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CASE STUDY

TECHNOLOGICAL INNOVATION TO ADDRESS POST-HARVEST LOSSES IN INDIA

Promoting Responsible Value Chains in India for an Effective Contribution of the Private Sector to the SDGs (PROGRESS Project)

Sector: Agro-processing
Organization: Greenpod Labs

Centre for Responsible Business (CRB) and Aston India Centre for Applied Research (AICAR), Aston have teamed up to explore and investigate how private sector companies – as part of Global Value Chains (GVCs), production networks, and FDIs in India have/ could better contribute towards the achievement of specific SDGs, particularly inclusive education and life-long learning (SDG4), employment and decent work for the youth (SDG 8), women’s social and economic empowerment (SDG 5) and sustainable consumption and production (SDG 12). The generated evidence would be used to influence and support

policy and practice (industry) level discussions and actions through multi-stakeholder processes in India, with various industry sectors that are part of GVCs, production networks, and foreign investments, but continue to be vulnerable. The project is being undertaken with support from the International Development Research Centre (IDRC), Canada.

This case study has been developed as an example from the Indian agro-processing industry on the contribution of industry-led initiatives towards some of the SDGs (indicated above).



GREENPOD LABS

GreenPod Labs is an Agri-tech company that develops cost-effective post-harvest solutions using Nanotechnology to extend the shelf life of fruits and vegetables during storage and transport. The company's vision is to minimize post-harvest losses in fruits and vegetables in the world.

TITLE OF THE CASE STUDY**NATURE OF ORGANISATION**

Technological Innovation to address post-harvest losses in India

Early-stage start-up

SECTOR COVERED**WORK PACKAGES COVERED**

Agro-processing

Work Package 2: Innovation and Business Competitiveness

RELEVANT SDG AND RELATED TARGETS

SDG 12: Responsible Consumption and Production

Target 12.3: Halve global per capita food waste
By 2030 halve per capita global food waste at the retail and consumer level, and reduce food losses along production and supply chains including post-harvest losses

Target 12.5: Substantially reduce waste generation
By 2030, substantially reduce waste generation through prevention, reduction, recycling, and reuse

BACKGROUND

The agricultural value chain is increasingly seeing the role of agri-tech ecosystem players. According to an EY report titled Agritech – Towards Transforming Indian Agriculture, one of the challenges inhibiting Indian agriculture that has been identified is an inefficient post-harvest supply chain. This leads to occurrences of losses of produce and thereby has a negative impact on the level of remuneration that farmers receive for their produce. In this regard, the EY report goes on to describe how this challenge is being addressed via supply chain tech and output market linkages. Given the interconnected nature of the SDG 12.3 target and its implications for other SDGs (such as SDG 2- zero hunger), this is an important area of study, especially in the context of India, where the economic loss of food waste costs \$14 Billion every year¹ on one hand and staggering malnutrition on the other. This case study demonstrates how an early stage start-up has addressed food loss and waste, respectively, depending on the stakeholder utilizing the solution, via the usage of innovative technology that extends the shelf life of fruits and vegetables. Please note that the two terms of food loss and waste have respective definitions given that the former reflects losses in the earlier segments of the value chain, namely farmers; whereas food waste refers to the wastage that is dealt with by distributors and retailers. Hence, given the fact that the three customer segments are utilizing the solution requires the use of a comprehensive term to be utilized, namely, food loss and waste.

OBJECTIVE OF THE CASE STUDY

GreenPod Labs is addressing the issue of food loss and waste via the introduction

of a nano-technology that increases the shelf life of fruits and vegetables and hence contributes to the achievement of SDG 12. This SDG has a target of addressing the issue of Food Loss and Waste, namely, “by² 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.”

Further, this case study will try and highlight some of the key interventions required to expand the work of an organisation working to address this goal.

ABOUT THE ORGANIZATION

GreenPod Labs is addressing the problem of food wastage with sachets³ that contain plant extracts and edible ingredients and when these packets are dropped near the fruits and vegetables, it releases volatile compounds that slow down the ripening rate of a fruit or a vegetable and inhibit microbial growth.

Thus, it slows down the ripening process and reduces bacterial growth which in turn helps the fruits and vegetables stay fresh for longer to reduce the spoilage and wastage.

DETAILS OF THE INITIATIVE/ SUSTAINABLE PRACTICE:

GreenPod Labs seeks to provide post-harvest solutions in order to help extend the shelf life of fruits and vegetables during storage and transport. The utilization of sachets provides the outcome to create a controlled environment to preserve the quality of fresh produce throughout the supply

¹ <https://www.indiatoday.in/india/story/india-grows-more-food-wastes-more-while-more-go-hungry-1752107-2020-12-22>

² <https://in.one.un.org/page/sustainable-development-goals/sdg-12/>

³ <https://changestarted.com/solving-food-wastage-through-a-small-sachet-greenpod-labs-deepak-rajmohan/>

chain. On average, the inclusion of sachets can increase the shelf life of produce by 40% to 60% without the use of cold storage. Since most regions in India do not have access to cold storage facilities and the ones that do can only store 10% of the fruits and vegetables produced annually, this initiative seeks to provide a sustainable solution.

It is important to note that given the differing nature of each commodity, the formulations⁴ (of the sachets) differ from product to product, as each crop has its own unique physiological properties like water content, rate of ripening, etc.

This solution targets three customer segments, namely, farmers, distributors and retailers. The latter two segments benefit from the technology keeping in mind the perishability associated with fresh fruits and vegetables, but not all, which thereby affects shelf life.

WHAT WAS THE MOTIVATION TO UNDERTAKE THIS INITIATIVE? (COMPANY PHILOSOPHY, BRAND/BUYER REQUIREMENTS, BETTER EXPORT OPTIONS ETC.)

The initial motivation behind the development of the sachet was to help by-pass the need for cold storage, an infrastructural requirement that is not always accessible. Furthermore, related to this initial motivation is the need to address the challenge of food⁵ waste both from a climate change perspective and in terms of hunger and malnutrition.

Given the problems that farmers face, which include incurring⁶ losses because of spoilage, not being paid as per the quality, not being able to reach new markets, and being unable to take leverage in case of price fluctuations, this technology has helped to address the concerns of farmers. The organization now has the combined vision to reduce greenhouse gas emissions, increase the availability of fresh produce, while also increasing farmer incomes by minimising post-harvest losses in fruits and vegetables in India by 50 per cent in the next five to seven years.

WHAT STEPS DID THE COMPANY ADOPT TO DRIVE THIS INITIATIVE (BOTH INTERNALLY AND EXTERNALLY (IF APPLICABLE)? ALSO, HOW DID THE COMPANY MAKE AVAILABLE THE RESOURCES NEEDED FOR THE INITIATIVE?

The company took some time in the product design stage to develop this product. The initial stage that spanned over 3-6 months entailed the development of the first product, which then underwent a process of changes and upgrade. Furthermore, given that the development of the product is based on science⁷, R&D was a requirement.

Having established the process behind product development, it is to be noted that GreenPod Labs as an organisation is, Accelerator/Incubator Backed, namely, by Manush Labs⁸, which is an accelerator⁹ program for underserved impact innovators & entrepreneurs. Furthermore, the organisation benefited

⁴ <https://changestarted.com/solving-food-wastage-through-a-small-sachet-greenpod-labs-deepak-rajmohan/>

⁵ <https://www.manushlabs.co/post/greenpod-labs>

⁶ <https://changestarted.com/solving-food-wastage-through-a-small-sachet-greenpod-labs-deepak-rajmohan/>

⁷ <https://changestarted.com/solving-food-wastage-through-a-small-sachet-greenpod-labs-deepak-rajmohan/>

⁸ <https://www.manushlabs.co/post/greenpod-labs>

⁹ <https://www.manushlabs.co/about>

from a TANSEED¹⁰ research grant from Startup TN. In relation to the support received from TANSEED, the Greenpod Labs team benefited from bootcamps¹¹ that emphasizes the importance of story-telling, which it benefited from in relation to making pitches in the future. Finally, it benefited from imbibing a first principles thinking approach.

WHAT BENEFITS DOES THE COMPANY SEE FROM THE INITIATIVE (TO COMPANY AND TO BENEFICIARIES) – FOR E.G. REDUCED TURNOVER, STABLE AND SKILLED WORKFORCE FOR THE COMPANY

CHALLENGES (RESOURCE CONSTRAINT? LOWER MARGINS, LACK OF ADEQUATE POLICY SUPPORT ETC.)

1. Being an early-stage start-up with limited funds, hiring new people has been a challenge given that salary expectations are not met and this influences the retention of staff as well.
2. Given that there is a need to manufacture the product to meet demand, there is a challenge of accessing large scale contract manufactures and there is a lack of a repository of manufacturers.
3. There is a lack of incentivisation to stop the wastage of food. This is despite the fact that farmers and retailers recognise the long term benefits of doing so. In the short term, wasting and throwing the produce has continued.
4. There is also a need for policy support and for different/flexible incentivisation schemes by the government to target each

stakeholder including farmers, FPOs, distributors, middlemen etc, and subsidising cold chains so it is more accessible.

5. One of the critical areas is smallholder farmers' access to technologies. FPOs are more focussed on optimising inputs but not on markets.
6. Research on increasing the export potential of fruits and vegetables is also needed given that currently, only 2 percent of India; produce is being exported. The same amount of investment in post-harvest is needed as already in the production side of growing food.
7. Access to grants has also been a challenge faced by the organisation as it is a time consuming and lengthy process.
8. Given the uniqueness of this product, there have also been regulatory challenges that come with approving the product.

Testing¹² the product, talking to multiple stakeholders, and then scaling the product also brought its own set of challenges. Given the above listed challenges, the company recognizes that the minimisation of food loss and waste in the earlier phases of the value chain can help to address a slew of other agenda items of the government such as raising farmers' incomes as well as other SDGs.

ROAD AHEAD - HOW CAN THIS INITIATIVE BE SCALED UP INCLUDING GAPS IN THE ECOSYSTEM THAT NEED TO BE ADDRESSED SUCH AS

¹⁰ <https://www.manushlabs.co/post/greenpod-labs>

¹¹ <https://www.youtube.com/watch?v=kG1X3hehWGw>

¹² <https://changestarted.com/solving-food-wastage-through-a-small-sachet-greenpod-labs-deepak-rajmohan/>

REGULATORY SUPPORT, CAPACITY BUILDING OR SKILLING, AVAILABILITY OF FINANCE, TECHNOLOGY ETC.

Focusing only on fruits and vegetables at this stage, GreenPod Labs seeks to expand to other food products soon. At the moment, the product has not been commercialised and has mostly been sold to customers who have contacted them through social media. The organisation plans to scale¹³ up and work with farmer cooperatives to use their networks to sell to their farmers. Further, it plans to expand to other countries with similar climates, in regions such as Africa.

There is a need for interventions, namely capacity building and awareness generation to address food waste. Furthermore, it was highlighted that there is a need to educate farmers on the losses in terms of best practices as well as the need to raise awareness of better price realisation if food loss is addressed.

ENGAGEMENT WITH BRANDS – IF INITIATIVE DRIVEN BECAUSE OF BRANDS’ COMMITMENTS; WHAT IS THE MECHANISM TO PROVIDE FEEDBACK ON THE REQUIREMENTS? IN CASE INITIATIVE IS SELF-MOTIVATED THEN IS IT RECOGNIZED BY BRANDS? OR DOES SUCH A PRACTICE ENABLE THE ORGANISATION TO BE BETTER PLACED WITH BUYERS AND BRANDS?

Additionally, the organisation has been recognized in the start-up

space and in the sector as a whole. Most recently, it was chosen as a semi-finalist¹⁴ in the Cisco Agri Challenge in 2021. Furthermore, the organisation has leveraged the power of networks, as in, “Out¹⁵ of the customers we’ve worked with in trials, almost 90% have come in from social media, or a connection from a mentor, or something of that type” with regards to the uptake of the product.

HOW/ IF IMPACTS ARE MEASURED FROM THE INITIATIVE (INCLUDING BENEFITS FOR THE COMMUNITY IF ANY)

One of the proposed impacts is to ensure mitigation of post-harvest losses of fruits and vegetables to ensure that farmer incomes are increased. This is achieved by increasing the bottom-line of fruits and vegetables via increasing their shelf life and retaining the quality of their produce and thereby increasing the incomes of farmers. From on-going conversations, the company has found that there has been a 30 to 35 percent increase in incomes with usage of the product.

In terms of the economic side, the organisation hopes to increase the potential to export fruits and vegetables given that there is a huge opportunity to do so. In terms of addressing sustainability, the organisation aims to reduce greenhouse gas emissions by facilitating a reduction of food loss and waste.

SUSTAINABILITY COMMUNICATION – WHERE DOES THE FIRM

¹³ <https://www.manushlabs.co/post/greenpod-labs>

¹⁴ <https://yourstory.com/2021/09/thenudge-foundation-cisco-entrepreneurs-increase-farmers-innovative-solutions/> amp

¹⁵ <https://www.manushlabs.co/post/greenpod-labs>

COMMUNICATE AND HOW?: (TO STAKEHOLDERS: SUPPLIERS, CUSTOMERS, ETC.)

Channel-wise communication has been carried out with structured players such as ecommerce, retailers, distributors and which is direct whereas communication with other types of customers, namely farmers and FPOs is via a network of foundations and NGOs. Thus, it has adapted its communication style depending on the type of stakeholder.

CONCLUSION AND SUMMARY

Greenpod Labs seeks to adopt this solution to address the goal of reducing food loss and waste, respectively depending on the stakeholder utilising it via To this end, the start-up provides a packaging solution extending the shelf life of fruits and vegetables. The organisation aims at minimising post harvest losses in fruits and vegetables in India by 50 per cent in the next five to seven years and is aligned with the Government's policy of Doubling Farmers' Income.

This case study has highlighted the interventions required to aid in the expansion of such a start-up. The need for engaging various actors within the ecosystem is crucial in order to expand the organisation's impact, for example, in the early stages of its growth as well as in outreach with farmers

