



MANDALA CAPITAL

INAUGURAL
IMPACT REPORT

2019





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MESSAGE FROM MANDALA'S MANAGING PARTNER

Our mission is to create impact along the entire food chain that is sustainable and scalable. What does that really mean and how is Mandala's approach to impact as an asset manager differentiated?

Sustainable impact requires durability that ensures impact on all stakeholders beyond an investment cycle or fund life. The inherent challenge in our work is the potential for a promoter or owner of a business to have a time horizon and return expectations that are not fully aligned with the investment style and structure of a fund. As a firm, we recognize this dynamic and approach investments with the aim of balancing our objectives of optimal investor return while ensuring that investments are meaningful to the company. Often, it is only through active dialogue that these issues can be resolved to achieve an ideal outcome for all stakeholders. Fundamentally, our relationship with the companies is built on a basis of trust that transcends the transactional and provides a foundation to influence operations post-investment. It is through our close operational involvement that we are able to closely monitor and prioritize value creating events that align EBITDA progression with sustainable social impact progression. Each of our companies are their respective category leaders in the food supply chain and, as such, innately capable of delivering positive social impact. Our investment structures are designed to ensure our companies are well poised to deploy Mandala's investment to integrate operational adjustments as well as innovation to demonstrate return that has a correlating effect in contributing to long-term positive social impact. The developments that we guide within our portfolio are designed to be fixtures of an investee company and will amplify over time rather than truncate.

Scalable impact is impact that has a meaningful effect and that can be replicated at a larger scale without diluting impact. Small scale start-ups established solely with the purpose of achieving impact either through innovation or geography are often dislocated from viable sources of capital and, more importantly, the supply chains that their products and services must be integrated with in order to have measurable and sustainable impact. Certainly these companies can develop and often grow into meaningful market leaders, but, as an asset management strategy, it is not a reliable assumption to expect high quality returns — financial and social — within 10 years. Instead, we have discovered that larger companies in the sector are naturally best positioned to make large scale, socially impactful, changes and bring in the private sector, government and DFI funding to grow.

In preparing to draft this impact report, we spent a long time reviewing the existing literature and practices in the space. In most instances we found at least one of two trends on display: either social impact is very loosely attributed to a fund manager's investment or targeted impact investments show very little capability to achieve demonstrable returns. We then decided to take a slightly unconventional approach to evaluating our investments — intended to employ many of the same elements of our investment strategy — that would be focused on what our role was going to be, where

we could add value and how we could showcase the sustainable and scalable impact we seek to create.

This report demonstrates our initial best effort in defining, measuring and monitoring the impact our investments have created and in laying the foundation for continuing to track their impact trajectory. We have defined our goals and the corresponding data points and worked with all our partners to gather the data. We have also formulated calculations that allow us to translate those data points into the monetary impact created towards each of our goals, per dollar invested into the Fund and deployed into each company.

We have taken this approach because we believe that numbers tell a complete story, removing from the results the emotion and bias that often favor less compelling and impactful investments from those which create true value. Numbers also serve as an effective bridge between our investors and portfolio companies. The trendiness of impact investing leads me to believe that the impact investing industry is moving towards a more quantitative approach in measuring and communicating impact.

Publishing and sharing Mandala's inaugural impact report is a major milestone, both for the company and for me personally. The Mandala team – including all our partners – care about a lot of social causes and actively support and lead various philanthropic endeavors. This is in large part due to the influence of my grandfather, Mr. B.R. Barwale, who built a very large and successful business in agriculture and always emphasized the importance of giving back a significant amount to the farmers and the rural community, without seeking recognition or advertising his philanthropic efforts. Thus, from the outset, we have naturally sought partners aligned in this basic philosophy.

Mandala Capital was established in 2008 and we launched Fund I in 2014. This report is certainly long overdue, but we deliberately wanted to watch the impact investing industry mature and contemplate our role in the community of impact investors. We believe that this report reflects who we truly are while demonstrating adequate respect to the impact investing world. It is my sincere hope that you will enjoy reading it and that it will provoke new thoughts and ideas that broaden and elevate our ongoing dialogue.



Uday Garg
Managing Partner
of Mandala Capital



OVERVIEW OF MANDALA CAPITAL

Mission Statement

We aim to create impact along the entire food chain line that is both **sustainable** and **scalable**.

Core Values

Sustainability

All our investments and investee companies' operations are planned and executed in a manner such that invested capital correlates to measurable impact that meets the needs of the present without compromising the ability of future generations to meet their own needs. We also ensure that all our activities strike a balance between economic, environmental, and social impact so that they can be maintained in the long run.

Scalability

Mandala seeks to build ventures with solid foundations and business models that have the ability to grow rapidly to manage evolving market demands and which are well positioned to deliver impact in their respective categories, so that it can create the maximum impact in the most cost-effective manner and within the shortest amount of time.

HOW WE INVEST

The investment team at Mandala Capital prides itself in adopting a structured and comprehensive approach to evaluating investments in agriculture, food, and food related businesses. This approach has been developed and continuously refined for more than a decade, building upon more than 200 years of combined experience within the team.

Our strategy encompasses 4 key steps:



1. Thesis Driven

We are focused in our research, assessing the company against an expansive rubric, which dives into a sub-sector level of detail, Mandala's unique value-add to the company, as well as a consideration of industry trends and disruptors. This results in stronger conviction, a better diligence process and greater understanding of the right business valuation.



2. Deal Creation

We forge strong relationships with the people behind the companies before we invest in them. This allows us to appreciate the nuances behind their strategic and operational decisions that aren't captured in spreadsheets, empowering us to become better business partners.



3. Deal Structuring

We are innovative and creative in deal structuring, providing solutions that are non-typical of private equity firms. Our ability to invest across the capital structure also ensures that we can meet the unique needs of the companies while ensuring stable returns for our investors.



4. Value Through Operations

We are committed to adding value to every company's operational capabilities post-investment, with a focus on efficiency, capacity and governance. Our networks with industry thought leaders and our knowledge in the new frontiers empower us to do so effectively.

Backed by this rigorous approach, we are confident that every deal we create is beneficial to our companies, our investors, and our world.

To learn more, [click here](#) or reach out to our investment team via email.

MANDALA'S PORTFOLIO



Arcadia Biosciences develops and commercializes agricultural traits and products that bring value to growers, processors and consumers, while benefitting the environment and enhancing human health.

www.arcadiabio.com



Gati Kausar, a cold chain solutions vertical of Gati Ltd., offers temperature-controlled logistics solutions with its extensive fleet of 180 refrigerated vehicles and a growing network of cold warehouse facilities across India.

www.gatikausar.com



Godavari Biorefineries produces sugar, other foods, biofuels, chemicals, power, compost, waxes, and related products using sugarcane as the primary feedstock.

www.somaiya.com



SAFL is the first private sector NBFC in India providing agri-loans with a wide and diverse range of financing options for almost every need of agricultural activity.

www.safl.in



Jain Irrigation Systems is the largest company in Asia in drip irrigation, and the second largest globally. Its subsidiaries are also engaged in food processing, tissue culture, and solar appliances.

www.jains.com



Jain FarmFresh is the subsidiary of Jain Irrigation Systems engaged in food processing, including fruit pulps and concentrates, and dehydrated products.

www.jainfarmfresh.com



EFRAC is one of the largest integrated food testing and research facilities in India.

www.efrac.org



Keventer is a leading food processing business based in eastern India engaged in multiple segments in dairy products and beverages.

www.keventer.com

IMPACT REPORTING PRINCIPLES

1 Measure and report outcomes, not simply output

Beyond stating the activities done or the type of investment portfolio we have, we seek to measure the extent to which value has been added and how the well-being of people, the society, or the environment has been affected through our investments.

2 Measure with context

We design every metric based on a deep understanding of Mandala's investees' context and experiences, which is derived from extensive conversations with the investees. This is possible due to the strong, long-term relationship Mandala has with the investees, and having the benefit of context ensures that our assumptions are sound and that our metrics are relevant.

3 Measure the difference made

We strive to measure accurately the incremental contribution Mandala's investments bring to the table; as such, in every metric, we take into consideration what would have happened anyway (deadweight), any unintended negative consequences or displaced benefits (displacement), and the extent to which the outcomes are as a result of Mandala's involvement (attribution).

4 Keep impact reporting accessible and universal

We translate all the impacts created into a familiar monetary unit and ratio that can be easily understood by all investors, regardless of their background and depth of technical knowledge. We believe this will lower the barriers to entry for the impact investing space, encourage more investment, ensure greater impact investment accountability and transparency, and create even more impact within a shorter amount of time.

5 Report impact with transparency

We openly share the calculations for each metric and make explicit the assumptions made. This allows all stakeholders to better evaluate the robustness of our impact measurements and appreciate the report.

6 Constantly learn and improve

We also maintain a posture of learning and openness to feedback, so that Mandala's impact reporting methodology can constantly improve and its credibility can be established over time.



DEFINITION AND CALCULATION OF IMPACT

Based on the principles laid in the previous page, this is how we define and measure impact in monetary terms:

$$[\text{impact}] = [\text{outcomes}] - [\text{attribution, deadweight, displacement}]$$

The social return on investment (“SROI”), which is the ratio of the impact created to every dollar invested, can thus be calculated using this formula:

$$\begin{aligned} &[\text{impact per invested dollar}] \\ &= [\text{impact}] / [\text{total investment adjusted to current values}^1] \end{aligned}$$

This model does not distinguish between the effects of equity and debt.

¹Based on ~2% p.a. inflation

EIGHT PRIMARY AREAS OF SOCIAL IMPACT

Through Mandala's investments and the efforts of its portfolio of companies, we have identified these eight primary areas of social impact:

1 EMPLOYMENT //

ENVIRONMENT
2 CO₂ EMISSION SAVINGS //

ENVIRONMENT
3 IMPROVED SOIL HEALTH //

ENVIRONMENT
4 WATER SAVINGS //

FOOD ACCESS AND NUTRITION
5 HEALTH AND NUTRITION //

FOOD ACCESS AND NUTRITION
6 REDUCED FOOD WASTAGE //

FOOD ACCESS AND NUTRITION
7 STRENGTHENED FOOD SAFETY //

8 RURAL COMMUNITY DEVELOPMENT //



ALIGNMENT TO THE SUSTAINABLE DEVELOPMENT GOALS

Each of the eight areas is also strongly connected to at least one of the 17 SDGs.

8 DECENT WORK AND ECONOMIC GROWTH



13 CLIMATE ACTION



15 LIFE ON LAND



6 CLEAN WATER AND SANITATION



2 ZERO HUNGER



12 RESPONSIBLE CONSUMPTION AND PRODUCTION



3 GOOD HEALTH AND WELL-BEING



10 REDUCED INEQUALITIES



Therefore, an alternative way of measuring and reporting Mandala's impact would be the amount of social impact contributed towards each of the SDGs. This can then be compared against UNDP's estimated funding gap required in the developing world to achieve the SDGs, which is USD \$2.5 trillion.

SNAPSHOT OF FY 2017/2018 IMPACT ACROSS OUR PORTFOLIO

INVESTEES & DATE OF INVESTMENT	Employment	CO ₂ Emissions Savings	Improved Soil Health	Water Savings	Health & Nutrition	Reduced Food Wastage	Strengthened Food Safety	Rural Community Development
 Arcadia <small>BIO SCIENCES</small> May 2014		🌿		🌿	🌿		🌿	
 GATI KAUSAR <small>Cold Chain Solutions</small> Oct 2014	🌿	🌿				🌿		
 Godavari <small>BIO SCIENCES LTD</small> Mar 2015	🌿	🌿	🌿	🌿		🌿		🌿
 SAFL <small>Sustainable Agro-commercial Finance Ltd.</small> Mar 2015	🌿							🌿
 JAIN <small>Jain Irrigation Systems Ltd.</small> <small>Small Ideas. Big Revolutions.</small> Mar 2016	🌿	🌿	🌿	🌿				🌿
 Jain Farmfresh Mar 2016	🌿			🌿	🌿	🌿	🌿	🌿
 efrac <small>Edward Food Research & Analysis Centre Limited</small> Jun 2016	🌿		🌿				🌿	
 keventer <small>enriching lives, every day</small> Sep 2017	🌿	🌿	🌿	🌿	🌿	🌿	🌿	🌿



SNAPSHOT OF FY 2017/2018 OVERALL AGGREGATED SOCIAL IMPACT

The cumulative aggregate social value created by Mandala's investments to date is projected to be at least **US\$467,802,888**, or 0.02% of the funding needed to achieve the SDGs.

Based on FY2017/18² figures, Mandala has an SROI ratio of 0.68:1. This implies that, for every US\$1 invested, approximately US\$0.68 of social value is created per year across various categories including water, the environment, food and nutrition, as well as livelihoods.

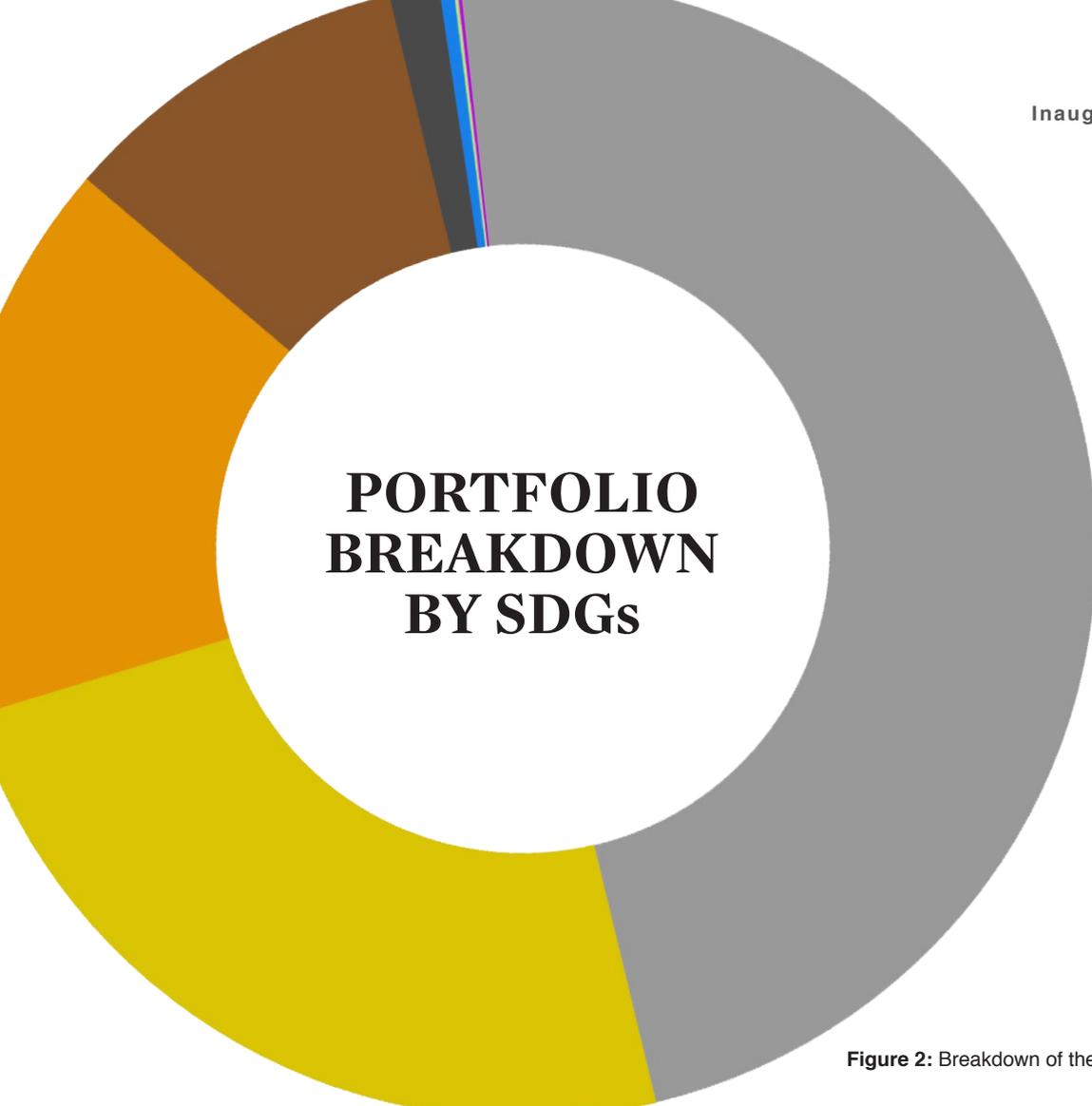
The breakdown of impact created across the eight primary areas can be seen in Figures 1 and 2.



PRIMARY AREA OF IMPACT	FY 17/18 ² IMPACT (US\$ MILLION)	IMPACT PER \$ INVESTED (US\$)	CUMULATIVE TOTAL IMPACT (US\$ MILLION)	IMPACT PER \$ INVESTED (US\$)
Employment	3.53	0.02	6.87	0.03
CO ₂ Emission Savings	0.03	0.0001	0.04	0.0002
Improved Soil Health	26.22	0.11	111.97	0.48
Water Savings	25.13	0.11	46.77	0.20
Health and Nutrition	0.12	0.0005	0.21	0.0009
Reduced Food Wastage	0.80	0.003	2.16	0.01
Strengthened Food Safety	69.23	0.30	225.46	0.97
Rural Community Development	33.04	0.14	74.31	0.32
TOTAL	158.11	0.68	467.80	2.01

Figure 1: Summary of the cumulative impact created by Mandala's portfolio as of end FY 17/18

² Fiscal Year from April 2017 to March 2018



PORTFOLIO BREAKDOWN BY SDGs

Figure 2: Breakdown of the impact across the eight SDGs

- 48% SDG 3: Good Health & Well-Being
- 24% SDG 15: Life on Land
- 16% SDG 10: Reduced Inequalities
- 10% SDG 6: Clean Water & Sanitation
- 1.4% SDG 8: Decent Work & Economic Growth
- 0.4% SDG 12: Responsible Consumption
- 0.1% SDG 2: Zero Hunger
- 0.1% SDG 13: Climate Action

These monetary values were calculated based on the definition of impact described in the Definition and Calculation of Impact section, and relied heavily on the data collected by Mandala's investee companies. Where estimates or assumptions were required to proxy or quantify the impact created, these are described in the subsequent pages to provide full disclosure and transparency behind the reported impact figures.

Despite efforts to be as accurate as possible in the impact calculations, as the measurement primarily focuses on tangible benefits, many other benefits such as the improved well-being of individuals who gained employment, or whose communities were developed, and the second-order benefits to their families and children have not been quantified yet. This suggests that the impact calculations are likely to underestimate the true social value created by Mandala Capital and its portfolio of investees. This report has therefore included case studies or Impact Spotlights in each broad category of social value (Employment, Environment, Food Access and Nutrition and Rural Community Development) to provide a more comprehensive understanding of the full impact Mandala's portfolio of companies have created.

With this inaugural impact report, we have established a baseline for future impact measurement. The team at Mandala Capital will constantly improve its impact measurement and reporting methodology, and continue to bring all stakeholders an increasingly reliable and meaningful impact report in the coming years.

The subsequent pages will go into detail of the impact created in each area, and how the impacts were measured and calculated.



EMPLOYMENT

IMPACT FIGURE AT FY 17/18

CUMULATIVE TOTAL IMPACT
US\$6,878,543

IMPACT PER \$ INVESTED
US\$0.03

HOW WE MEASURE IMPACT

This metric measures the value to the people who receive employment because of the companies' operations, made possible by the investment.

This metric quantifies the additional income earned by the employees, after considering the income they would otherwise have received. A discount factor equal to Mandala's equity stake in the investee is also applied to more accurately account for the incremental value creation that occurred as a result of Mandala's investments.

Impact per year =

(Total employee spend per year – spend on urban employees – 25% × spend on male rural and low income employees – 17.5% × spend on female rural and low income employees) × (% equity stake and % debt share)

KEY ASSUMPTIONS

1. Urban employees that were hired by Mandala's investees are assumed to receive a similar wage if other companies hired them instead.
2. Rural and low-income workers are defined as workers employed outside Tier 1 and Tier 2 cities, and are on average expected to earn four times less than an urban dweller.³ As such, a discount factor of 25% is applied on the employee spend for employees in the rural and low-income communities to account for the incremental impact created.
3. According to India's Open Government Data Portal, the average agricultural daily wage rate for women

is approximately 70% of the men's wages.⁴ Hence, a discount factor of 70% was further applied on the discount for low-income male workers, i.e. a discount of 17.5% was applied on the employee spend for low-income female workers in the impact calculation.

IMPACT ANALYSIS

Attribution of the impact is accounted for via the portion of equity stake and share of debt Mandala possesses in the companies, which is a proxy for Mandala's influence on the companies' activities and resulting impact vis-à-vis other stakeholders in the company. To account for deadweight, the employee spend on urban employees was deducted from the impact figure, and discount factors were applied on the employee spend on rural and low-income employees.

These result in a conservative estimate of the impact figure, and arguably an underestimated value, since the additional positive outcomes experienced by the people with a good employment opportunity – including but not limited to improved psychological well-being, new skills and knowledge, and stronger career prospects – have not been included in this calculation.

³ Datta, P. (2004, July 3). The great Indian divide. *Frontline*, 21(4), 28-31.

⁴ Open Government Data (OGD) Platform India. (2015). Average Agricultural Daily Wage Rate Rural in Rupees [Data file]. Retrieved from <https://data.gov.in/resources/average-agricultural-daily-wage-rate-rural-rupees>

employment

IMPACT SPOTLIGHT

Besides providing financial investment solutions to its companies, Mandala seeks to add value to every company as a business growth partner. This could occur at a strategic level, such as supporting the clarification and governance of the companies' social and financial missions to avoid mission drift as the companies undergo rapid growth, and at an operational level, such as providing inputs in measuring and implementing monitoring mechanisms to track companies' social and environmental outcomes.

Here, we take a closer look at Mandala's partnership with **Keventer Agro Limited (KAL)** and how Mandala's support bolstered KAL's impact in the community, specifically in the area of Employment.

Providing Globally Competitive Employment Opportunities in Eastern India

KAL, the food processing business of Keventer Group, is one of the fastest growing food companies in Eastern India. The business is present across categories such as dairy, bananas, frozen foods, export of food commodities, and beverages. In fact, KAL is the largest and the oldest franchisee for the top three fruit beverage brands in India.

In addition to working with more than 4,000 farmers in its entire procurement network, KAL has created more than 1,300 employment opportunities in the last financial year, with more than half of these going towards employees outside Tier 1 and Tier 2 cities. Notably, both the dairy and beverage divisions of KAL have created job opportunities in the more remote parts of West Bengal, such as Barasat

and surrounding areas, benefiting the communities and livelihoods there.

Among other things, Mandala supported the implementation and documentation of new HR processes in Keventer, including grievance handling policies and health and safety policies as per global ILO, IFC Performance Standards and local laws and regulations. Putting in place such best practices ensures that the company moves ahead in its internal processes as it grows, and smoothens its transition to become a globally competitive company and brand.

These efforts have paid off. The company has achieved positive feedback and relatively strong ratings from its employees, who often credit the company's management for being "effective" and "helpful", and boast in the strong learning and development culture in the company. Because of that, KAL is seen as a "great company to start a career", where employees are exposed to cutting-edge technology and machinery and are able to gain valuable industry working knowledge and skills. At the same time, KAL has not neglected the softer aspects of its HR management; its employees are immersed in a family-like culture, where teams co-operate freely and work happily across ages, seniority levels, and cultural backgrounds.

KAL's investment in its talent development processes and provision of valuable employment opportunities in the more remote parts of India have effectively levelled up these communities economically, creating an impact that has the potential to ripple out in many more ways still waiting to be seen.





CO₂ EMISSION SAVINGS

IMPACT FIGURE AT FY 17/18

CUMULATIVE TOTAL IMPACT

US\$37,353

IMPACT PER \$ INVESTED

US\$0.0002

HOW WE MEASURE IMPACT

This metric measures the value to the environment and the nation in terms of CO₂ emission savings earned by building and using cogeneration (cogen) and solar plants and equipment compared to the conventional coal-fired counterpart. This metric aggregates the environmental and economic damages avoided and the added financial benefit to the nation through the sale of saved carbon on emission trading schemes.

Impact per year =

$$\begin{aligned} & [[(Additional\ installed\ capacity\ of \\ & \text{cogen plants} \times \% \text{CO}_2 \text{ emissions} \\ & \text{savings of cogen plants}) + (Additional \\ & \text{installed capacity of solar plants and} \\ & \text{equipment} \times \% \text{CO}_2 \text{ emissions savings} \\ & \text{of solar plants})] \times (\text{Social costs} + \text{Trade} \\ & \text{value per ton of CO}_2) \times \\ & (\% \text{ equity stake and } \% \text{ debt share}) \end{aligned}$$

KEY ASSUMPTIONS

1. The amount of CO₂ emissions saved by cogeneration and solar plants compared to a regular coal-fired plant is derived from international research studies⁵ that take into account the lifecycle CO₂ emissions of the different sources of electricity, including the construction of the plant, its operation and maintenance, and the electricity generation (fuel combustion) process.

2. The social cost of each additional ton of CO₂ emitted is estimated to be US\$37 according to past research studies⁶, calculated on the basis of decreased agricultural yields, harm to human health, and lower worker productivity due to climate change.

3. The value per ton of CO₂ traded is estimated to be US\$20 per ton, based on the mid-case CO₂ price forecast made on existing emissions trading systems.⁷

IMPACT ANALYSIS

Attribution of the impact is accounted for via the portion of Mandala’s equity stake and share of debt in the companies. Deadweight is not applicable because the metric is calculated based on the savings in CO₂ emissions due to the technology used; in its absence there would be no carbon-saving measures in place.

There is also no need to separately account for displacement for solar plants and equipment in this metric as the CO₂ emissions produced in building solar plants or equipment is already taken into consideration when calculating the difference in lifecycle emissions. For cogen plants, as there are no reliable estimates of the amount of CO₂ produced in building a cogeneration unit or heat recovery system, the displacement component is not accounted for. However, this is not expected to be large and should not affect the impact figures significantly.

⁵ Solar Energy Research Institute. (1990). CO₂ emissions from coal-fired and solar electric power plants. Golden, CO: Kreith, F., Norton, P., & Brown, D. and Pehl et al. (2017). Understanding future emissions from low-carbon power systems by integration of life cycle assessment and integrated energy modelling. Nature Energy, 2, 939-945. doi: 10.1038/s41560-017-0032-9

⁶ Than, K. (2015). Estimated social cost of climate change not accurate, Stanford scientists say. Stanford News. Retrieved from <https://news.stanford.edu/2015/01/12/emissions-social-costs-011215/>

⁷ Synapse Energy Economics, Inc. (2015). 2015 carbon dioxide price forecast. Cambridge, MA: Luckhow et al.



IMPROVED SOIL HEALTH

IMPACT FIGURE AT FY 17/18

CUMULATIVE TOTAL IMPACT

US\$111,972,674

IMPACT PER \$ INVESTED

US\$0.48

HOW WE MEASURE IMPACT

This metric measures the value to the environment and the nation in terms of improved soil health by the soil testing activities performed by Mandala's investees and their resulting recommendations and implementations to the tested land holdings.

This metric quantifies the incremental crop value as a result of extended soil fertility and improved health due to the soil testing services and resulting improvements in land management.

Impact per year =

(Acres of soil tested – Healthy soil – Severely damaged soil) × Extension of soil life in years × Crop value per acre per year × (% equity stake and % debt share)

KEY ASSUMPTIONS

1. According to national statistics⁸ provided by the Indian Council for Agricultural Research and the Indian Space Research Organization, an estimated 30% of arable land is in very good health and 58% of arable land is severely damaged and would not return to a healthy state in the short term via agricultural management efforts. Thus, we estimate that 12% of arable land are in the mild or early stages of degradation and can be easily reclaimed with proper agricultural management practices given the right information about the soil's nutrient levels.

2. Based on a previous case study of similar land management projects in India⁹, the outcome of implementing recommendations arising from soil testing can extend at least some proportion of damaged soil by

1 year. This is the value used to estimate the average life extension of the land sampled for testing.

IMPACT ANALYSIS

Attribution of the impact is again accounted for via the portion of Mandala's equity stake and share of debt in the companies. Deadweight is considered in the impact calculation by discounting soil that is irreversibly or severely damaged and cannot be reclaimed easily, as well as soil that is already healthy and will not receive significant quality improvements. Displacement is considered negligible because the samples taken are small and have no expected negative impact on the soil health or quantity/quality of crops produced.

There is much room for improvement for this metric to more comprehensively quantify the increase in crop value due to increase yields and improved food quality, but we are limited by the availability of data and local research to provide a reliable measure of such impact, which also differs based on the crop grown and environmental factors. The value-add of stronger food security in the country and environmental impact of reduced fertilizer usage are also excluded in this impact calculation.

⁸ In "Degraded and Waste Lands of India" (2010), a report by the Indian Council for Agricultural Research and the National Academy for Agricultural Sciences, India is reported to have 141 million hectares of arable land, out of which 100 million hectares (71%) is under-going degradation. An article by Indian Space Research Organization estimates that 81 million hectares (58%) is seeing desertification.

⁹ Farming communities in India improve soil fertility and earn higher income. (n.d.). Retrieved from <http://www.undp.org/content/undp/en/home/ourwork/ourstories/farming-communities-in-india-improve-soil-fertility-and-earn-high.html> and Sustainable land and ecosystem management in shifting cultivation areas of Nagaland for ecological and livelihood security. (n.d.). Retrieved from http://www.in.undp.org/content/india/en/home/operations/projects/environment_and_energy/sustainable_landandecosystemmanagementinshiftingcultivationareas.html



WATER SAVINGS

IMPACT FIGURE AT FY 17/18

CUMULATIVE TOTAL IMPACT

US\$46,774,588

IMPACT PER \$ INVESTED

US\$0.20

HOW WE MEASURE IMPACT

This metric measures the value to the environment in terms of water savings earned by the technology utilized and activities engaged by Mandala’s investees.

There are 3 main sources of water savings across Mandala’s investees: water savings as a result of drip irrigation technology applied (which uses up to 70% less water as compared to flood irrigation), rainwater harvesting activities, and water reuse and recycling efforts. This metric quantifies the cost savings earned from the water that is saved.

IMPACT ANALYSIS

Similar to previous metrics, attribution of the impact is accounted for via the portion of Mandala’s equity stake and share of debt in the companies. Deadweight is considered negligible as there would be no water savings in the absence of the companies’ irrigation projects or water conservation activities. Displacement to the environment is also considered negligible; while many irrigation systems and projects could have consequences on the local water supply and soil salinity, the use of micro-irrigation systems by Mandala’s invested companies avoids these negative effects, bolstering confidence in the calculated impact figure.

In fact, the reported figure is likely to be a conservative estimate of the true impact created given that the cost of water in some cities are much higher than the typical price used. Furthermore, the positive spillover effects of the micro-irrigation projects undertaken by Mandala’s invested companies on the environment and on the farmers have also not been included in this calculation. A glimpse of these effects is described in the Impact Spotlight.

Impact per year =

$$\begin{aligned}
 & [(Meters\ of\ drip\ irrigation\ sold \times \\
 & \textit{Average\ annual\ water\ savings\ per} \\
 & \textit{meter\ lateral}) + (Cubic\ meters\ of\ water \\
 & \textit{recycled\ or\ reused\ for\ gardening}) + \\
 & (Cubic\ meters\ of\ rainwater\ harvested)] \\
 & \times \textit{Cost\ of\ water\ per\ cubic\ meter} \times \\
 & (\% \textit{equity\ stake\ and\ \% \ debt\ share})
 \end{aligned}$$

KEY ASSUMPTIONS

1. The average annual water savings per meter lateral is derived based on self-reported data from the investee companies, taking into account the land fallowing period and monsoon seasons.
2. The cost of water is derived from the typical water price in most major states of India, which is 15 INR (or US\$0.23).¹⁰

¹⁰ Gonsalves, O. (2018, Apr 5). India’s industrial water rates and supply. Retrieved from <https://www.india-briefing.com/news/industrial-water-rates-india-supply-16547.html/> and Merchant, T. (2014). To save water, pay for it. Forbes India. Retrieved from <http://www.forbesindia.com/blog/life/to-save-water-pay-for-it/>

environment

IMPACT SPOTLIGHT

A healthy environment is the lifeline of agriculture, food, and food-related businesses. Mandala and its investees therefore strive to minimize their footprint and generate positive value-add to the environment in all their operations, by utilising renewable energy sources, conserving and recycling water, devising solutions to lengthen the productive life of the soil, and more.

Here, we take a closer look at **Jain Irrigation (JISL)** and its unique approach in drip irrigation, which benefits the Environment in a myriad of ways while also enhancing farmers' lives and livelihoods.

Jain Irrigation's Unique Approach in Drip Irrigation

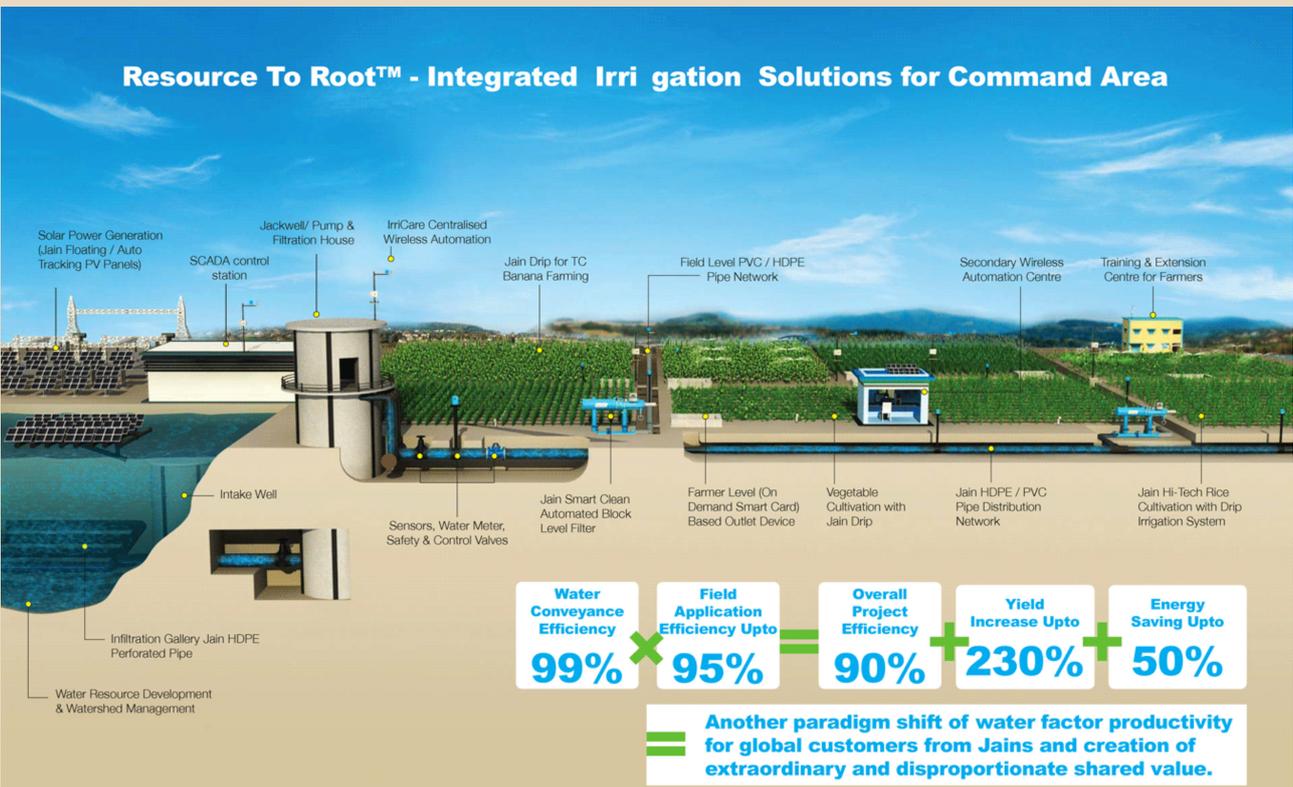
Prevailing inefficient irrigation practices in India account for significant energy consumption, with a substantial quantity of water going waste in the form of evapotranspiration, surface run off and percolation. Following JISL's sustainable model of drip irrigation, farmers are saving more than 50% water, improving their farm water management, and achieving a yield improvement of 30-200% for various crops.

However, a gap was still present as the water conveyance and distribution efficiency in the canal system was not adequately addressed. Jain Integrated Irrigation Solution (JIIS) was formed to take a revolutionary step by focusing on the issue of water conveyance. JIIS utilizes a unique

approach based on the concept of bringing the water from "Resource to Root", which includes lifting the water from the reservoir, creating a pipe distribution network, and ensuring optimum utilisation of water on the farm using advanced irrigation and automation systems. Compared to conventional means which have a water efficiency level of 40%, this approach helps to save up to 89% water.

These water savings benefit not only the farmer, by increasing his yield and reducing his input costs, but also address the issue of land acquisition as acquiring land is not essential for this model. The Resource to Root approach is thus economically viable, eco-friendly, and contributes to the sustainable development of the nation.

But JISL did not stop there. In true Jain fashion, they went on to pioneer the development of complete solar agri-pumping systems in India, and is currently one of the few manufacturers of such pumping systems in the world. To date, JISL has installed more than 25,000 plus solar agri-pump sets installed in 16 different states across India. Not only does the use of solar energy greatly reduce CO2 emissions produced in the process of lifting water, solar pumps offer a powerful solution to the prevailing problem of erratic power supply in the Indian agriculture sector. Even amidst power cuts, villagers and farmers can still have access to sufficient and regular water for irrigation, ensuring security in food, their livelihoods, and their life satisfaction.





HEALTH & NUTRITION

IMPACT FIGURE AT FY 17/18

CUMULATIVE TOTAL IMPACT
US\$206,434

IMPACT PER \$ INVESTED
US\$0.0009

HOW WE MEASURE IMPACT

This metric measures the value added to the nation in terms of healthy fruits and vegetables sold to people due to Mandala's investees' operations. This metric measures the monetary value of the food that is sold.

considered negligible here as it is unlikely that the amount of fruits and vegetables in people's diets are hitting a saturation point or that there is an over-supply of fresh, healthy produce that would lead to wastage.

Impact per year =

*(Tons of fruits and vegetables sold ×
average value of per ton of food) ×
(% equity stake and % debt share)*

KEY ASSUMPTION

1. Based on inputs from the investee companies, the average value of 1 ton of food is taken to be 500 Rs.

IMPACT ANALYSIS

As there is no practical way to measure the differential impact of the consumption of specific foods on a person's health and well-being, it was not immediately feasible to calculate impact in terms of healthcare costs saved or stronger economic productivity due to avoided illnesses. Consumption of the food sold on the market cannot be tracked reliably as well. Hence, this metric simplifies the impact calculation to an aggregate of the market value of the healthy foods that are sold as a baseline proxy of the social impact of providing quality food to people. As more literature and research is conducted, a more compelling and comprehensive calculation for this metric will be developed.

Attribution of the impact is accounted for via the portion of Mandala's equity stake and share of debt in the companies. Due to the strong deficiency of fruits and vegetables in the Indian diet, deadweight and displacement are both

REDUCED FOOD WASTAGE

IMPACT FIGURE AT FY 17/18

CUMULATIVE TOTAL IMPACT

US\$2,162,413

IMPACT PER \$ INVESTED

US\$0.01

HOW WE MEASURE IMPACT

This metric measures the value added to the nation in terms of food wastage avoided / food supply added due to Mandala's investees' operations.

There are 2 primary methods used in preserving the food – cold chain technology and food processing. This metric measures the monetary value of the food that is preserved.

Impact per year =

$$\begin{aligned} & [(((\text{Cold chain capacity owned and} \\ & \text{leased} + (\text{Reefer trucks owned and} \\ & \text{leased} \times \text{Average reefer truck capacity}) \\ & - \text{Portion of food double counted}) \times \% \\ & \text{food wastage avoided due to cold chain}) \\ & + (\text{Tons of processed food} \times \% \text{ food} \\ & \text{wastage avoided due to processing})] \times \\ & \text{Average value per ton of food} \times \\ & (\% \text{ equity stake and } \% \text{ debt share}) \end{aligned}$$

KEY ASSUMPTIONS

1. The average reefer truck capacity is derived based on self-reported data from the investee companies, and differs across companies.
2. Based on investee companies' inputs, the average value of 1 ton of food is taken to be 500 Rs.
3. The typical wastage incurred without cold chain technology or without food processing was then derived from secondary research and based on international and regional research sources.¹¹

IMPACT ANALYSIS

Attribution of the impact is again accounted for via the portion of Mandala's equity stake and share of debt in the companies. Deadweight is not applicable here because the metric is calculated based on the food wastage avoided due to the preservation or processing technology used; in its absence there would be no measures in place to avoid such wastage.

Displacement could occur in the form of damaging nutrients in the food when undergoing processing – in that case, even though the physical form of the food is preserved, the nutritional and health value may be compromised. This is however considered to be low and severely outweighed by the increase in provision of food and food choices to consumers, especially in India which has a high (40%) postharvest loss of fresh fruits and vegetables.¹² Given that food processors also add nutritional value to the food through their processing methods, the net value-add is considered to be positive. To avoid over-complicating the impact calculation, both the negative and positive impacts of processing on the nutritional value of food are not considered in the measurement but are discussed in the Impact Spotlight section.

¹¹ The International Institute of Refrigeration. (2009). 5th informatory note on refrigeration and food. France. and Asian Productivity Organization. (2006). Postharvest management of fruits and vegetables in the Asia-Pacific region. Italy: Rolle, R.

¹² Asian Productivity Organization. (2006). Postharvest management of fruits and vegetables in the Asia-Pacific region. Italy: Rolle, R.



STRENGTHENED FOOD SAFETY

IMPACT FIGURE AT FY 17/18

CUMULATIVE TOTAL IMPACT

US\$225,461,717

IMPACT PER \$ INVESTED

US\$0.97

HOW WE MEASURE IMPACT

This metric measures the value added to the consumers in terms of the avoided illnesses or deaths relating to foodborne diseases as a result of Mandala’s investees’ activities that strengthen food safety.

There are 2 primary activities involved in reducing consumers’ exposure to contaminated food – cold chain technology and testing of processed foods. This metric measures the healthcare and economic cost savings of the avoided illnesses and deaths.

2. The contamination risk avoided due to cold chain technology, taking into account the contributions of each component in the cold chain process, and the contamination risk avoided due to testing of processed foods is estimated based on findings from international research studies.¹³

3. The cost of illness/death is calculated via the human capital approach; total healthcare costs for foodborne diseases (FBDs) in India in 2010 amounted to US\$1.8 billion for 100 million cases.¹⁴

IMPACT ANALYSIS

Attribution of the impact is again accounted for via the portion of Mandala’s equity stake and share of debt in the companies. Deadweight and displacement are considered negligible here. Deadweight could occur in the form of consumers being their own “guards” against eating spoiled food and so avoid contamination anyway, but this is by coincidence and is difficult to estimate. By implementing cold chain technology and setting up a food testing lab, there are no expected negative impacts created since food safety can only be improved.

One limitation of this metric is that it does not quantify the full societal impact of food testing. For instance, the economic costs of foodborne diseases and the losses in the agricultural and food sectors and the trade impacts are not accounted for in this calculation.

There are also other food safety initiatives, such as food safety clinics, conducted by Mandala’s investees which are challenging to include in the impact calculation. The impact that these could achieve in conjunction with testing and refrigeration would be much higher.

Impact per year =

[(Market share of cold chain capacity owned and leased × % contamination risk avoided due to cold chain) + (Market share of reefer trucks owned and leased × % contamination risk avoided due to cold chain)) + (Market share of food tested × % contamination risk avoided due to testing)] × estimated Indian population consuming packed or processed foods × Annual average healthcare spending on FBDs × (% equity stake and % debt share)

KEY ASSUMPTIONS

1. The proportion of the Indian population consuming packed or processed foods is assumed to be 75%, based on estimates provided by the investees.

¹³ Microbiological testing. (n.d.). Retrieved from <https://www.meatpoultryfoundation.org/fact-sheets/microbiological-testing> and Easter, M. (2015, June 15). What do microbiology test results really mean?. Retrieved from <https://www.foodqualityandsafety.com/article/what-do-microbiology-test-results-really-mean/> and The International Institute of Refrigeration. (2009). 5th informatory note on refrigeration and food. France.

¹⁴ Wageningen University & Research. (2017). The economics of food safety in India – a rapid assessment. Netherlands: Kristkova, Z., Grace, D. & Kuiper, M.

food access and nutrition

IMPACT SPOTLIGHT

Ensuring that people have adequate access to safe, healthy, and good quality food is the third broad category of impact that Mandala is focused on in delivering value across the food value chain. This also happens to be the least-researched category, with limited data and anecdotes in the industry and across the invested companies. One of the reasons behind this is that the impact of health and nutrition is particularly long-term and difficult to attribute given the complexity of factors involved.

That said, the following examples seek to provide a glimpse of the qualitative impact created by Mandala's investees in the area of Food Access and Nutrition, complementing the quantitative reports shared in the preceding pages.

Educating Consumers on Food Safety as an Additional Safeguard

With an increased population, there would be an increased demand for agricultural produce and livestock; to meet such demand, farmers may turn to fertilizers, pesticides, hormones and other harmful substances to grow their supply rapidly. This means that food-related health risks to consumers and food contamination will become an increasingly important concern in India.

Reflecting on this burgeoning issue, Dr. Balwinder Bajwa, CEO of **Edward Food Research & Analysis Centre Limited (EFRAC)**, shared that beyond lab testing and tracing the links through the food chain, EFRAC will also set up food safety clinics in districts and cities all over India, starting from Eastern India, where everyone can come to learn more about the food safety, food testing, and research.

These clinics will help to bring the awareness in consumers about food safety so that they can take their own precautions in the storage and preparation of their food at home to avoid contamination risks.

"We will also make available food safety kits at these clinics so that with the help of these kits the consumers can even do the basic food testing at their home itself," says Dr. Bajwa. With the home testing kits, consumers will be able to screen for a few major contaminants in the convenience of their own homes. With a multi-pronged approach, food safety risks can be reduced much more quickly and effectively, and this will eventually translate to a healthier and more productive workforce.

Facilitating Easy, Everyday Access to Healthy Foods

JFFFL's founder, Dr. Bhavarlal Jain, had a vision to create natural food products for the consumers which retain the characteristics of how they exist in nature. This vision laid the foundation for the introduction of all-natural food products under the brand Fru2Go. Fru2Go products

are made without any preservatives, added sugar or artificial flavours and colours and are manufactured under stringent quality measures as per global standards with the implementation of Quality Management Systems (QMS) and Food Safety Management Systems (FSMS).

Fru2Go's products are a 100% natural blend of fruit pulps, and their attractive packaging and easy-to-consume formats are targeted at helping children get a daily fruit intake and nutrition. Arguably, this makes access to healthy foods easier for children, benefiting not only their health but also their overall development.



Following Fru2Go, JFFFL also launched its 100% natural frozen fruit pulps in 3 variants: mango, strawberry and jamun, with the jamun offering tailored to help diabetic patients control their diabetes. By elongating the life of the fruits through the freezing process, these products allow people to enjoy their healthy flavours regardless of the season, allowing a steady supply of healthy foods to the population all year round.



RURAL COMMUNITY DEVELOPMENT

IMPACT FIGURE AT FY 17/18

CUMULATIVE TOTAL IMPACT

US\$74,313,167

IMPACT PER \$ INVESTED

US\$0.32

HOW WE MEASURE IMPACT

This metric measures the value added to the rural community and the people's lives because of the companies' operations and expenditures, made possible by the investment.

The metric quantifies the added income earned or credit obtained by the farmers, the additional capital expenditure investments in the rural areas, and the added CSR spending made by the companies.

Impact per year =

[(Payments made to farmers for purchases of goods – market value of goods + Value of equipment sold to farmers + Credit extended to farmers + Capital expenditure investments in rural areas + CSR spending)] × (% equity stake and % debt share)

KEY ASSUMPTIONS

1. Payments made to farmers are mostly done via the facilitation of farming contracts, where Mandala's investee companies would pay the farmer either the current market price or the pre-agreed price, whichever is higher.¹⁵ Assuming that the pre-agreed price is higher than the current market price half of the time, the additional value-add to the farmers is calculated as 50% of the total payments made.

2. At present, the farmers' only alternative to the loans offered by Mandala's investees are local moneylenders, whose credit terms are significantly worse: payment cycles are short, collateral and paperwork requirements

are challenging to meet, and interest rates are high. Therefore, as farmers are unlikely to obtain any credit at equivalent terms otherwise, there is no deduction applied on the value of credit extended to farmers.

IMPACT ANALYSIS

Attribution of the impact is accounted for via the portion of Mandala's equity stake and share of debt in the companies. To account for deadweight, a generous estimate of the income the farmers would have otherwise received from the sale of similar goods at the market was deducted from the impact figure. This however does not take into account the additional value-add of the income stability and increased profits that contract farming provides to the farmers.

Displacement from the capex investments is assumed to be negligible at present, given that the investments are greenfield projects and the factories are built on existing company-owned land or rented land – farmers are thus not displaced through this process. All environmental standards are also adhered to in these projects. The value of other small business activity that is crowded out or replaced by the capex spending cannot be estimated reliably and is thus omitted in this calculation.

The additional positive outcomes arising from the rural community development efforts – such as improved individual and community well-being and stronger farming businesses – are also not included in the impact calculation, leading to an arguably underestimated impact figure. The case studies presented on the next page offer a glimpse of these positive outcomes.

¹⁵ Harvard Business School. (2018). Jain Irrigation Systems Limited: Continuing a legacy. Boston, MA: Reinhardt, F., Trumbull, G. & Rao-Kachroo, M.

rural community development

IMPACT SPOTLIGHT

Mandala's investee companies have a plethora of activities that contribute to the development of the rural community and farmers. Here are 3 examples of the impact these companies have made.

Improving Farmers' Lives through Contract Farming

Jain Farm Fresh Foods Limited (JFFFL) has over 6,000 contract farmers for onions. In this arrangement, JFFFL assists the farmer from planting to harvest, establishing standards and providing know-how; in return, the farmer sells the crop to Jain at the pre-agreed price or the current market price, whichever was higher.

Mr. Sandip Balaji Tapre is one of Jain's onion contract farmers. Sandip owns 10 acres of land in Jalgaon. Before working with JFFFL, Sandip used to plant onions by hand, and his income depended on the weather and market rates. Now, he explains happily, "I get a better price for my onions; I am earning more money."



Sandip has also seen large improvements in yield and had accumulated capital to purchase machines for sowing and a tractor. He beams with greater joy as he shares how his life has been impacted. "I expanded my house... I can [also] give my son a proper education and send him to English Middle School."

WATCH VIDEO

<https://youtu.be/mmconukRcOA>

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view video



Strengthening Farmers' Capabilities through Knowledge Sharing

Godavari Biorefineries Limited (GBL) aims to be the leading integrated producer of sugar and downstream products from feedstock. Its strategy relies on converting every waste stream to a useful product and entering new markets to derive maximum value per unit of biomass processed. To enable its vision, it needs both strong research capabilities and close relationships with the farmers – who provide GBL its feedstock.

The company works with over 30,000 smallholder farmers,

some of whom have innovated dramatically to produce consistently high yields in a sustainable manner. For example, one farmer near GBL's facilities achieved twice the yield of his colleagues for 8 years. GBL aims to learn from such examples and bring these sustainable farming practices to other farmers, thereby benefiting the entire community.

In this way, as GBL grows its biorefinery, it not only creates more biomass from the same raw material quantity but also deepens the capabilities of its partner farmers and spreads the message of sustainability.

Solving a Farming Community's Water Problems through Flexible Loans

A team of 4 farmers in what was previously known as a "black zone" in Anjangon, Maharashtra struggled to get access to water for their farms. As a result, they rallied at least 60 farmers and wanted to embark on a collective lift irrigation project. This however required them to secure a loan for a large sum of capital.

"Banks don't entertain farmers," the team quickly learnt. So, they approached **Sustainable Agro-Commercial Finance Ltd (SAFL)**, who "understood their proposal [and] appreciated...the need for the loan". On the basis of the project's potential impact, the loan was processed within 45 days and construction began immediately.

4 years later, 24/7 water supply is now available across the community, reliant only on gravity (i.e. no electricity) due to the irrigation structure's intelligent design. This has led to an increased production of 50-60%; unsurprisingly, all 60 farmers involved are extremely happy and proud of their achievement.



With its flexible, farmer-centric loan scheme, SAFL effectively resolved a market gap, catalysed an environmental innovation, and saved an entire community's livelihood.

WATCH VIDEO

https://youtu.be/_bpgGnjg9jo

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LOOKING AHEAD

As mentioned in the opening note, this report demonstrates our initial best effort in defining, measuring and monitoring the impact of Mandala's investments. There is still much more work to be done.

We are already intending to engage in conversations with a variety of organisations in the impact investing space after the publication of this inaugural report. We look forward to receiving feedback, suggestions, and ideas on how we can refine our methodology. We are also keen to explore collaboration opportunities with research or investment organisations that are interested to partner with us and take this report to the next level.

And in line with our mission to continue growing our impact, we look forward to these exciting upcoming developments in the next 12 months:

- 1) One of our portfolio companies, Arcadia Biosciences, is slated to commercialise one of its key products, GoodWheat. This is expected to boost Mandala's impact figure and spread its global impact footprint into new territories.
- 2) We are looking to incorporate a Foundation within Mandala Capital, which has the aim of marrying the latest agri technologies with leading Indian and South East Asian agribusinesses (including existing portfolio companies) to catalyse technology adoption and create new offerings for the emerging markets. These new offerings are expected to be transformative and would further contribute to Mandala's primary areas of social impact.
- 3) We will also be setting up an international alliance of agri private equity funds that operate similarly to Mandala but have expertise and focus in different geographies. This will improve information exchange and enhance our abilities as a fund manager to provide the best products for our investors.
- 4) We have recently confirmed the hosting of an inaugural day-long seminar in November at the National University of Singapore, which will bring together CEOs from across the agri universe to speak on various topics on the global food and agribusiness sector, sparking discussions, new ideas and potential collaboration opportunities.

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