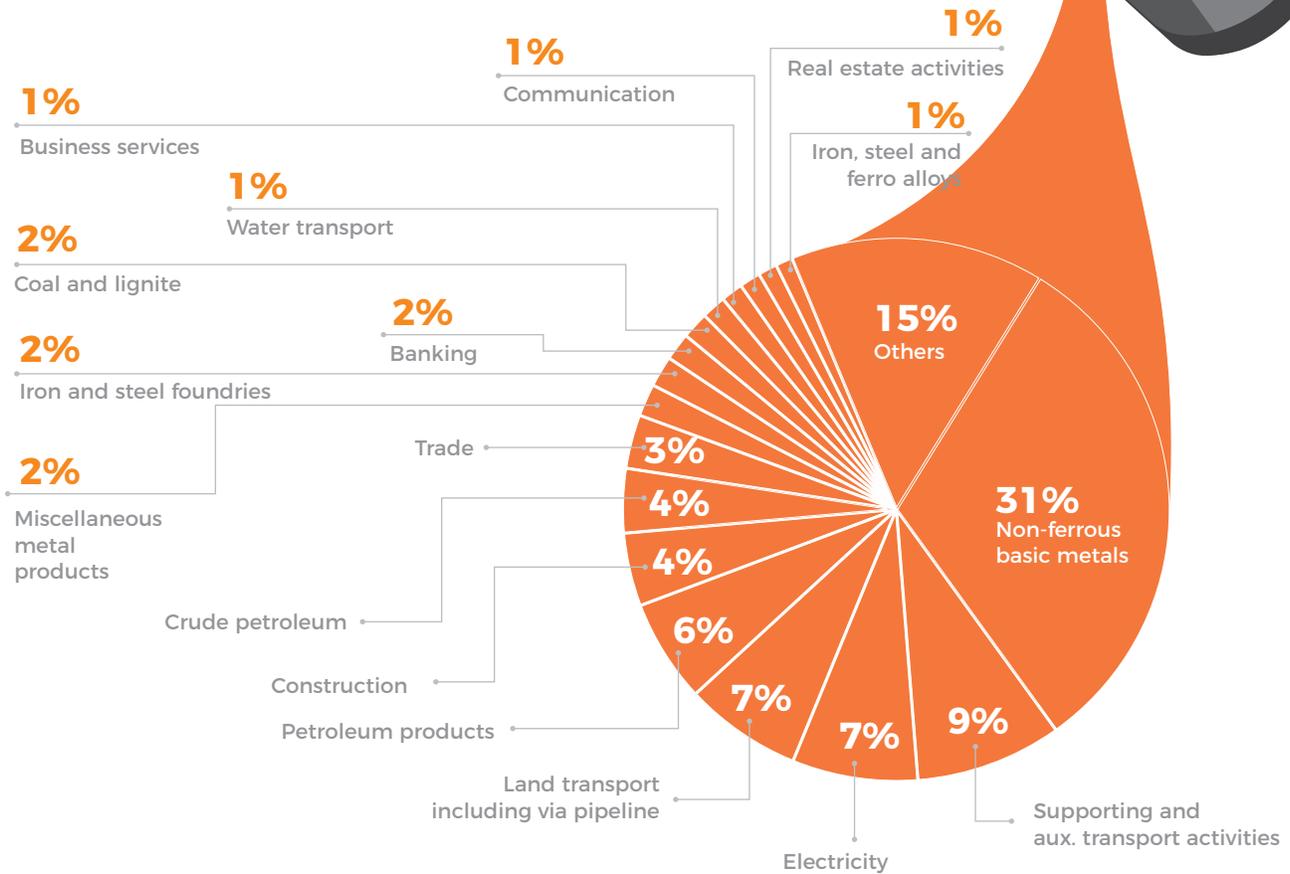


Figure-7. Sector-wise Impact Of VAL's operations

Source: Vedanta Group Ltd and IFC Analysis

Output and Income Multipliers

The output multiplier for a given industry is the total value of sales by all industries necessary to deliver a rupee's worth of final demand for that industry's output. It is expressed as the ratio of change in direct and indirect output changes to direct output change due to a unit increase in final use. The value of this total business activity is larger than the market value of the currently demanded goods and services.

Therefore, VAL's total sales (INR 25,314 crores) by the output multiplier of the industry (2.95) gives us the impact on economy's output. This is equal to INR 74,676 crores, that is 0.39 percent of India's GDP.

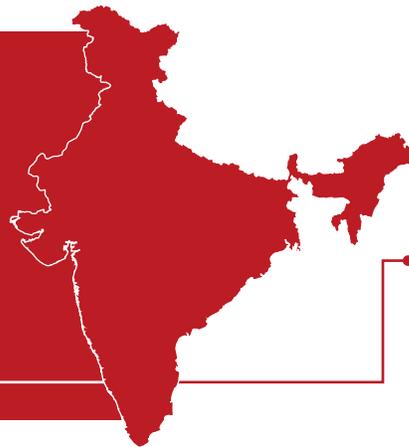
The income multiplier translates the effect of change in demand into changes of household income. It basically looks at the consumption patterns. There are two types of income

multipliers. First, the one that captures the change in income due to change in output. Second, the one that captures the change in income associated with an initial change in income.

Impact of Vedanta Aluminium on Output and Income									
Year	Industry	GDP (INR Cr.)	Vedanta's Aluminium Total Output (INR Cr.)	Output Multiplier of the Industry	Impact on Economy's Output (INR Cr.)	Impact on Economy's Output (As a percentage of country's GDP)	Income Multiplier of the Industry	Impact on Economy's Income (INR Cr.)	Impact on Economy's Income (As a percentage of country's GDP)
2019	Non-Ferrous Basic Metals	1,90,53,967	25,314	2.95	74,676	0.39	0.92	23,289	0.12

We look at the first one. The income multiplier for the industry is 0.92, that implies that VAL's impact on the economy's income is

INR 23,289 Cr.



THAT IS

0.12 %
of India's
GDP

Employment Multiplier

Vedanta Aluminium makes substantial contribution to the economy through its employment generation capacity. Vedanta Aluminium has an output revenue of INR 19,00,055 Lakhs. Non-Ferrous Basic Metals Industry has an employment multiplier of 0.174, which means for every 1 lakh of output

there is a generation of 0.174 jobs. Accordingly, VAL with its output revenue of INR 19,00,055 lakhs generates around 330,610 jobs in the economy. Also, with the help of every 1 employed individual in VAL, they can generate around 21 jobs in the economy.

Industry	Employment Multiplier of the industry	Output (INR Lakhs)	Impact on Employment	Total Employees in VAL	Employment generated per employee of VAL
Non-Ferrous Basic Metals	0.174	19,00,055	330,610	15,549	21.26

LOCAL IMPACT

The operations of Vedanta Aluminium are located in the heart of Odisha at Jharsuguda and Lanjigarh with abundant bauxite reserves. VAL is one of the major operators in Odisha with significant contribution to the state's Mining and Quarrying industry. The company's revenue as a percentage of mining and quarrying industry gross value added has been rising over time.

VEDANTA ALUMINIUM HAD AN INDUSTRY SHARE OF AROUND

64% in 2018

Over a four-year period from 2014-15 to 2017-18 where the industry grew at a CAGR of 2.94 percent, Vedanta's share also increased at 7.18 percent CAGR which highlights the company's significant contribution towards growth of the region.

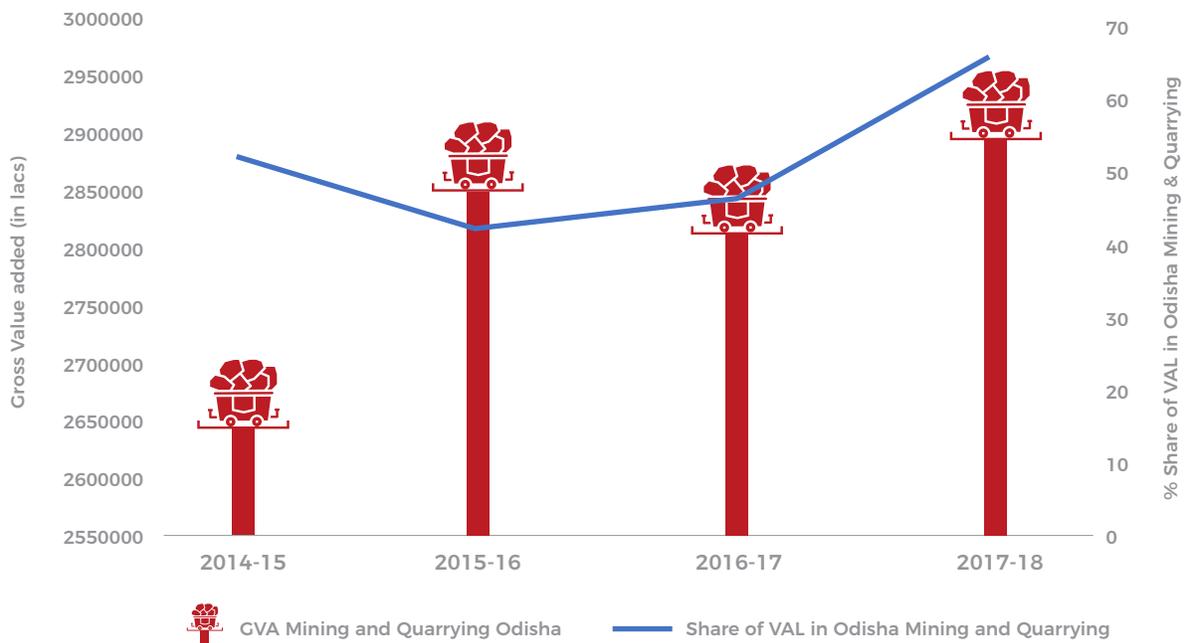


Figure 8: Vedanta Aluminium's contribution to Odisha's mining and quarrying industry
Source: IFC analysis and Directorate of Economics and Statistics, Odisha

Further impact of the company's operations on local economies can be determined through their contribution to the District Mineral Fund (DMF). DMF is a trust set up as a non-profit body in districts where mining is a predominant economic activity. The fund is meant to be used in interest and benefit of people and areas affected by mining-

related activities. The table below shows the amount of DMF contributions made by Vedanta Aluminium over the last four years at Jharsuguda. The DMF contributions, if used in capital expenditure can have an exponential impact on the economy of the district. The capital expenditure multiplier for India is 2.45. The same has been illustrated in figure-9.

Contributions by Vedanta Aluminium to District Mineral Fund (DMF)						
Year	2014-15	2015-16	2016-17	2017-18	2018-19	Contribution to district over last four years
DMF of Vedanta Aluminium in Jharsaguda (INR Cr.)	10.64	50.16	52.41	63.67	78.72	255.60



Figure 9: Potential Impact of DMF on Jharsuguda's economy
Source: Vedanta Group Ltd

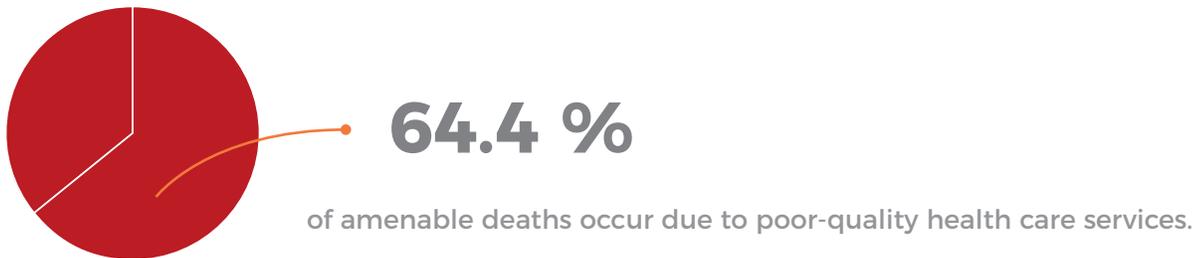
The figure shows that the contribution to the DMF has been increasing over the years and therefore the impact on the economy also has an upward trend hence the increase in impact.



**SOCIAL
IMPACT**

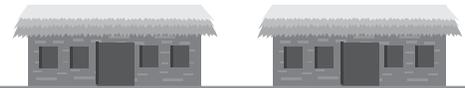
HEALTH

Amenable mortality is defined as premature deaths (under the age of 75) from a collection of diseases that could have been avoided with the provision of effective and timely healthcare. As per Lancet study in 2018,



VAL has realized its social responsibilities and has been an active contributor in providing proper health care services. With its initiatives like Mobile health unit and ambulance services, it has benefitted

23,282 villagers



in both Lanjigarh and Jharsaguda. These initiatives have helped in preventing 96 deaths (amenable and not avertable) when the prevailing death rate was 6.4 per 1000 of population.

Conservative Estimates of Lives Saved due to Mobile Health Vans	
Death rate in India (per 1000 population)	6.4
Amenable Deaths due to use of poor quality of healthcare in South Asia (%) (2018)	64.4
Number of people who had access to health care due to VAL	23,282
Lives Saved in Odisha	96

EDUCATION

It's a known fact that a country cannot make progress in true sense if its education system is weak. Being an integral factor that improves quality of life and leads to broad social benefits to individuals and society, necessary steps are required to refine the education system. Significant efforts have been made by VAL to improve the primary school enrolment in the state of Orissa. VAL has been running mid-day meal scheme, thus benefitting



Despite numerous efforts to increase school enrolments, according to UNICEF, the drop out rate in India has still been high. Approximately 50% children drop-out before reaching class

10 which leads to lower levels of productivity. According to ILO data, the difference between male wage with secondary education and the ones with primary education has been 93

per day. An average female with secondary education earns INR 50 more per day as compared to the ones with primary education. With its persistent effort and determination to give back to the society, VAL has come up with

schemes like Vedanta Vidhyarthi Vikash Yojna. It's being expected that the scheme would translate into a monthly increase in cumulative wages by approximately INR 15.06 lakhs.

Conservative Estimates of Increase in School Enrolments due to Mid-Day Meal Scheme*	
Students Impacted by VAL	14,000
Increase in primary school enrolment due to MDMS	6.60%
Students who would be attending school without VAL intervention	13,133
Increase in student enrolment due to VAL	900

*The Mid-Day meal program has been handed over to Government and is not run by Vedanta Aluminium anymore.

Conservative Estimates of Increase in School Enrolments due to Education Initiatives	
Students Impacted by VAL	700
Sex Ratio Odisha	979
Number of Female Students	346
Number of Male Students	353
Male Wage Gap (Indian male with secondary education minus Indian male with primary education)	93
Female Wage Gap (Indian female with secondary education minus Indian female with primary education)	50
Potential Increase in daily earning capacity due to VAL (INR)	50,209
Potential Increase in Earning capacity per month due to VAL (INR)	15 lakhs



WOMEN EMPOWERMENT

Gender Inequality has been a curse on Indian society since a very long time. VAL has launched leaf-plate making program with an intention to enable tribal women to generate income for themselves.

The program has benefitted

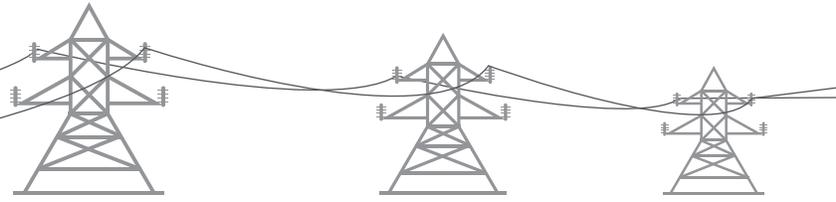
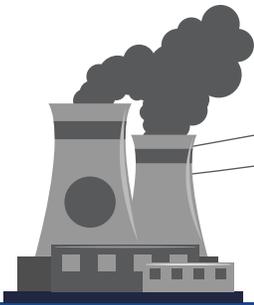
350 tribal women

creating an overall impact of INR 1.05 crores per annum.

Conservative Estimates of Increase in Wages due to Skill Development Initiatives	
Number of female beneficiaries	350
Average monthly increase in wages due to VAL (INR)	2,500
Potential Annual increase in wages (INR)	1.05 Crores

TSPL





IN FY2017-18, ELECTRICITY GENERATION IN INDIA

Increased by **5.71%**

the rapid increase in consumption outstripped the former by growing at a rate of

7.39%

THE TOTAL REVENUE OF THE FIRM HAS SHOWN SPECTACULAR RISE,

growing at a **CAGR of 80%**



ECONOMIC IMPACT OF TSPL INDIA OPERATIONS

AN INCREASE IN PRODUCTIVITY LEVELS HAS BEEN OBSERVED FROM



2.26 Cr.
2015



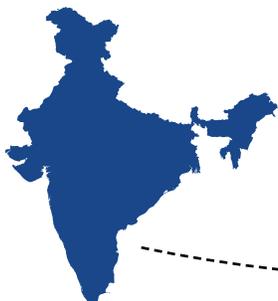
15.34 Cr.
2017

And now is at a record-level of INR 69.5 Cr. per person



THE TOTAL AMOUNT OF TAXES PAID BY TSPL IS

INR **620 Cr.**



THE SALES AMOUNT UP TO

0.028 %

of India's GDP in 2018.

On the other hand, the indirect impact of TSPL is of

INR **13,956 Cr.**

SOCIAL IMPACT OF TSPL INDIA OPERATIONS

TSPL, THROUGH ITS OPERATIONS HAS IMPACTED,

7,588 people until now



and the intervention has prevented loss of **31** lives approximately via provision of quality health care.



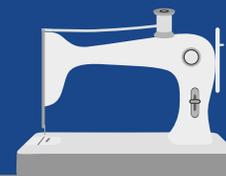
Helped increase each farmer's average income by around **INR 3,000** in Talwandi Sabo

Around 500 family farms cultivating in Kharif season have been benefitted by a Sustainable Agriculture Promotion Project initiative which has resulted in a collective saving of around INR 15 Lakh.



Support a local women centric cultural event reaching out to **150 persons**

Supported 25 women for income generation by providing sewing machines



TSPL extended support to **25 physically challenged persons by providing wheel chairs and tri-cycles**

INTRODUCTION

Power industry is of paramount importance for the economic growth and development of any economy. The property of power, to enable the smallest of productions is what makes it an indispensable commodity for every sector thus making it the most diversified raw material in respective value chains. Moreover, it is one of the most crucial components used in the infrastructure. To even imagine performing construction tasks without electricity is no less than a nightmare and evokes nostalgia from the stone-age. From huge sectors like construction and defense to the most miniscule as the household chores, every aspect of the economy is fueled by the power industry.

Since many years, India has been a victim of substantial power shortage as the

skyrocketing demand, initiated by the exponential growth of the population, is not being fulfilled. Also, the country faces significant disruption in power supply. Non-performance of the power transmission sector has an adverse spiral effect on the entire economy as power is the key input which facilitates firm growth and productivity. A proper supply of electricity can help in powering irrigation, food and seed preservation, accelerate the infrastructural output and stimulate investment in the country making the economy much stronger. Having a strong and positive correlation with the GDP of the country, improvement of power sector is, therefore, essential for the economic well-being of the country as well as for the enhancement of the ease of living of citizens.



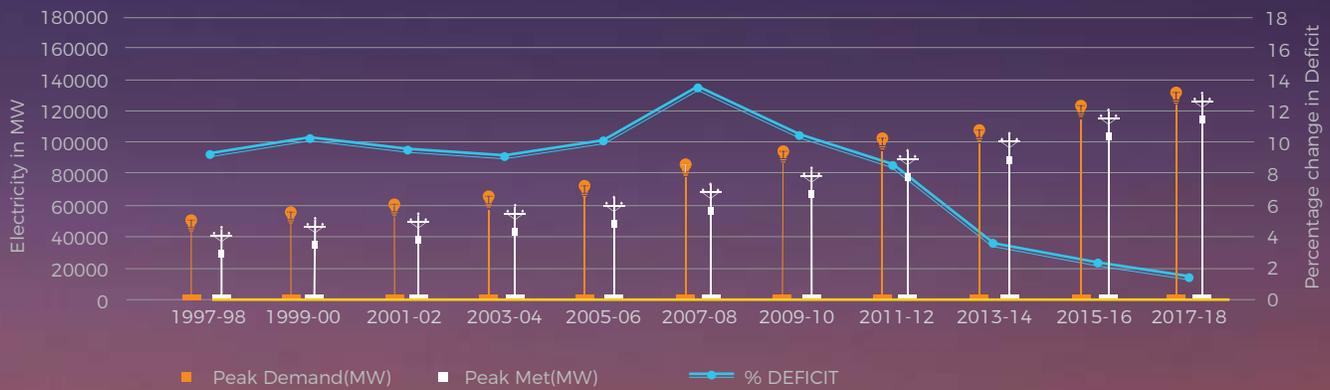


Figure 1- Demand Supply Scenario of Power in India

Source: Central Electricity Authority

Though, in FY2017-18, electricity generation

in India,

increased by

5.71%

the rapid increase in consumption outstripped the former by growing at a rate of

7.39%

The above figure shows the growth trajectory of electricity demand and supply in India during peak seasons over two decades. It has been observed that there has been a considerable improvement in demand supply scenario. From an era of deficits, the country has substantially moved towards a situation where average deficits have narrowed down significantly. Thus, indicating that India is indeed trading on the path of self-sufficiency in the power sector.

However, around 21% of the total Indian population still do not have electrical connections. To resolve this issue, the government has come up with schemes like Pradhan Mantri Sahaj Bijli Har Ghar Yojna (Saubhagya) and Deen Dayal Upadhyaya Gram Jyoti Yojna (DDUGJY) to provide electricity in every house by 2019. Talwandi Sabo Power Limited (TSPL) is helping the government to achieve the same objective. The company has been able to set a strong and enabling foot in the industry.

TSPL, being a wholly owned subsidiary of Vedanta Group, signed a Power Purchase Agreement with Punjab State Power Corporation Limited (PSPCL) for establishment

of 1980 MW thermal-coal power plant in the year 2008. Being the zero-discharge plant with 97% availability, the company has established itself as one of the leading names in the power industry. With deep commitment to stand apart from the conventional ways of power generation, TSPL is one of the first which plans to use Supercritical technology to supply electricity to the PSPCL. Capable of generating the same amount of electricity using less coal, the aforementioned technology would prove to be the most environment friendly and cost-efficient one. Not only this, with its unparalleled utilization of entire fly ash (a by-product of thermal- power generation) and the lowest ever heat station rate, TSPL has emerged as the greenest thermal power plant.



The plant, located in Punjab having 3 units of 660MW each, became fully operational in 2016.

THE TOTAL REVENUE OF THE FIRM HAS SHOWN SPECTACULAR RISE, growing at a **CAGR of 80%**



Revenue has increased from INR 496.6 crore to INR 5,286.4 crore within 5 years i.e. from 2014-15 to 2018-19. Profit after Tax, however, has remained constant with some minor fluctuations.

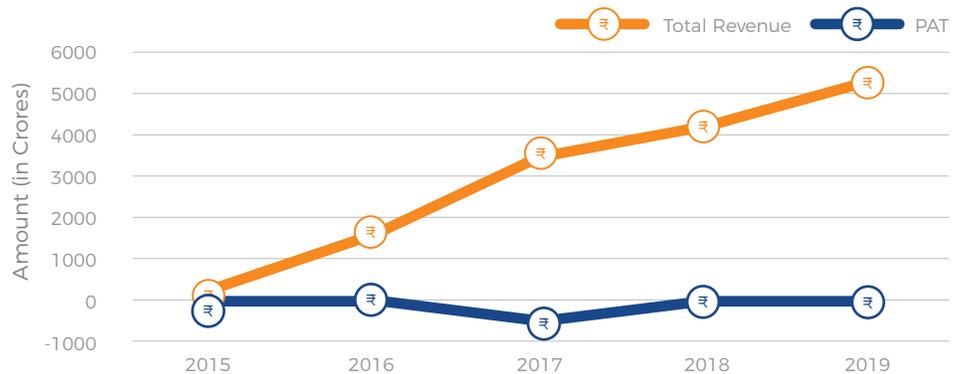


Figure 2- Financial Trends of TSPL Over Time

Source: Vedanta Group Ltd and IFC Analysis



ECONOMIC IMPACT

Talwandi Sabo Power Ltd. (TSPL) has had a huge ripple effect on the economic aspects of a country, especially that of Punjab. To study the impact on the society, it's necessary to observe and analyze the Economic Impact of TSPL over a stratum of factors such as employment generated, govt. exchequer etc.

Extent of Contractual Employment

TSPL, though being fully operational just from 2016 onwards, has had a huge impact over the coal power value chain. In a short span of 2 years, TSPL has positively affected around

1500 people in 2018 with a direct employment of 76 personnel and around 1400 indirect employees. In 2018, the ratio of indirect to direct employment is 25 to 1.

● Direct Employment ● Indirect Employment — Ratio



Figure 3: Employment Trends of TSPL

Source: Vedanta Group Ltd and IFC Analysis

Productivity Growth

It's not possible to measure the success of a company by observing only employment. Productivity is one of the most essential piece of data to study about while gathering evidence for a company's progress and growth. An increasing trend in productivity is what drives a company to maintain their competitive

edge. Figure 4, while analyzing the same with the help of a ratio between the revenue of the company and number of direct employees, shows that the productivity of TSPL has been subject to an exorbitant rise. As mentioned, after being fully operational in 2016,



THE PRODUCTIVITY LEVELS HAVE INCREASED BY

2.26 Cr. in 2015 to **15.34 Cr.** in 2017

AND NOW IS AT A RECORD-LEVEL OF

INR 69.5 Cr./person





Figure 4: Productivity of TSPL Employees

Source: Vedanta Group Ltd and IFC Analysis

Contribution to Government Exchequer

The impact of a company on the economy of a country is a result of the taxes that are paid to the government. Going by this principle, TSPL has been a major contributor to influence the economy through its tax payments. As given below,

INR 16 Cr. (3%)

With-holding Taxes

INR 89 Cr. (16%)

Government Royalties (Including DMF)

448 Cr. (81%)
Indirect Taxes

Figure 5: Contribution of TSPL to Government Exchequer (INR Crores)

Source: Vedanta Group Ltd and IFC Analysis

Impact of Tax Contribution

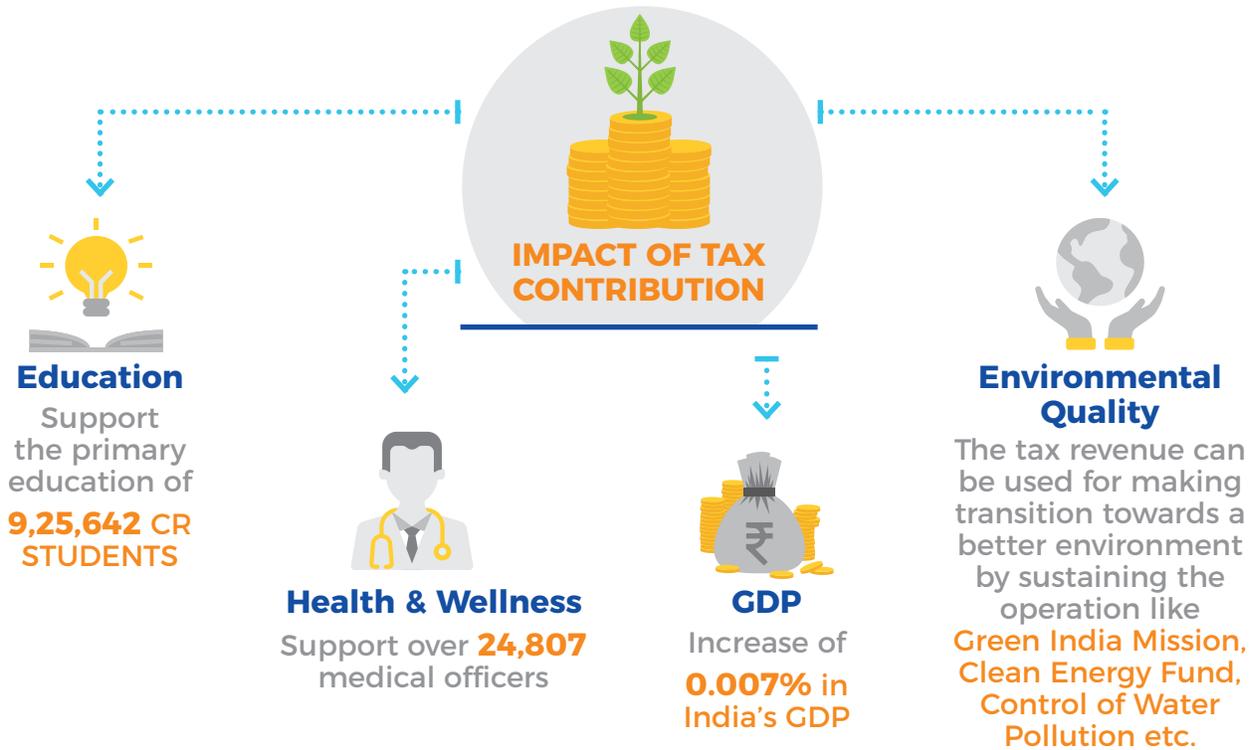


THE TOTAL AMOUNT OF TAXES PAID BY TSPL IS



INR 620 Cr.

The below given figure depicts the impact of tax contributions by TSPL on the economy by looking at different sectors.



CAPITAL EXPENDITURE

If the entire revenue is used as a capital expenditure, it will lead to an increase of

INR 620 Cr. in India's GDP

The number is calculated using the capital expenditure multiplier of value 2.45.



EDUCATION SECTOR

Around

30,854 teachers

teachers can be benefitted if all the tax revenue of TSPL is used in this sector yearly. **With a mandated pupil teacher ratio of 30:1 at the primary level,**



TSPL Ltd. can support the education of

9,25,642

students in the country.

HEALTH SECTOR

The cost of availing medical officers in India range between

INR 2.5 lakhs to INR 4.5 lakhs per annum

This implies that the revenue by the company can support around **24,807** medical officers.



ENVIRONMENT, FOREST & CLIMATE CHANGE



The total expenditure of the Ministry of Environment, Forests and Climate Change is

INR 2,626 crores

The tax revenue can be used for making this transition towards a better environment by sustaining the operations like Green India Mission, Clean Energy Fund, Control of Water Pollution etc.

Direct, Indirect and Induced Impact

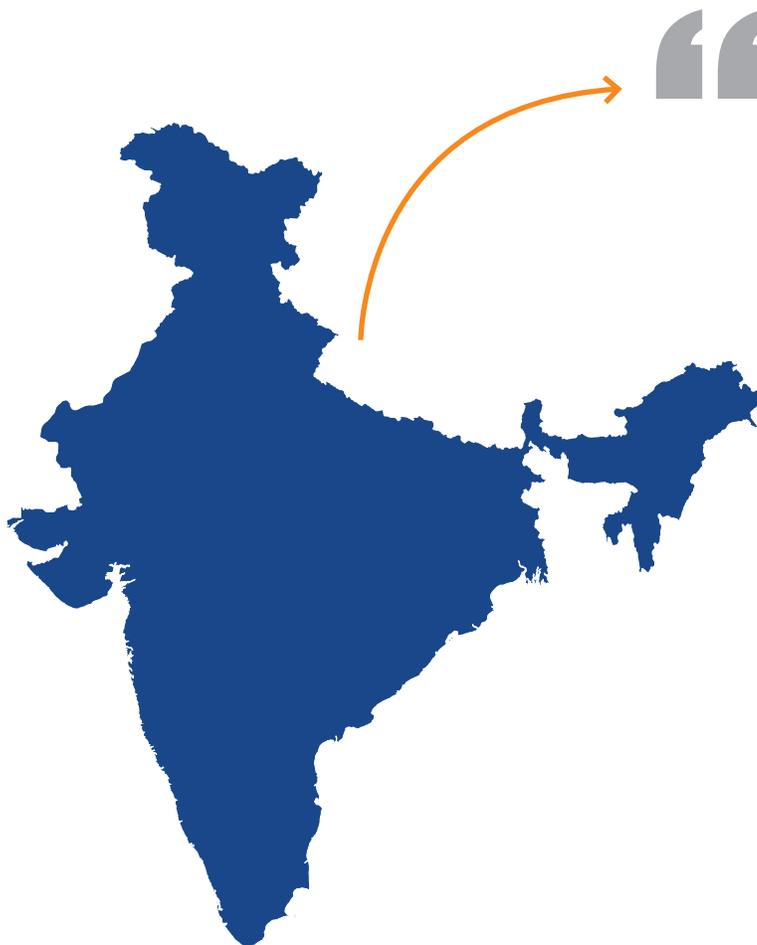
The operations of TSPL fall under the Power industry. Based on the multipliers of that industry, table captures the direct, indirect and

induced impact of Talwandi Sabo Power Ltd. operations since 2015.

Table 1. Direct, Indirect and Induced Impact of TSPL's Operations

Year	India's GDP (INR Cr.)	Total Sales (Direct Impact) (INR Cr.)	Sales (as a % of GDP) - Direct Impact	Type - I Multiplier	Indirect Impact (INR Cr.)	% Indirect Impact of TSPL	Type - II Multiplier	Induced Impact (INR Cr.)	% Induced Impact of TSPL
2015	1,24,67,959	497	0.004	2.64	1,311	0.01	5.69	2,826	0.02
2016	1,37,71,874	1,641	0.012	2.64	4,333	0.03	5.69	9,338	0.07
2017	1,53,62,386	3,591	0.023	2.64	9,481	0.06	5.69	20,435	0.13
2018	1,70,95,005	4,207	0.025	2.64	11,106	0.06	5.69	23,936	0.14
2019	1,90,53,967	5,286	0.028	2.64	13,956	0.07	5.69	30,080	0.16

The direct impact of TSPL on the economy of India can be measured by the sales this company has achieved.



The sales amount up to

0.028%

of India's GDP in 2019.

On the other hand, the indirect impact of TSPL is of

INR13,956 Cr.

which, in context to the national economy growth, is as large as

0.07% of India's GDP

There is a INR 30,080 Cr. which translates to an induced impact that is as large as

0.16% of India's GDP

Sectoral Impact

The power industry is considered to be a capital intensive industry and the inelastic need of power for sustaining the development process is evident by the variety of linkages this industry has with other sectors of an economy.

The prices of power will always determine the growth of the economy as almost each sector/ industry does depend, directly or indirectly, on the power industry.

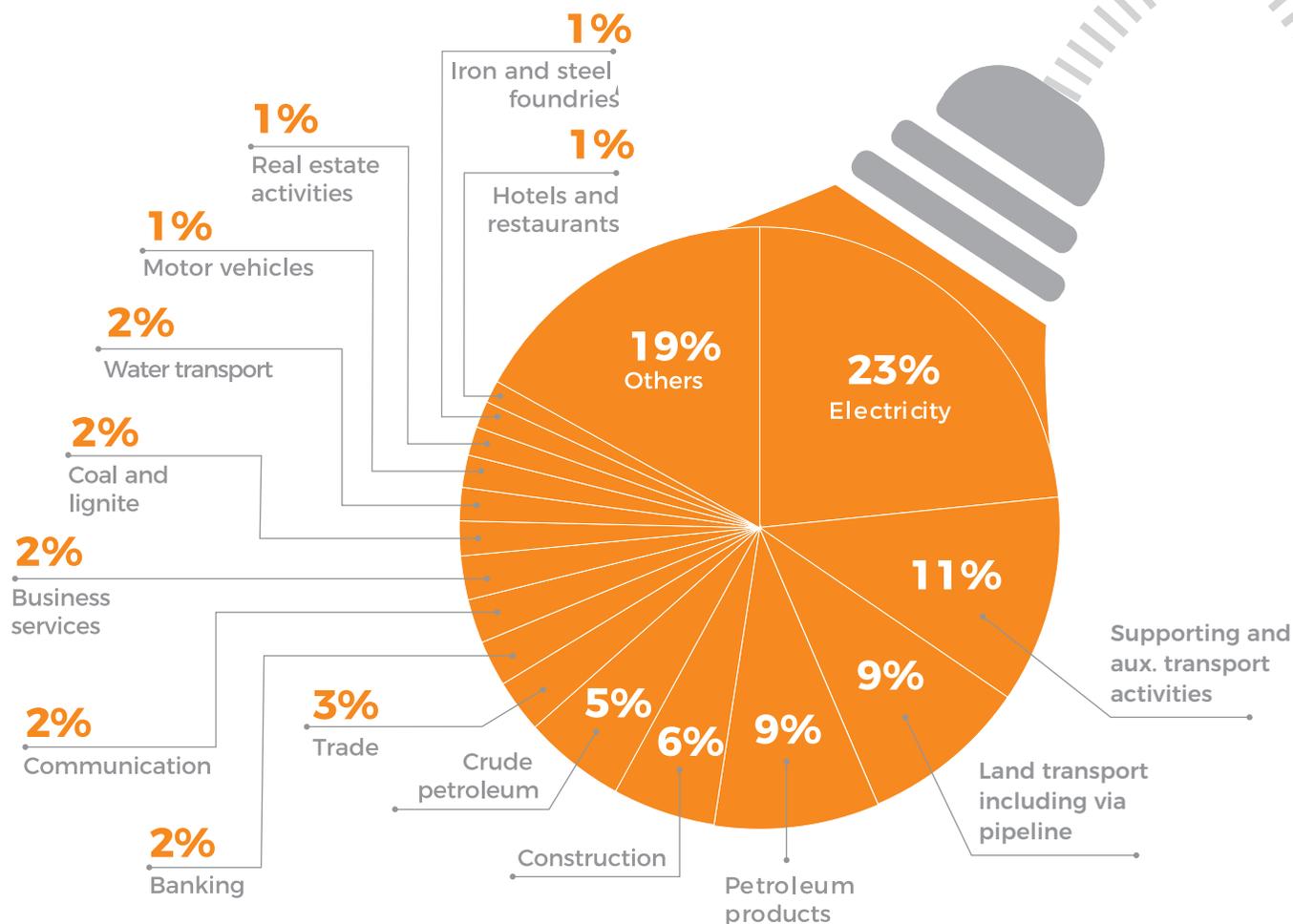


Figure 6. Sectoral Impact of TSPL Operations

Source: Vedanta Group Ltd and IFC Analysis

In the wide strata of industries connected with the power industry, an 11 % impact can be seen on the supporting and auxiliary transportation activities. This can be accounted to the fact that transportation vehicle's basic structure requires a power source i.e battery for its function. Now, with the coming age, the economy is shifting towards a more hybrid environment and electricity driven transportation facilities, increasing the inter-dependence between both these industries. Similarly, there is a 9% impact observed on land transportation via pipeline which can

be explained by the necessity of this industry to have this linkage in order to sustain itself. Similarly, petroleum products industry has also a 9% impact. The building block of this industry, which includes diesel, butane and fuel oil as products, has been set up on the inter-dependency between both, petroleum products and power industry as these are often considered as complementary commodities. Both are known to be power sources for different industries and activities which often work together.

Output and Income Multipliers

The output multiplier for a given industry is the total value of sales by all industries necessary to deliver a rupee's worth of final demand for that industry's output. It is expressed as the ratio of change in direct and indirect output changes to direct output change due to a unit increase in final use. The value of this total business activity is larger than the market value of the currently demanded goods and services.

The income multiplier translates the effect of change in demand into changes of household income. It basically looks at the consumption patterns. There are two types of income multipliers. First, the one that captures the change in income due to change in output. Second, the one that captures the change in income associated with an initial change in income.



TSPL's impact on economy's output is equal to **INR 14,706 Cr.**



{Impact on economy = TSPL's total sales (INR 5,286.4 Cr.) multiplied by the output multiplier of the industry (2.78)}

Table 2. Impact of TSPL on Output and Income

Industry	GDP (INR Crores)	TSPL's Total Output (INR crores)	Output Multiplier of the Industry	Impact on Economy's Output (INR crores)	Impact on Economy's Output (As a % of country's GDP)	Income Multiplier of the Industry	Impact on Economy's Income (INR Crores)	Impact on Economy's Income (As a % of country's GDP)
Electricity	1,90,53,967	5,286	2.782	14,707	0.08	0.947	5,006	0.026

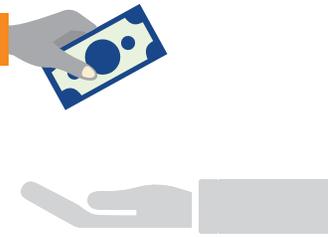
We calculate the impact of TSPL's operation by using the first multiplier that measures the impact of change in income of households due to change in the company's sales. This change in income is driven by the increase in demand that impacts the demand for raw material supplies and hence the employment.

“ impact on economy’s income

INR 5,006 Cr.



that is equal to
0.026%
of India’s GDP.



{Impact on economy = TSPL’s total sales (INR 5,286.4 Cr) multiplied by the the income multiplier of the industry (0.94)}

Employment Multiplier

The Electricity Industry has an employment multiplier of 0.23 which means for every 1 lakh of output there is a generation of 0.23 jobs. A high output level of around INR 42,067 Lakhs enables TSPL to have an employment

impact of generating 9,675 job opportunities for the people in the economy. Each individual employed in TSPL, further creates 6 job opportunities in the economy.

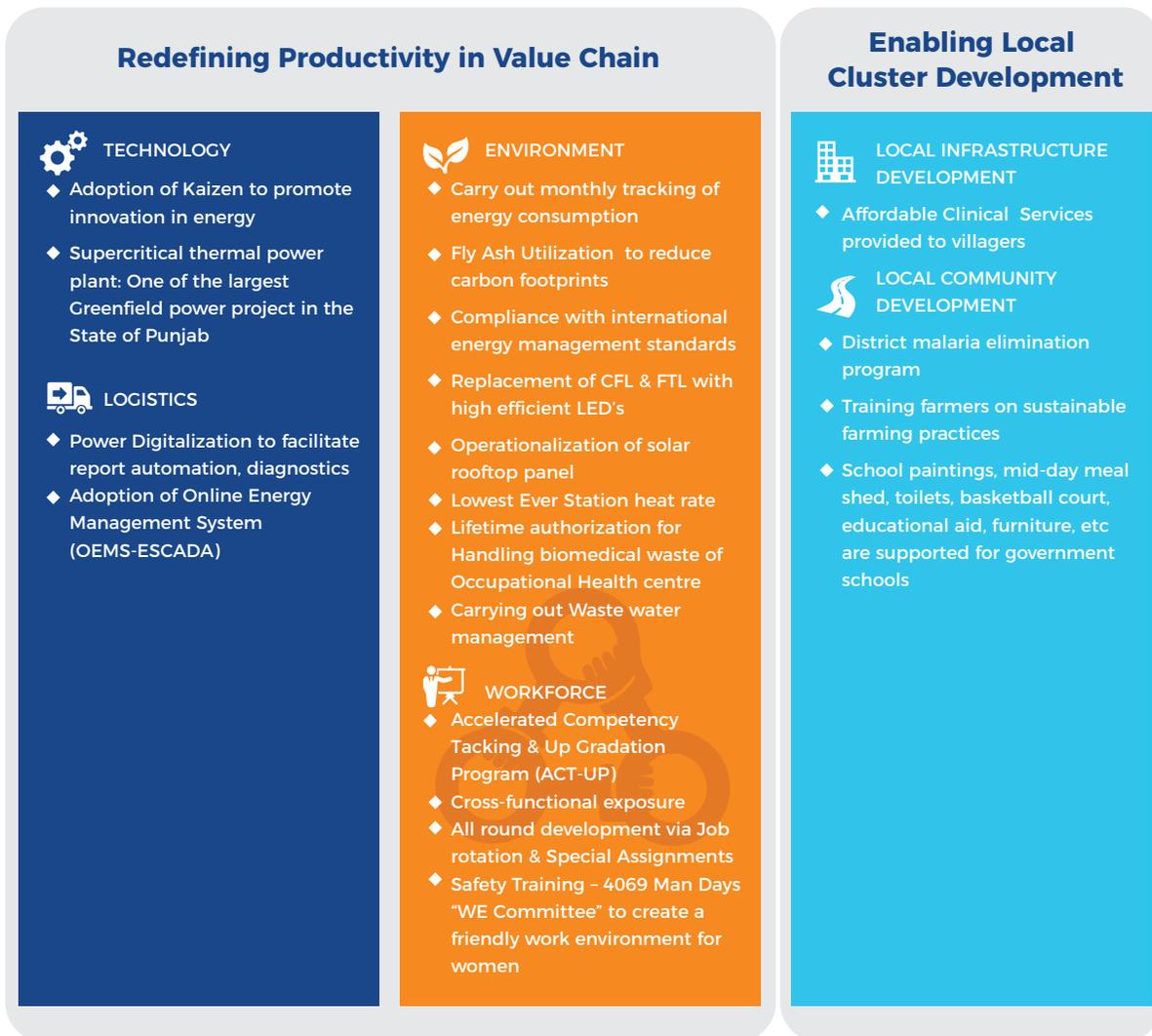
Industry	Employment Multiplier of Industry	Output (INR)	Impact on Employment	Total Employees in TSPL	Employment generated per employee of TSPL
Electricity	0.23	42,067	9,675	1,493	6



SOCIAL IMPACT

Shared Value

HOW TSPL IS CREATING SHARED VALUE



TSPL, via its activities, is able to create shared value for the economy via its operations.

Over the years, TSPL has worked towards creating shared value through its operations. Being a power generating company, there is little scope for the first level, viz. reconceiving products and markets. However, in the process, of redefining the product in the value chain, TSPL has adopted kaizens to promote innovation in energy and has enabled in setting up of the supercritical thermal power plant. In terms of logistics, TSPL has enabled power digitalization to facilitate report automation and adopted online management systems to increase efficiency.

TSPL has also ensured that its operations are environment-friendly. The power plant at TSPL has the lowest heat rate, a high rate of fly ash utilization as well as managing biowaste. The organization is also ensuring a safe working environment for its employees and enabling the creation of talent via carrying out of specialized training at Indian Institute of Technology and NPTI.

TSPL has also enabled the development of local infrastructure by creating accessible clinics and allowed for local community development by enabling sustainable agricultural practices for farmers, carrying out drives for malaria prevention, drug-abuse awareness, and enhancing educational opportunities.

HEALTH

Amenable mortality is defined as deaths from a collection of diseases which are potentially preventable if there is the timely provision of healthcare facilities. According to a study by Lancet in 2018, 64.4% of amenable deaths occur due to poor quality of services. TSPL wants to make a difference by tackling this statistic and help bring down the number of amenable deaths through the provision of a set of healthcare services.

TSPL has been carrying out multiple initiatives in the spectrum of health care in the form of provision of clinical health services, partnering with the District Health Department and enabling setting up of clinical laboratories. TSPL has also provided quality healthcare services by setting up of medical health camps and has been carrying out control drives for malaria and dengue, along with awareness campaigns for drug abuse. They also have set

up a program 'Ek Pehal' for breaking the social stigma around menstruation in 43 villages.

TSPL, via its initiatives, has been able to successfully provide affordable quality healthcare services to 7588 villagers. With these services TSPL has been able to prevent 31 deaths, given the death rate of 6.4 per 1000 population. This is under the assumption that the probable deaths taken into consideration are amenable and not avertable.



Conservative Estimates of Lives Saved due to Intervention in 2017-18

Amenable Deaths due to use of poor quality of healthcare in South Asia (%) (2018)	64.4
Death rate in India (per 1000 population)	6.4
Number of people who had access to quality health care (Patients who benefitted by TSPL's Initiatives)	7,588
Lives Saved in India	31

“ TSPL, THROUGH ITS OPERATIONS HAS IMPACTED,

7,588 people until now



AND THE INTERVENTION HAS PREVENTED LOSS OF

31 lives

approximately via provision of quality health care.

AGRICULTURE

TSPL through its “sustainable agriculture promotion project” has promoted the idea of sustainable agricultural practices. They have focussed on spreading awareness about techniques like inter-cropping and integrated pest management which has helped the farmers of Talwandi Sabo to overcome the problem of low yield and monetary returns.

Around 500 family farms cultivating in Kharif season have been benefitted by this initiative as it resulted in a collective saving of around INR 15 Lakh,



increasing each farmer’s average income by around INR 3,000.

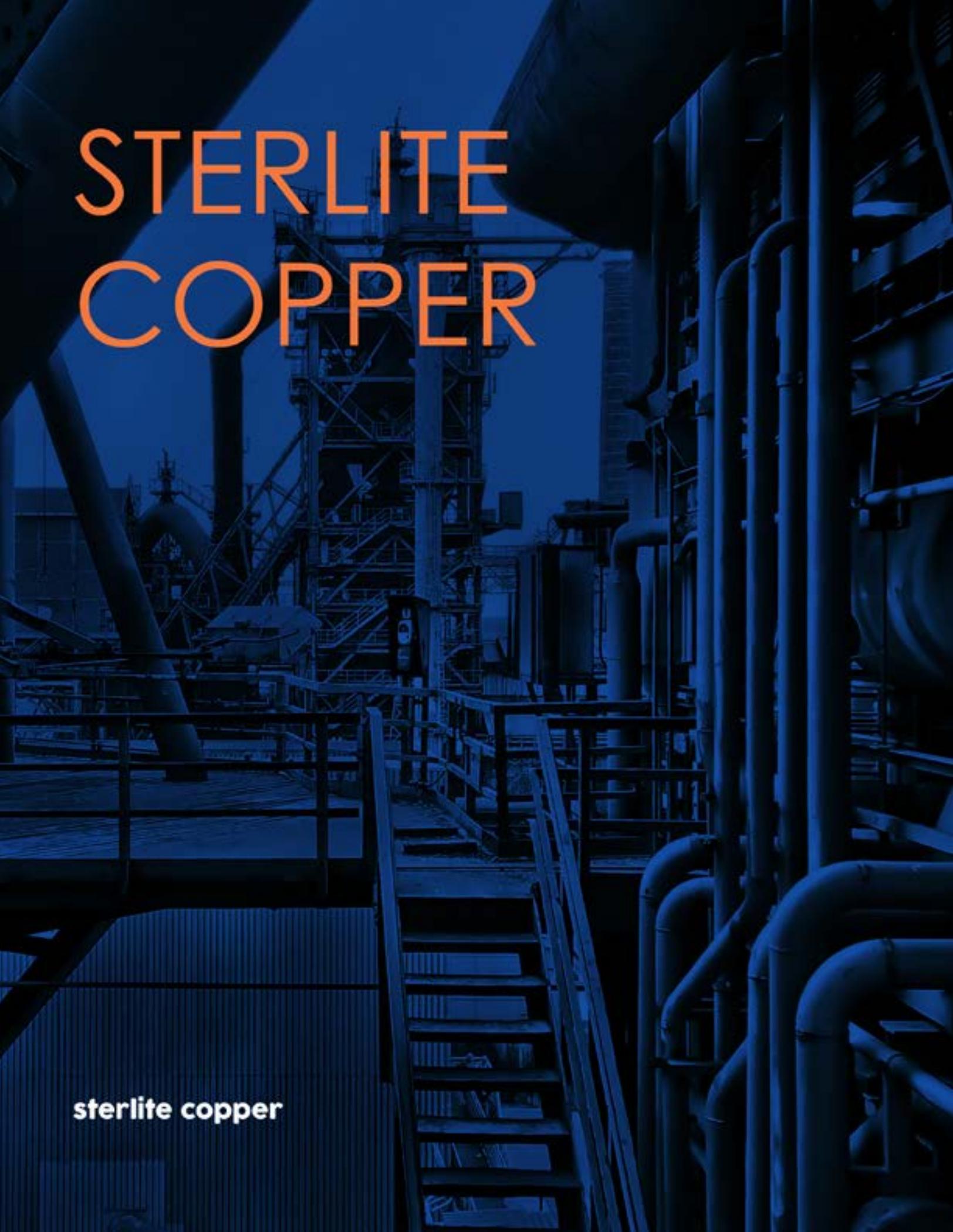
This amount is equivalent to half of the Indian farmer’s average income (INR 6,426) and hence increases the average annual income of a farmer in Talawandi Sabo to INR 9,426.

If a farmer works only in Kharif season, the following table shows the significant benefit this program has created for the farmer in Talwandi Sabo.

No. of family farms	500
Total Collective Saving (INR)	15,00,000
Per-farmer Earning (INR)	3,000
Average Income (INR)	6,426
Increase in income due to the program (INR)	9,426

SUPPORT TO COMMUNITY

- **TSPL EXTENDED SUPPORT TO 25 PHYSICALLY CHALLENGED PERSONS BY PROVIDING WHEELCHAIRS AND TRI-CYCLES**
- **SUPPORTED 25 WOMEN FOR INCOME GENERATION BY PROVIDING SEWING MACHINES**
- **SUPPORT A LOCAL WOMEN CENTRIC CULTURAL EVENT REACHING OUT TO 150 PERSONS.**



STERLITE COPPER

sterlite copper



Sterlite Copper

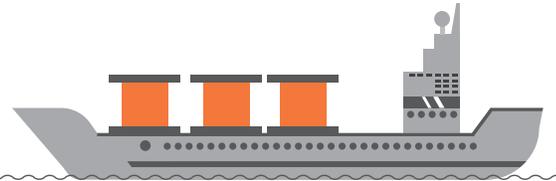
is the largest copper smelter in India and the seventh largest in the world

EXPORTS GREW AT AN IMPRESSIVE RATE OF

26% from 2012-13 to 2017-18. with a compound annual growth rate of 3.9%

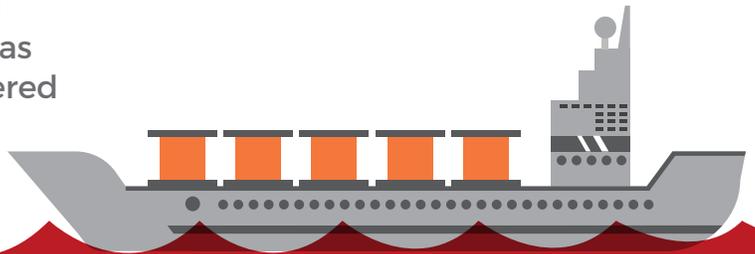
However, the country's remarkable gains from the exports took a toss and registered a dip of

86% between 2017-18 and 2018-19.



ECONOMIC IMPACT OF STERLITE OPERATIONS

The path of self-sufficiency in refined copper production on which India was trading since 2012 has been hampered severely post the halting of smelting operations of Tuticorin plant.



In 2017-18, it exported around **46 %** of its total production to its trading partners

WHICH FELL TO

10.7 % in 2018-19



THIS IMPLIES THAT THE CLOSURE OF STERLITE HAS COSTED A HEFTY LOSS OF AROUND

USD **2.5** billion to the country

PRODUCTIVITY LEVELS HAD RISEN BY OVER 30 % IN THE FIVE YEARS

30%



INR **16** Cr.
2012

INR **20** Cr.
2018

SOCIAL IMPACT OF STERLITE OPERATIONS

STERLITE COPPER THROUGH ITS OPERATIONS HAS IMPACTED

50,000 people until now



and the intervention has prevented loss of **194** lives approximately via provision of quality health care.

STERLITE COPPER THROUGH ITS OPERATIONS HAS IMPACTED

343 children until now



until now and the gains of such intervention amount to **INR 13.38 Cr.**



Sterlite Copper via ensuring water security has been able to save lives of approximately

34 villagers



Sterlite Copper through its activities under the ambit of sanitation has prevented a negative impact of

INR 1.74 Cr.

WOMEN EMPOWERMENT



Sterlite Copper has helped increase women's collective income per year by

INR 48.51 Cr.

SKILL DEVELOPMENT INITIATIVE



it can be approximated that the average annual wage of labour has increased by

INR 0.13 Cr.
in India



scholarship to orphanage students from 6th to 12th standard

INTRODUCTION



Copper is one of the oldest metals used by mankind and has been an important material in the development of civilizations around the world. It is indispensable for a country's infrastructural and economic growth primarily because of the ease of use it provides in every sector. Be it telecom, power, construction, transportation, handicrafts, engineering, consumer durables or defense, the metal finds numerous economy-wide applications. Having an incredible range of unique characteristics such as high electrical conductivity, corrosion resistance, ductility, malleability and rigidity, copper plays a crucial role in nation-building.

The metal's importance can be adjudged from the fact that it ranks only third after iron and aluminium in terms of consumption across the world. Even though India has limited copper reserves constituting about 2 percent of the global reserves, it was ranked seventh in the global refined copper production and fifth in global copper smelter production globally in 2018.

India has come a long way since being a net importer of the metal as the production capacity has

increased significantly over the years; and so have the country's exports. Since copper is primarily used in the construction, electrical and automobile industry – all of which are the most vibrant sectors in developing economies – India presents a huge demand potential for the red base metal. Figure 1 shows how the country's copper consumption is rapidly catching up with its production levels. It is estimated that between 2018 and 2030 India's demand for copper will grow by 8.2 percent per annum against a global demand growth of 1.4 percent.¹

However, unfortunate events over the last couple of years have put a spanner in the wheels of the rapidly growing copper industry. Sterlite Copper – which accounts for about half of India's total copper output² – suffered a setback after the Tamil Nadu government ordered an indefinite suspension of its Tuticorin plant. The plant housed the largest copper smelter in India and the seventh largest in the world. It used to meet about 36 percent of the country's domestic copper demand while the rest was exported. The closure of the plant has resulted in some long-ranging ramifications for the Indian economy.



The closure of the Tuticorin plant

THE LARGEST COPPER SMELTER IN INDIA AND THE SEVENTH LARGEST IN THE WORLD

has had long-ranging ramifications for the
Indian economy

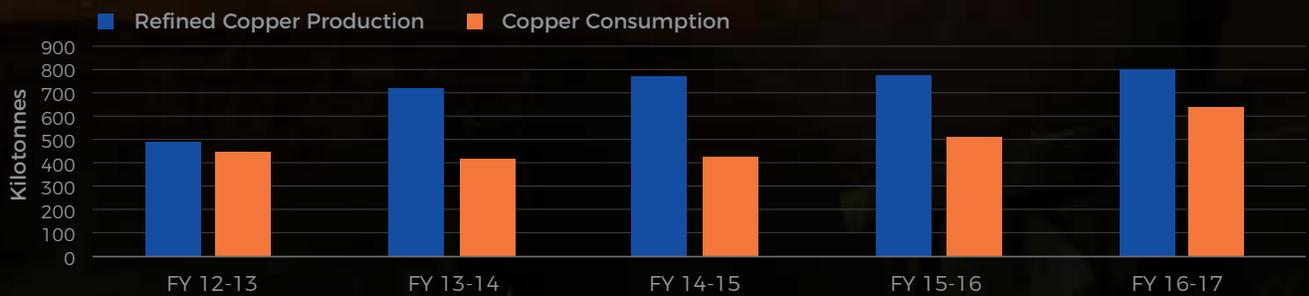


Figure 1. Production and Consumption Trends of Copper in India

Source: Ministry of Commerce

¹ Wood MacKenzie, EIA

² Business Today (May 30, 2018), How badly will Sterlite Copper shutdown affect copper production in India.



ECONOMIC IMPACT

Extent of Contractual Employment

Sterlite currently provides employment to around 1600 individuals, out of which 949 are employed directly and around 662 are contractual employees.

The closure of the Tuticorin plant led to a fall in employment from 2017-18 to 2018-19 with a 70 percent reduction in contractual employment. Thus, the indirect to direct employment fell from around 2.16 in 2017-18 to 0.69 in 2018-19.



Figure 2: Employment Trends of Sterlite Copper

Source: Vedanta Group Ltd

The Import Export Scenario

India is not particularly well-endowed with copper mines. Due to this deficiency in copper ore and concentrates, it relies heavily on imports for fulfilling its need. However, in the refined copper industry, India has managed to emerge as a net exporter since 2012. But due to the closure of the Tuticorin plant of Sterlite Copper, this trend was offset in the year 2018-2019.

impressive rate of 26 percent from 2012-13 to 2017-18, with a compound annual growth rate of 3.9 percent. The highest exports, worth of INR 15,77,449 lakhs were recorded in 2017-18. However, the country's remarkable gains from the exports took a toss and dropped to INR 2,19.546 lakhs, registering a dip of 86 percent. The same year also witnessed a jump of 118.3 percent of increase in the imports of refined copper, rising from INR 2,02,513 lakhs to INR 4,42,078 lakhs.

The import and exports trends are illustrated in Figure 3. It shows that exports grew at an

“ Exports grew at an impressive rate of

26%



from 2012-13 to 2017-18 with a compound annual growth rate of **3.9 %**

However, the country's remarkable gains from the exports took a toss and registered a dip of

86% between 2017-18 and 2018-19.

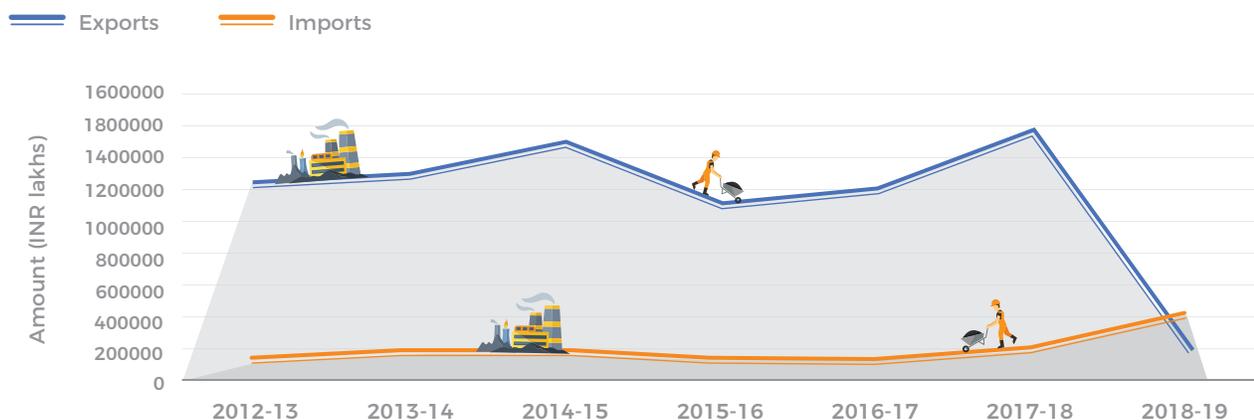


Figure 3: Export and Import Trends of Refined Copper for the Indian Economy

Source: EXIM Bank

The closure of Tuticorin plant has resulted in a range of issues pertaining to the external sector of the Indian economy.

The self-sufficiency of the refined copper industry is in danger. Table 1 shows the domestic production, consumption, imports and exports of the refined copper industry

during the period 2016-17 to 2018-19. A comparison has been drawn only for three quarters as the data for the latest year is available only for that period of the year. It can be established from the table that the self-sufficiency of the industry is falling continuously since 2016-17.

Table 1: Production, Consumption, Import and Export Trends

Year	Production (KT)	Consumption (KT)	Exports (KT)	Imports (KT)	Production - Exports (Availability for domestic consumption)	Self Sufficiency
2016-17 (9 Months)	577	371	230	25	347	93.53
2017-18 (9 Months)	624	362	288	26	336	92.82
2018-19 (9 Months)	336	366	36	66	300	81.97

In 2016-17, the industry fulfilled 93 percent of the domestic consumption needs. It can be seen that despite the 93 percent figure, the domestic production exceeded domestic consumption demand by 206 KT. This implies that even with high production levels that can lead to fully self-reliant industry, it is sometimes preferred to import certain grade of metals to meet specific demand or maybe businesses prefer exports over domestic sales. However, the path of self-sufficiency in refined copper production on which India

was trading since 2012 has been hampered severely post the halting of smelting operations of Tuticorin plant, as it accounted for 40 percent of country's smelter capacity. The self-sufficiency dipped to 81 percent in 2018-19. India's production for the first three quarters is 336 KT and exports are 36 KT, implying that only 300 KT is available for domestic consumption. Against this availability, the domestic demand for the metal is 366 KT. This shows that the Tuticorin plant was an import substitute for India.

The path of self-sufficiency in refined copper production on which India was trading since 2012 has been hampered severely post the halting of smelting operations of Tuticorin plant.

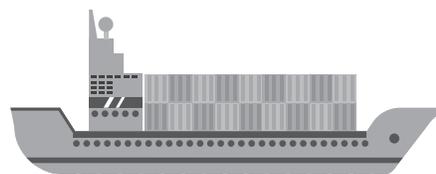
The low production levels also threaten India's position in the global copper industry. India had managed to establish itself as a major exporter of the said metal. At its peak, in 2017-18, it exported around 46 percent of its total production to its trading partners³. However, it no longer holds that global position. The percentage of production being exported fell to 10.7 percent in 2018-19. The low production

levels in India left our trading partners with no choice but to import from other countries. Moreover, the planned expansion of the Tuticorin plant from current level of 400 KTPA to 800 KTPA would have made Sterlite as one of the world's largest single-location copper smelting complexes. This would have further strengthened India's position at the global stage.



THE LOW PRODUCTION LEVELS ARE THREATENING INDIA'S POSITION IN THE GLOBAL COPPER INDUSTRY.

In 2017-18, it exported around **46 %** of its total production to its trading partners



WHICH FELL TO
10.7 % in 2018-19

One major implication of the fall in production is the increase in India's import bill, happening through two ways. First, the domestic demand that was being catered by Sterlite is now being fulfilled either through imports or through other domestic suppliers. In the short run it is not possible for the domestic suppliers to increase their capacity, hence, the domestic supply increase by them would lead to a fall in their exports. Apart from that, the exports value

due to Sterlite's operations has also dropped to zero.

This implies a fall in exports and an increase in imports equivalent to the production of Sterlite. The production of Sterlite in 2017-18 was 403 KT. The global copper prices hover around USD 6,200 - 6,300 per tonne. This implies that the closure of Sterlite has costed a hefty loss of around USD 2.5 billion to the country.



THIS IMPLIES THAT THE CLOSURE OF STERLITE HAS COSTED A HEFTY LOSS OF AROUND

USD 2.5 billion to the country



³ The figures are for the first three quarters for comparison purposes.

Apart from the loss of forex reserves, higher imports would lead to negative consequences which can affect the economic growth and stability. When the demand for imports exceed that of exports, the value of currency of the country begins to fall. There can arise forex market disruptions with adverse effect on interest rates. A downward pressure on

country's currency can devalue it and thus can lead to inflation. In order to combat it, the central bank may increase interest rates. Inflation coupled with higher interest rates severely dampens the economic growth of the country.

Company-level Analysis

While the economy-wide ramifications of the closure of the Tuticorin plant are significant due to the nature of the product, there will be further losses to the economy as a major player in the industry has been abruptly forced to cease operations. Such a move carries with it a domino-effect of sorts as vital linkages across the value chain are broken and both upstream and downstream players are simultaneously affected along with the people employed throughout the spectrum. To understand such deleterious effects, it is necessary to first

understand the company-level trends. To begin with, the company's revenue had been on the rise and profit after tax had been positive for a majority of the previous decade until the plant's closure last year. Figure 4 shows these trends in a detailed manner. It can be seen that the company witnessed a persistent increase in the revenue during its entire course of operation till the year 2017-18. In the same year, the profit after tax also fell into negative territory from a five-year average of over INR 1,000 crore.



Sterlite's revenue dipped for the first time in over five years after the closure of the Tuticorin plant

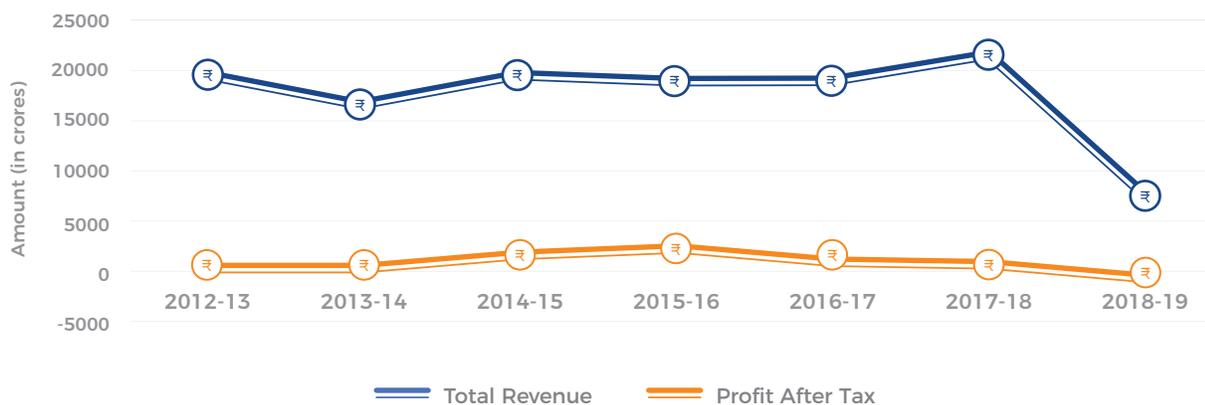


Figure 4: Financial Trends of Sterlite Copper Over Time

Source: Vedanta Group Ltd and IFC Analysis

The immediate impact of the plant closure and the fall in profitability is on employment. Job losses from the move occur not just in the company but across the value chain. Eventually these losses result in a fall in consumption levels by these families and

have an inimical impact on the economy. Figure 5 shows the employment trends just pertaining to the company in comparison to the average employment trends in the manufacturing sector.

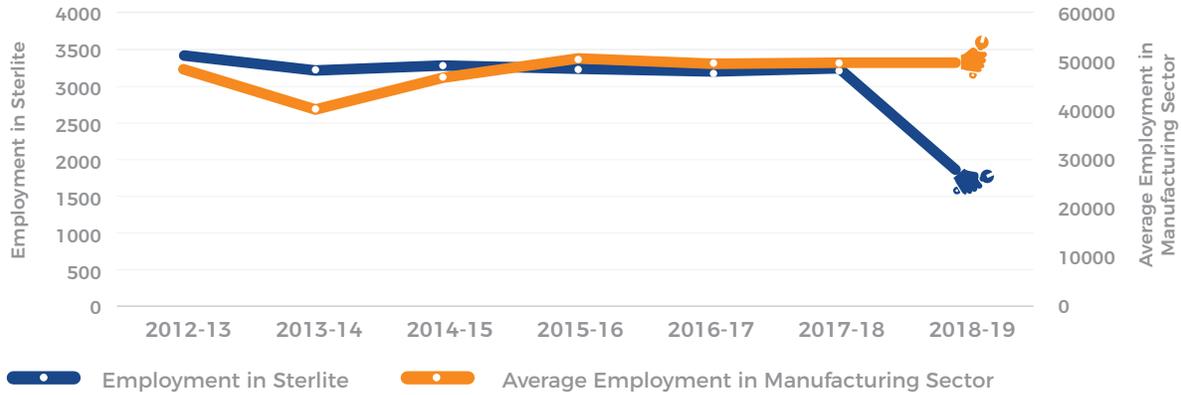


Figure 5: Comparative Employment Trends of Sterlite and the Average Employment in Manufacturing Sector
Source: Vedanta Group Ltd. | India Cluster Mapping Project, IFC

The figure shows that employment trends have remained more or less in sync - at times even better - than the employment trends in the manufacturing sector at large in India. Even in those years when the manufacturing sector was witnessing a slump in average employment, employment in Sterlite did not show any significant dips. The later periods saw a strong correspondence between the employment trends of the company and the manufacturing sector, except in the last year. Prior to the plant closure the total number of employees in the company amounted to nearly 3,200 on an average with a committed

workforce of around 1,030 employees and over 2,200 contractual workers in 2017-18. In the following year, the total employment dipped to 1,611. In effect, around 1,600 employees of Sterlite were affected due to the closure.

Apart from job losses, there is also a loss in productivity owing to the closure of the Tuticorin plant. It is crucial to look into productivity since employment alone is an incomplete measure of growth. Only when higher employment is accompanied with rising productivity, there is a rise in competitiveness for any nation.

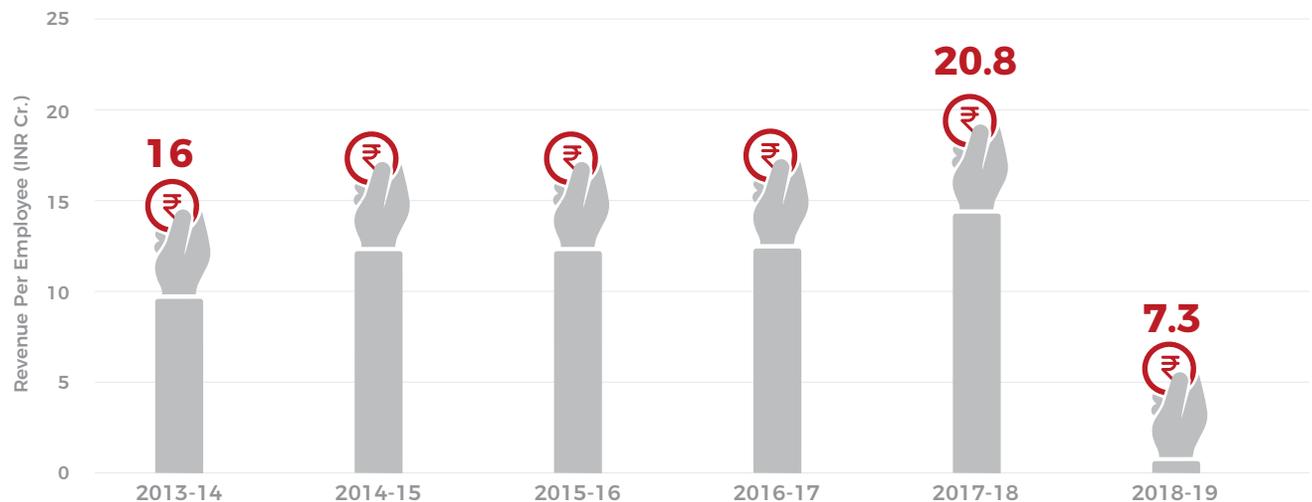
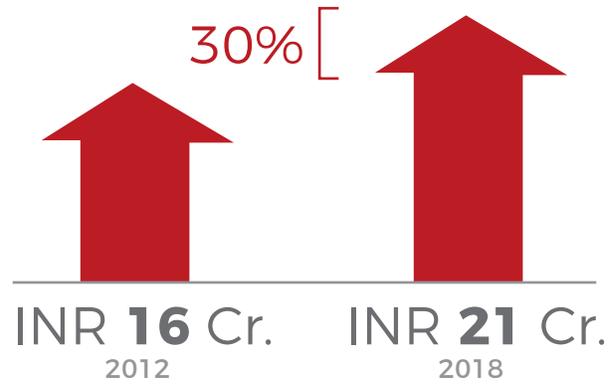


Figure 6: Productivity Trends of Sterlite Copper

Source: Vedanta Group Ltd and IFC Analysis

PRODUCTIVITY TREND

The productivity trends of employees at Sterlite Copper can be seen in Figure 6. The productivity for Sterlite employees is measured by assessing the revenue generated per employee. It can be conclusively said that since 2013-14, there has been an increase in the productivity of the employees. Sterlite witnessed an increase in productivity from INR 16 Cr. in 2012 to INR 21 Cr. in 2018; a rise of almost 30 percent in a span of 5 years.



However, 2018-19 saw a drastic drop in productivity which can be because of lower revenues and fewer employees post the shutdown of Tuticorin plant. Thus, as a result of the move the country is incurring productivity losses in the copper refining industry.



PRODUCTIVITY LEVELS HAD RISEN BY OVER

30 % in the five years preceding the Tuticorin ban

Contribution to Tamil Nadu Economy

Along with it being one of the largest names in the Indian copper industry, Sterlite has also been a significant contributor to Tamil Nadu's GDP. The company has driven considerable growth in the regions it operates in. Sterlite's revenue as a percentage of GDP of Tamil Nadu has been over 1.5 percent for the last four years. In the year 2018, around 1.5 percent of Tamil Nadu's GDP was contributed by Sterlite's revenue.

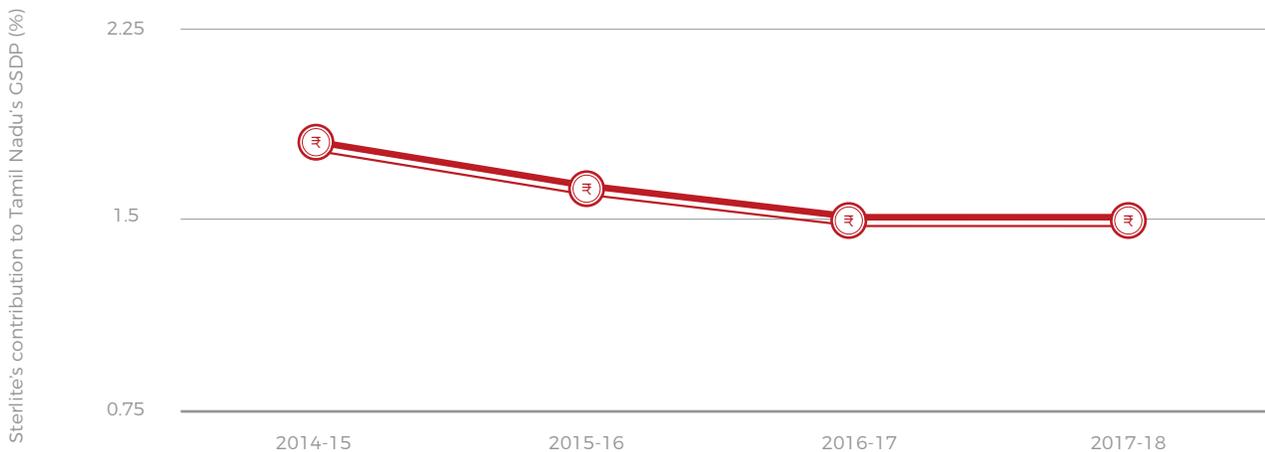


Figure 7: Sterlite's contribution to Tamil Nadu's GDP

Source: Central Statistical Organisation (CSO), Vedanta Group Ltd



**SOCIAL
IMPACT**

Shared Value

Sterlite Copper, through its operations, has worked towards creating shared value over the years. Being a copper company, there is little scope for the first level, viz. reconceiving products and markets. However, in the process, of redefining the product in the value chain, it has been able to create investment in sustainable technology. Sterlite Copper has adopted new technology of CS 3000 as well as Continuous Cast Copper Rod. Sterlite has also put environment in the focus by ensuring recycling or selling of hazardous waste and creating green cover in and around periphery

of the plant. Sterlite also has the fourth lowest in energy consumption across copper smelters worldwide.

The organization has ensured generation of talent via provision of training under the Project Tamia Muthukkal. Sterlite has enable quality access care via mobile health vans, improved lives of farmers by cleaning of irrigation channels and helped in the process of water security, created women empowerment by supporting and aided child development.

HOW STERLITE COPPER IS CREATING SHARED VALUE

Redefining Productivity in Value Chain



TECHNOLOGY

- ◆ Investment in sustainable technology
- ◆ Latest Version of CS 3000 Distributed Control System of Yokogawa, Japan controls the entire Copper Smelter
- ◆ The Continuous Cast Copper Rod (CCR) Plants are based on technology and equipment from Continuus Properzi, Italy. The plants have total annual capacity of 240,000 tonne



ENVIRONMENT

- ◆ Percentage of Hazardous waste recycled/sold (46% in 2017-18)
- ◆ Fourth lowest in energy consumption across copper smelters world wide
- ◆ Green cover in and around periphery of the plant covering an area of 68 hectares



WORKFORCE

- ◆ Driving diversity and Flexibility
- ◆ V Connect to create engaged workforce
- ◆ 777: engaging with new employees
- ◆ Surakhsha Bandhan
- ◆ VOW: Voice of Women, an in-house magazine for women

Enabling Local Cluster Development



TALENT

- ◆ ASSOCHAM and Ministry of Skill Development & Entrepreneurship 'Silver Trophy' under 'Best Higher Vocational Institute for Skill Development' - Project 'Tamira Muthukkal'



LOCAL INFRASTRUCTURE DEVELOPMENT

- ◆ Mobile Health Vans for 50,000 people in 28 villages
- ◆ Cleaning of irrigation channels



LOCAL COMMUNITY DEVELOPMENT

- ◆ Khushi Child care centres
- ◆ Ensuring water security for 1422 villagers
- ◆ 'Sakhi' Program for 170 SHGs, enabling income-generation for women

HEALTH



Healthcare is an issue that is particularly thorny for the Indian economy. Affordable healthcare is inaccessible to most Indians as private health services are financially out of reach while public are most spatially out of reach. Rural areas suffer the most due to these issues. With this in view, Sterlite Copper has setup an initiative of Mobile Health Vans, 'Health on Wheels' - where a bus with a team of professional doctors travels through the villages of Thoothukudi to provide free primary and secondary healthcare access.

A Lancet study done in 2018 estimates that 64.4 percent of all death in South Asia occur due to poor quality of healthcare services in the region. Such deaths can be avoided with better service delivery.

Through the initiatives, Sterlite Copper has removed inaccessibility to quality healthcare and has positively impact

50,000 people across 28 villages

By provision of quality healthcare facilities to the people, Sterlite Copper has been able to prevent 206 deaths, given the death rate of 6.4 per 1,000 population. This is under the assumption that the probable deaths taken into consideration are amenable, and not avertable.

Conservative Estimates of Lives Saved due to Intervention in Healthcare Services

Amenable Deaths due to use of poor quality of healthcare in South Asia (%) (2018)	64.4
Death rate in India (per 1000 population)	6.4
Number of people who had access to quality health care (Patients who benefitted by Sterlite's Mobile Health Van Initiative)	50,000
Lives Saved in India	206



STERLITE COPPER THROUGH ITS OPERATIONS HAS IMPACTED

50,000 people until now



AND THE INTERVENTION HAS PREVENTED LOSS OF

206 lives

approximately via provision of quality health care.

Sterlite Copper has set a program called 'Khushi', setup with a goal to ensure that no child in India remains malnourished, deprived of education and primary health. Under the

initiative, Khushi child care centres have been setup across the states in India, running in 11 villages. The program has been able to benefit 343 children between the age of 3-6.

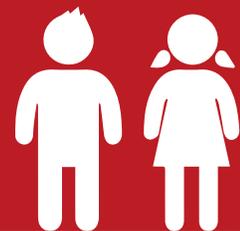
Conservative Estimates of Savings due to Interventions in Nutrition	
Average Per Capita Income (INR)	86,668
Years (20-65)	45
Lifetime Earnings (INR)	39,00,060
Loss due to Malnutrition (INR)	3,90,006
Children Impacted	56,000
Loss saved due to Intervention (INR)	13.38 Cr.

The table provides the details of such interventions. There are various studies that have quantified the impact of malnutrition on learning abilities of children and how that impacts their lifetime earnings. As per a World Bank Study, the loss in lifetime earnings is approximately 10 percent. The economic costs of such micro-nutrient malnutrition costs India around 0.8 percent to 4 percent of its GDP

according to various estimates. The average per capita income of Indians is INR 86,668. Assuming an average person works for 45 years, his lifetime earnings are INR 39 lakhs. Going by the most conservative estimates that the direct loss in productivity leads to 10 percent loss in average income, the loss due to malnutrition per person in his lifetime is INR 13.28 Crores.



Sterlite Copper through its operations has impacted **343 children until now**



and the gains of such intervention amount to **INR 13.38 Cr.**

WATER SECURITY

As per the Composite Water Management Index by NITI Aayog, 600 million Indians face high to extreme water stress and about two lakh people die. To counter the problems of water scarcity, Sterlite via its initiative has

ensured uninterrupted drinking water for all 400 households within the village from under Thoothukudi Corporation's 4th pipeline connection scheme. The project has been able to ensure water security for 1422 villagers.



Given that 46 percent of the population has been under water stress, and 2.4 percent of the total deaths are caused due to water scarcity,

it can be approximated that the Sterlite's initiative has been able to prevent 34 deaths by ensuring water security to 1,422 villagers.

Conservative Estimates of People Saved from Water Stress due to Intervention	
Number of India's who face water stress	600 million
Population of India	1.3 billion
Percentage of people facing water stress (%)	45
Beneficiaries of Water Security Program by Sterlite	1,422
People saved from Water Stress	656
Percentage of deaths attributable to water security (%)	2.42
Deaths Prevented by Sterlite's Initiatives	34

Sterlite Copper via ensuring water security has been able to save lives of approximately 34 villagers.

SANITATION

According to World Bank estimates, India is suffering losses of INR 2.4 trillion each year due to issues of sanitation. As per the study 'The Economic Impact of Inadequate

Sanitation in India' in 2006 by the Water and Sanitation Department, World Bank, the per person annual impact of inadequate sanitation is INR 2,180.

Conservative Estimates of prevented Losses due to CSR activities in water and Sanitation	
Per Person Annual Impact Due to Inadequate Sanitation (INR)	2,180
Number of Beneficiaries in 2017-18 under Sanitation Program	8,000
Total Loss Prevented(INR)	1.74 Crores



Sterlite Copper through its activities under the ambit of SANITATION HAS PREVENTED A NEGATIVE IMPACT OF

INR 1.74 CRORE



Sterlite Copper invested 1.28 crores to build 315 individual toilets in Theerkuveerapandiapuram, Vadakkusilukannpatti and a village in Milavittan benefiting 2,000 people. The organization has also spent INR 27 lakhs in building of 6 school sanitation complexes,

which has benefited 6,000 students. As the total number of beneficiaries via construction of individual toilets and school sanitation complexes by Sterlite Copper are 8,000, the estimated burden or the negative impact which has been prevented via provision of water and sanitation facilities is INR 1.74 crores.



WOMEN EMPOWERMENT

India faces a challenge of gendered inequality in terms of economic opportunities reflected in the gendered wage gap. Sterlite Copper via its initiative 'Sakhi' has reached out to 170 Self Help Groups (SHGs), with an outreach of 21,000 women in Thoothukudi.

Conservative Estimates of Increase in Women's Collective Income Per Year	
Daily Wage for Female (INR)	231
Number of Women Benefitted due to SHGs	21,000
Increase in Women's Collective Income due to Sterlite India's Initiative (INR)	48.51 Cr.

The daily wage for females in 2011-12 was INR 231. Given that Sterlite Copper has been able to reach 21,000 women, it can be stated that the Sterlite Copper has been able to increase

women's collective income in India by INR 48.51 crore annually. This can be calculated under the assumption that women are employed for a minimum of 100 days.

“ **STERLITE COPPER HAS HELPED INCREASE WOMEN'S COLLECTIVE INCOME PER YEAR BY INR 48.51 Cr.** ”



SUSTAINABLE LIVELIHOOD - SKILL DEVELOPMENT AND YOUTH

India is among the top five countries with highest skill shortages, wherein the demand for skill development and vocational training is on the rise.

As per the Ministry of Labour's Annual report 2017-18, there exists a difference between the wages of a skilled and unskilled labour. Using

the estimates, it can be stated that the average per day wage gap between a skilled and unskilled personnel is INR 75.5. Sterlite Copper has been able to train 298 youth via 'Coast Livelihood Project' (Tamira Muthukal). The objective has been to mobilize, motivate and train the youth within or outside the district. Given that out of the 298 trained workers, 60

% were given employment, it can be stated that the training initiatives by Sterlite have led to an increase of INR 0.13 crores annually. This

is under the assumption that the now-skilled worker is employed for a minimum of 100 days per year.

Conservative Estimate of Wage Increase due to Skill Addition	
Average Minimum Wage of Skilled Personnel (INR)	497.5
Average Minimum Wage of Unskilled Personnel (INR)	422
Value Addition as per Skill (INR)	75.5
Number of Youth trained by Sterlite	298
Value Addition to Annual Wages By Sterlite (given 60 percent employed) (INR)	0.13 Crores



WITH THE HELP OF TRAINING ACTIVITIES, IT CAN BE APPROXIMATED THAT THE AVERAGE ANNUAL WAGE OF LABOUR HAS INCREASED BY

0.13 crores in India



OTHER INITIATIVES

- **Sterlite Copper** is also ensuring educational support by providing regular **scholarship to orphanage students from 6th to 12th standard**. This initiative has also aided higher education by enabling pursual of **courses in Engineering, Medicine, Arts, Science** and various other fields because of the Scholarship.
- **Sterlite has also contributed** to the agriculture and animal husbandry, by cleaning irrigation channels (North Main Channel, Maruthur Melakal Channel and Peikulam Channel) which has **enabled flow of water to 50,000 acres of land, benefitting 1 lakh farmers**. Sterlite copper has also promoted the **idea of kitchen garden** across every household in the targeted village. They have also distributed **vegetable seed kits containing 6 types of hybrid seeds to 6,000 families**.

SESA GOA

Iron ore is, thus, a key mineral in the developmental stages of an economy.

Fortunately, India has ample iron ore resources and is among its top producers globally.

The total production in FY19 has grown to over

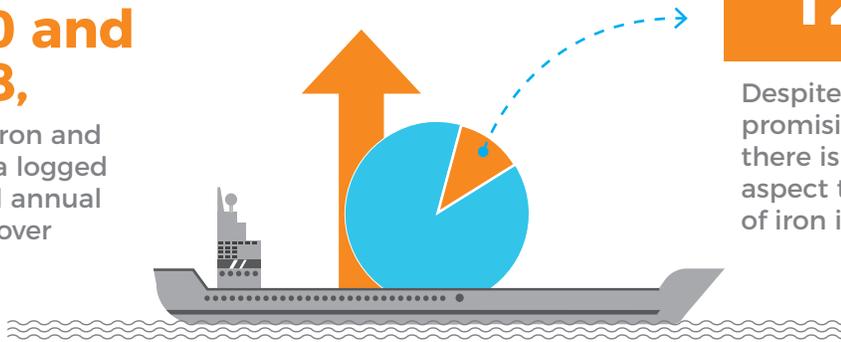
220 million tons

while growing at an annual average rate of about **9.5 %**



Between 2009-10 and 2017-18,

the exports of iron and steel from India logged a compounded annual growth rate of over



12%

Despite these promising trends, there is another aspect to the mining of iron in India.

ECONOMIC IMPACT OF SESA OPERATIONS

The overall loss in Indian exchequer due to

Sesa Goa Iron Ore

winding down its Goa operations after the mining ban amounts to about



INR 3,575 crore

as these demands are now being met through imports.



The closure of mining operations has resulted in a loss of

INR 3,810 crores

in terms of indirect impact and

INR 10,635 crores

in terms of induced impact.

The productivity increased by 164 percent during 2013 - 2017.

However, this remarkable upward trend was hampered by the mining ban in 2018. The productivity levels have dropped down to INR 1.16 Cr. in 2018-19.



SOCIAL IMPACT OF SESA OPERATIONS

Sesa through its operations has impacted

3,41,847 people



until now and the intervention has prevented loss of **1,324 lives** approximately via provision of quality health care.

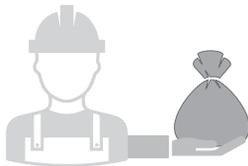
Sesa via its scholarship (engineering) has been able to increase the cumulative annual wages

Higher Education
INR 0.62 Cr.



Secondary education
INR 0.58 Cr.

With the help of Sesa's Technical School,



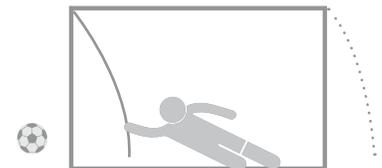
it can be approximated that the average annual wage of labour has the potential to increase by

2.26 Lakhs in India

Sesa has positively contributed to the lives of **320 farmers** in aiding conversion of barren land via provision of agricultural facilities. They have also benefited **61 farmers** under the **Dairy Farming Scheme**.



With the help of the Sesa Football Academy, the average annual income of **4 players** will go up by almost



INR 2.94 crore

Women Empowerment



Sesa has empowered women via a '**Sesa Kishori Prabhadan**', as it addresses all concerns with regard to **health, hygiene, academic, personality and social aspects**. This initiative has been able to positively **impact about 655 adolescent girls**.

Sea has also ensured **safe drinking water** for **1,000 families** in 3 panchayat villages in **Karnataka**.

Sesa has also carried out eye checkups, wherein

2,940 people

have been provided spectacles and **195 people** have been treated for **cataract**.



INTRODUCTION

Steel is one of the most ubiquitous metals we experience in our daily lives. Practically everything from the formidable skyscrapers to the humble washing machines are built on the backbone of steel. The metal is so vital to the sustenance of modern economies that it makes up 95 percent of the global metal production. However, given the importance of steel, iron ore, the raw material from which steel is forged, attracts surprisingly inadequate attention.

Iron ore is, thus, a key metal in the developmental stages of an economy.



Fortunately, India

has ample iron ore resources and is among its top producers globally. The total production in FY19 has grown to over

220 mn tonnes

while growing at an annual average rate of about 9.5 %.

Between 2009-10 and 2017-18,

the exports of iron and steel from India logged a compounded annual growth rate of over

12%

Despite these promising trends, there is another aspect to the mining of iron in India.



In early 2018, mining in Goa, which holds vast iron ores reserves, came to a halt after the Supreme Court quashed all licenses to mine the metal. The SC move was brought about after it declared the process of renewing permits illegal, which were in turn being renewed following a previous mining ban that had only ended in 2014. Apart from the loss in livelihood caused due to these successive adverse rulings among thousands of mining workers and many more in supporting industries, India has also lost its credibility as a reliable supplier of iron ore in the global economy.

There are obvious economic losses to the country due to the repeated mining bans. Even though India has huge metal reserves

and is the third-largest crude steel producer, the country has turned into a net importer of iron and steel. Figure 1 shows how the Indian economy transforms into a net exporter of the metal when normal mining operations are resumed. Thus, regulatory challenges have resulted in substantial exchequer losses for the economy over the years.

Sesa Goa Iron Ore is one of the key players in the iron and steel industry. The company is a particularly significant player in the Goa region and exports about 50 percent of the Goan iron ore. We delve into the economic impact of the mining ban in the state and also the economic and social impact of the company itself in the following sections.



Figure 1. India's Trade Dynamics in Iron and Steel (Source: Ministry of Commerce & Industry)

A black and white photograph of three miners standing in a dark tunnel. They are wearing hard hats with bright headlamps. The tunnel walls are rough and textured, and the floor is uneven. The light from the headlamps creates a strong contrast with the dark surroundings, highlighting the miners' silhouettes and the texture of the tunnel walls.

ECONOMIC IMPACT

Sesa Goa Iron Ore is a key player in the Indian iron ore industry. The company has operations in exploration, mining and processing of iron ore spread across the state of Goa, Karnataka, and most recently, Jharkhand. The company has expanded its business through vertical integration after its recent acquisition of Electrosteel Steels Limited.

Extent of Contractual Employment

Sesa Goa has an overall employment impact on over 4,500 individuals across the value chain with direct employment of 2,621 personnel and around 2,000 contractual employees for 2018-19. Since the successive mining bans

starting from 2011-12, the company has witnessed a dip in the absolute employment of direct and indirect employees while the ratio has more or less remained constant.

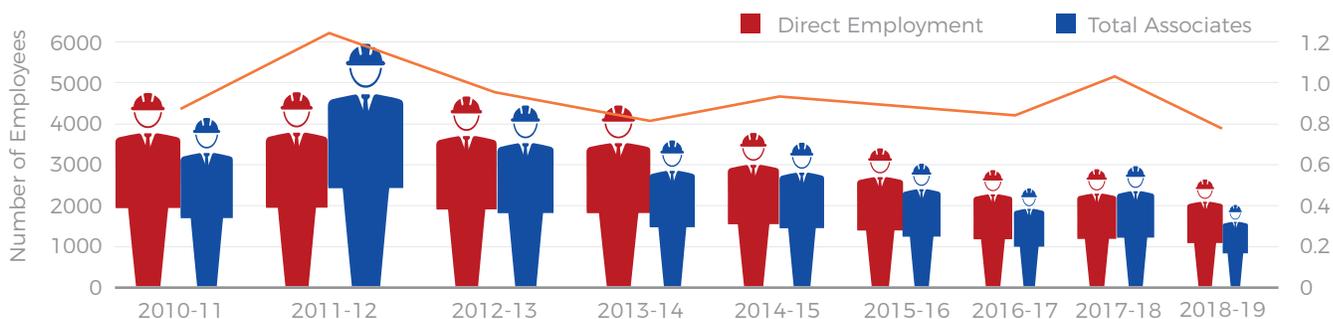


Figure 2: Employment Trends of Sesa Goa

Source: Vedanta Group Ltd

Import - Export Scenario

Sesa Goa was also a major exporter of iron ore before the ban with an annual capacity of 5.5 MT per annum just from the Goa segment of the business. Since the price of iron ore roughly stands at INR 4,700/tonne, the cost of the ban to the country merely due to Sesa Goa winding

down its Goa operations should be around INR 2,540 crore as these demands are now being met through imports. There have been further losses to the country due to the mining ban that go beyond the loss to exchequer. The following sections elucidate the same.



THE OVERALL LOSS IN INDIAN EXCHEQUER DUE TO SESA GOA IRON ORE WINDING DOWN ITS GOA OPERATIONS AFTER THE MINING BAN AMOUNTS TO ABOUT

INR 2,540 CRORE

as the gains from international demand remain unrealised.

There have been further losses to the country due to the mining ban that go beyond the loss to exchequer. The following sections elucidate the same.

Input Output Linkages

The input-output table, that capture the economic flows between industries, is used to analyse the impact created by Sesa through its operations on the economy. There are three types of impacts that are captured through the multipliers generated by the IO tables.

Direct Impact

The direct impact looks at the upsurge in sales value of the company due to increase in the demand for the product.

The total sales for Sesa grew at an impressive rate of

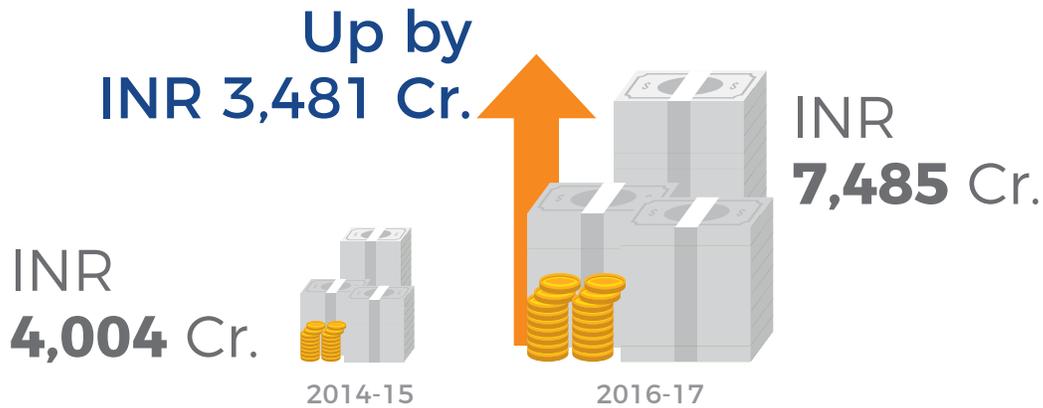
86.95% from 2014-15 to 2016-17.



THE DIRECT IMPACT OF THE COMPANY, AS A PERCENTAGE OF GDP, GREW FROM 0.018 TO 0.028.

Indirect Impact

The indirect impact of Sesa's operations through its suppliers and their suppliers down the value chain is analysed by multiplying the sales value with the Type - I multiplier. The indirect impact witnessed a jump of INR 3,481 crores, moving from INR 4,004 crores in 2014-15 to INR 7,485 crores in 2016-17.



Induced Impact

Another effect of the company's operations is through the consumption patterns known as the induced impact. The increase in demand for company's products expands the employment levels, that leads to a surge in the household income. A proportion of this increased income is spent on the final goods and services. The induced impact of Sesa's operations was 0.09 in 2014-15 and it went up to 0.136 in 2016-17.

Direct, Indirect and Induced Impact of Sesa's Operations

Year	India's GDP (INR crores)	Total Sales (Direct Impact) (INR crores)	Sales (as a percentage of GDP) - Direct Impact	Type - I Multiplier	Indirect Impact (INR crores)	Percentage Indirect Impact of Sesa	Type - II Multiplier	Induced Impact (INR crores)	Percentage Induced Impact of Sesa
2015	1,24,67,959	2,262	0.018	1.77	4,004	0.032	4.94	11,174	0.090
2016	1,37,71,874	2,348	0.017	1.77	4,156	0.030	4.94	11,599	0.084
2017	1,53,62,386	4,229	0.028	1.77	7,485	0.049	4.94	20,891	0.136
2018	1,70,95,005	3,257	0.019	1.77	5,765	0.034	4.94	16,090	0.094
2019	1,90,53,967	3,048	0.016	1.77	5,395	0.028	4.94	15,057	0.079

However, the closure of Sesa's mining operations in Goa has severely impacted the economic gains generated by the company. The total sales of the company dipped from INR 4,229 crores to INR 3,048 crores during the period 2016-17 to 2018-19.



The closure of mining operations has resulted in a loss of

INR 3,810 Cr. in terms of indirect impact &
INR 10,635 Cr. in terms of induced impact



This resulted in a fall of indirect impact from INR 7,485 crores in 2016-17 to INR 5,765 crores in 2017-18 and further down to 5,395 in 2018-19. If one assumes that Sesa would have maintained the same level of sales as in 2016-17, then the loss for first year is INR 1,720 crores and for second year it is INR 2,090 crores. On similar terms, the cumulative fall in the induced impact of the company is INR 10,635 crores. Another important metric used to analyse

the economic benefits for the economy from Sesa's operations is the output and income multiplier. The output multiplier for Iron Ore (Sesa) industry is the total value of sales by all other industries necessary to deliver a rupee's worth of final demand for Iron Ore's output. The output multiplier for the Iron Ore industry in India is 2.123. This indicates that the impact of Sesa's operations on economy's output was INR 6,915 crores in 2017-18, and it fell to INR 6,471 crores in 2018-19.

Impact of Sesa on Output and Income									
Industry	Year	GDP	Sesa's Total Output	Output Multiplier of the Industry	Impact on Economy's Output	Impact on Economy's Output (As a % of country's GDP)	Income Multiplier of the Industry	Impact on Economy's Income	Impact on Economy's Income (As a % of country's GDP)
Iron Ore	2018	1,70,95,005	3,257	2.123	6,915	0.04	0.984	3,205	0.019
	2019	1,90,53,967	3,048	2.123	6,471	0.03	0.984	2,999	0.016

The income multiplier of the Iron Ore industry translates the effect of change in demand into changes of household income. This is done by capturing the change in income due to change in output. If we multiply the total sales value

of Sesa with the income multiplier for the Iron Ore industry, the impact on economy's income comes out to be INR 3,205 crores for 2017-18. However, it dropped to INR 2,999 crores in 2018-19.

Sectoral Impact

The iron ore mining industry has strong linkages with almost all other industries, since steel is used in almost all the products. The

illustration in Figure 3 shows which sectors of the economy have benefitted most from Sesa's operations.

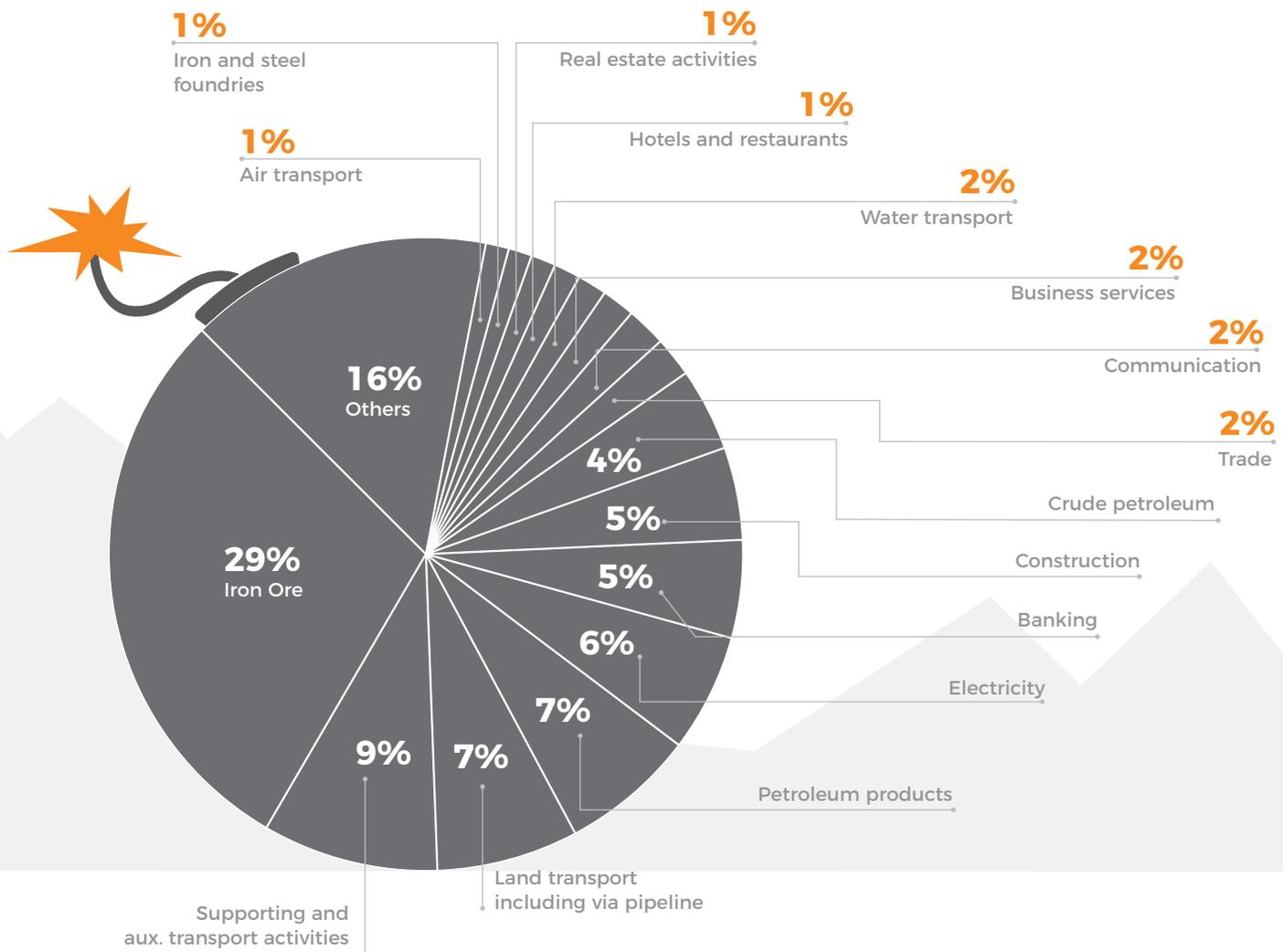


Figure 3: Sectoral Impact

Source: Vedanta Group Ltd and IFC Analysis

The highest impact - 29 percent is on the Iron Ore industry itself. Apart from that, 9 percent impact is on "Supporting and auxiliary transportation activities" and 7 percent on the Petroleum products sector.

Company-Level Analysis

The previous section shed light on the economy-wide consequences of the closure of the Sesa's operations, there will be further losses to the economy as a major player in the industry has been abruptly forced to cease operations. This will have an impact as

linkages across the value chain are broken and both upstream and downstream players are simultaneously affected along with the people employed throughout the spectrum. To understand these impacts we look at the company-level trends.

Employee Productivity

To begin with, we look at how the productivity of Sesa's employees have changed overtime. It is illustrated in Figure 4. The productivity of employees i.e. revenue per employee

was continuously rising since 2013 (with a minor dip in 2014) and peaked in 2017. The productivity increased by 164 percent during 2013 - 2017.

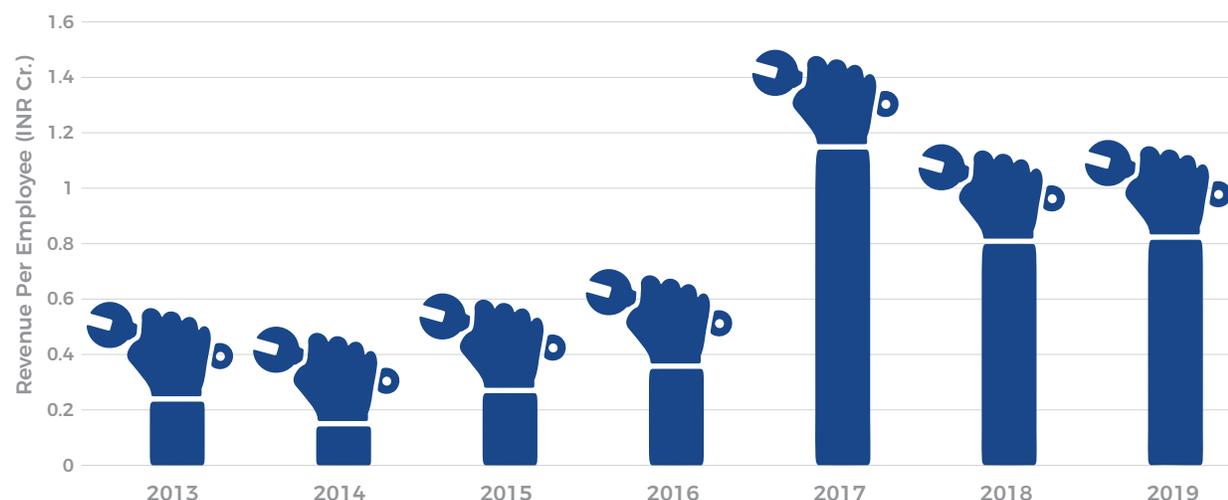


Figure 4: Productivity of Employees

Source: Vedanta Group Ltd and IFC Analysis



THE PRODUCTIVITY INCREASED BY

164 % during 2013 - 2017



However, this remarkable upward trend was hampered by the mining ban in 2018. The productivity levels have dropped down to INR 1.16 Cr. in 2018-19.

Labour Income

Another major impact of the company is the contributions made towards the labour income and other employee benefit expenses. SESA contributed



The salaries and wages of Sesa's employees are significantly higher than the average wages in their operational state. The annual average wage paid by Sesa was INR 8,00,000 in 2018, up from INR 4,85,837 in 2014.

Year	2014	2019
Remuneration (SESA) (INR Crore)	140.3	139.6
No. of Employees	2,889	1,745
Annual Wages* (SESA)	4,85,837	80,000
Monthly Wages (SESA) (INR)	40,486	66,667
Average Wage in Goa and Karnataka (INR)	2,50,161	4,12,766

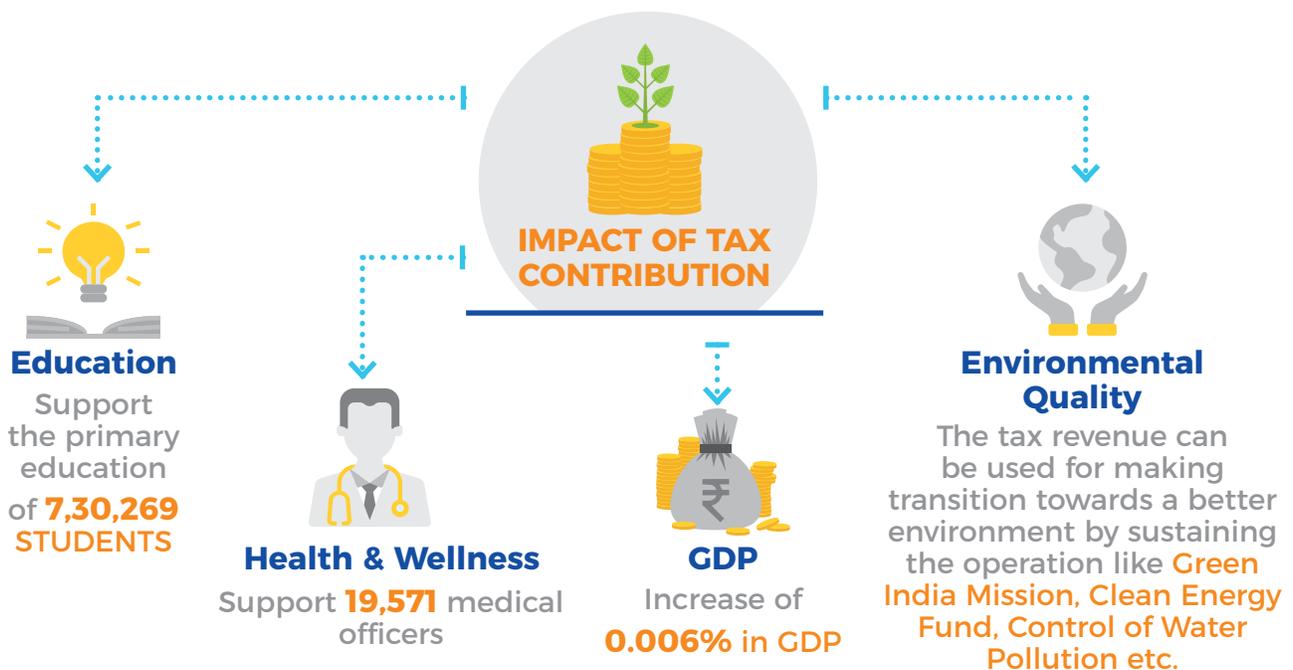
Source: Vedanta Group Ltd and India Cluster Mapping Project, IFC

*The annual wages in Sesa are calculated by taking the average wages for Goa and Karnataka operations

These figures suggest that an employees in Sesa earn almost twice than the average employees in Goa and Karnataka.

Impact of Tax Contribution on the society

The tax revenue from national as well as state level direct and indirect taxes amounts to INR 489.28 crores, i.e. 17 % of the company's revenue. These tax contributions made by Sesa Goa can have a significant impact on different sectors of the economy depending on how the revenue is being spent.



CAPITAL EXPENDITURE

If the entire revenue is used as capital expenditure then it will increase the GDP by

INR 1,198 crores



BASED ON THE CAPITAL EXPENDITURE MULTIPLIER VALUE OF 2.45.

EDUCATION SECTOR

The average annual salary of teachers in India is INR 2 lakhs. The entire revenue is enough to support

24,342

teachers yearly
With a mandated pupil
teacher ratio of 30:1 at
the primary level,



IT CAN SUPPORT THE
EDUCATION OF

7,30,269

**students in the
country.**

HEALTH SECTOR

The cost of medical officers in India range between

INR 2,50,000 to INR 4,50,000

This implies that the revenue by the company can support **10,873 to 19,571** medical officers.



ENVIRONMENT, FOREST & CLIMATE CHANGE



The total expenditure of the Ministry of Environment, Forests and Climate Change is

INR 2,626 crores

This suggests that Sesa's tax revenue is sufficient to maintain 18 percent of the expenditure by the ministry. The tax revenue can be used for making the transition towards a better environment by sustaining the operations like Green India Mission, Clean Energy Fund, Control of Water Pollution etc.

The contributions by the company were at peak during the 2009-10 – 2011-12 period, when the mining industry was running smoothly. The average yearly tax during this period was INR 1,150 crores, which is 2.3 times the current tax. This figure indicates that the gains in the above discussed sectors would be 2.3 times more if the mines were operational.

Case of Goa

Mining has been an indispensable part of the Goa economy. The sector has been a significant foreign exchange earner for the state and a substantial part of its overall GSDP. This was true until the Shah Commission ban was imposed in September 2012. The ban suspended all mining operations in Goa for nearly 19 months till April 2014; after which the Supreme Court finally allowed the industry to operate with several riders in place. The state renewed the iron ore mining leases for 88 companies in 2015. However, in February 2018,

the mining activity came to a halt once again after the SC declared the renewal process illegal.

The successive halt of mining activities in the state, which was once a major contributor to its economy, has had an adverse impact on it over time. Figure 5 shows how the share of mining in Goa's GSDP, which was over 15 percent in 2011-12, still remains at negligible levels. This shows that the state has lost a significant contributor to its GDP due to the bans.

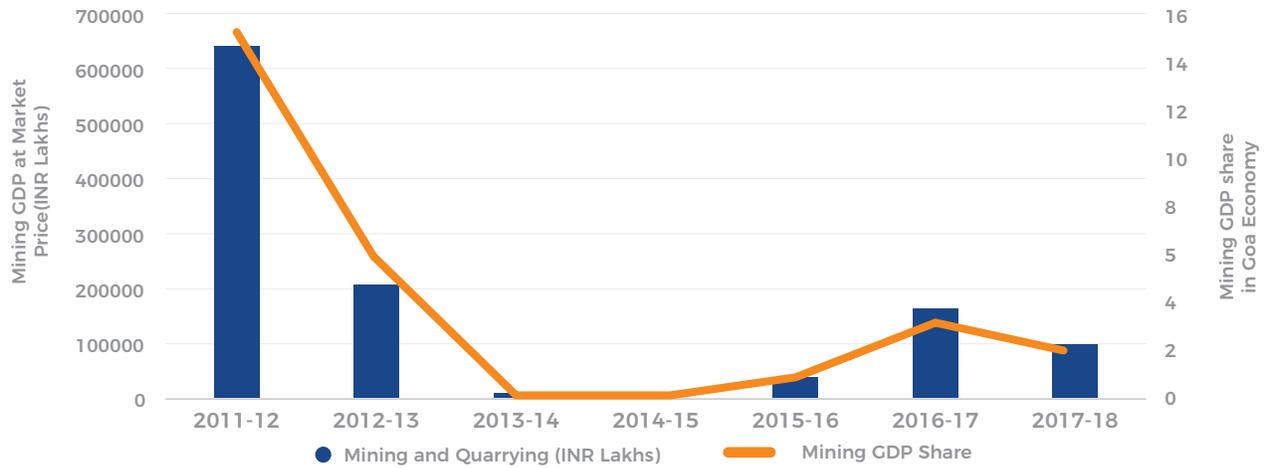


Figure 5: Effect of successive mining bans on the Goa mining industry
 Source: Economic Surveys of Goa government

Another major impact of the mining ban to the Goa economy comes from the loss in non-tax revenue that came from the sector. Figure 6 shows that in 2011-12, the mining sector accounted for almost 40 percent of the

state's non-tax revenue. As of 2018, this share is below 10 percent. Undoubtedly, this is a significant setback for the Goa government, which could have utilised these resources for developmental purposes.

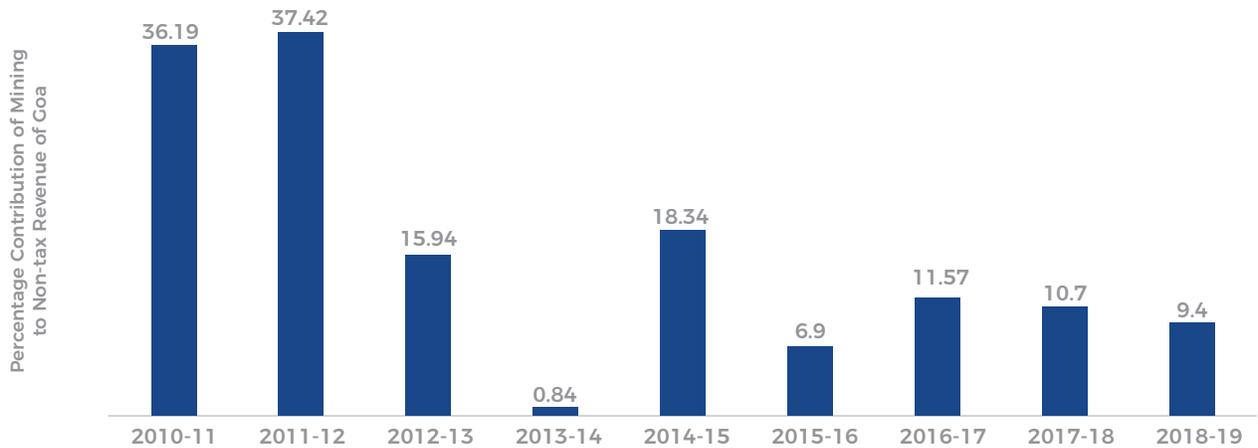


Figure 6: Mining Contribution to Non-Tax Revenue of Goa
 Source: Economic Surveys of Goa government



**SOCIAL
IMPACT**

Shared Value

Sesa Goa is the iron ore vertical of Vedanta and has been able to create shared value through its operations. However, since Sesa is an iron-ore company, it is difficult to reconceive the product. In the field of redefining productivity, Sesa Goa has been able to adopt high end technology, create the largest pig ironore division in India. Sesa Goa has adopted Vedanta's strategy of asset management, as well as techniques of total quality maintenance and total productive maintenance.

Sesa has also focused on sustainability of the technology used, and allowed for agricultural rejuvenation project, rehabilitation and reforestation of exhausted mining pits as well as implementation plans to mitigate air pollution.

Sesa has ensured a decent workforce, enable development of talent via Sesa Technical School, focused on cluster development and aided the process of local infrastructure and community development via investment in health, education, skill development initiatives.

HOW SESA IS CREATING SHARED VALUE

Redefining Productivity Across Value Chain



TECHNOLOGY

- ◆ Setting up of Sesa Environmental Laboratory
- ◆ Proprietary environment -friendly met coke making technology
- ◆ Pig Iron Division is the largest producer of low phosphorous pig iron in India (installed capacity of 625000 Tones/Year)
- ◆ Coke Technology is optimum waste heat recovery per ton of coke produced



LOGISTICS

- ◆ Asset Management (AM)
- ◆ Total Quality Maintenance (TQM) & Total Productive Maintenance (TPM)



ENVIRONMENT

- ◆ Rehabilitation and Reforestation of exhausted mining pit
- ◆ 'Back to Farming' : Agricultural Rejuvenation Project
- ◆ Root Trainer: New Technology in Forest Nursery
- ◆ Bio-technological approach for mine land reclamation - planting of native species
- ◆ Sanquelim Management Plan - Model concept: utilisation of exhausted mines to improve biodiversity
- ◆ Mitigation of Air Pollution by mobile water spraying
- ◆ 100% disposal of biomedical waste



WORKFORCE

- ◆ Competitive salary and benefits
- ◆ 'Star of Business' - Putting young talent on a fast growth track
- ◆ Spent 28822 hours on skill training in 2018-19
- ◆ Lost time Frequency Injury Rate (LIFTR) has been reduced in the last one year

Enabling Local Cluster Development



TALENT

- ◆ Skill Development via 'Sesa Technical School'



CLUSTER

- ◆ Presence of locally sourced input
- ◆ Value of contracts with local suppliers (826 crores)



LOCAL INFRASTRUCTURE DEVELOPMENT

- ◆ Setting up of Community Medical Centres as well as Mobile Health Vans
- ◆ Enabling infrastructure for higher education (degree in Mining Engineering)



LOCAL COMMUNITY DEVELOPMENT

- ◆ Nutrition Improvement Programs at Balwadi Centres
- ◆ Scholarship Program for students to encourage completion of secondary education: 'Sesa Dnyanjyoti Shishyavritti'

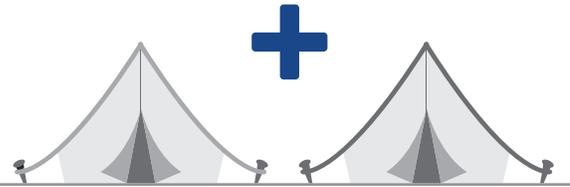
HEALTH

As a developing economy with a relatively low per capita income on the global scale, healthcare is a major challenge for India. The poor quality of its healthcare services often result in deaths that can be otherwise prevented. Lancet estimates that 64.4 percent of deaths in South Asia occur due to poor quality of services.

Sesa has focused on the issues of health and accessibility via establishment of Community Medical Centres (CMCs) in the areas of its operations. Till date, Sesa has been able to setup 11 CMCs and benefitted 3,41,837 people. Sesa has also supported the idea of provision of

quality medical care by setting up of 2 mobile health van units.

By ensuring accessibility of quality healthcare to 3,41,837 people, Sesa has been able to prevent 1,324 deaths given the death rate of 6.4 per 1,000 population. This is under the assumption that the probable deaths taken into consideration are amenable, and not avertable.



Conservative Estimates of Lives Saved due to intervention in Healthcare Services

Amenable Deaths due to use of poor quality of healthcare in South Asia (%) (2018)	64.4
Death rate in India (per 1000 population)	6.4
Number of people who had access to quality health care (Beneficiaries of CMC's)	3,41,847
Lives Saved in India	1,324

“ SESA THROUGH ITS OPERATIONS HAS IMPACTED

3,41,847 people until now



AND THE INTERVENTION HAS PREVENTED LOSS OF

1,324 lives approximately via provision of quality health care.

Sesa has also focused on provision of nutrition to children via setting of Balwadi Centres. Sesa has setup a Nutritional Improvement Program which has enable monthly provision of nutritional supplement and regular health

checkups. They have also provided protein supplements to malnourished and under-nourished children across 40 Balwadi centres in 7 panchayats. Overall, Sesa's nutrition initiative has benefitted 426 children.

Conservative Estimates of Savings due to Interventions in Nutrition	
Average Per Capita Income (INR)	86,668
Years (20-65)	45
Lifetime Earnings (INR)	39,00,060
Loss due to Malnutrition (INR)	3,90,006
Children Impacted	426
Loss saved due to Intervention (INR)	16.61 Crores

The table provides the details of such interventions. There are various studies that have quantified the impact of malnutrition on learning abilities of children and how that impacts their lifetime earnings. The loss in lifetime earnings is around 10% (World Bank Study). The economic costs of such micro-nutrient malnutrition costs India around 0.8 percent to 4 percent of its GDP according

to various estimates. The average per capita income of Indians is INR 86,668. Assuming an average person works for 45 years, his lifetime earnings are INR 39 lakhs. Going by the most conservative estimates that the direct loss in productivity leads to 10 percent loss in average income, the loss due to malnutrition per person in his lifetime is INR 16.61 Crores.

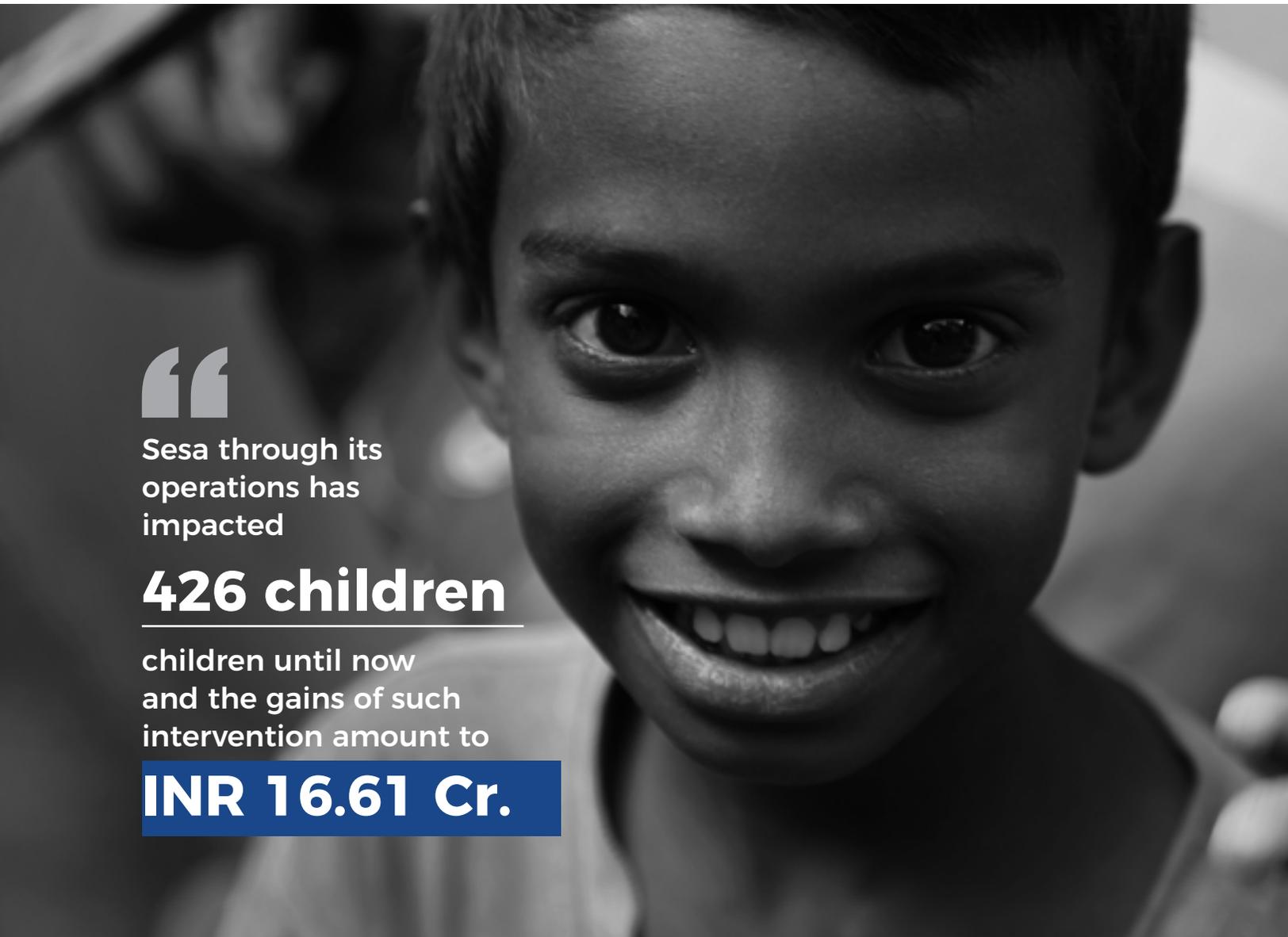


Sesa through its operations has impacted

426 children

children until now and the gains of such intervention amount to

INR 16.61 Cr.



EDUCATION



Sesa has worked on the aspects of education, especially secondary and higher education. Sesa Goa has tied up with Government of Goa, and setup a degree on Mining Engineering at the Goa Engineering college. The course has 214 alumni, implying that the education level for 214 individuals improved from secondary education to attainment of higher education due to Sesa's initiatives. The initiative has enabled the necessary infrastructure in terms of classrooms, faculty rooms, laboratories, auditoriums, etc for a period of 5 years.

The ILO estimates using NSSO data can be used in deriving the average daily regular workers wage for secondary education as INR 247 and INR 538.5 as wages for higher education. Therefore, due to the initiative in promotion of a degree in mining engineering,

the per person increase in wages facilitated by Sesa is INR 291.5. The cumulative increase in wages for the economy is INR 0.62 crores, assuming 100 days of employment is available after attaining higher education.

Conservative Estimates of Wage Increase due to Opportunity in Higher Education

Increase in Wage due to completion of higher education (Urban regular workers)	291.5
Number of Beneficiaries due to scholarship	214
Cumulative increase in Wages (INR)	0.62 Crores



SESA VIA ITS SCHOLARSHIP IN HIGHER EDUCATION (ENGINEERING) HAS BEEN ABLE TO INCREASE THE CUMULATIVE ANNUAL WAGES BY

INR 0.62 Cr.



Sesa has also started a scholarship program called 'Sesa Dnyanjyoti Shishyavritti' aimed at students from 5th standard to 8th standard, and encourage them to complete secondary

education by provision of financial support. This has the capacity to enhance the wages of the students, who would have otherwise only completed primary education.

Conservative Estimates of Wage Increase due to Scholarship in Secondary schooling

Increase in Wage due to completion of secondary education (regular workers) (INR)	87.5
Number of Beneficiaries due to scholarship	670
Cumulative increase in Wages (INR)	0.58 Crores

As per the ILO estimates using NSSO data, the regular workers daily wage (across male-female and urban-rural) is INR 247 for an individual with secondary education. Similarly, the regular workers average daily wage for an individual with primary education is INR 159.5. Therefore, the initiative for completion of secondary level of education will lead to a per person daily average wage to increase by

INR 87.5. The scholarships have been provided to 670 students from 57 schools who have been given scholarship of INR 2,500 and INR 3,500. The cumulative impact of increase in wages is INR 0.58 crore, assuming that the minimum number of employment days is 100 (as compared to the guaranteed employment of 100 days provided by MNREGS).



SESA VIA ITS SCHOLARSHIP IN SECONDARY EDUCATION (ENGINEERING) HAS BEEN ABLE TO INCREASE THE CUMULATIVE ANNUAL WAGES BY

INR 0.58 Cr.



SUSTAINABLE LIVELIHOOD - SKILL DEVELOPMENT AND YOUTH

With increasing mechanisation of the workplace, numerous unskilled jobs are under threat of being rendered irrelevant in the near future. In such a scenario, skilling of the workforce will be key to prevent widespread unemployment. While the government has recently taken up the initiative to skill India, Sesa Goa is also playing its part through its CSR activities.

Sesa has established a 'Sesa Technical School' which has been affiliated with National Council of Training, which has 5 courses, namely: Fitter, Machinist, Instrument Mechanic, Multi-trade (mechanical) and Multi-trade (electrical). The

initiative in skilling and training has been able to impact around 1,000 youths and have been able to gain employment.

As per the Ministry of Labour's Annual report 2017-18, there exists a difference between the wages of a skilled and unskilled labour. Using the estimates, it can be stated that the average per day wage gap between a skilled and unskilled personnel is INR 75.5. Sesa Goa has been able to train 1,000 youth via Sesa Technical Skill School. This is under the assumption that the now-skilled worker is employed for a minimum of 100 days per year.

Conservative Estimate of Wage Increase due to Skill Addition	
Average Minimum Wage of Skilled Personnel (INR)	497.5
Average Minimum Wage of Unskilled Personnel (INR)	422
Value Addition as per Skill (INR)	75.5
Number of Youth trained under Sesa Technical School	1,000
Value Addition to Annual Wages By Sesa (given 60 percent employed) (INR)	0.76 Crores



“

WITH THE HELP OF SESA'S TECHNICAL SCHOOL, IT CAN BE APPROXIMATED THAT THE AVERAGE ANNUAL WAGE OF LABOUR HAS THE POTENTIAL TO INCREASE BY

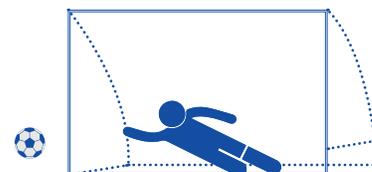
INR 0.76 crores in India

SPORTS

Sesa had setup a 'Sesa Football Academy' in 1999, with the goal to encourage the sport of football in Goa, wherein they have been providing free academic as well as specialized training. **Sesa Football Academy has had 100 pass-outs who are now professional footballers, and 4 of them have also represented the Indian National Team**



Gains due to Football Academy	
Average Basic Annual First Team Pay in Super League(In INR)	74,69,271
Average Annual Income in India (INR)	1,03,870
Increase in Yearly Income of one player (INR)	73,68,720
Total Increase in Yearly Income of four player (INR)	2.94 Crores



WITH THE HELP OF THE SESA FOOTBALL ACADEMY, THE AVERAGE ANNUAL INCOME OF 4 PLAYERS WILL GO UP BY ALMOST

INR 2.94 crore

OTHER INITIATIVES

- Sesa Goa has carried out multiple initiatives beyond the realm of health and education that have been mentioned before. Sesa has also helped in establishment of a Pediatric Neuro Rehabilitation Centre in Goa to cater to the special needs children. **Sesa has also carried out eye checkups, wherein 2,940 people have been provided spectacles and 195 people have been treated for cataract.**
- **Sesa has also ensured safe drinking water for 1,000 families in 3 panchayat villages in Karnataka.** The organization has enabled safe drinking water at low cost, ensuring improved health status.
- Sesa has empowered women via a '**Sesa Kishori Prabhadan**', as it addresses all concerns with regard to **health, hygiene, academic, personality and social aspects.** This initiative has been able to positively **impact about 655 adolescent girls.**
- Sesa has also contributed in the field of agriculture, dairy farming as well as environment. **Sesa has positively contributed** to the lives of **320 farmers** in aiding conversion of barren land via provision of agricultural facilities. They have also **benefited 61 farmers under the Dairy Farming Scheme.**

SOCIO - ECONOMIC
IMPACT ANALYSIS
METHODOLOGY
DOCUMENT

ECONOMIC IMPACT ANALYSIS

The economic impact analysis attempts to measure the change in economic activity that is caused by the operations of company.

EXTENT OF CONTRACTUAL EMPLOYMENT

• Employment Trends

We begin by analysing the employment trends in the company. These are then compared by the trends in the industry. It gives us an idea about the employment generation capacity of the company vis-à-vis the industry.

• Employment Multiplier

Industry Employment Multiplier gives us an estimate of the employment generated by increasing the output of the industry by INR 1 Lakh. Using this multiplier, we have calculated the total no. of man-years generated by the company's output. Assuming that 1 man-year is equivalent to 1 employee, the employment impact is given by

$$\text{Employment Impact} = \text{Industry Employment Multiplier} \times \text{Output of the company}$$

Also, we have estimated the employment impact based upon the total no. of employees in the company. This is given by

$$\text{Per employee Impact} = \frac{\text{Employment Impact}}{\text{Total no. of Employees}}$$

• Employee Productivity

Growing employment is the first level of economic impact that a company can have in an economy. An even more vital contribution is in affecting a positive change in the productivity of those employees. A consistency in driving productivity of workers is what helps companies and even countries in general maintain a competitive edge. The employee productivity is examined through the indicator revenue per employee.

$$\text{Employee Productivity} = \frac{\text{Revenue}}{\text{(Direct Employees)}}$$

FOREX SAVING FOR THE NATION

The products that are mined and produced by Vedanta play a pivotal role in the development of modern economy. Keeping these uses in mind, it is important to understand how these products are helping in the country save foreign exchange. It is due to the domestic production and sales of these products; the country is not dependent on foreign imports of the metal. Such an advantage allows the country to reduce its import bill and save precious foreign exchange reserves. This section calculates the forex savings for the nation by calculating the import bill, had there been no domestic sales by Vedanta. This is then compared with the actual import bill to calculate the savings.

$$\text{Import Value Per KT of the product} = \frac{\text{Total Import Value of the Product}}{\text{Total Amount Imported}}$$

The increase in value of Imports of Vedanta's domestic sales is NIL (Forex Savings) = Import Value Per KT of the product * Vedanta's domestic sales

INPUT OUTPUT TABLES

Most of the sectors in the economy are interdependent. Industries purchase inputs from other industries, employ labour and capital to produce goods that are either sold to final consumers or to other industries. These economic flows between industries are recorded in the input-output tables. The input-output table, at its simplest, can be represented as given in the table below. The first matrix (F11: Fxx) is the intermediate industry input matrix. This matrix defines the two-way

links between industries and, through these links, the labour, fixed capital and natural resource requirements of final demand. This can be interpreted as reflecting the relationship between the level of output and the required quantities of inputs for every industry.

Supplying Industry	Intermediate Uses			Final Uses			Total Output
	Industry 1	Industry 2	Industry x	PFCE	GFCE	Net Final Demand	
Industry 1	F11	F12	F1x	C1	G1	D1	O1
Industry 2	F21	F22	F2x	C2	G2	D2	O2
Industry x	Fx1	Fx2	Fxx	Cx	Gx	Dx	Ox
Value Added	V1	V2	Vx				
Taxes	T1	T2	Tx				
Value of Output	O1	O2	Ox				

Then the value added is represented either by the value of final demand for output (consumption plus investment plus net exports) or by the value of primary inputs used in that production (labour plus capital income plus rent on natural resources).

The input-output tables are used to quantify the impact of economic change, by adopting some assumptions about the inter industry relationships. These assumptions include:

- There is a fixed structure in each industry, which can be described by fixed technological coefficients
- All the products of an industry are identical or are made in fixed proportion to each other
- Each industry exhibits constant returns to scale in production

There are three types of impacts that can be captured using the IO tables.

1

Direct Impact

When there is an increase in the demand of a particular industry's output, say industry A, it raises the output of that industry. This is the direct impact, that can be captured through the total sale value.

2

Indirect Impact

As the output of industry, A is increased, it will lead to increase in output of industry A's suppliers and further suppliers down the value chain, due to an increase in the raw materials. This is known as the indirect impact.

3

Induced Impact

This surge in demand raises the household income throughout the economy by impacting the employment levels. A proportion of this increased income is spent on the final goods and services. This is known as the induced impact.

The Type I multipliers sum the direct and indirect impact while the Type II multipliers sum the direct, indirect and induced impact.

SOCIAL IMPACT ANALYSIS

HEALTH

Vedanta's impact on healthcare is estimated as the number of deaths (amenable not avertable) prevented by providing quality healthcare services. Amenable mortality is defined as premature deaths (under the age of 75) from a collection of diseases that could have been avoided with the provision of effective and timely healthcare. As per Lancet study- Mortality due to low-quality health systems in the universal health coverage era: a systematic analysis of amenable deaths in 137 countries- in 2018, 64.4 percent of amenable deaths occur in South Asia due to lack of quality healthcare services.

The number of deaths prevented is calculated as the number of beneficiaries multiplied by the death rate of India (as per NITI Aayog 2016) -6.4 per thousand population- further multiplied by the amenable death percentage (64.4) for South Asia.

Number of lives saved = Number of beneficiaries * Death rate * Amenable death rate

EDUCATION

Mid-day meals

Despite achieving close to universal enrolment at the primary level, the dropout rates in India are very high with around 50 percent of students dropping out before reaching class 10, majority of those belonging to the disadvantaged groups. Vedanta has made significant efforts towards improving the enrolment at primary level through its mid-day meal scheme. According to a study published at the Indian Statistical Institute, mid-day meals result in 6.6% increase in primary school enrolment. The increase in enrolment due to the mid-day meal scheme by Vedanta is calculated as 6.6% of total students impacted by the program.

Increase in student enrolment due to mid-day meal scheme = Number of students impacted * .066

Earning Potential

Education initiatives can increase the income level of people significantly. As per a report by International Labour Organisation, the wage gap between Indian Male with secondary education and the one with primary education is INR 93 per day while that of female is INR 50 per day. Vedanta through its initiatives in education sector has helped people to improve their earnings. Multiplying the number of total beneficiaries with the sex ratio (according to 2011 Census) would give the number of male and female beneficiaries. The increase in wages per day would be calculated by first multiplying the number of male beneficiaries with their wage gap due to education and the female beneficiaries with their respective wage gap due to education and then summing up both the number. Monthly increase can be calculated by multiplying this daily increase in income with 30.

$$\text{Increase in Monthly wage} = [(\text{No. of male beneficiaries} * \text{Indian Male wage gap}) + (\text{No. of female beneficiaries} * \text{Female wage gap})] * 30$$

WOMEN EMPOWERMENT

Vedanta has worked towards creating an inclusive society by enabling income generation for women through 'Sakhi' program and other initiatives. For understanding the impact towards financially empowering women, the number of beneficiaries is multiplied by the daily wage for female as per India Wage Report by International Labour Organisation (or by the average wage increase as per Vedanta's initiatives) to calculate the possible cumulative increase in wages. This calculation is under the assumption that women are employed for a minimum of 100 days.

$$\text{Cumulative increase in income} = \text{Number of female beneficiaries} * \text{Daily wage for female} * 100 \text{ days of employment}$$

MALNOURISHMENT

Through the Khushi Aaganwadi project, Vedanta is working towards eradicating child malnourishment in the country. As per The World Bank study- Nutrition in India - loss in lifetime earnings in India due to malnutrition is around 10 percent. Ten percent of the average lifetime earnings is considered for estimating the total loss prevented by Vedanta's initiatives due to malnourishment.

Lifetime earnings are calculated as a product of average per capita income in the country and working life (45 years). The conservative estimates of savings due to interventions in nutrition by Vedanta is the number of children impacted by the initiatives multiplied by the loss of earnings due to malnourishment in a single lifetime.

$$\text{Total loss avoided} = \text{Lifetime earnings} * 0.1 * \text{Number of children impacted}$$

SKILL DEVELOPMENT

India is among the top five countries with the highest skill shortages, wherein the demand for skill development and vocational training is on the rise. To counter this concern, Vedanta has launched various skill development initiatives for enhancing opportunities for sustainable livelihood for the country's youth. As per the Ministry of Labour's Annual report 2017-18, there exists a difference between the wages of skilled and unskilled labour.

The estimates of wage increase due to skill development programs by Vedanta is calculated by multiplying the number of youth skilled by the company initiatives with the value addition per skill. This calculation is under the assumption that women are employed for a minimum of 100 days.

$$\text{Estimate of wage increase due to skill development} = \text{Number of youth skilled} * \text{Value addition per skill} * 100 \text{ days of employment}$$

SANITATION

Inadequate sanitation is still one of the key challenges that plague the country as its not only a health issue but also adversely affects the economic growth. According to the World Bank study- The Economic impact of inadequate sanitation in India- the per person annual loss of inadequate sanitation is INR 2,180. Vedanta has undertaken various initiatives in the field of water and sanitation to reduce these losses. The total loss prevented is calculated as the multiplication of the number of beneficiaries under the program with the per person annual loss.

$$\text{Estimate of prevented losses due to activities in water and sanitation} = \text{Number of beneficiaries} * 2,180$$

AGRICULTURE

Agriculture sector in India is heavily dependent on monsoon as a source of water for agricultural activities. But failure of monsoon impacts the sector adversely and this is a major cause of concern. The micro irrigation technology can significantly help in this situation. As per a Grant Thornton Report, 2016, Micro irrigation technology has led to a 52.5% increase in the average wage of farmers in Rajasthan. Many initiatives have been taken by Vedanta Group to ensure that the gains from this technology are transferred to as many farmers as possible. According to the NITI Policy Paper : Doubling Farmers' Income, 2017 the average annual income of a farmer is INR 36,938 (for the year 2012-13). Thus, the total increase in annual earnings of farmers is calculated by multiplying the number of beneficiaries with the average annual income of farmers and with the rate of increase in average wages.

$$\text{Estimated increase in annual income of farmers} = \text{Number of beneficiaries} * 36,938 * 0.525$$

SPORTS

Vedanta has a more than 40 year old association with the development of football infrastructure in India. Apart from achieving the end goal of positioning India among the top-10 teams in Asia and top-25 in the world within the next five years, the project will help in raising the living standard of the children. The benefits achieved by athletes can be quantified by looking at the potential increase in their average wages due to signing of professional contracts. The prospective cumulative gains are calculated as the increase in income due to signing of professional contract multiplied by the number of athletes trained.

$$\text{Potential cumulative gains} = \frac{(\text{Average Basic Annual First Team Pay in Super League} - \text{Average annual income in India}) * \text{Number of athletes}}{\text{Number of athletes}}$$



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The Institute for Competitiveness

U24/8, U-24 Road, U Block, DLF Phase 3, Sector 24, Gurugram, Haryana 122022
info@competitiveness.in | www.competitiveness.in