

from
FARM TO PLATE

TACKLING FOOD LOSS
ACROSS THE AGRI VALUE CHAIN





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ABOUT FOOD LOSS

The global food landscape is marred by a staggering statistic: approximately one-third¹ or 1.3 billion tonnes² of food produced worldwide is lost or wasted between farm and fork annually. This staggering figure is enough to feed two million people³, double the number of undernourished individuals globally. The implications of this wastage extend far beyond mere numbers, negatively affecting not only human health and nutrition but also economies and the environment.

In monetary terms, wasted food incurs a cost of more than ₹1 lakh crore⁴ on the global economy each year. Moreover, environmentally, it contributes to 8%-10%⁵ of total global greenhouse gas emissions. To put this into perspective, if wasted food were a country, it would rank as the world's third-largest producer of carbon dioxide.



While food loss and waste occur at various stages, developing countries bear a disproportionate burden, with 40% of losses occurring at post-harvest and processing levels⁶.

Over the past five decades, Indian agriculture has undergone remarkable growth. India now ranks second in terms of total food production globally, just behind China⁷. A staggering 70% of the rural households depend primarily on agriculture for their livelihood, with 82% of farmers being small and marginal, who own less than two hectares of land⁸.

Despite high levels of food production, Indian agriculture is infested with inefficiencies that leads to about 40% or 68.7 million tonnes⁹ of food produced goes to waste every year even before the food reaches the consumer. This loss translated to nearly ₹89,000 crores annually, representing a substantial drain on the economy, equivalent to about 1% of the GDP¹⁰.

These losses are caused by various factors, including fragmented supply chains, inadequate storage infrastructure, and a lack of appropriate logistics. Additionally, the spectre of climate change looms large, exacerbating challenges and leading to diminished farm incomes.

At the forefront of these losses are small and marginal farmers, positioned precariously at the bottom of the value chain. Vulnerable to market fluctuations and lacking access to resources, they bear the brunt of these inefficiencies.

Agriculture is a multifaceted endeavour, comprising both production and post-production phases. While successful crop cultivation is undoubtedly vital, the often overlooked realm of post-harvest management plays an equally pivotal role. It is here that the quality and value of harvested produce are safeguarded, making it an indispensable component of sustainable and prosperous agriculture.



¹ <https://www.un.org/en/observances/end-food-waste-day>

² <https://www.unep.org/news-and-stories/story/why-global-fight-tackle-food-waste-has-only-just-begun>

³ <https://www.wfp.org/stories/5-facts-about-food-waste-and-hunger>

⁴ <https://www.wri.org/insights/reducing-food-loss-and-food-waste>

⁵ <https://www.wri.org/insights/reducing-food-loss-and-food-waste>

⁶ <https://www.wfp.org/stories/5-facts-about-food-waste-and-hunger>

⁷ <https://economictimes.indiatimes.com/markets/commodities/views/indias-changing-agricultural-landscape-and-its-way-to-inclusive-growth/artideshow/95622420.cms?from=mdr>

⁸ <https://www.fao.org/india/fao-in-india/india-at-a-glance/en/>

⁹ <https://www.unep.org/resources/report/unep-food-waste-index-report-2021>

¹⁰ <https://timesofagriculture.in/food-wastage-in-india-farm-to-bin/#:~:text=In%20India%2C%2040%25%20of%20the,and%20affects%20the%20nation's%20economy>

PROGRAM OVERVIEW

INTRODUCTION

Reducing food loss is a crucial dimension in enhancing farmers' incomes, easing pressure on land and water resources, addressing food and nutrition insecurity, mitigating greenhouse gas emissions, and advancing overall economic development. The significance of reducing food loss and waste is also recognised in Target 12.3 of the Sustainable Development Goals (SDGs), which calls for reducing food loss and halving food waste by 2030.

In March 2022, Social Alpha launched the 'Tectonic – Innovations Towards Zero Food Waste' program to accelerate the adoption of sustainable technologies & solutions along the food value chain, to drive positive environmental, livelihood and economic impact.



PROBLEM AREAS

Insights were gathered from all stakeholders regarding the primary issues contributing to significant food loss and waste. The workshop garnered participation from esteemed individuals, including:

Mr Vivek Arora, Principal Lead, FSSAI	Ms Nalini Shekar, Co-founder, Harisu Dala
Mr Vilas Shinde, Chairman & MD, Sahyadri Farms	Mr C.M. Patil, CEO, Krishi Kalpa
Mr Prasanna Rao, Co-founder & CEO, Arya Warehousing	Mr Anjaney Bhutada, Director, go4fresh

The experts helped identify and validate key problem areas, which were subsequently utilised to prioritise specific focus areas for the Zero Food Waste Program. These areas include:

PRIMARY PROCESSING NEAR FARMGATE

Introducing affordable, small-scale, and innovative solutions tailored for deployment at or near the farmgate. These solutions target losses incurred through traditional, non-mechanised threshing, the cleaning process for non-perishables, and improper handling of perishable produce.

WAREHOUSING AND STORAGE

Implementing cost-effective, highly efficient, modular, and multi-crop solutions to counter the absence of decentralised storage infrastructure near farmgate. These solutions aim to alleviate the high capital expenditure and operational costs associated with storage infrastructure.

TRANSPORT AND LOGISTICS

Deploying affordable and efficient solutions to address the lack of aggregation and pickup mechanisms for first-mile transport and distribution services from the farmgate. Additionally, there's a focus on tackling the absence of cold transportation solutions.

PROCESSING AND VALUE ADDITION

Introducing small-scale, efficient, and multi-functional processing and value addition solutions. These aim to bridge the gap in access to mechanised primary processing technologies near farmgate while addressing the high capital expenditure and operational costs of current processing and value addition technologies.

MARKET ACCESS

Implementing technology-driven solutions to overcome barriers to organised markets and empower farmers with real-time market information for data-backed decision-making.

SHELF-LIFE IMPROVEMENT

Introducing affordable bio-tech innovations to combat the high perishability of fresh produce across the food value chain. These solutions target issues stemming from microbial growth, pest attacks, and inefficient packaging, which adversely affect the quality and shelf-life of fresh produce.

FOOD WASTE MANAGEMENT

Introducing innovative technologies to enhance the discoverability and optimal utilisation of agricultural waste generated at the farmgate. Additionally, the focus extends to tackling food waste generated at Agricultural Produce Market Committees (APMCs), modern retailers, and HORECA (Hotel/Restaurant/Café) establishment.



COHORT SELECTION

The program attracted a total of 71 applications from start-ups across India. For the final selection, the shortlisted applicants presented to a distinguished Grand Jury panel.

THE GRAND JURY INCLUDED:

- Dr P Srinivasa Rao**, Agricultural and Food Engineering, IIT Kharagpur
- Mr Rajesh Ranjan**, CEO, NABVENTURES
- Mrs Vijaya Khader**, former Dean Faculty of Home Science, Acharya N.G.Ranga Agricultural University
- Mr Vasu Guruswamy**, Co-founder, Lavani Ventures
- Mr Purushottam Kaushik**, Head, Centre for Fourth Industrial Revolution, India, World Economic Forum
- Mr Ganesh Neelam**, Executive Director, Collectives for Integrated Livelihood Initiatives

THE WINNERS

After extensive presentations and deliberations with the jury, 5 outstanding start-ups were selected to join the accelerator program.



Fermentech Labs: Valorises agricultural wastes procured from farmers and converts it into industrial enzymes using a novel SSF Bioreactor and proprietary microorganisms.



Krimanshi: Converts agricultural commodities and food waste from FMCG and HORECA sectors and household waste into ingredients to fortify feeds for the dairy, seafood, and poultry industry.



Pequirel Technologies: A smart seed-to-sale platform anchored by a multi-use greenhouse infrastructure that provides improved growing and drying capabilities.



Raheja Solar Food Processing: Manufactures solar-powered dryers for farmers and facilitates market access for the dried produce, leading to increased price realisation.



Temperate Technologies: Provides farming communities with access to decentralised cold rooms that increases the shelf life of fruits and vegetables, reduce food waste, and increase farmer incomes.

These start-ups demonstrate a commitment to addressing critical challenges in post-harvest management, offering promising solutions to enhance food security, reduce waste, and promote sustainable agricultural practices.





PROGRAM IMPACT

79443 KWh

ELECTRICITY SAVED

2207495 kg

GHG EMISSION AVERTED

883698 kg

FOOD WASTE REDUCED

₹3269031

REVENUE GENERATED

3262 FARMERS
IMPACTED

114 MICRO-ENTREPRENEURS
CREATED & EMPLOYMENT
GENERATED

ORIENTATION

The program kicked off with a dynamic two-day orientation workshop held in Mumbai, where founders and the program team from DBS and Social Alpha came together. This immersive workshop served as a crucial starting point, setting the stage for the journey ahead.

During the workshop, participants were provided with an insightful introduction to the program, setting clear expectations and objectives. One-on-one needs assessment sessions with portfolio managers were conducted, allowing founders to chart out their scale-up plans and define actionable milestones tailored to their unique needs and goals.

Moreover, the orientation featured expert-led sessions aimed at equipping participants with essential tools and strategies for success. Social Alpha led discussions on crafting a robust Go-To-Market (GTM) strategy, providing invaluable insights into navigating the complexities of market entry and expansion. Meanwhile, Sambodhi, an organisation that specialises in 'monitoring and evaluation' in the social development space, guided participants through the creation of impact assessment frameworks, emphasising the importance of measuring and evaluating the social and environmental impact of their ventures.



KNOWLEDGE SESSIONS

Two insightful knowledge sessions were organised to cater to the specific needs identified within the cohort.

The first session, led by Mr. Sudhanshu Rai, the founder of Fyllo, delved deep into the intricate realm of target segmentation and prioritisation. Participants were immersed in a thorough exploration, covering the identification and categorisation of customer segments, the use of metrics to guide prioritisation, factors influencing the mapping of customer personas, and the critical alignment of Go-to-Market strategies with decision-making for customer prioritisation.

In the second session, Mr. Vaibhav Tadke from S4S Technologies spearheaded an interactive workshop focused on Marketing & Sales Operations tailored for the acquisition of the first 1000 customers. This session featured a live case study that provided invaluable insights into the best practices for building efficient sales operations. Engaging discussions encompassed the evaluation of implementable sales strategies, the art of lead identification and qualification, targeted customer conversion rates in B2B scenarios, and the pivotal key metrics for B2B sales success. Additionally, participants gained invaluable knowledge on the essential hygiene requirements for a robust brand-building strategy, with a special emphasis on organic lead generation through various channels such as the website, LinkedIn, and other digital platforms.

These knowledge sessions were informative and insightful, equipping the cohort with practical tools and strategies to navigate the complexities of target segmentation, prioritisation, and successful marketing and sales operations.

ABOUT THE COHORT



OVERVIEW

Fermentech is dedicated to revolutionising the utilisation of agro-industrial waste by transforming it into valuable products such as enzymes and prebiotics. While conventional methods typically involve using this waste as boiler fuel, its low bulk density often results in exorbitant transportation costs, leading to a significant portion of the waste going to landfills or burned on the field.

Despite existing solutions for waste valorisation at the lab scale, the real challenge lies in successfully validating and scaling these innovations to an industrial level. Fermentech addresses this challenge head-on by employing solid-state fermentation, complemented by a novel pre-treatment process and state-of-the-art bioreactor technology, all powered by proprietary microorganisms.

This innovative approach not only converts pretreated waste into high-value enzymes but also generates a valuable side-stream rich in prebiotics and C-5 and C-6 sugars. By leveraging cutting-edge technology, Fermentech is at the forefront of sustainable waste management and high-value product creation in the agro-industrial sector.



PROGRAM SIGNIFICANCE

During the program, Fermentech received a grant of ₹44 lakh and benefitted from support provided by Social Alpha to achieve significant milestones:

- Processed 975 kilograms of agro waste, yielding more than 530 liters of enzymes.
- Generated over 1050 leads and received 3 letters of interest, indicating market demand and potential partnerships.
- Filed a patent application for xylanase and a provisional patent application for cellulase, enhancing intellectual property protection.
- Conducted 5 validations with major players in the textile industry, ensuring compliance with industry standards.
- Completed comprehensive market sizing and techno-economic feasibility studies for various enzymes, informing strategic decision-making.
- Obtained certification from FSSAI and accreditation from the National Accreditation Board for Testing and Calibration Laboratories, validating product quality and compliance with regulatory standards.

The program has demonstrated impactful progress by advancing Technology Readiness Levels in fermentation technology, conducting successful production pilots, fostering collaborating with industry for sampling and validation purposes, and refining product price-specifications in preparation for market pilots.



IMPACT ACHIEVED

2311
Reduction in GHG emissions (CO₂e in kgs)

85%¹¹
Savings on water consumption

1625
Quantity of waste procured (in kgs)

57¹²
Number of households impacted

¹¹Compared to industries

¹²Estimated based on assumptions related to annual rural household income and that an increment of INR 500 because of waste procured would result in one household being positively impacted.

FROM THE EYES OF THE USER

Pramod Tyagi, a dedicated farmer in Roorkee, Uttarakhand, grapples with a common challenge shared by many in the agricultural community - the efficient disposal of post-harvest waste, particularly from sugarcane crops. Cultivating mustard, wheat, and sugarcane on his 4-acre farm, Pramod encounters a significant hurdle in managing the waste generated after harvesting, especially from sugarcane crops.

The two-year life cycle of sugarcane necessitates thorough cleaning of the field after each season, involving the removal of green leaves and crop residue. With approximately 4 tonnes of waste generated per acre of sugarcane field, only 10% is suitable for cattle feed, leaving farmers like Pramod with the daunting task of disposing of the remaining 90%.

Traditionally, farmers have grappled with the disposal of sugarcane waste, with some resorting to selling it to local factories as a fuel source or burning it on the farm - a practice increasingly hindered by stringent regulations against burning.

In July 2023, Fermentech intervened to address this critical issue by partnering with Pramod Tyagi. Through this collaboration, Fermentech purchases the waste collected from the field, offering Pramod a simple solution to manage the waste effectively.

In 5 months, Pramod has shipped approximately 650 kilograms of waste to Fermentech, receiving a competitive rate of ₹15 per kilogram. This partnership has not only translated into an additional income of ₹7,800 for Pramod but also holds the promise of sustainable agricultural practices, aligning with the broader goal of waste reduction and efficient resource utilisation.





OVERVIEW

Low cattle productivity and substandard-quality milk render livestock farming unprofitable for smallholder farmers, hindering the possibility of exporting raw milk from India. This challenge stems from various factors, including inadequate feed formulations, poor bio-absorption rates, and exorbitant raw material prices.

In response to these pressing issues, Krimanshi offers a transformative solution through precision livestock nutrition delivered via a distributed production system. Leveraging their expertise, Krimanshi has crafted a meticulously balanced, palatable, and highly nutritious feed with a cost-effective formulation derived from upcycled ingredients sourced from food byproducts.

Their innovative approach not only elevates nutritional balance and enhances productivity but also holds the potential to mitigate greenhouse gas emissions through improved digestibility and absorption mechanisms. By addressing the root causes of low cattle productivity and inferior-quality milk, Krimanshi is not just revolutionising livestock farming but also fostering sustainability and profitability for smallholder farmers across India.



PROGRAM SIGNIFICANCE

During the program, Krimanshi received a grant of ₹44 lakh and support from Social Alpha to achieve remarkable milestones:

- Sold over ₹45 lakh worth of cattle feed in new regions.
- Achieved a revenue of approximately ₹5 lakh per month at the Bangalore facility.
- Enhanced waste conversion capacity to 2 tonnes per day at the Jodhpur facility and 10 tonnes per day at the Bangalore facility by streamlining processes and improving efficiency.
- Achieved an average monthly saving of ₹1 lakh by utilising unconventional raw materials, resulting in a 1% increase in gross profit.
- Established a cattle feed plant in Uttar Pradesh and initiated sales from the facility.
- Completed studies and lab reports on new variants of cattle feed.

The program has significantly impacted Krimanshi by optimising production and strategically expanding into new regions and markets.



IMPACT ACHIEVED

8915

Number of new cattle farmers reached

1682

Number of cattle farmers impacted

10248

Number of cattle impacted

UP 20%

Increase in productivity of cattle farmers

704380

Waste processed (in kgs)

1760950

GHG emissions reduced (CO₂e in kgs)

FROM THE EYES OF THE USER

Among the satisfied customers is Madhu from Bajju Tejpura, Bikaner, who has three milking cows. Prior to switching to Krimanshi's feed, **Madhu** obtained 24-26 litres per day by feeding her cattle cotton seed cake and other locally available food material. Since the switch, she noticed a significant increase in cattle activity and daily milk production, reaching an impressive 28 to 30 litres per day. Additionally, the fat content increased from 3.1-3.2% to 3.5-3.7%.

While the feed that Madhu was previously using costed ₹27 per kilogram, Krimanshi's feed comes at a more affordable price of ₹24 per kilogram. Delighted with the consistent quality, Madhu purchased an additional 11 bags of 50 kilogram each after her initial order of 2 bags in September 2023. Through Krimanshi's intervention, Madhu earned an additional income of over ₹42,000 and saved approximately ₹2,000 on the cost of feed for the 13 bags in 4 months. She expressed her commitment to never reverting to her old feed practices.



OVERVIEW

Pequirel is dedicated to elevating farmer profitability, minimising food loss, and promoting climate-resilient practices within the food production system. While the conventional method of open sun drying is prevalent, it comes with inherent challenges such as quality deterioration, susceptibility to fungal infections, and a prolonged drying process lasting up to 20 days. Additionally, less climate-resilient seedlings often suffer mortality rates as high as 15%.

In response to these challenges, Pequirel introduces the Advanced Adaptable Agriculture System (A3S), a revolutionary innovation that is reshaping farming practices. A3S not only enhances crop quality, quantity, and market influence but also has the potential to boost farmer income by up to 30%. This innovative system seamlessly integrates drying and growing capabilities under a single roof, empowering farmers in unprecedented ways.

With A3S, farmers can efficiently dry various crops at a precise temperature of 55 degrees Celsius while simultaneously cultivating diverse seedlings at an optimal temperature of 25 degrees Celsius. This transformative solution not only addresses the limitations of traditional drying methods but also propels farmers towards greater productivity, sustainability, and prosperity in agriculture.



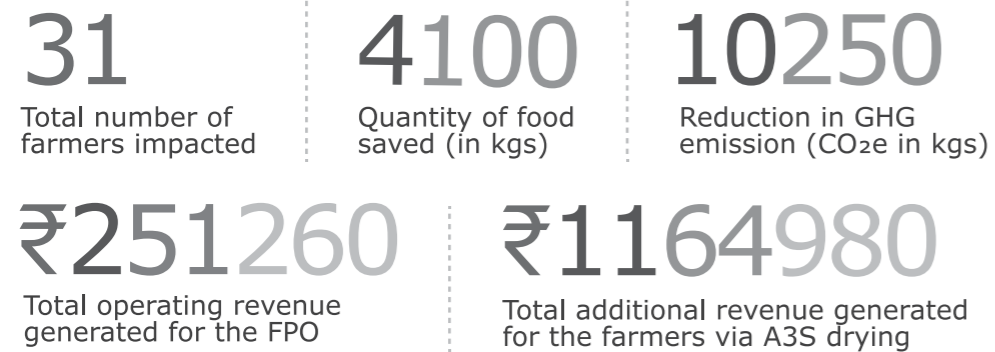
PROGRAM SIGNIFICANCE

During the program, Pequrel Technologies received a grant of ₹44 lakh and benefitted from support provided by Social Alpha to achieve the following significant milestones:

- Installed 3 A3S-4000 units with FPOs in Karnataka and 1 A3S-4000 unit with a small food manufacturer in Madhya Pradesh.
- Developed and installed demo units for A3S-1000 and A3S-600 variants.
- Generated 25 active leads for different variants and received 1 purchase order for an A3S-1000 unit.
- Successfully dried various produce, including greengram, chili, and lemon peels, showcasing significant differences in quality and revenue generation.
- Developed an application for managing A3S operations.
- Completed quality testing for dried tomato and moringa.
- Identified fodder cultivation as an additional use case for the A3S unit.
- Raised ₹75 lakh worth of follow-on capital to sustain operations.
- Conducted tests on rapid airflow, thermal storage, and multi-layer growing techniques.

The program's impact is clearly demonstrated through the successful implementation of pilot programs with new customers, showcasing improved technical performance, and the development of innovative designs for the A3S-600 and A3S-1000 models.

IMPACT ACHIEVED



RECOGNITION

- **Karnataka Amrita award with grant of ₹25 lakhs**
- **BIRAC BIG award with a grant of ₹50 lakhs**

FROM THE EYES OF THE USER

Established in July, 2023 in Kerutagi, Bijapur, Karnataka, the **Kari Siddeshwara** Farmer Producer Company stands as a beacon of support within a 25-kilometer radius. With over 400 shareholders cultivating diverse crops on landholdings ranging from 2 to 40 acres. The FPC primarily focused on input sales but recognised the pressing need to address post-harvest challenges faced by local farmers.

The region's farmers cultivate a variety of crops, including red gram, jowar, wheat, sunflower, red chilli, and vegetables. However, unpredictable, and untimely rainfall poses a significant obstacle, leading to decreased production and heightened post-harvest losses. For instance, insufficient rainfall during red chilli production results in low productivity, while rain during harvesting can cause total loss due to fungal infections.

To tackle these challenges head-on, Kari Siddeshwara FPC forged a collaboration with Pequrel Technologies in November 2023. Since the installation of Pequrel Technologies' A3S system, Kari Siddeshwara FPC has successfully dried over 5,000 kilograms of red chilli. The dried produce, achieved after 6-7 days of processing, maintained a moisture level of 12-13%, crucial for quality chilli but is impossible to attain through traditional drying methods.

Farmers availing themselves of these drying services express utmost satisfaction with the quality of the dried produce. Encouraged by this success, they are eagerly looking forward to experimenting with drying other crops. For the upcoming season, the FPC plans to extend drying services to crops like sunflower, fresh coriander, tomatoes, and more.





OVERVIEW

With approximately 1.3 billion tons of food wasted globally each year, accounting for roughly 15.3% of the food produced worldwide and resulting in 2.2 gigatonnes of CO₂e emissions, the need for action is undeniable. Raheja Solar is committed to tackling this pressing issue head-on.

Dedicated to mitigating food waste, lowering the carbon footprint, and enhancing agricultural outcomes, Raheja Solar is on a mission to revolutionise the way we approach food processing. They manufacture affordable and portable solar dehydrators that empowers farmers, especially small and marginal farmers, to transform surplus food into shelf-stable, high-value ready-to-eat products. This innovative solution not only addresses the twin challenges of food waste and low income but also opens new avenues of income generation for farmers. With a 100% buyback guarantee and comprehensive capacity-building trainings, Raheja Solar ensures that farmers receive the support they need every step of the way. By harnessing the power of solar energy, Raheja Solar is not just empowering the farmers but they're transforming lives, communities, and the future of agriculture as we know it.



PROGRAM SIGNIFICANCE

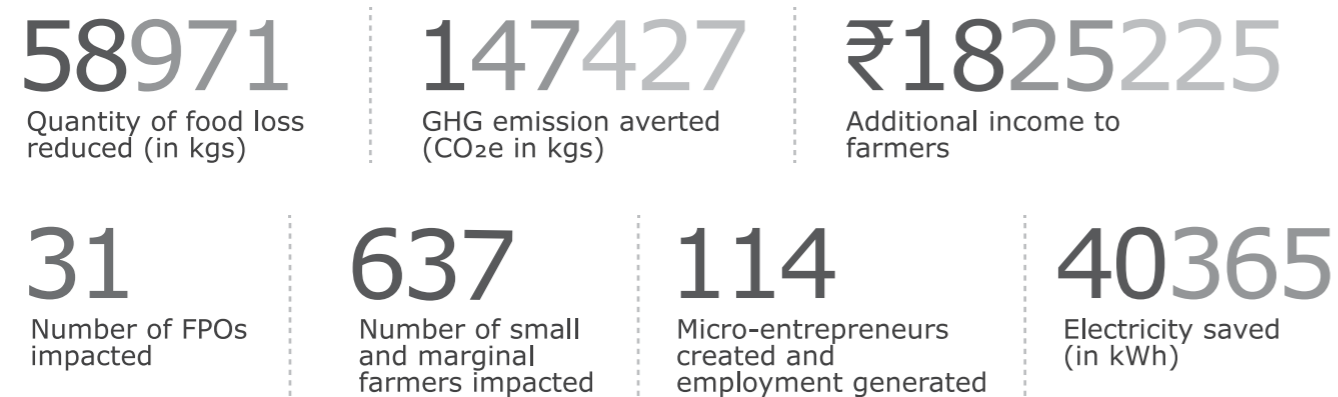
During the program, Raheja Solar received a grant of ₹44 lakh and benefited from support provided by Social Alpha, achieving significant milestones:

- Expanded into new markets, specifically Andhra Pradesh, Telangana, and Odisha, to form a new cluster by installing 17 dryers with subsidies.
- Sold 1,500 units, generating revenue of over ₹400 lakh, with approximately 1,300 units sold in the new regions, resulting in revenue exceeding ₹277 lakh.
- Sold over 10,700 kgs of dried products, resulting in revenue of just under ₹40 lakh.
- Developed a prototype of a new, efficient solar dryer and filed a provisional patent application, along with generating purchase orders.
- Developed 12 detailed proposals under the Pradhan Mantri Formalisation of Micro food processing Enterprises (PMFME) scheme to support FPOs in availing subsidies under the program.

The program significantly impacted Raheja Solar, resulting in expanded market presence in Andhra Pradesh, Telangana, and Odisha, diversification of the product portfolio, the establishment of sales operations for dryers, and successful business development initiatives for dried products.

IMPACT ACHIEVED

The impact achieved by Raheja Solar since the beginning of the program is as follows:



RECOGNITION

- Collaborated with Women on Wings, India.
- Collaborated with Andhra Pradesh State Minorities Finance Corporation Limited.
- Selected under the enterprise development program of SELCO Foundation.

FROM THE EYES OF THE USER

Established in 2018, Samisthi Farmer Producer Company operates in three villages, collaborating with 520 farmers with average landholdings of 2 to 5 acres. With a focus on horticulture, 60% of farmers are engaged in its production. **Led by Mr. Mala Reddy**, the FPC expanded from input sales to output marketing, addressing challenges faced by farmers. Crops such as tomato, brinjal, onion, okra, green chilli, marigold, and rose dominate the agricultural landscape in the region. However, about 30% of the produce faces market rejection due to bruising or over-ripening. Farmers also grapple with uncertainties in returns, discovering the selling price only upon reaching the market which is over 60 kilometres away. In 2023, Mr. Mala Reddy collaborated with Raheja Solar, acquiring a 100 kg dryer for experimenting with value addition to provide an alternative market for farmers. According to Mr. Mala Reddy, during periods of reduced prices, the farmers are opting to dry the produce, and by doing so, they can earn more. Since their engagement in February 2023, the FPC has produced over 35 kilograms and generated a revenue of ₹14,000. Mr. Mala Reddy emphasised how the initiative with Raheja Solar has helped in mitigating market rejection issues and has empowered farmers by providing an alternative income stream.





temperate

OVERVIEW

India grapples with an annual loss exceeding ₹50,000 crores in fruits and vegetables due to the lack of adequate cold chain facilities. This dire situation not only undermines farmers' incomes but also erodes their bargaining power, often forcing them to sell their produce at prices well below their production costs. Temperate Technologies aims to revolutionise the agricultural landscape by reducing post-harvest losses. Their mission is to combat the post-harvest losses head-on by developing innovative solutions that not only extend the shelf life of fruits and vegetables but also slash food loss and boost farmer incomes.

Temperate Technologies has emerged as a beacon of hope, introducing decentralised, cost-effective cold storage solutions designed to be seamlessly integrated at the farmgate. Their patented dew point cooling technology, a game-changer that boasts up to 80% lower energy consumption compared to conventional refrigeration systems. This translates to not only lower upfront costs but also significantly reduced operating expenses, making sustainable cold storage accessible to even small-scale farmers.



PROGRAM SIGNIFICANCE

Through the program, Temperate Technologies received a grant of ₹44 lakh and was supported by Social Alpha to achieve the following milestones:

- Sold 7 units in Andhra Pradesh and Telangana, generating revenue of ₹4.70 lakh. Additionally, generated Letters of Interest for 6 units with a potential revenue of ₹2.40 lakh.
- Developed a new product that is more efficient and costs less as a single-unit cooling device and conducted extensive testing on the onion storage unit.
- Increased manufacturing capacity to produce 100 units per year, with the potential to double production capacity by adding more human resources.
- Filed a request for examination for the patent filed earlier, now granted, in addition to filing a provisional patent for the latest product developed.
- Reduced the cost of goods sold (COGS) for the cooling device making the unit more affordable.
- Established a sales and marketing team and developed sales and product strategies.

The impact of the program is evident in the successful migration of Technology Readiness Level, the establishment of a production unit, reduction in COGS, movement in IP filing, improvements in component design, and the initiation of pilot sales.

IMPACT ACHIEVED

912

Number of farmers with access to cold storage

39078

Electricity saved (in kWh)

286556

GHG emissions averted (CO₂e in kgs)

114622

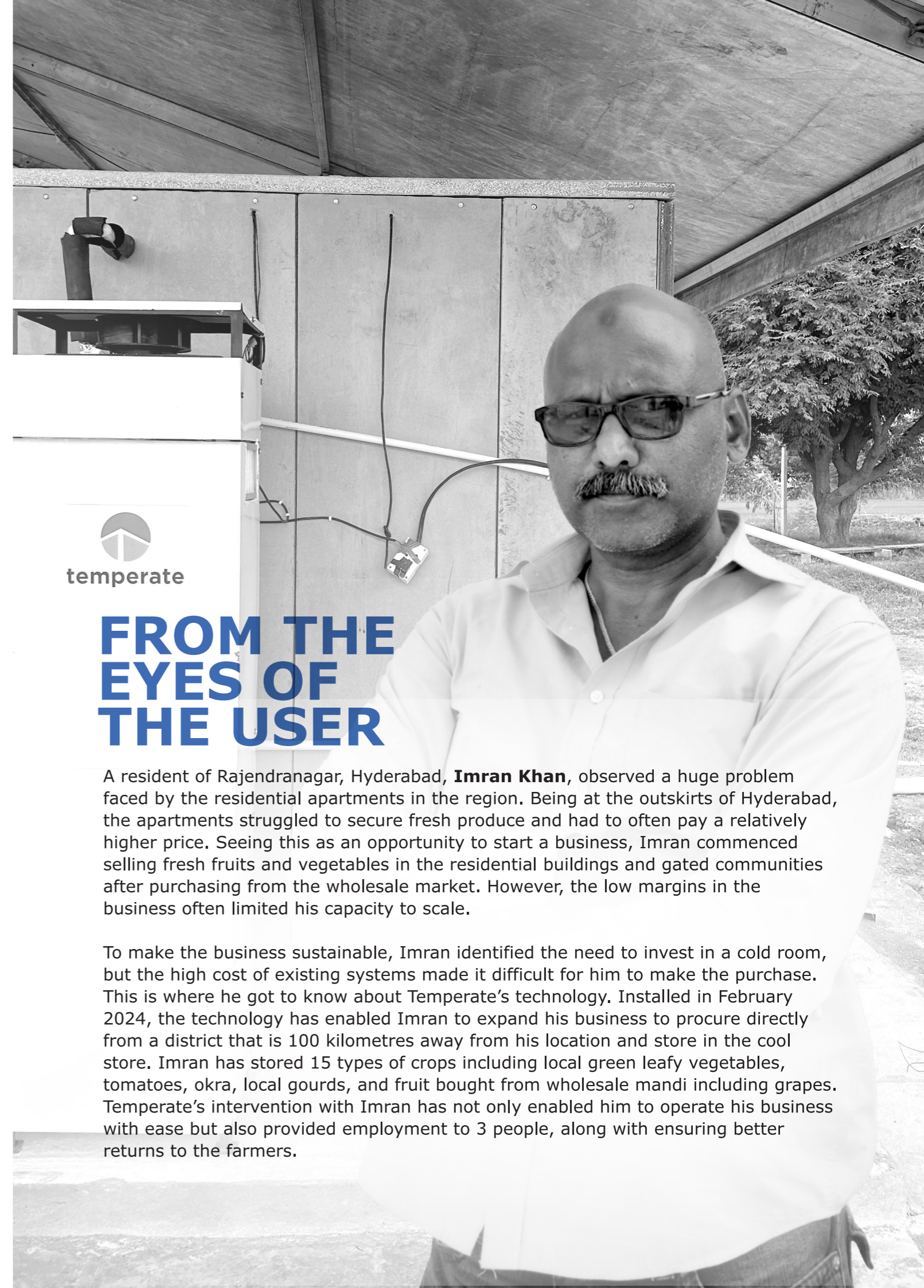
Quantity of food saved (in kgs)

1528300

Quantity of food stored (in kgs)

RECOGNITION

Selected as one of the 100 start-ups globally for COP28 by New Energy Nexus and COP28 UAE



FROM THE EYES OF THE USER

A resident of Rajendranagar, Hyderabad, **Imran Khan**, observed a huge problem faced by the residential apartments in the region. Being at the outskirts of Hyderabad, the apartments struggled to secure fresh produce and had to often pay a relatively higher price. Seeing this as an opportunity to start a business, Imran commenced selling fresh fruits and vegetables in the residential buildings and gated communities after purchasing from the wholesale market. However, the low margins in the business often limited his capacity to scale.

To make the business sustainable, Imran identified the need to invest in a cold room, but the high cost of existing systems made it difficult for him to make the purchase. This is where he got to know about Temperate's technology. Installed in February 2024, the technology has enabled Imran to expand his business to procure directly from a district that is 100 kilometres away from his location and store in the cool store. Imran has stored 15 types of crops including local green leafy vegetables, tomatoes, okra, local gourds, and fruit bought from wholesale mandi including grapes. Temperate's intervention with Imran has not only enabled him to operate his business with ease but also provided employment to 3 people, along with ensuring better returns to the farmers.



INSIGHTS

DURING THE WORK WITH THE START-UPS,
THE TEAM OBSERVED THE FOLLOWING:

Tailored Offerings for Varied Start-Up Scales:

It is important to tailor offerings and fund requirements according to the unique needs of start-ups. The introduction of separate cohorts based on the current scale would ensure that the support is finely tuned to the distinctive challenges and opportunities faced by each start-up.

Strategic Field Implementation Partnerships:

Start-ups invest significant time and resources in expanding to new geographies. To alleviate this burden, the program should onboard field implementation partners in collaboration with start-ups at the beginning of the program to enhance efficiency and amplify reach.

Enhanced Program Flexibility:

Acknowledging the unpredictable nature of the entrepreneurial journey, the program's design should incorporate greater flexibility. This will ensure adaptability to unforeseen events, allowing us to respond promptly to emerging challenges and opportunities.

Awareness Campaigns with Field Partners:

Building awareness about the technology is pivotal for the success of start-ups. Collaborating with field partners, we should launch awareness campaigns to educate customers about the products and its potential impact.

Localised Marketing Strategies:

Marketing through word of mouth and local influencers in regional languages has provided maximum leads for the start-ups in rural regions. This approach should be focused by the start-ups.

Comprehensive Support Ecosystem:

Ensuring end-to-end support, from building awareness to hands-on guidance, is essential for start-ups to successfully sell their products, with market access and credit availability being the most crucial factors.



WAY FORWARD

The Zero Food Waste Program has made substantial contributions to scaling up start-up operations. The initiative has supported the cohort in advancing Technology Readiness Levels, optimising production processes, fostering strategic market expansions, implementing pilot programs, enhancing technical performance, diversifying product portfolios, and initiating profitable sales. The grant support has successfully accelerated the enterprises, enabling them to reach a position to secure additional grants and capital. This reflects a positive transformation in the innovation and development landscape.

As we conclude Zero Food Waste program, Social Alpha recognises the importance and urgency of continuing our pursuit of innovations that can transform the post-harvest ecosystem. We believe that a larger program, encompassing multiple technologies and addressing every facet of the value chain from farm to fork, is the next logical step. Such a program is essential for creating a post-harvest ecosystem where producers earn better, and fewer resources go to waste.

ABOUT **SOCIAL ALPHA**

Founded in 2016, Social Alpha is a multistage innovation curation, and venture development platform focused on addressing the most critical social, economic, and environmental challenges. With its deep community engagement, partnerships, and ecosystem leadership, Social Alpha has evolved into a societal platform for promoting high-impact innovations to fight poverty, disease and climate change.

Social Alpha searches for innovators willing to take the entrepreneurial risk and supports them as they build compelling solutions to address India's intractable development sector challenges. Since its inception in 2016, Social Alpha has built over ten innovation platforms, managed 30+ accelerators, and nurtured more than 300 start-ups.

Breakthrough research and innovations have the potential to create a profound and irreversible impact on the people and planet. Society needs entrepreneurs to translate these innovations into solutions and ignite the economic engine by creating new markets. Social Alpha's theory of change revolves around developing entrepreneurial solutions to societal problems. It has built a full-stack architecture that orchestrates various enablers for innovation curation, solution development, market access, deployment and scale-up.

Social Alpha's three Strategic Impact Units (SIUs), namely Climate and Sustainability, Health and Wellness, and Livelihoods and Prosperity are designed to address various social, economic and environmental challenges and contribute positively to mass prosperity, wellness and climate action with well-defined development indicators.

Social Alpha's platform architecture is designed to support the three SIUs and catalyse the "lab to market to communities" progression of high-impact innovations. It consists of product innovation labs, venture incubators, accelerator programmes and multiple capital pools.

Foundation for Innovation and Social Entrepreneurship (FISE), a non-profit entity, hosts the Social Alpha architecture, and all the initiatives of FISE operate under the brand umbrella of Social Alpha.



SCAN TO KNOW
MORE ABOUT **SOCIAL ALPHA**

TOWARDS
**ZERO
FOOD
LOSS**

