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DALMIA BHARAT: SOCIAL RETURN ON INVESTMENT

Utkarsh Majmudar and Namrata Rana wrote this case solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

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Vishal Bharadwaj, head of the Dalmia Bharat Foundation, had spent the better part of the last week inside his corporate office with his team. The foundation was the corporate social responsibility (CSR) arm of the cement and sugar giant Dalmia Bharat Group. Bharadwaj’s team had done a lot of work in soil conservation, energy, and skill and livelihood training in the past year; however, the start of the new financial year, April 2016, brought a new challenge. Bharadwaj was asked to significantly increase the targets he had set for the foundation and at the same time specify the funds that would be needed to achieve those targets. He knew that the chances of justifying the funds needed would increase if he could quantify the work done by the foundation. However, the foundation’s activities were wide ranging, and although the team communicated a lot of statistics, they needed measures that could quantify the success of each activity.

Dalmia Bharat Limited, which funded the foundation, ran large cement manufacturing plants. Cement manufacturing had a significant impact on the soil and water of the areas near the manufacturing plants. Hence, Bharadwaj decided to focus on quantifying the work done as a first step. Aswin Kumar David, who headed the soil and water initiatives, was given the task of leading this project, for which he suggested the company get professional help. He assigned a group of professionals and summer interns from a well-known management institution to search for an appropriate methodology to measure the foundation’s work. He sought recommendations from the team on a suitable measure and on how the measure could be implemented.

Dalmia Cement

Dalmia Bharat Limited was started in 1935 by Jaidayal Dalmia, who was a follower of Mahatma Gandhi’s selfless philosophy of trusteeship. The company had four main business divisions—cement, sugar, power, and refractories. The cement division, Dalmia Cement Bharat Limited (Dalmia Cement), was established in 1939. The group had a consolidated net revenue of ₹66 billion,[[1]](#footnote-1) a net profit of ₹5.6 billion, and total assets of ₹16 billion for the financial year 2015–16.[[2]](#footnote-2)

Dalmia Cement’s manufacturing activity was spread across 11 locations in eight Indian states, with an installed capacity of 25 million tonnes per annum. The company manufactured high-quality cement and had a market leadership position in super speciality cement used for oil wells, railway sleepers, and airstrips. It was also the country’s largest producer of slag cement.[[3]](#footnote-3)

The Dalmia Bharat Group’s belief in growing responsibly had led it to take proactive steps toward water and energy conservation, as well as clean manufacturing processes. Dalmia Cement was one of three Indian companies to be a part of the Cement Sustainability Initiative (CSI).[[4]](#footnote-4) As a member of CSI, the company monitored and reported globally accepted key sustainability indicators on an annual basis. In its 2015–16 annual report, the company reported that it had the lowest carbon footprint among cement manufacturers in India. Its operation had a net carbon dioxide (CO2) emission of 493 kilograms (kg) per tonne (kgCO2/tonne) of cementitious material, compared to the Indian cement industry’s average of 579 kgCO2/tonne and the global average of 612 kgCO2/tonne.

In 2015–16, Dalmia Cement increased the proportion of blended cement[[5]](#footnote-5) in its overall product mix to 80 per cent from 71 per cent in 2013–14. Blended cement was considered more environmentally friendly than the usual cement varieties, as it was produced by blending requisite quantities of slag or fly ash. Slag was the waste produced by steel plants, and fly ash was the waste produced by coal-based power plants. An increased use of fly ash and slag in cement manufacturing had improved the cement-clinker ratio substantially. This initiative was undertaken to conserve the environment through the improved disposal of industrial waste, which would have been hazardous to the environment if left untreated. Dalmia Cement also moderated the consumption of fossil fuels by substituting them with industrial wastes like petroleum coke.

Dalmia Cement was the first cement company in India to join RE100, a global collaborative initiative of the world’s most influential companies committed to 100 per cent renewable power. The company had set up over 53 windmills with a capacity of 16.5 megawatts (MW) to generate inexpensive and eco-friendly captive power for its plant. This power was routed through the state utility transporter for consumption at the plant. The company also had set up 8 MW of solar captive capacity. Dalmia Cement also made commitments to decrease water consumption. It intended to attain water neutrality across all integrated plants by the end of 2017.[[6]](#footnote-6)

CEMENT INDUSTRY AND ENVIRONMENTAL IMPACT

By 2016, India was the second largest cement-producing country in the world. The role of cement production in India’s economy was critical, as it provided employment to more than a million people. It was anticipated that the demand for cement would grow to 550–600 million tonnes per annum by 2025.[[7]](#footnote-7) Cement consumption was dominated by the housing sector, which accounted for roughly two thirds of the total consumption.[[8]](#footnote-8) Infrastructure at 13 per cent, commercial construction at 11 per cent, and industrial construction at 9 per cent contributed to the balance of consumption.[[9]](#footnote-9) Cement was the major ingredient in concrete, which was the second most consumed material on the planet. However, like all industrial activities, cement production could harm the environment if it was not managed properly.

Many of the features of cement production made it environmentally unfriendly. It required land for the plant and infrastructure, which affected local communities. Limestone, a key raw material, was extracted through mining; its production caused dust and particulate matter emissions if operations were not managed properly and if systems were inadequately designed. Some mines were located on agricultural land (though it could also be forest land or waste land). Mining, therefore, changed the land-use pattern of an entire region. Land was associated with livelihoods as well as ancestry and tradition, and therefore was an emotive issue.

Cement was an energy-intensive industry. It required about 80 kilowatt hours to produce 1 tonne of cement, and about 3,000–3,200 megajoules of thermal energy per tonne of clinker produced. Due to the unavailability of an uninterrupted power supply from grids, many cement plants set up captive thermal power plants. Limestone, when heated in the cement manufacturing process, was calcined and released CO2. Each tonne of limestone that was used released 0.44 tonnes of CO2, or greater than 0.53 tonnes of CO2 per tonne of clinker produced. These processes led to CO2 emission from the kiln. As cement production required high temperatures, the emission of nitrogen oxide was another major environmental concern. Thus, the cement industry caused many externalities—both positive and negative (see Exhibit 1).

ABOUT the DALMIA BHARAT FOUNDATION

The Dalmia Bharat Foundation was set up in 2009. It worked with rural communities in the areas of soil and water conservation, renewable energy, climate change mitigation, and livelihood and skill training. By March 2016, its efforts had connected with over 600,000 people spread across 15 districts, covering about 800 villages around the country.

The foundation was set up as a separate body and registered as a not-for-profit entity. Apart from the initial capital it invested, Dalmia Cement gave an annual grant to the foundation to undertake its activities. The foundation also received grants from other companies to augment its resources. Since the foundation received grants from Dalmia Cement, the company had a say in the activities of the foundation. The foundation acted as the implementing agency for all CSR activities of the company. It was an independent agency with an independent board.

Soil and water conservation was a key foundation program area. The foundation focused strongly on developing, creating, and upgrading water harvesting structures, and on methods of soil protection and improvement. In the southern part of India, it selected and supported needy farmers. It supported these farmers with farm ponds, check dams, drip irrigation, and other activities. In new locations in the eastern part of India, the foundation concentrated on creating a wide network of community water resources. This was achieved through building village ponds and wells, and bore wells.

In several areas, the foundation’s activities had a far-reaching impact. For example, at Suniapada, a small tribal village at Cuttack in eastern India, the foundation worked to provide a piped water supply to inhabitants.[[10]](#footnote-10) At Ariyalur, in southern India, the foundation’s work led to the reversing of a water crisis for over 25 acres of land. This resulted in the provision of water for irrigation where water availability was scarce. In 2016, the foundation’s watershed development projects in partnership with the National Bank for Agriculture and Rural Development (NABARD) were continuing in two states of southern India.

Unemployment was a major issue in most parts of India. The foundation’s connection with the National Skill Development Corporation (NSDC) was aimed at increasing India’s training capacity. The foundation set up skill training centres in partnership with the NSDC, and it was planning follow-up platforms for placement and entrepreneurship development. Under the skill development training program of the government of India, the foundation set up six skill training centres in North India, which served the marginalized populations, particularly people with disabilities. It also facilitated the formation of about 162 new self-help groups and organized training programs for almost 137 self-help groups in 2016.

In the field of energy conservation and climate change mitigation, the foundation promoted and distributed off-grid solar products. Families across program areas were given fuel-efficient cook stoves and smokeless cook stoves. In addition, biogas plants catering to 50 families were installed. The foundation had pioneered the sustainable cotton initiative in partnership with NABARD and the Better Cotton Initiative near its Dalmiapuram plant in southern India. It was spread over 2,000 hectares of land. Several farmers joined this program and benefited enormously by learning new agricultural methods in sustainable cotton cultivation.

FOCUS ON WATER CONSERVATION

With the increasing demand for water in India, Dalmia Cement strongly believed that everyone had a moral responsibility to conserve water. The company worked closely with the governments of various states to establish micro-irrigation systems for agriculture. Drip irrigation was promoted, as opposed to flood irrigation, to reduce water consumption by over 70 per cent. Dalmia Cement was significantly involved in the construction of check dams, farm ponds, and bori-bunds (check dams made with filled bags) in its program area. The stored water was used to cultivate small duration crops and for milch animal consumption. It also helped in recharging the ground water. The company also established reverse osmosis plants in some villages to provide clean drinking water to the neighbouring communities.

Dalmia Cement made efforts to spread awareness in the villages about safe drinking water. It did this by organizing campaigns in the villages. The company joined with NABARD to develop around 2,000 hectares of land on its watershed program base in the Trichy district in the state of Tamil Nadu. The project, based on the public–private partnership model, aimed to benefit over 6,000 people.

By 2016, Dalmia Cement had achieved water neutrality at its Kadapa and Ariyalur plants (see Exhibit 2). Bharadwaj said, “The company expects to be water neutral at group level by 2017. We measure water harvested based on the assumption that our structures get filled once a year. In reality, our structures get filled twice a year. This could easily double our volume of harvested water.”

PROBLEM OF MEASUREMENT

Dalmia Cement needed to measure at periodic intervals how it was performing. The water neutrality measure was not particularly effective, as it failed to account for the costs and benefits of the company’s water programs. The company knew its actions could lead to consequences that could be both positive and negative. For instance, a plant might emit smoke that could cause harm to people around the plant. This harm imposed a social cost on the company. Alternatively, the company might undertake measures to increase the availability of water in the region. This improvement brought social benefit to the company. The company could spend money to either mitigate social costs or enhance social revenues. The problem was how to measure the costs and benefits of its programs.

SOCIAL RETURN ON INVESTMENT

By 2016, the Dalmia Bharat Foundation had spread its geographical footprint across the southern, northern, north-eastern, eastern, and western regions of India. Driven by the findings of needs assessments and a shared value concept, the foundation focused on soil and water conservation; renewable energy and climate change; skill development and livelihood; and social development.

Dalmia Cement set about engaging with primary and secondary stakeholders to calculate the social return on investment generated between 2013 and 2016. The company focused on its soil and water conservation projects (adoption of micro-irrigation systems, conservation of rainwater through farm ponds and check dams, deepening of village ponds, deepening of canals, and the integrated water management project undertaken in partnership with NABARD) and also on its livelihood and skill training projects (self-help groups, milch animal project, and employability training and skill upgrading projects).

Aswin’s project team started thinking about which metric they should use to measure the performance of Dalmia Bharat Limited’s social and sustainability programs. A scan of the literature revealed various methods of measurement (see Exhibit 3). An evaluation of these methods led the team to choose social return on investment (SROI) as the appropriate tool. SROI was easy to understand and most commonly used in assessing social performance. SROI helped in evaluating the progress of projects in terms of the returns on each rupee invested and in reviewing the future course of action to enhance effectiveness.

The team found that SROI could be looked at in two ways. The first was an *evaluative approach*, which was conducted retrospectively and based on actual outcomes that had already taken place. The second was a *forecast approach*, which predicted how much social value would be created if the activities met their intended outcomes. The team wondered which would be the best way to proceed.

The team decided to look at the evaluative approach. They figured that to be successful in their efforts, they needed to ensure the principles of SROI were met. These included involving stakeholders, understanding the changes, valuing the things that mattered, including only what was material, not over-claiming results, being transparent, and verifying the results.

Next, the team decided to plan for the steps that would lead to the computation of SROI. After many rounds of revisions, they put together the required steps (see Exhibit 4). A question that arose for the project team was whether they should look at all four areas—soil and water conservation, energy conservation, social development, and skill development—or if they should choose a narrower area. To begin the measurement of SROI, the team felt that it should focus on water, which was one the main work areas of Dalmia Cement.

Dalmia Cement engaged with the community to provide improved water availability through check dams, farm ponds, ring wells, drip irrigation, a watershed program that included new field bunding,[[11]](#footnote-11) plantations,[[12]](#footnote-12) and a livelihood revolving fund.[[13]](#footnote-13) These individual projects helped the project team focus on the areas of investment for which they wanted to measure performance (see Exhibit 5).

As a first step, they mapped the stakeholders. This activity enabled the project team to understand the scope and reach of the programs for the beneficiaries. The key stakeholders identified were (a) government, (b) employees, (c) panchayati raj institutions[[14]](#footnote-14), (d) political parties and elected bodies, (e) neighbouring companies, (f) media, (g) local non-governmental organizations, (h) industry associations and other bodies, (i) project partners, and (j) neighbouring communities (see Exhibit 6).

The project team then visited various areas and used the internal information system to arrive at the project outcomes, that is, the benefits that were accruing for the stakeholders (see Exhibit 7). The beneficiaries of foundation programs benefitted monetarily. The team computed the average monetary benefit across beneficiary groups (see Exhibit 8). The drip irrigation project benefited the cultivators of sugar cane, vegetables, cotton, and chilli. An average of ₹40,000 was used as the direct benefit per acre, which included a government subsidy and support from the foundation (see Exhibit 7). In addition, ₹25,000 was used as the average economic benefit realized in terms of yield, decrease in labour, and electricity charges. The additional income took care of the loan amount payable.

Of the 299 farm ponds constructed, 15–20 per cent used the government subsidy of ₹100,000 per farm pond. In addition, all the farmers stored rainwater, which helped in the application of pesticides and insecticides. The construction of check dams also proved beneficial. It was found that ₹1,750 was the average benefit for 7,000 farmers based on stakeholder sharing. Water from village ponds and from ring wells was used domestically and benefited 20,000 villagers, with an economic impact of ₹1,000. The watershed project also had a positive impact on agriculture, with an economic benefit of ₹7,000 per farmer.

The next step was to estimate dead weight, attribution, and drop-off (see Exhibit 9).[[15]](#footnote-15) With all of the inputs in place, computing SROI seemed easy.

next steps

When the numbers were presented to Aswin, they appeared to be perfect in terms of arithmetic. Yet the assumptions behind the numbers were worth going over again. Was the adopted approach up for scrutiny? Was the metric of benefit per beneficiary correct? Or should they value the amount of water added based on scarcity levels in different regions? How sensitive were the numbers to the measurement of attribution, dead weight, and drop-off? Were government subsidies and free electricity for farmers relevant to the computation? Aswin needed to find explanations from the project team.

**Exhibit 1: Framework for identifying and quantifying material externalities**

|  |  |  |
| --- | --- | --- |
| Externality Type | Examples of Externalities | Positive/Negative |
| Economic externalities | * Taxes * Shareholder dividends * Interest on loans * Wages | Economic externalities are positive when there is a contribution to the economy and to societal wealth. They can become negative in situations of tax evasion or where corrupt practices are undertaken. |
| Social externalities | * Infrastructure * Health care * Education | Social externalities refer to activities for society that improve economic opportunities, earning capacity, and quality of life. They can become negative if they adversely affect life, health, and safety. Pollution can be a negative externality. |
| Environmental externalities | * Renewable energy * Land stewardship * Recycling | Environmental externalities refer to things that help in saving, recharging, and improving the environment. Negative externalities damage ecosystems and can refer to situations where the use of raw materials leads to a loss of biodiversity or to resource scarcity. |

Source: Created by the author.

**EXHIBIT 2: WATER CONSUMPTION AND USE AT DALMIA CEMENT**

|  |  |  |  |
| --- | --- | --- | --- |
| **Plant Name** | **Estimate of Annual Water Consumption (unit-wise) for 330 Days of Operation** | **Capacity Added by the Dalmia Bharat Foundation** | **Water Balance Index** |
| Dalmiapuram | 0.67 | 0.21 | 0.31 |
| Ariyalur | 0.15 | 0.49 | 3.27 |
| Kadapa | 0.19 | 0.31 | 1.63 |
| Lumshnong | 0.81 | 0.00 | 0.00 |
| Lanka | 0.02 | 0.00 | 0.10 |
| Rajgangpur | 1.30 | 0.01 | 0.01 |
| Cuttack | 0.12 | 0.04 | 0.33 |
| Medinipur | 0.09 | 0.00 | 0.00 |
| Bokaro | 0.05 | 0.04 | 0.82 |
| Umrongso | 0.09 | 0.00 | 0.01 |
| Belgaum | 0.17 | 0.07 | 0.40 |
| **Group Level** | **3.66** | **1.17** | **0.32** |

Note: Water consumption and capacity addition is in million cubic metres. The water balance index is a ratio calculated by dividing capacity by consumption. A ratio greater than 1 indicates that the plant/company is water positive.

Source: Company documents.

**EXHIBIT 3: VARIOUS MEASUREMENT SYSTEMS**

|  |  |
| --- | --- |
| **Measures** | **Details** |
| Triple Bottom Line | An accounting framework with three key elements: social, environmental, and financial. |
| Shared Value | A strategy focused on the intersection between business and social problems. |
| Social Return on Investment | A framework based on generally accepted accounting principles used to help manage and understand an organization's social, economic, and environmental outcomes. |
| Total Impact Measurement and Management | An impact assessment framework. |
| True Price | A social enterprise that helps organizations—multinationals, small and medium-sized enterprises, non-governmental organizations, and governments—to quantify and evaluate economic, environmental, and social impacts, particularly on a product level. |
| Natural Capital Protocol | A way of valuing natural capital while making investment decisions. |
| B Impact Assessment | Standards, benchmarks, and tools enabling companies to assess, compare, and improve their social and environmental impacts over time. |
| True Value | A framework that helps assess true earnings in the context of externalities and evaluate future earnings at risk. |

Source: Created by the author.

**EXHIBIT 4: STEPS IN COMPUTING SROI**

Source: Adapted from Jeremy Nicholls, Eilis Lawlor, Eva Neitzert, and Tim Goodspeed, *A Guide to Social Return on Investment,* Cabinet Office, Office of the Third Sector, 2009, 9–10, accessed June 17, 2017, https://www.bond.org.uk/data/files/Cabinet\_office\_A\_guide\_to\_Social\_Return\_on\_Investment.pdf.

Exhibit 5: **PERFORMANCE OF DALMIA CEMENT PERTAINING TO WATER**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Project** | **Year**  **(in numbers)** | | | **Cumulative**  **(in numbers)** | **Investment**  **(in ₹ thousands)** | |
|
| **2013–14** | **2014–15** | **2015–16** | **Leverage** | **DBF** |
| Drip irrigation (in acres) | 148 | 100 | 210 | 458 | 2,200 | 2,010 |
| Farm ponds | 106 | 100 | 93 | 299 | 1,900 | 1,794 |
| Check dams | 3 | 5 | 11 | 19 | 300 | 9,215 |
| Village ponds | 7 | 6 | 6 | 19 | 285 | 95 |
| Ring wells |  | 6 | 3 | 9 | 87 | 864 |
| **Watershed Project** |  | | | | 2,500 | 1,700 |
| New field bunding |  | 4,084 | 11,277 | 15,361 |
| Plantations |  | 11,700 | 4,800 | 16,500 |
| Livelihood revolving fund |  |  | 42 | 42 |
| **Total** |  |  |  |  | **7,272** | **16,533** |

Note: ₹ = INR = Indian rupee; ₹1 = US$0.02 on March 31, 2016; DBF = Dalmia Bharat Foundation

Source: Company documents.

**EXHIBIT 6: STAKEHOLDER MAPPING**

|  |  |  |
| --- | --- | --- |
| **Project** | **Primary Stakeholders** | **Secondary Stakeholders** |
| Drip irrigation | 1,915 farmers | Micro-irrigation department/panchayat |
| Water conservation structures (farm ponds/check dams/ring wells/earthen dams/channel clearance) | 22,000 farmers | Panchayat/district water management agencies/minor irrigation department |
| Village ponds | 18,000 villagers /  7,000 milch animals | Panchayat/block development office |
| Watershed area, treatment/drainage, treatment/productivity, and enhancement/livelihood | 13,000 villagers / 5,000 milch animals | NABARD/VWC/panchayat/district water management agencies/minor irrigation department/TAWDEVA/government line department |

Note: Primary stakeholders are direct beneficiaries, while secondary stakeholders are indirect beneficiaries. India is divided into states, and each state has many districts. Each district has many blocks, each with many villages. A panchayat is a village council; VWC is the village working committee; TAWDEVA is the Tamil Nadu Watershed Development Agency.

Source: Company documents.

**EXHIBIT 7: PROJECT OUTCOMES**

|  |  |  |  |
| --- | --- | --- | --- |
| **Project** | **Need** | **Economic Outcomes** | **Social Outcomes** |
| Drip irrigation | Suitable for most crops | 485 farmers got direct access to an 85 per cent subsidy | Farm and village ponds dug to increase water capacity |
| Adoptable in most of the farmable slopes | 15 percent increase in net earnings | Ground water put to proper use |
| Suitable for most soil types | Increase in net sown area by 20 per cent | Fossil power consumption reduced |
| Lessens soil erosion | Reduced farmers’ dependence on rain water by 70 per cent | Adoption of micro-irrigation systems |
| Reduces the risk of crop disease since foliage remains dry |  |  |
| Water conservation structures | Controls water velocity | 15 per cent increase in net additional income | Increased bonding between community members |
| Conserves soil and improves land quality | Benefited 22,000 farmers with an availability of 0.71 million cubic metres | Reduction of stress on ground water |
| In dry areas, increases ground water recharge | Benefited 2,500 acres of land | Increase in rainwater harvesting |
|  | Under MNREGA\*, 85 farmers availed themselves of the government scheme of ₹100,000 per pond | Formation of community bodies on the judicious usage of water |
| Village ponds | Provides protection from floods | 18,000 villagers and 7,000 animals got access to 330,000 cubic metres of water for domestic usage | Increased community participation |
| Improves economic growth of the village | In Ariyalur, four ponds were created, which benefited 500 villagers | Increased rainwater harvesting |
| Balances water in extreme conditions |  | Active participation of local community in planning and implementation |

Note: \*MNREGA stands for *Mahatma Gandhi National Rural Employment Guarantee Act*—an Indian labour law and social security measure that aims to guarantee the “right to work.” ₹ = INR = Indian rupee; ₹66.2555 = US$1 on March 31, 2016

Source: Company documents.

**EXHIBIT 8: STAKEHOLDER BENEFITS IN VARIOUS PROGRAMS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Project** | **Relevant Stakeholder** | **Average Value per Person (₹)** | **Subsidy from Government (₹)** | **Number**  **of People** |
| Drip irrigation | Farmers | 65,000 | 40,000 | 458 |
| Farm ponds | Farmers | 20,000 | 1,600 | 1,500 |
| Check dams | Farmers | 1,750 | 50 | 7,000 |
| Village ponds | Community | 1,000 | 40 | 20,000 |
| Ring wells | Community | 1,000 | 322 | 270 |
| **Watershed project** |  |  |  |  |
| New field bunding | Farmers | 7,000 | 2,200 | 410 |
| Plantations | Farmers | 1,200 | 1,200 | 110 |
| Livelihood— revolving fund | Low-income families | 20,000 | N/A | 42 |

Note: ₹ = INR = Indian rupee; ₹66.2555 = US$1 on March 31, 2016

Source: Company documents.

**EXHIBIT 9: DEAD WEIGHT, ATTRIBUTION, AND DROP-OFF**

|  |  |  |  |
| --- | --- | --- | --- |
| **Project** | **Dead Weight** | **Attribution** | **Drop-Off** |
| Drip irrigation | 15% | 15% | 10% |
| Water harvesting structures | 10% | 15% | 0% |
| Village ponds and ring wells | 10% | 5% | 0% |
| Watershed project | 5% | 5% | 0% |

Source: Company documents.

1. ₹ = INR = Indian rupee; all currency amounts are in ₹ unless otherwise specified; ₹1 = US$0.02 on March 31, 2016. [↑](#footnote-ref-1)
2. The financial year was from April 1 to March 31; *Dalmia Bharat Foundation Annual Report 2015–16,* accessed June 27, 2017, www.dalmiabharatfoundation.org/wp-content/uploads/2014/02/DBF-Annual-Report-2015-16-Low-Res.pdf. [↑](#footnote-ref-2)
3. Slag cement (also called ground granulated blast furnace slag) was a hydraulic cement produced during the reduction of iron ore to iron in a blast furnace. Molten slag was tapped from a blast furnace, rapidly quenched with water (granulated), dried, and ground to a fine powder. [↑](#footnote-ref-3)
4. CSI was a CEO-led voluntary cement sector initiative of the World Business Council for Sustainable Development. [↑](#footnote-ref-4)
5. Blended cement was obtained by mixing OPC (ordinary Portland cement) with mineral admixtures or additives like fly ash, slag, or silica fumes. [↑](#footnote-ref-5)
6. *Dalmia Bharat Foundation Annual Report 2015–16,* op. cit., 25. [↑](#footnote-ref-6)
7. “India’s Cement Demand to Touch 550–600 Million Tonnes per Annum by 2025: Study,” *The Economic Times*, April 30, 2014, accessed August 27, 2017, http://economictimes.indiatimes.com/articleshow/34435994.cms?utm\_source=contentofinterest&utm\_medium=text&utm\_campaign=cppst. [↑](#footnote-ref-7)
8. India Brand Equity Foundation, “Cement Industry in India,” accessed October 16, 2016, [https://www.ibef.org/industry/cement-india.aspx](http://www.ibef.org/industry/cement%20-%20india.aspx)). [↑](#footnote-ref-8)
9. Ibid. [↑](#footnote-ref-9)
10. *Dalmia Bharat Foundation Annual Report 2015–16*, op. cit., 6. [↑](#footnote-ref-10)
11. Field bunding referred to the creation of a small retaining wall, usually of mud, that permitted water to stay in the field. [↑](#footnote-ref-11)
12. Plantations were used for avoiding water run-off and for the retention of ground water. [↑](#footnote-ref-12)
13. This fund enabled farmers to increase their livelihood through income generation. Water conservation played an important part. [↑](#footnote-ref-13)
14. In India, the Panchayati Raj now functions as a system of governance in which gram panchayats (a village level self-government organisation) are the basic units of local administration. [↑](#footnote-ref-14)
15. Dead weight was a measure of the amount of outcome that would have happened even if the activity had not taken place. It was calculated as a percentage. Attribution was an assessment of how much of the outcome was caused by the contribution of other organizations or people. Drop-off was used to account for how the outcomes, in future, were likely to be less than current measurements. It was only calculated for outcomes that lasted more than one year. [↑](#footnote-ref-15)