Case Studies on Agri-Startups in India: Inspiration from Mann Ki Baat, Innovations and Impact

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ABSTRACT

Innovation is the key to successful startups. Startups are developing technology and innovations supported by improvements in several activities of the agri-food systems. As a major support pillar for the startups, national startup policy, programs and the PM's 'Mann Ki Baat' also had an impact on entrepreneurs to take innovation into action. The study has included 5 startups that are got influenced by the same. The case study on agri-satrtups includes the innovations to farm improvement, the evolving process from the idea to implementation, stakeholder involvement, incubation support and the impact of startups among the farmers and other stakeholders.

Keywords: Mann Ki Baat, Agri Startups, Agricultural Innovations, Agri-Business Incubation, India

Introduction

Agriculture is the largest sector in Indian rural economy. The rural economy contributed nearly half the nation's overall GDP in 2019–2020 and employs 350 million people (68% of the total workforce). After the era of Green revolution, currently India is trying to promote smart farming and natural farming. The overall agriculture ecosystem witnessed revenue growth of approximately 85 percent during FY 2019-20. Howeverr, current state of the agriculture system needs to face different challenges such as backward input market linkage support for farmers to connect with the network, financial accessibility, innovations and technologies and disruptions in the market accessibility and price mechanism and lack of insights on changing consumer needs and these makes gaps in agriculture value chain (Naina, 2022, Sabita, 2014, https://www.downtoearth.org.in). In these complex agriculture scenario, innovation could act as the basic criteria

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for finding the solution for the challenges. Entrepreneurship is all about identifying the opportunities in solution to confront with these challenges.

Startups plays a crucial role in the development of the innovation, especially in the initial phase. Different empirical studies assess the relationship of innovation in the growth of startups (Fiorentino et al., 2020). Across the different segments of the agricultural value chain, startups are coming up with innovations with technological support.

The starting of agri tech startups era in India marked from 2010. A total of 366 agri-based startups have come up from 2013 to 2017 (Anand and Raj, 2019). And Noticeably startups showed exponential growth during the pandemic period (www.pib.gov.in, 18 Oct 2022). That was considered as a need of the hour and ideas such as a consumer-farmer network, input e-commerce platform and agro marketplace were instantly proven, and that boosted investor trust (https://economictimes.indiatimes.com, Sep 24, 2021).

At present, India is home to 4943 agritech startups (www.pib.gov.in, 15 March 2023, www.startupindia.gov.in) . This fast-growing agri startup system resulted as every ninth agri start-up globally is from India (PWC, 2021). This shows the possibility for exceptional transformation in agriculture in India. The sustained and long-term oriented direction from Government also contributed to the rapid growth of startup ecosystem in agriculture. The use of scientific data and technology in farming is constantly being emphasized by the Government and the corporate sector. This expansion of agritech start-ups has a direct impact on the socioeconomic situations of India's rural population by creating jobs and improving farmland.

The government has provided adequate support to agricultural start-ups through policies and programs such as Start-up India, the Atal Innovation Mission, RKVY – RAFTAAR scheme, NIDHI (National Initiative for Developing and Harnessing Innovations), the Venture Capital Finance Assistance (VCA) Scheme promoted by the Small Farmers' Agri-Business Consortium, NewGenIEDC (New Generation Innovation and Entrepreneurship Development Centre) and the ASPIRE scheme. Such programs, in collaboration with well-known accelerators, incubators, and mentors selected for the agritech start-up ecosystem, have been working to provide technical assistance and shorten the gestation period of agri start-ups. The Innovation and Entrepreneurship cell at RKVY-RAFTAAR has made significant steps in establishing the agri startup ecosystem in a much larger scale. So far 3376 agri startups have been incubated with a funding of Rs.119.84 Cr. This could make an benefits to 40.30 lakhs of farmers (Agri-startups innovations 2022, Ministry of Agriculture and Farmers Welfare, Gov. of India).

As a continuation of support, Ministry of Agriculture and Farmers Welfare, GoI has set up Accelerator Programme of Rs. 500 crore for promoting Agri Start-ups. This will help develop a separate division of agriculture start-up to work as a single window agency to facilitate all the stakeholder linkages required for agri Start-ups (www.pib.gov.in, 22nd Oct 2022).

"Mann Ki Baat" – An Inspiration for Agristartups

In the 75th edition of monthly radio program 'Mann Ki Baat, Prime Minister of India pointed out the importance of modernization in agriculture as the need of the hour. He insisted that, technological innovation can reinforce farm diversification. This will create employment opportunities and diversified income sources for farmers. The Government wants to support the improving startup scenario of the country. In the 83rd episode of Mann Ki Baat, the PM mentioned that, ideas, innovation and passion to take risks can-do magic in entrepreneurship to make success stories.

During the 2023 post-budget webinar on 'Agriculture and Cooperatives' the PM highlighted the importance of promotion of agri tech startups for eliminating the challenges of the sector. The Prime Minister pointed out that India is home to more than 3000 agri-startups today compared to next to nothing 9 years ago. He informed about the introduction of Accelerator Funds for agri-tech startups and said that the government is not only creating digital infrastructure but also preparing funding avenues.

In this background, to build a strong ecosystem for nurturing innovation and startups in the agricultural domain, the Government is preparing policies and programs. The regulatory ecosystem governing startups in India and gives an account of complementary schemes under which startups can obtain Government benefits. Through these programmes, the government seeks to delegate start-ups through innovation. Start-up India supports entrepreneurs and those who can innovate by offering various levels of technical and financial support (Singh, 2020). In long term it will boost the startups and contributes to the government's Atma Nirbhar Mission and Make In India vision can be realized, creating more jobs, raising the standard of living for millions of Indians, and strengthening India worldwide.

From 2016 onwards, based on the policies, programs and schemes implemented by the Government, the idea of innovation into reality through startups started to get momentum. The policies, success stories and support highlighted by the PM in 'Mann Ki Baat' has motivated many to take up entrepreneurship as an opportunity.

The support given by the Government has boosted agri-startup scenario. In the

75th Mann Ki Baat, the PM concentrated on diversification and modernisation of agriculture sector. Apart from that, he shared his viewpoints on a variety of topics related to agriculture. The Government of India from the starting promoted the idea of waste utilisation which can be an additional source of income for farmers. On 24th November 2019 the 80th episode on the PM made comments on the 'Waste to Wealth' concept in his Mann Ki Baat. In The Government always put focus on the idea of 'Connect with Nature'. During the Mann Ki Baat of July 2022 episode, the PM mentioned the success of Surath model of natural farming and advised the nation to take up the opportunities in it. The Government has special attention towards Livestock development and welfare. He mentioned the Ladakh farmer Urgain Phuntsog in Mann Ki Baat programme for his diversified farming with livestock. Even though livestock sector is considered as a traditional sector, it provides secured income to farmers. Last but most importantly, the focus was given to the livelihood enhancement of the marginalised community of farmers.

In this context, aspiring entrepreneurs could come up with innovative solutions to the challenges in the agriculture sector. Based on the concept of diversification and modernisation as suggested by Prime Minister, the study has selected five major focus areas which were mentioned in the Mann Ki Baat.

1. Eco- farming
2. Modernisation of agriculture
3. Livestock welfare and development
4. Waste to wealth
5. Farmer livelihood enhancement

Methodology

MANAGE Center for Innovation and Agripreneurship incubated 330 Agri-Startups from 2017-2018 and 134 (41%) of Agri-Startups from the above indicated five areas. From this 134 Startups, five Startups from 4 states have been randomly selected for case study. A structured interview schedule and telephonic interviews were conducted to collect and document the case studies. The authors of the case studies had personal interaction with these selected Startups. As a matter of due diligence policy, the team members of MANAGE Center for Innovation and Agripreneurship regularly visit all the incubated Startups and the Startups also visit MANAGE for mentoring sessions.

Thus, we have selected five early-stage startups from above mentioned focus areas of innovation. The case study documentation included the background of the challenge, innovation to the solution, how the startup made it into reality, stakeholder engagement of the startup and the impact created by the startups.

The five case studies and their areas of innovation and startups are given in the table below:

Case Study No.	Focus area of innovation	Startup	Contact
1	Sustainability in Resource Utilization: Waste to Wealth	Atma leather, Sonarpur, West bengal	Website: https://banofileather.com/ Mobile: +91 9821499797 Email: jinali@atmaleather.com
2	Automation for Water Management in Aquaculture	Bariflo Labs, Bhubaneswar, Odisha	Website: www.bariflolabs.com Mobile: +91-7328021033 Email: bariflolabs@gmail.com
3	Livelihood Enhancement through Collective Marketing and Value Chain Approach	Tribe Grown, Amravati, Maharashtra	Website: www.tribegrown.com Mobile: 08390131411 Email: tribegrown1@gmail.com
4	Animal Welfare, Livestock Management and Marketing	Pashupaala.com, Banglore, Karnataka	Website: www.pashushala.com Mobile: 9910491500 Email: gaurav@pashushala.com
5	Eco-friendly Cultivation and Farm Advisory to Marketing	Eco Agriprenurs, Devanagere, Karnataka	Website: www.ecoagripreneurs.org Mobile: +91-9676598585 Email:ecoagripreneurs@gmail.com

CASE STUDY - 1

Atma Leather: An Environmentally Friendly and Cruelty-Free Material

Environmental degradation and natural resource constraints are demanding sustainable technological advancement in agriculture. Innovative approaches to turning farm waste into ecological and economic assets can contribute to a sustainable way of production. Most crops produce as much or more waste than they do usable products. With this background, the startup Atma Leather introduced the idea of converting banana waste into good-quality leather products. This became a solution for the environmental damage created by the leather industry through the utilization of resources. With educational knowledge and incubation support, the founder, Ms. Jinali Mody could make the innovation into reality. As an environment-friendly product, the startup could create a positive impact not only on sustainability but also on the livelihood of the farmer by providing additional income.

Introduction

India has a rich history of agriculture and with the increasing focus on sustainability and environmental conservation, Agri-startups in farm waste

management have gained importance in recent years. Over the years, the agricultural sector in India has faced a major challenge in managing its farm waste, which has resulted in significant environmental degradation. The COVID-19 pandemic had a significant impact on the agricultural sector, but it also highlighted the need for sustainable agricultural practices. This has led to an increased focus on agri-startups that provide solutions for managing farm waste in a sustainable and efficient manner. The government has also launched several initiatives, such as the Atmanirbhar Bharat Abhiyan, to support the growth of agri-startups and encourage sustainable agricultural practices. Overall, the growth of agri-startups in farm waste management has been encouraging, with several innovative solutions being introduced to tackle this issue.

In the early years of the 21st century, the focus of agri-startups in India was mainly on improving agricultural production and yield. There were very few startups focused on farm waste management during this period. Startups like Carbon Masters India, Blue Tribe, and Roli Roti emerged during this time and introduced innovative solutions such as converting farm waste into biofuels and fertilizers. Government initiatives such as Swachh Bharat Abhiyan also promoted the importance of waste management and provided funding and support for startups in this sector. However, a few startups began to recognize the potential of managing farm waste and started working on solutions to reduce the environmental impact of agricultural practices. And those startups includes, Indian Green Service, Saahas Zero Waste, and Daily Dump.

Areas of Concern

In India, 350 million tonnes of agricultural waste are generated each year. That quantity makes up 35% of the global total of around a billion tonnes of crop waste. Most crops produce as much or more waste than they do usable products. India, for example, is the world's biggest banana producer. During every harvest, 80% of the banana plant ends up wasted - around 120 million tons and the amount of waste generated each year is growing. Less than 10% of banana waste alone is used in some way. Indeed, around 40 percent of the crop gets wasted as a peel. Much of the time, banana waste and other crop waste is simply burnt or left to decompose, yielding pollution and emissions of greenhouse gases like methane and carbon dioxide.

The leather industry is responsible for significant environmental damage and also puts immense pressure on land, food, and water resources. Fruit waste is increasingly being transformed into vegan leather, reducing waste and pollution and helping to create cruelty-free and sustainable materials for the

fashion industry. Looking to the global scenario, in Spain, Persiskin launched a vegan leather made from leftover persimmons, while Pinatex uses pineapple leaves to create a luxury alt leather, a favorite among eco-consumers. Other companies are leveraging fruit waste, using tamarind pods and apples to make shoe collections, watches, bags, and accessories. In Kanpur, India, untreated effluent from tanneries carries heavy metals like chromium into the Ganges River. From there it makes its way into drinking water, crops, and soil, causing congenital defects and debilitating skin diseases. All this effort exploits the natural resources also. A single leather handbag uses up to 18,000 litres of water which could have to meet the daily water needs of over 5,600 people.

The emergence of Atma Leather

Inspired by the above causes of leather making and crop waste in India, the journey of Atma Leather began in early 2022, Ms. Jinali Mody who is the founder of Atma Leather faced difficulty in finding an environmentally friendly leather bag made in India. Also, during the monthly radio address of 'Mann Ki Baat', the Prime Minister emphasized the importance of vocal for locals and adopting new alternatives and innovations in the agriculture sector to increase farmers' income and create employment opportunities, which triggers her to work on the vegan based leather idea.

As someone from India which is considered as the leading exporter country of leather, Ms. Jinali was aware of the environmental impact of this resource-intensive and highly polluting material. She recognized that even synthetic leather, which is advertised as vegan, is derived from petrochemical sources. Given the lack of sustainable alternatives, Ms. Jinali embarked on a quest to replace materials that have a harmful impact on the planet. But to understand in depth how exactly it started from an Idea to Reality, we need to go into the past.

Ms. Jinali leveraged her business experience from McKinsey & Co. and her Master's Degree in Sustainability from the Yale School of Environment to kick-start the venture. In her first year at the Yale School of the Environment, was looking for areas in climate and sustainability where a startup might be able to make a tangible difference. Where Ms. Jinali got $25,000 from Startup Yale's 2022 Sustainable Venture Prize and the necessary equipment for basic R&D and to build a functioning Minimum Viable Product (MVP).

Incubation Support and Journey of Atma Leather

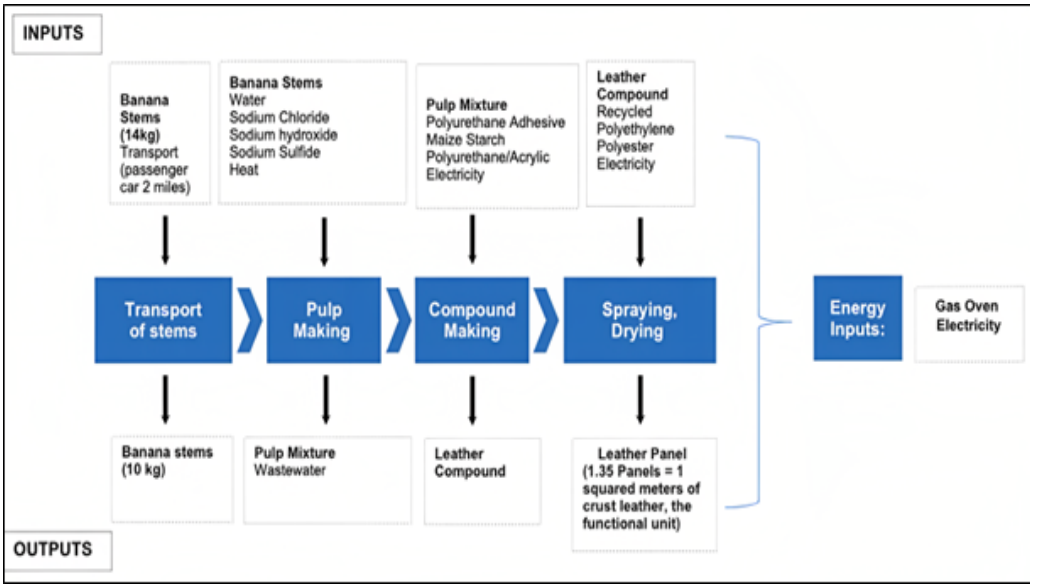
The startup found a niche in a surprising intersection between the problems plaguing leather making and another industry: agriculture. Meanwhile product development and R&D, Ms. Jinali came across the "Rashtriya Krishi Vikas Yojana

- Remunerative Approaches for Agriculture and Allied Sectors Rejuvenation" (RKVY-RAFTAAR) is a flagship scheme of the Ministry of Agriculture and Farmers Welfare (MoA&FW), Government of India is aimed at strengthening infrastructure in Agriculture and Allied sectors by building Agripreneurship & Agri-Business ecosystem in the country, facilitating financial aid to potential Agri-startups and nurturing a system of business incubation. The National Institute of Agricultural Extension Management (MANAGE) supported her startup with the mentoring training program of two months under the RKVY-RAFTAAR program and provided a networking opportunity for connecting with various stakeholders of the startup ecosystem. MANAGE, an autonomous Institute of MoA&FW for agricultural extension, has long been a leader in assisting agricultural entrepreneurs. For the benefit of Agri startups, MANAGE established a Centre of Excellence and Incubation Centre (MANAGE-CIA). The centre's focus is to promote Agri-Startups, which provide better support to their services, products, and technologies in the agriculture value chain. By creating a national agribusiness ecosystem, providing financial support for potential agri-startups, and maintaining a business incubation system, it aims to develop infrastructure in agriculture and related industries.

Armed with funding and a good idea, Ms. Jinali headed back to India to get the company off the ground. The startup journey started with finding Head of R&D, Shashank Srivastava, who was born and brought up in Kanpur and knows the ins and outs of the leather industry and spent the last decade working in the fashion industry. Ms. Jinali met many people along the way who said they knew how to make plant leather, but it is extremely complex and challenging. They opined that 'you have to make a material that lasts very long and you have to do it sustainably and That's not easy'.

"Banofi" is a premium banana leather brand developed by Kolkata-based material innovation firm Atma Leather by upcycling banana crop waste and transforming it into fibres. Atma Leather is using discarded banana crop waste to create plant-based leather, addressing the issues of pollution and animal cruelty in the leather industry and the growing issue of crop waste.

Banofi's make-up is 50 per cent banana stem waste and 30 percent natural additives such as rubber and gum arabic. The remaining 20 per cent is made from primarily recycled polymers required for the leather backing, but Atma is working to innovate and reduce its dependence on polymers. The leather has a significantly lower environmental impact than animal and plastic leather, with 90 per cent less carbon emitted and 90 per cent less water required in the manufacturing process. Atma's process also doesn't create any toxic wastewater and saves animals that would otherwise be slaughtered to produce leather.



Flow chart of manufacturing Leather from Banana stem

Moreover, she began to search for a space and saw more than 50 spaces in Calcutta and found the perfect facility for her startup, as bananas are the primary raw material for banana leather production. Therefore, it's essential to choose a location where bananas are readily available in sufficient quantities and at a reasonable price. Bananas thrive in warm and humid conditions. Therefore, it's essential to select a location with a tropical or subtropical climate, with an average temperature range of 25-30°C and moderate rainfall. While choosing a location for her startup, the availability of skilled workers, transportation options, and infrastructural facilities are the other primary factors are considered.

She searched for the basic machinery that would be needed. As things began to fall into place, they started to find a team. Their procurement specialist, Kaushal, recruited most of their team from the Government College of Engineering and Leather Technology in Calcutta. Shashank leads the design department and has a decade of experience working with export houses that produced leather apparel for popular fast fashion brands like Zara.

The team experimented with mango peels and cores, as well as wheat straw, which are waste products from the pulp industry. However, due to the short seasons for both of these raw materials, sourcing them proved to be challenging. As a result, they turned to the perennial banana crop. Banana fibres extracted from discarded banana pseudostems are ideal for their purposes as they are soft, supple, and breathable. These fibres are also incredibly durable, owing to the thick walls of cell tissue that are bonded with natural gums. The material

composition includes cellulose, hemicellulose, and lignin. Banana fibre possesses the excellent spin ability, fineness, and tensile strength, making it an ideal raw material for vegan leather.

Furthermore, banana fibres have a natural shine that is similar to leather. Most importantly, they are eco-friendly, chemical-free, non-toxic, odour-free, and biodegradable. The startup has conducted extensive comparison tests between its material and animal leather. The results show that their material "Banofi'' (banana-fibre leather) is free from toxic metals and chemicals. Additionally, their material exhibits comparable characteristics to animal leather, including tear strength, flexibility, and overall look and feel. The material is tested by accredited labs across the country such as SGS. This SGS's Eco secure certification supports the global footwear industry by enabling it to verify that components or products have undergone testing and are certified against this global benchmark. Atma Leather has also received a PeTA vegan certification, which indicates a certification for products that do not contain any animal-related materials. However, they are continuously striving to improve the durability, softness, and tensile strength of the material.

The most significant barrier to their enterprise has been the inertia required to move a new product. Leather has existed since ancient times. However, it takes a great deal of time and effort before customers are willing to try their material; to build faith and trust. Atma Leather relentlessly strives to build this faith by providing boutiques with free samples and improved material in return for feedback. To gauge consumer interest in sustainability, they conducted surveys at Yale, which revealed that over 80% of consumers care about sustainability and are willing to pay over 20% more for a more sustainable alternative. They have also engaged with several boutiques to gather on-the-ground customer feedback, with a particular focus on India.

Impact Created by Atma Leather

Atma Leather is a team of individuals with expertise across leather, textiles, design, agriculture, and material science. The startup has generated employment opportunities for women entrepreneurs and rural youth. They possess a diverse range of skills and expertise in leather, textiles, design, agriculture, and material science. The startup is backed by industrial experts and advisors namely Mr. Avinash Goyal, Senior Partner at McKinsey Chemicals & Agriculture Team, Ms. Monica Shah, Co-Founder of Jade, a Luxury Fashion House in India and Mr. Vidit Bhandarkar a Ph.D., Consultant at MIT. Atma Leather continuously striving to improve the durability, softness, and tensile strength of their plant-based leather material.

Atma Leather provides banana farmers with an additional income of Rs. 2/Kg and labour cost to remove the stem, which is the monthly additional income of Rs. 1500 to the individual farmer (on the procurement of ~5000 kg per month – which yields <10% of usable raw material). Atma sources its banana waste from more than 12 smallholder farmers from the area of Rajpur Sonarpur in the state of West Bengal, where this waste is not utilised. These farmers are compensated for their produce, disincentivising harmful crop-burning practices and, by removing the banana waste quickly from farms, reduces water logging in fields and the breeding of mosquitoes and scorpions.

Atma Leather got its first order of 150 leather-bound notebooks for the Yale School of Management and has buyers at small boutiques and major fashion houses alike interested in using Banofi in their products. The startup has just started generating revenue of Rs. 2.00 lakhs of in the previous Financial Year 2022-23 and Atma Leather has team currently consists of 13 members, with 60% being women.

At present, they have established affiliations with more than 20 eco-friendly boutiques situated in India, the United States, and the United Kingdom. Atma Leather partners with brands includes Studio Beej, Pixie Mood, Coral by Seema, Mondarro Shoes, Lo and Sons, Amare Antwerp, Misfit Panda, Crimzon, Sylven New York, Luxtra London, Nisolo, and Santos By Monica, among others and working hard to position her startup in the international market. These partnerships were established by diligently approaching brands already involved in sustainable practices. As a result, they have received requests from brands interested in launching a range of products made with their material. Moreover, they have a contractual agreement with one brand granting them exclusivity until their summer launch.

Ms. Jinali looking forward to the Agricultural Accelerator Fund introduced by the Government of India, which seeks "creative and cheap solutions to the difficulties faced by farmers'' and current technology to be efficient and successful, it inspired her to scale up her venture. She travels in Europe and the United States to scale up her startup, but she envisions Atma remaining based in India, where it benefits from proximity to both the farmers it works with and the manufacturers it hopes to sell to.

CASE STUDY - 2

Bariflo Labs – On Mission to Provide Quality Water for Aquaculture

Founded in 2018 by Mr Mrityunjaya Sahu, Bariflo-labs is a startup working in the aquaculture sector. They have developed an Intelligent and automated aquaculture management system comprising sediment aeration, water column and sediment mobile monitoring and mobile nutrient control module. The primary application of their system is in Shrimp Aquaculture with the major market segment being B2B i.e, Shrimp aquaculture farmers. They are also offering total water management solutions for water bodies.

Mrityunjaya Sahu founded Bariflo Labs with a vision of providing the best water quality needed for aquaculture. The level of dissolved oxygen at the sediments is not optimal as per the requirement and Bariflo Labs came up with an AI-IoT Robotic aeration device called LOTUS for aqua-pond. Their IoT-based aeration system is a wave-based diffused aeration that operates at the sediment, where the aeration works by the guidance of mobile monitoring system. They also have a mobile AI-IoT floating robot that gathers water-quality parameters at different strata of the water body on a real-time basis and provides a complete three-dimensional picture of the water body. The data helps in the early detection of shrimp disease and facilitate timely action.

The device was found to be quite useful for both Aquaculture and urban water management bodies with a total of 12 Cr litres of water managed by the 19 devices installed by the company.

Introduction

In India, approximately 16 million farmers are involved in aquaculture as an occupation among them sizeable population are involved in shrimp farming. Based on yield, shrimp farming can be segmented to three segments. Intensive farmers, semi-intensive farmers and rest are low-income traditional farmers. In all the segments, it is observed that farming is unorganized. Bariflo Labs, a technology-based aquaculture startup is planning to capture organized the market by making farmers its adopting sustainable green technology and management practice will enhance yield by at least two times leading to creating bigger market. In addition, acceptance of aquaculture as an organized market can be established, quality and quantity of exports also can be improved. The business and tech model is very much scalable as segments are well explored as well as the requirement to scale the model doesn't require not more than 2-3 crore in India. Further, as the issue is so ubiquitous that the tech and

business model can be replicated to other geography and other issues such as lake cleaning, and reservoir health management as well. In India, as in many countries across the world, groundwater levels have been depleting rapidly and at unsustainable levels for the future. What has happened down the line is that a huge amount of water is being drained, the soil moisture is eroding faster leading to desertification. All major cities across the globe are water-stressed, as well as in the villages, where all the farmers are pumping water from the ground. The challenge is finding a way to show value in the water. This is how he ended up building a venture in the aquaculture sector to create dependency on water reserves.

Startup Founder's Introduction

To address the issue water quality management, Mr Mrutyunjaya Sahu from Titlagarh, Bolangir, Odisha founded Bariflo Labs. Mr Mrutyunjaya is an Environmental studies academician with specialization in water management. His interest has always been in water resources. He spent much of his early career in academia and had been studying the water sector since his undergraduate years. He has pursued his PhD from the University of Canterbury. Previously, he did his MS and B. Tech from NIT Rourkela in Civil Engineering. He has published highly cited publications on the application of Artificial Intelligence in water resources management. He has also filed product design patents for water quality improvement of water bodies. One of the main verticals of his innovation is Aquaculture, primarily pond based/brackish water aquaculture.

Birth of Bariflo Labs- Aquaculture Startup

Technology: Bariflo Labs has developed an innovative water body management system by leveraging fluid dynamics, IoT (Internet of Things), robotics, and AI (Artificial Intelligence) for aqua-farm management. Its intelligent and automated aquaculture management system comprises of sediment aeration, water column and sediment mobile monitoring and mobile nutrient control module.

He left an enriching life after his Ph.D., in Australia and came back to India to pursue his venture. He entirely bootstrapped his venture Bariflo Labs and built a team to create a prototype for the proof of concept. He leveraged upon his knowledge on water resource rejuvenation and fluid dynamics and gathered knowledge on AI-IoT and robotics, collaborating with several research institutions and academics. Bariflo Labs has worked closely with ICAR-CIBA (ICAR- Central Institute of Brackishwater Aquaculture) for validating the proposed technology such as diffused bubble aeration, Intelligent hypolimnetic

aeration and the results and the results were promising. ICAR-CIBA provided the ground and facility for the testing and validation of the technologies which helped in the POC of the device. Subsequently Bariflo Labs developed several patented devices for the field of aquaculture such as the ISAS (integrated sediment aeration system) and IMS (intelligent monitoring system). Patents were filed based on the study such as "**Intelligent Maneuvering Hypolimnetic Aeration System"** with patent number 201831031000.

Bariflo Labs is an industry 4.0 compliant startup that has developed a water body management system by leveraging technologies such as AI-IoT, machine learning, LORA transmission. The company offers intelligent solutions for aquafarmers, co-operatives, villages, communities, cities and industries at a variety of scales. In different fields the devices are deployed for specific requirements for example in case of aquafarmers the prime objective of the devices are to monitor and maintain the DO level at a higher value for cultivating high population of fish in a smaller area, where as in case of cities the main objective is to remove the surface dirt of the waterbodies, remove Phosphorus and Nitrogen to suppress the bad odour and algal bloom etc. Same devices could serve for different requirements at different fields using the sensors and analyzing the final deliverables.

Intelligent Solutions for Aquaculture Management

Bariflo Labs has developed an innovative water body management system by leveraging fluid dynamics, IoT (Internet of Things), robotics, and AI (Artificial Intelligence) for aqua-farm management. Its intelligent and automated aquaculture management system comprises sediment aeration, water column and sediment mobile monitoring and a mobile nutrient control module. Fluid dynamics and robotics mainly helps in the aeration maneuverability and efficiency for water quality and suitable oxygen transfer mechanism in the water. AI and IoT are used for the monitoring of the aeration and data integration to the overall mechanism. A data driven aeration method could be implemented. In the majority of the shrimp ponds, lack of consistent electricity and connectivity is observed where the devices can be life savers for the farmers. Monitoring can be homogeneously done across a pond by sediment mobile monitoring and mobile nutrient control module is useful to provide nutrition to the livestock in the pond uniformly.

Startup Incubation Support, Funding and Inspiration

The project was initially bootstrapped by the founder; his prototype was subsequently supported by the Vellore Institute of Technology Incubation fund

where Bariflo Labs raised its first external funding. Later the company was selected for multiple grants including secured SEED FUND under Biotechnology Industry Research Assistance Council (BIRAC), grant in aid under Innovation and Agri Entrepreneurship program under RKVY-RAFTAAR.

In one of the "Mann ki Baat" sessions the Hon'ble PM of India Shri. Narendra Modi expressed the intent of "Amrit Sarovar" plan which initiated the establishment of 75 ponds in each district in India with the proper management system for the ponds and promote livelihood for the community. This was a great opportunity and hope for Bariflo Labs to leverage its technology to serve the purpose.

As the company grew and the prototype developed towards MVP, several other grants were awarded recognizing the gravity of the problem addressed by the startup. The initial prototype was costing a lot and was unaffordable by the target customers. Besides, there is a distinct difference between a theoretical concept and field application, so there were many instances where the prototype failed to perform as desired in an extreme or unpredictable conditions. So it was a long way to stabilize the product to work efficiently in all conditions and also to be cost-effective.

Startup came up with the flagship products of Bariflo Labs are ISAS (Integrated Sediment Aeration System) and IMS (Intelligent Monitoring System). The ISAS is responsible for the sediment aeration of water bodies and thereby improving the water quality for better productivity in aquaculture and cleanliness for urban water bodies. It increases the DO (dissolved oxygen) and manages the BOD/COD, pH and ORP. The IMS has the purpose to acquire the water data, analyze it and implement a data-driven aeration for the ponds and subsequently use the data for predictive modelling of outcomes. Aqua farmers in Odisha, Tamil Nadu, Telangana and Andhra Pradesh have used the devices and shown impressive results in their productivity and maintenance. The devices could be installed in the ponds of the farmers and they work in automation. The farmers could monitor their operation through web/smartphone dashboards. Several parameters such as DO, ORP, pH, BOD/COD, TDS/TSS, TOC and TAN can be monitored.

Impact

- 19 devices deployed across three states
- 12 Cr Litres of water quality improved
- Up to 25% of productivity enhancement for the aqua based farmers
- Saving 50% of the energy cost through innovative solutions

The devices have been proven to be more effective than the traditional paddle wheel and jet aeration system. Farmers from different regions have secured more profit and managed their ponds in a much more structural way. Nineteen devices deployed across three states with 12 Cr Litres of water quality improved. There is an Up to 25% of productivity enhancement for the aqua based farmers and saving 50% of the energy cost through innovative solutions.

Awards and recognition

Bariflo Labs have won several accolades on its journey from multiple Government agencies. The Ministry of Housing and Urban Affairs has recognized Bariflo Labs for its exceptional contribution to the field of rejuvenating ponds and creating livelihood through aqua farming. It has also won the 'Fisheries grand challenge' from the Department of Fisheries.

Revenue Generated

Year	Income/Turnover(In Lakhs)
2019-20	3
2020-21	12.5
2021-22	48
2022-23	100

Vision for the Startup and Services

Bariflo Lab's Vision is to rejuvenate and create livelihood around the waterbody of PAN India and expand to North America, Australia and Europe. With its technology, biodiversity can be revitalized and GHG emissions can be tackled easily which would be a game changer. In the next 10 years, Bariflo Labs aims to expand to all major cities across the globe where these small and medium-sized lakes are eutrophic and not being managed properly because of a lack of monetization opportunities and ignorance about the problem.

As one of the biggest dreams, startup want to create a platform for aquafarmers to be connected with the real-time monitoring and maintenance of their ponds and livestock. Along with this, the farmers would be able to interact with experts for consultation 24x7 by creating a profitable online business model for the aquaculture consultants. Subsequently Bariflo Labs has the aim to expand these services all over India for both pond based and brackish water aquaculture targeting a minimum of 30000 farmers and create direct and indirect employments by creating a sustainable supply chain of high quality aqua products all over India and creating awareness about the philosophy of innovating new technology in this field.

CASE STUDY - 3

Tribe Grown - Serving Pure

Social entrepreneurship can contribute to the economic empowerment of tribal and marginalized communities of society. The startup collaborated with local tribes by creating a supply chain for the products such as wild honey, Desi ghee cow and turmeric powder. And this has given the uniqueness of the product by giving flavor of nature and tradition without any modernization. Apart from the product The startup has given training to 1500+ farmers and tribals from the states of Maharashtra and Madhya Pradesh for long-term skill advancement.Ultimately it could provide financial independence to the marginalized community by improving their income by 30 percent.

Introduction

Tribe Grown, one of the startups incubated and supported by the National Institute of Agricultural Extension Management (MANAGE), Hyderabad, is training tribal farmers to produce high-quality natural products in the state of Maharashtra and Madhya Pradesh, making them available to urban consumers at an affordable price. The startup has been selected for financial assistance in the form of a Grant-in-aid from MANAGE through the RKVY-RAFTAAR scheme of the Ministry of Agriculture & Farmers Welfare, Government of India.

Wild honey, turmeric powder, and Desi Cow Ghee are among their products. All items are supplied by tribal and marginalized farmers in Maharashtra and Madhya Pradesh's wilds. The items are specifically sourced without losing their tradition and originality.

Bhavesh Ravindra Wankhade, Founder of Tribe Grown has done his master's in social Entrepreneurship from the Tata Institute of Social Science (TISS, Mumbai). As he grew up, he was exposed to the alarming issue of farmers' suicides in Vidarbha and Central India. His father used to discuss the pain points with him, and he felt a strong urge to find solutions to the problem which piqued his interest in the farming sector, and he realized that he wanted to work towards improving the lives of farmers and their families. According to him, the motivation behind his startup was driven by several factors, including his father's heart attack, the importance of healthy food, the need to bridge the gap between tribals and the market, and the growing demand for safe and healthy food. Earlier the founder visited many companies to understand their operations which provided him with valuable insights into the market and helped him further in refining their business strategy.

Partnership with Tribal Farmers

> "In the 75th episode of Mann Ki Baat, Honourable PM Modi said that farmers should embrace new alternatives while doing traditional farming and urged farmers to diversify the agricultural income. While listening to Mann Ki Baat, I felt like a new energy to go deep to the problem and now PM himself is suggesting the diversification of the farmers and tribal farmers' income. It was kind of an approval I got for my model and with all my confidence and resource. I have started working on the ground with the tribal farmers"- Bhavesh Ravindra Wankhade, Startup Founder, Tribe Grown.

Startup partnered with the local tribes and work together to prepare the product for the market. They have established a supply chain for the product and designed appropriate packaging and send their samples to customers for feedback, both in bulk and retail, and then launch the product. The startup prioritize cost-effectiveness, adaptability, and accessibility to make our products available to farmers and customers sustainably and efficiently. Startups also promoted sustainable farming practices among tribal communities and connect them with consumers looking for safe and healthy food options.

Startup products are also in demand in the US, Singapore, Australia, and Dubai. Founder says that he has no problem with the customers, but the production is not that much due to limited resources, and they are constantly looking for investors who share their vision of creating a sustainable and equitable food system. They are also planning to launch seven new products, which will be sourced directly from tribal farmers using sustainable and organic farming practices. Startup aims to expand their product line and increase the income of tribal farmers while promoting sustainable and healthy food options for consumers. The tribal communities in the country are still far away from mainstream society. They have been farming in the same way for centuries. As such, it was quite challenging to bring about change there.

Their products include Wild Honey, Turmeric Powder, and Desi Cow Ghee. All products are sourced from tribal and marginalized farmers from various wilds of Maharashtra and Madhya Pradesh. First, they select the tribal region where they want to work and the product they want to launch. Then they collaborate with the local tribes and work together to prepare the product for the market. They also establish a supply chain for the product and design appropriate packaging.

The products come from remote lands, untouched by modernization. The forests are blessed with a vast diversity of flora and fauna, and they are mainly focused

on wild honey from the Melaghat tiger reserve in Maharashtra and Madhya Pradesh. The bees source their nectar from plants such as the Sheesham, Neem, Jamun, Mahuaa, Amaltas, and thousands more, making the honey a rich source of vital nutrients. The lands are so fertile, that turmeric can be grown with no pesticides or chemicals. The tribal cows are healthy and are forest grazed, making their milk abundant in nutrients. Furthermore, the milk is removed only after the calf has had its due. All of these factors contribute to the products being natural, high-quality, and flavourful. Moreover, zero to minimum processing is used for the products, making them chemical and preservative-free.

Digital Marketing and Organic Stores

The Company sells its products through social media platforms like Facebook and Instagram by posting its products and all the required information with the help of social media marketing. Apart from this, their goods are also available in more than 120 organic stores in the country in states like Madhya Pradesh and Maharashtra with the help of sustainable agriculture promotors.

Best Practice in Bee-Keeping

Tribe Grown changed its process. The earlier tribal community used to cut the entire beehive for honey. Due to this hundreds of bees used to die in one hive. Then, the startup guided them that a beehive is like a house, with the young living separately and the adults living separately. Earlier they used to wrap cloth on the face, smoke it and cut the honeycomb. They taught them how to use shoots and how even by cutting just 10-15 percent of the hive, the entire honey can be extracted. They also helped the farmers in learning about the method of beekeeping. In this process, the whole hive was not wasted, and honey could be extracted from it again in 10-15 days. Earlier the tribals were extracting the honey by smoking it for centuries. That's why it was not easy for them to adopt a new method. Startups adopted strict ways to show the right direction to the tribals. They stopped buying honey from farmers who don't wear suits and cut the entire hive to show them the right path. This made them (farmers) to realize that if they are selling honey on the roadside, they may get only Rs.100 per kg, but Startup was buying from them for Rs.300 per kg. In this way, in the desire for more profit, they were motivated to change themselves. Earlier tribal farmers could hardly get four to five kilos of honey from a hive and moreover, beehives were destroyed but now they get 10-15 kg of honey easily through extensive research and training programs conducted by the startup to educate the tribals on the importance of bees in the wilds and sustainable ways to harvest honey without destroying the beehives. Startup team also taught tribal farmers the right time to harvest honey to get the best quality. Startup is currently associated

with 1200 farmers from tribal communities like Korku, Gond, Bhil, and Bhelwa, of which 500 work directly with him.

Startup Activities

Tribe Grown Startup had a significant impact on the lives of tribal farmers in Maharashtra and Madhya Pradesh. In addition to creating employment opportunities, Startup team members are also working towards empowering women entrepreneurs, rural youth, and self-help groups (SHGs) and by providing training, resources, and support to these groups, they can help them to build their skills, create their own enterprises, and become active participants in their local economy. Startup believe that by investing in people and communities, it can create a more equitable and sustainable world for all.

Impact

Founder himself along with other team members have trained more than 1500 farmers in over 30 villages and has seen a 33% increase in their monthly income, benefiting at least 300 + farmers. Out of 1500 trained, 1200+ have been employed and are working with them to produce high-quality sustainable products. Their efforts have not only raised the income levels of these farmers but also equipped them with the necessary knowledge and skills to adopt sustainable and organic farming practices.

Revenue Generated

Year	Income/Turnover (In Lakhs)
2020-21	7.00
2021-22	45.00
2022-23:	200.50

Innovation/USP

- Better Livelihood in own area
- Creating Micro-Entrepreneurs
- SHG & FPO Formation
- Value addition, processing, and packaging practices
- Tribal (Gondi) language Agri Literature Videos
- Research & Revive Desi Seeds
- Land & Soil Specific Training
- Forest to Fork Supply Chains

Network of Farmers as Entrepreneurs

By connecting with these farmers, they have created a network of rural entrepreneurs, helping them to grow their businesses and contribute to their local communities. Startup has also hired members from the tribal community to procure and transport the products to our warehouse. This not only creates employment opportunities for the community but also helps us to build a strong network of individuals who are invested in the success of our business. Through their team building and employment generation efforts, they aim to not only create a successful business but also to make a positive impact on the lives of those they work with.

Startup's innovation and adaptation in product development and supply chain management have resulted in a positive impact on the environment and the economy and have contributed to the sustainable development of rural areas. Mainly farmer connectivity is the backbone of their business model as work closely with tribal farmers to educate them about sustainable and organic farming practices and provide them with market linkages and fair prices for their produce.

CASE STUDY - 4

Pashushala.com – Comprehensive Online Solutions for Cattle trading: A Case Study of Inspiration to Implementation

Pashushala.com is an online marketplace for livestock aimed at reducing the dependencies on middlemen and to further strengthening the Livestock Economy of the country. It intends to help farmers with a wide variety of choices and better prices.

It was founded in 2018 in by Mr Gaurav Choudhary and a team of technology management professionals, has first-hand experience with the livelihood of farmers. The startup understood the need for "Bharath" and Pashushala.com is the solution that connects "Bharath to India". Mr Gaurav is inspired by the talks of the Honourable Prime Minister – Mann ki Baat, where he emphasized Indian Products for Indian Consumers and a Self-reliant and resilient Nation (Aatma Nirbhar Bharat), and the idea of Pashushala born.

Pashushala has supported over 30000 farmers through animal husband and dairy. They have enhanced their livelihood and social status while making them self-dependent (Aatma Nirbhar). They have generated revenue of Rs 5 crores as of March 2023 and have shown the model is self-sustainable and can go a long way in supporting the farmers.

Introduction

Technology is playing a major role in the last decade in solving the problems faced by the agriculture sector. Many innovations are being introduced by the Agri-startups. Agri- startups play a crucial role in the sector through various technology-led interventions. India is the world's largest dairy producer as well as has the world's largest livestock population but in terms of livestock productivity, it's lagging. There exists great scope for improvement that can create huge economic value. The allied sector is an integral part of the Indian agricultural ecosystem with India being the largest producer of milk and buffalo meat, second in terms of production of goat meat and eggs. The sector contributes to nearly 30% of agricultural products in terms of value. This has allowed multiple startups to venture into the sector. Number of livestock technology-based startups are there in India solving very critical problems in the sector.

Currently, the availability of quality livestock is only in certain geographical regions, such as quality Gir Cow are available in Gujarat, Sahiwal in Haryana, and Rajasthan, Murrah buffalo in Haryana and HF in Karnataka and Punjab. This resulted in a distributed market, absence of any organised player in the domain has left the industry highly unstructured, besides, a lack of quality breeds and access to best practices, and veterinary services results in loss of income and also a limited income opportunity for a farmer. This lack of organized players in the livestock industry was identified as an opportunity by Mr Gaurav Choudhary, and he launched Pashushala.com, an integrated online marketplace for livestock and livestock-related products, services to digitalise and organise the Industry as a whole. The solution is an innovation in animal husbandry and dairy space that's transforming the way livestock have been traded and has supported over 30000 farmers to date.

The company was founded in Sept'2018 in Bangalore by Mr Gaurav Choudhary, a technology management professional with over a decade of experience across multiple sectors. Promoters come from a humble background and have closely seen the livelihood of farmers. Mr Gaurav is inspired by the Talks of the Honourable Prime Minister – Mann ki Baat, where he emphasized Indian Products for Indian Consumers and a Self-reliant and resilient Nation (Aatma Nirbhar Bharat) and the Idea of Pashushala born.

It offers livestock (Cow, Buffalo, Goat, Sheep), and livestock-related products and services like livestock insurance, transportation, veterinary services, feed/ fodder, cattle accessories, plant equipment etc. through an Android application and web portal. Here, the customers can choose from a vast pool of curated

livestock, compare prices in real-time, and make decisions based on factors such as produce, distance, price, and age of the animal. They are providing multiple solutions in the livestock trading space by collaborating with various stakeholders of the livestock industry. The company work with several transporters, insurance providers, feed/fodder manufacturers, plant equipment manufacturers, veterinary doctors etc to offer its services seamlessly across geography. Pashushala is all set to disrupt the market with its game-changing offering. Founders themselves have experience in the dairy sector. They wanted to create a solution that can unleash the income potential from livestock while enhancing their health and productivity, their solution is now well-received in the industry and has benefited several farmers across India.

Motivation to take up the Startup

Opportunity to create a company that can create sustainable Impact at scale and keep on adding value to the lives of farmers.

Primary and Secondary research was the key to hypothesis and solution modelling, they undertook structured question-based interviews and free flow connection with approximately 2000 dairy farms across the country. They also conducted focus group discussions with experts to understand the gaps in Animal Husbandry and Dairy Industry and create solutions to bridge them. The key gaps identified and a solution created:

Key Decision Criterion	Classical Sales Findings	PS Sales
Geographic reach	100 KM	Over 1500 KM
Average time to purchase 6 livestock	4 -5 Months	15 Days
Selection/Price/Quality	Traditional/Bargain/Luck	Scientific/ Guaranteed
Accessibility of livestock	Haat/Fair/Referrals	24/7, Online
Insurance, Transportation and Vet Services	Unknown	Upto 100%

First investment: The first investment was from the founder followed by friends and family round. Pashushala.com is incubated at MANAGE as part of the Agripreneurship Orientation Program under RKVY-RAFTAAR program of the Ministry of Agriculture and Farmers Welfare, Govt. of India and incubated and supported with a pre-seed grants of Rs 5 lakh.

The startup also got good visibility and recognition by participating in various

MANAGE led Saturday Webinar Series on Agri startups, and E launch for Agri-startups. The founder was invited to multiple training programs like Pre Incubation Mentoring Program, Digital Marketing for Agri startups where he shared his experiences that inspired aspiring entrepreneurs.

Startup Journey

The journey from prototype to Minimum Viable Product (MVP) was the result of a constant endeavour the cyclic effort of learning, improving and implementing. Some examples are as follows:

Sl. No.	Parameters/ Assumption	Learning	Improvement
1	Android application will start giving results as soon as it gets launched	You need to support technology with manual experts and string processes.	Set up an expert team of animal husbandry and dairy experts to guide farmers.
2	Online payment will be easily adopted	Farmers are sceptical about online payments. It may take time to bring the change	Training, early adopters and local influencers were employed.
3	Processes will enable trade	Trust enables trade	Set marketing campaigns and field activities to establish trust.
4	Digital marketing was nominal driver	Digital marketing (Facebook, Instagram, You Tube) is very extensively used by farmers.	Have a strong digital presence with key focus on target segment.

Initially, they started by working closely with a closed group of livestock breeders and buyers and based on the learning they created the proper tech model, business model, revenue model etc. They are operating in 12 Indian States namely Uttar Pradesh, Rajasthan, Haryana, Punjab, Gujarat, Maharashtra, Karnataka, Tamil Nadu, Bihar, Jharkhand and Madhya Pradesh. The solution is offered via a cognitive Android application and a web portal. The platform is available in 13 Indian vernacular languages and is easy to use by the end users (farmers).

The market is highly unstructured and the target segment is very new to the use of technology (mobile) hence tapping the market was not a straightforward one. But they believed that the impact this idea can create for the ecosystem and

every day is a new day and has its perks and its share of challenges. They readied themselves to solve the issues be it an operational issue of onboarding sellers or giving guarantees to buyers of the livestock. Or be it guiding the technology team to make the product more user-friendly or be it reaching out to investors to excite them for the idea every aspect is challenging. But the solution to all is, trust, as they are working towards building a disruptive innovative channel of livestock sales that gives confidence among all the livestock stakeholders.

Team: Founding members are the most critical factor that a startup need to figure and they have assembled a good mix of management professionals from IIM, IT experts from the top colleges in India, people from animal husbandry and veterinary background, and access to industry veterans as advisors and mentors product/services provided by startup & the farmer connect. They also work with the rural population, train them to be "Pashumitras" and "Pashusakhis" and get social and economic recognition. So far they have a team of 18 full-time employees and over 100 on-demand Feet on Street, Vet and Expert teams. They have transformed over 2000 farmers into Pashumitras and Pashusakhis supporting animal husband and dairy in 10 states of the country. these Pashumitras and Pashusakhis promote trade through the pahsushala.com platform and in the process gets an opportunity to help fellow farmers while generating income for themselves.

Cost-effectiveness, adaptability and accessibility: Quality cattle are not available to cross all geographic locations which is a pertinent problem. Pashushala.com not only solve the problem related to discovery but its processes impart trust and promote inter-state and intra-state trade. The startup provides a trustworthy, convenient and cost-effective solution with end-to-end support. Farmers can avail the services through their Android Application (https://play.google.com/store/apps/details?id=com.pashushala&hl=en_IN&gl=US), Web Portal (www.pashushala.com) or just by giving a call to the centre. Access to the portal and Android application is free of cost, a user can come on the platform and learn/select from a vast pool of livestock options available on the platform. Only for carrying out transaction company is entitled to fee/service charges.

Impact

So far Pashushala has supported over 30000 farmers through animal husband and dairy. They have enhanced their livelihood and social status while making them self-dependent (Atma Nirbhar). Some of the best moments in the startup Journey include:

- International excellence award for best social impact start-up of the year

(2022-23).

- Most promising company for nation-building by Indian Achievers Forum (2022-23)
- Appreciation from Jharkhand Govt. and Ram Krishan Mission
- Top 30 startups to invest in by TimesNext
- Promoted Women empowerment & micro-entrepreneurship for marginal farmers

The startup has access to over 1 Lakh dairy farmers that take support from their platform to improve their dairy and animal husbandry practices. They have provided support to over 3000 dairy farmers directly by enhancing their farm standards and market connectivity.

It is Working with 30,000 farmers across India in 12 states. Generated employment for 118 people with 18 directly and 100 indirectly. Generated revenue of Rs 5 Cr appox as on date.

Revenue Generated

Year	Income/Turnover (In Lakhs)
2019-20	2
2020-21	52
2021-22	108
2022-23	335

Future Plans for the Start-up and Services

Pashushala.com is a disruptive online channel of sales, that brings various stakeholders of the livestock economy together in a managed environment to instil trust and promote trade. The initial few years were dedicated to spreading awareness, establishing processes that farmers can trust, prove that the structured tech-based solution will optimise the livestock trade market. Convincing farmers to change their habits took a lot of effort and eventually they manage to establish Pashushala.com as a trusted channel of sales in the industry that provide 24/7 market access to farmers to buy or sell anything related to the livestock industry.

As they move ahead towards their journey of structuring the livestock market, service expansion geography-wise / vertical expansion domain-wise is on the card. Pashushala wants to expand to 15 states of the country by end of this year 2023. They target to onboard more dairy farmers and animal husbandry

owners across the country so that they can benefit and grow from pashushala. com. They are launching an IoT Solution to track various cattle and farm-related parameters to improve livestock health and optimize farmer income. They have kept themselves a target to support over 10 lakh farmers and create over 10000 women entrepreneurs in the next 3 years.

CASE STUDY - 5

Eco Agripreneurs Pvt Ltd – An Innovation Towards the Sustainability

Residue farming is a key to ensuring nutritional security and environmental sustainability. But shifting from conventional farming to nature residue farming requires proper advisory services, input access and market connection. The startup Eco Agripreneurs Pvt Ltd took this challenge into an opportunity for entrepreneurship and developed a holistic framework for the same. Their ideas of "Eco Rice", the residue-free paddy, Agri pharmacy for quality tested inputs, market connect mechanism, and advisory services to farmers of different crops could make a positive impact on crop production as well as livelihood development of farmers.

Introduction

India is predominantly agrarian; 80 percent of the population is directly or indirectly dependent on agriculture. India is the world's second-largest producer cum largest exporter of rice in the world. India accounts for 21 percent of the world's total rice production. Rice is the most important food crop of India covering about one-fourth of the total cropped area and providing food to about half of the Indian population. The Rice provides instant energy as its most important component is carbohydrate (starch). Surprisingly, rice was found to contain high pesticides and trace elements. India has tremendous potential to become a major exporter of organic rice and residue free rice in the international market. Residue-farming adopts a much wider scope in comparison to natural farming. Environment-friendly sustainable agriculture practices are the need of the hour for ensuring food and nutritional security.

"Honourable Prime Minister's Mann Ki Baat has influenced me in many ways. His ideas for building the nation are truly inspiring. The examples of success stories and inspiring personalities has motivated me to do more for the country. I could understand several initiatives taken up by the Govt through Mann Ki Baat program. He is the first person to seek suggestions from common people"- Nagana Gouda Malkaji, Founder, Eco-Agripreneurs.

Eco Agripreneurs

The Company was founded in the year 2017 by Mr. Nagana Gouda Malkaji who has 20+ years of experience in the promotion of sustainable agriculture. Lack of scientific knowledge among farmers, lack of access to right agro-inputs, pollution of the ecosystem by the harmful pesticides and pesticide residues in the food chain made him to start Eco Agripreneurs Pvt Ltd. He did his Masters in Agronomy from the University of Agricultural Sciences, Dharwad. He is a Master trainer on Sustainable Agriculture/ IPM/FFS. He is helping farmers to produce residue free foods to conserve the ecosystem, protecting the health of farmers, farm workers and consumers. He is an expert consultant for a project "Green Innovation Centre" supported by GIZ, Germany and also a professional consultant for many horticultural crops. He was involved in training GIZ staff and lead farmers on Good Agricultural Practices in Potato and Tomato. His startup Eco Agripreneurs Pvt Ltd is helping these eco-farmers to grow rice responsibly without harming the ecosystem

He has conducted several trainings programs for NGO staff and other extension workers on Sustainable Agriculture Practices, Farmers Field School (FFS) methodology and IPM. He has also coordinated cotton research trials across India and station trials of paddy for reduced pesticide uses. They have farmers growing paddy for the past 6 years (12 crops) without using any pesticides. They trying to promote specific package of practices. They could increase the farmer base from 'zero' during 2017 to 5000 at present. He was quite instrumental in training the research and production team on technical aspects. It was his passion for farming and cultivation that made him quit his job as a Research Agronomist at Seedworks International Private Limited to pursue Agripreneurship.

Mr. Nagana says, "Producing safe food, sustaining the environment and improving agricultural productivity is the key for the future generations". His envisions creating a better life for every farming family by providing support through a holistic approach to crop management that integrates multiple agricultural components such as crop production and soil management, providing technical guidance before selling Agro-inputs, nurturing seed growers and creating a market for pesticide residue free 'Eco Rice'. Eco Agripreneurs procures the residue free paddy by paying a premium of Rs 100/quintal. Paddy will be supplied to exporters after residue testing. Rice is sold in the brand name of Eco Rice to consumers and retailers.

Focus

Agriculture consultancy: They follow a holistic approach to crop management. Often farmers are interested in only pest management but they are educating them

about other aspects of farming, especially plant nutrition through training and awareness activities. Regarding pest and disease management, they consciously focus on building capacities of farmers on growing residue free food, even if it is for the domestic market. They are currently providing technical guidance to about 100 Pomegranate farmers, 200 Paddy farmers, 20 Papaya farmers, 200 Vegetable growers, and about 600 seed growers. These are the farmers who consulted Eco Agripreneurs for farm advisory services and who attended the awareness programs and agreed to try the methods recommended by Mr. Naganagouda. They proudly call themselves as "Eco Farmers"', as they follow ecological principles in farming. This refers to ensuring healthy farming and healthy food for today and tomorrow, by protecting soil, water and climate. The current focus on paddy: Avoidance / reducing pesticides to produce pesticides residue free rice.

Agri pharmacy: They are into marketing of quality agro inputs. Their products are tested and certified by competent authorities. They have gained trust from farmers in a very short period of time. They don't sell inputs without providing technical knowledge. This includes the composition, measurement and frequency of application. This is their Unique Selling Point (USP) and they don't have much competition here. They buy products from quality-conscious, result oriented companies. Regular field visits are made to see the effectiveness of inputs supplied. Field trials are conducted before introducing any new input.

Developing SeedPreneurs: They are into contract farming for hybrid seed production. They have trained farmers on seed production and managerial skills. They are into HSP for about 10 crops. Village meetings were conducted to brief about seed production opportunities. Whoever shown interest will be selected for growing seeds of different crops through contract farming. A typical agreement contains details such as crop, variety, expected yield, minimum assured price, payment terms, seed quality standards, etc. They have a network of a large number of professional seed growers who have been into seed production for several years. They coordinated multilocation research trials across India to choose the best-performing hybrids. They Organized different agronomic trials to decide on the hybrid specific package of practices, data management. They are organizing seed production in various crops like Cotton, Tomato, Okra, Bitter Gourd, Marigold, Chilli, Sunflower, etc. Seed distribution is done through an established network of retailers. Farmers will get genuine seed.

Linking Farmers to Markets: They have begun to link their consulting farmers to markets. There is a huge scope to be expanded, especially for pomegranate.

They are exploring possibilities for pomegranate processing and they see huge potential to connect to niche markets and export. Residue free paddy was procured by them by paying a premium of Rs 100/quintal. Paddy was supplied to exporters after residue testing. Rice was sold in the brand name of Eco Rice to consumers and retailers. They have developed a mobile application AgBiz related to market linkage.

Present focus

- Testing of paddy for residue levels, procurement of residue-free paddy, processing of paddy and marketing of residue-free rice.
- Crop advisory services: Covering 8000 acres of different crops
- Carbon farming: In collaboration with Bayer they are implementing a project in paddy covering 5492 acres in 33 villages of Davanagere, Haveri and Vijayanagar districts. The Focus of the project are Alternate Wetting and Drying (AWD), reducing methane nitrous oxide emissions, balanced nutrition and integrated pest and disease management. They have employed 9 staff members exclusively for implementing this project.
- Manufacturing of micronutrients: We have started manufacturing mixed micronutrients meant for soil application.

Impact

Sl No.	Farmers' impact	
1	Farmers Reach	Direct Reach – About 5000, Indirect Reach – About 20,000
2	Area Coverage	2900 cumulative acres
3	Training	957 farmers
4	Field Days	1313 farmers
5	Krishi Mela	600 farmers
6	Field Visits	450 farmers
	Employment Created: 9 Persons	

Revenue Generated

Year	Income/Turnover (In Lakhs)
2019-20	3,76.07
2020-21	5,95.80
2021-22	6,33.97
2022-23	7,16.15

Collaborations

Mr. Naganagouda Malkaji, in his career span of 20 years have built strong relationship with many research organizations, Agri Universities, KVKs and companies who are into Agri business. To mention few, below are the collaborations of Eco Agripreneurs Pvt Ltd

- Department of Agriculture – Organised Farmers Trainings and Field Days jointly
- University of Agricultural and Horticultural Sciences, Shivamogga: Grown Eco Rice in their farm at Kattalagere successfully.
- University of Agricultural Sciences, Dharwad: Oriented final year Agri graduates at graduates at Dharwad and Hanumanamatti on residue free on residue free rice production
- KAPPEC, Bengaluru: Provided space for exhibiting Eco Rice during Gulffood
- KVK: Jointly organized trainings and field days

Conclusion

India is predominantly an agrarian economy. Hence, the agriculture sector also needs to be technologically advanced as other domains. With the complexity in the sector, the challenges need to be faced with appropriate solutions that are feasible in sustainability also. Hence, innovation needs to be put forth in this scenario to fill these gaps. Startups are considered as the pathway to implementing creativity and innovation in agriculture. With the support of technology and ideas, modernization can be included in to it. The Government's national-level policies and schemes for the promotion of the startup ecosystem with all the stakeholders and this has boosted the entrepreneurs to take up startups. During different episodes of Mann Ki Baat, PM has expressed his interest in the promotion of agri startups for the improvement of various domains of agriculture.

With inspiration from PM's Mann Ki Baat, the startups were focused on some selected activities of nature-friendly practices to livestock development. The case studies indicate how the startups choose the challenges, the selection of choice of innovative solutions, the advancement of the technology implementation and the impact created by the startup to the farming community. These startups indicate that technological advancement can reduce resource utilisation for farming, adoption of AI or automation in could impact the positive utilisation of natural resources. The startup focusing on residue free farming has implemented the idea of residual-free rice production with end-to-end advisory support.

The idea of farm waste utilisation could benefit the farmers with an additional income and which is environmentally friendly. The opportunity of social entrepreneurship has been chosen by the startup for the livelihood enhancement of the marginalized groups of farmers and tribes. They improvised their market connection through a collective organization. With the idea of ensuring livestock welfare, the startup could benefit the farmers for stable income.

Sustained support from the Government has motivated aspiring entrepreneurs to take the agriculture challenges as a startup opportunity. The success stories that are documented in the study could be a model to showcase how the farming challenges and Government initiatives are coming in the same nexus to find solutions through startups.

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