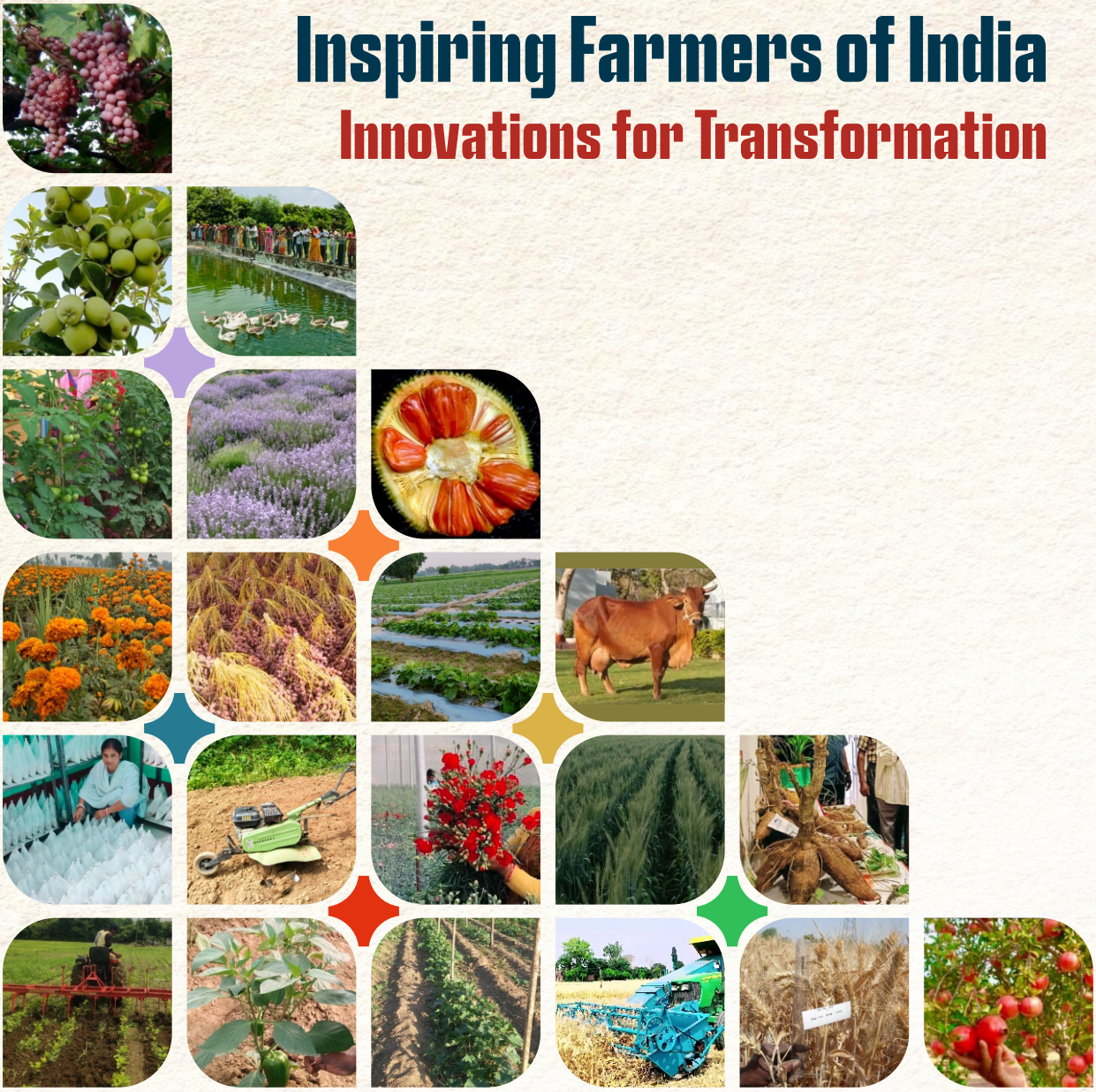
ISBN : 978-81-986753-7-8

Inspiring Farmers of India

Innovations for Transformation



भाकृअनुप
ICAR

ICAR-Indian Agricultural Research Institute
New Delhi-110 012

ISBN : 978-81-986753-7-8

Inspiring Farmers of India

Innovations for Transformation

ICAR - Indian Agricultural Research Institute
New Delhi - 110 012

Vision and Guidance
Dr. Ch. Srinivasa Rao, Director, ICAR-IARI

Editing and Compilation
Dr. Rabindra Nath Padaria
Dr. A.K. Singh
Dr. S. Chakravorty
Dr. Pratibha Joshi
Dr. Punitha P.
Dr. N.V. Kumbhare
Dr. Nafees Ahmad
Dr. Subhashree Sahu
Dr. Misha Madhavan M.
Dr. Girijesh Singh Mahra
Dr. Seema Sangwan
Dr. Gograj Singh Jat
Dr. Sweety Mukherjee
Sh. A.V. Dubey
Sh. Dilip Kumar
Sh. Suraj
Dr. Y.P. Singh
Sh. Mukul Dev
Dr. Pargat Singh
Ms. Tanisha Sachdeva

Contributors
IARI Awardee Innovative Farmers

Assistance :
Ms. Miinal Singh

Citation :
Rabindra Nath Padaria, A. K. Singh, S. Chakravorty, Pratibha Joshi, Punitha P., N.V. Kumbhare, Nafees Ahmad, Subhashree Sahu, Misha Madhavan M., Girijesh Singh Mahra, Seema Sangwan, Gograj Singh Jat, Sweety Mukherjee, A.V. Dubey, Dilip Kumar, Suraj, Y.P. Singh, Mukul Dev, Pargat Singh, Tanisha Sachdeva (2025). Inspiring Farmers of India : Innovations for Transformation. CATAT, ICAR-IARI, New Delhi - 110012

ISBN : 978-81-986753-7-8

Website : www.iari.res.in

Published by :
Centre for Agricultural Technology Assessment and Transfer, ICAR-Indian Agricultural Research Institute, New Delhi – 110012

Printed by : M/s Printsea, Plot No. 199, Sector-53, Phase-II, Kundli Industrial Estate, Haryana
Email: infodotprintsea@gmail.com | Phone No.: +91-7827124201

शिवराज सिंह चौहान
SHIVRAJ SINGH CHOUHAN

सत्यमेव जयते

कृषि एवं किसान कल्याण और
ग्रामीण विकास मंत्री
भारत सरकार
कृषि भवन, नई दिल्ली
Minister of Agriculture & Farmers Welfare and Rural Development
Government of India
Krishi Bhawan, New Delhi

MESSAGE

Agriculture is central to India's economy and remains the main source of sustenance for our rural population. It ensures food security for the nation and provides livelihoods to millions, contributing significantly to economic growth. Strengthening farmers' self-reliance and enhancing productivity are crucial for acceleration of growth in the sector, which necessitates adoption of modern technologies, innovative practices, and entrepreneurial approaches.

The ICAR–Indian Agricultural Research Institute (IARI), New Delhi, has consistently led the way in developing and disseminating advanced agricultural technologies. Its initiative to honour farmers who create and refine locally suited innovations is particularly noteworthy. Recognizing such grassroots achievements not only encourages individual farmers but also helps spread practical knowledge that benefits the wider farming community.

I am pleased to participate in the Innovative Farmers' Conclave on 23–24 December 2025, where ingenious farmers will share their experiences and insights. This conclave offers a valuable platform for learning, exchange, and inspiration, bringing together innovative farmers from across the country.

The book entitled ***"Inspiring Farmers of India: Innovations for Transformation"***, published by the Institute, presents the innovations of the selected farmers. Learning about their achievements will inspire countless others to pursue innovation with renewed enthusiasm. I am confident that this publication will prove immensely beneficial to our farmer brothers and sisters.

I extend my heartfelt congratulations to all the selected innovative farmers and convey my best wishes to the scientists associated with this important publication for their bright and successful future.

(Shivraj Singh Chouhan)

Agriculture & Farmers' Welfare Minister's Office : 120, Krishi Bhawan, New Delhi-110 001
Tel. : 011-23383370, 23782594, 23073789, 23782691
Residence : 12, Safdarjung Road, New Delhi-110 001
Tel. : 011-21411095, 21411096

भागीरथ चौधरी
BHAGIRATH CHOUDHARY

सत्यमेव जयते

कृषि एवं किसान कल्याण
राज्यमंत्री
भारत सरकार
MINISTER OF STATE FOR AGRICULTURE
& FARMERS WELFARE
GOVERNMENT OF INDIA

Message

Agriculture has long been the foundation of the Indian economy and continues to be the primary livelihood source for a large section of our population. As we work to meet the food requirements of a growing nation, it has become increasingly important to adapt our agricultural systems to address emerging challenges—changing dietary preferences, evolving consumer demands, rising awareness of quality and health, depletion of natural resources, and the growing need for efficient food-waste management. At the same time, ensuring fair and rewarding returns for farmers must remain a priority.

Enhancing the standard of living of small and marginal farmers and achieving higher productivity with limited resources are key challenges ahead. To overcome these, the development and effective dissemination of modern agricultural technologies are essential. Innovation, in particular, plays a vital role in creating sustainable solutions that improve both productivity and profitability.

I am glad that the Pusa Institute is organizing the Innovative Farmers' Conclave on 23–24 December 2025, where the selected innovative farmers will participate actively. This platform will enable progressive farmers from different regions to exchange ideas, share successful practices, and learn from each other. Such interactions will undoubtedly inspire and benefit everyone engaged in agriculture.

I appreciate the scientists of the Pusa Institute for compiling this valuable publication titled ***"Inspiring Farmers of India: Innovations for Transformation"***, and for making it available to the farming community.

My heartfelt congratulations to all the innovative farmers whose work is featured in this book. I am confident that this publication will encourage the wider adoption of new technologies and contribute to the advancement of Indian agriculture. I also extend my warm wishes to the scientists who have contributed to this important initiative.

I once again congratulate the organizers and convey my best wishes for the success of this event.

(Bhagirath Choudhary)

Room No. 199Q, Krishi Bhawan, New Delhi-110001. Tel. : +91-11-23782343, 23388165 Fax : 23074190
Camp Office : 28, Tughlaq Crescent, New Delhi-110001. Tel. : 011-23011382, 23019287, 20843001

राम नाथ ठाकुर
RAM NATH THAKUR

सत्यमेव जयते

राज्य मंत्री
कृषि एवं किसान कल्याण
भारत सरकार
Minister of State For
Agriculture & Farmers Welfare
Government of India
D.O. No.....MOS(A&FW)/VIP/

December 15, 2025

Message

The agricultural revolutions experienced in India have clearly shown that when farmers receive the right support of policy, scientific innovation, and adequate investment, they are fully capable of achieving remarkable gains in productivity. As the high-input technologies of the Green Revolution are reaching their limits, the need for environmentally sustainable, health-promoting, and market-responsive cropping systems has become increasingly important. Technological innovations offer strong solutions to challenges related to food and nutritional security and climate change, while social innovations such as collective action, farmer collaboration, and strengthened entrepreneurship are equally vital for improving processing, value addition, and marketing. Together, these efforts will guide Indian agriculture toward inclusive and sustainable growth.

The ICAR-Indian Agricultural Research Institute (IARI) has been providing national leadership in agricultural research, education, extension, and technology assessment since its inception. The Institute's efforts in creating and promoting innovative concepts and technologies have set high standards within the sector. Encouraging innovation among farmers and enabling them to adopt modern technologies is essential for fostering enterprise development and generating employment in agriculture. Recognizing India's most innovative farmers is an important step in this direction.

I am delighted that the Pusa Institute is organizing the Innovative Farmers Conclave on 23-24 December 2025, bringing together the innovative farmers selected by the Institute. This event will serve as a meaningful platform for farmers from across the country to share their experiences, ideas, and innovations, benefiting all stakeholders in the agricultural community.

I applaud the scientists of the Pusa Institute for preparing and disseminating this valuable publication titled "Inspiring Farmers of India: Innovations for Transformation", for the benefit of farmers. My heartfelt congratulations to all the innovative farmers whose work have been included in this book. I am confident that this publication will help inspire wider adoption of new technologies and contribute to the advancement of Indian agriculture.

I congratulate the organizers and extend my best wishes for the success of the programme.

Ram Nath Thakur

(Ram Nath Thakur)

Delhi Office : Room No. 322, 'A' Wing, Krishi Bhawan, Dr. Rajendra Prasad Road, New Delhi-110 001
Tel. : +91-11-23383975/76 **Fax** : +91-11-23383971, **E-mail** : mos-agri@nic.in
Residence : 301, Swaran Jayanti Sadan Deluxe, Dr. B. D. Marg, New Delhi-110 001

सत्यमेव जयते

डॉ. एम. एल. जाट
सचिव (डेयर) एवं महानिदेशक (भाकृअनुप)
Dr. M. L. Jat
SECRETARY (DARE) & DIRECTOR GENERAL (ICAR)

भारत सरकार
कृषि अनुसंधान और शिक्षा विभाग एवं
भारतीय कृषि अनुसंधान परिषद,
कृषि एवं किसान कल्याण मंत्रालय, कृषि भवन, नई दिल्ली 110 001
GOVERNMENT OF INDIA
DEPARTMENT OF AGRICULTURAL RESEARCH & EDUCATION (DARE)
AND
INDIAN COUNCIL OF AGRICULTURAL RESEARCH (ICAR)
MINISTRY OF AGRICULTURE & FARMERS WELFARE
KRISHI BHAVAN, NEW DELHI 110 001
Tel. : 23382629, 23386711 Fax : 91-11-23384773
E-mail : dg.icar@nic.in

MESSAGE

Agriculture remains the backbone of India's economy, supporting the livelihoods of a large rural population. In today's rapidly evolving agricultural landscape, innovation, entrepreneurship, and technology adoption have become highly imperative. Farmers who embrace scientific practices, diversify their enterprises, and adapt to changing climatic and market conditions not only improve their productivity and income but also drive progress within their communities.

The ICAR–Indian Agricultural Research Institute (IARI) has consistently provided leadership in agricultural research, education, and extension. Its scientific breakthroughs, innovative technologies, and farmer-focused outreach have played a crucial role in strengthening the country's food and nutritional security. The Institute has also nurtured agricultural entrepreneurship by encouraging farmers to adopt advanced technologies, refine locally relevant practices, and venture into high-value enterprises.

Farmers' innovations, rooted in practical wisdom and local experience, have become vital catalysts in developing scalable, sustainable, and impactful agricultural solutions. I am pleased that IARI is recognizing such exemplary farmers through the Innovative Farmers' Conclave 2025. The publication titled, ***"Inspiring Farmers of India: Innovations for Transformation"***, which documents the success stories of Innovative Farmers, highlights how grassroots innovations, scientific outlook, and entrepreneurial spirit can transform livelihoods. These farmers have not only enhanced their own economic resilience but have also become role models for others across the nation.

I extend my heartfelt congratulations to all the innovative farmers for making invaluable contributions in transforming agriculture. I am confident that this publication will serve as an important source of knowledge and inspiration, encouraging more farmers to adopt science-led innovations for a prosperous and resilient agricultural sector.

(M. L. Jat)

Dated the 16th December, 2025
New Delhi

भकृअनुप
ICAR
डॉ. देवेन्द्र कुमार यादव
उप महानिदेशक (फसल विज्ञान)
Dr. Devendra Kumar Yadava
Deputy Director General (Crop Science)

भारतीय कृषि अनुसंधान परिषद
कृषि अनुसंधान एवं शिक्षा विभाग
कृषि एवं किसान कल्याण मंत्रालय, भारत सरकार
कृषि भवन, नई दिल्ली-110001
Indian Council of Agricultural Research
Department of Agricultural Research & Education
Ministry of Agriculture and Farmers Welfare
Govt. of India, Krishi Bhawan, New Delhi-110001

MESSAGE

India has made significant strides in agriculture and has established itself as a global agricultural leader. By 2047, the nation's population is projected to increase from 1.4 billion to 1.63 billion, requiring nearly double the current level of food production.

Besides increasing production and productivity, enhancing farmers' income is a priority for researchers as well as policy makers. Crop diversification, integration of IT-based solutions, promotion of mechanization, and strengthening of value-chain development are essential to combat the emerging challenges in agriculture. There are several successful cases of farmers' innovations, which have proven advantageous in solving local problems. Innovation-driven farming will certainly motivate youth to take up farming as profession.

I am pleased that the Pusa Institute is organizing the Innovative Farmers' Conclave on 23–24 December 2025. The participation of the innovative and award–winning farmers will enrich the event through the sharing of their experiences, practices, and innovations. This conclave will provide a meaningful platform for the progressive farmers from across India to exchange knowledge and successful approaches.

I appreciate the scientists of the Pusa Institute for preparing and disseminating this valuable publication titled ***"Inspiring Farmers of India: Innovations for Transformation"***. I am confident that it will serve as an important guide in promoting advanced agricultural technologies. I also extend my warm wishes for a bright and prosperous future to all prize winners' farmers of our country.

(D. K. Yadava)

Dated: December 12, 2025
Place: New Delhi

E-mail : ddgcs.icar@nic.in, dkygenet@gmail.com Phone : 91-11-23382545, 23046560, Mobile : 9868537641

भारतीय कृषि अनुसंधान परिषद
कृषि अनुसंधान भवन–I, पूसा, नई दिल्ली–110 012
INDIAN COUNCIL OF AGRICULTURAL RESEARCH
KRISHI ANUSANDHAN BHAVAN-I, PUSA, NEW DELHI 110 012

डॉ. राजबीर सिंह
उप महानिदेशक (कृषि विस्तार)
Dr Rajbir Singh
Deputy Director General (Agricultural Extension)

Tele : 91-11-25843277 (O)
E-mail : ddg-extn.icar@gov.in

Message

Enhancing farmers' income and fostering self-reliance are national priorities. The Government of India is promoting innovation in agricultural research and extension to boost productivity and profitability. Recognizing innovative farmers and showcasing their achievements not only inspires others but also accelerates the adoption of modern technologies, driving transformative change across the farming community.

The ICAR-Indian Agricultural Research Institute, New Delhi, has been a national leader in developing advanced technologies and effective extension models. Each year, during the Pusa Krishi Vigyan Mela, the Institute honours outstanding farmers with the Innovative Farmer Awards. It is an initiative that not only acknowledges their achievements but also motivates many others to pursue innovation.

I am delighted that the Pusa Institute is hosting the "Innovative Farmer Conclave" on 23–24 December 2025, bringing together award-winning farmers, scientists, and policymakers. This platform will foster meaningful exchanges of practical knowledge, cutting-edge innovations, and inspiring success stories, empowering participants and catalysing wider adoption of transformative practices across the agricultural community.

It is also pleasing that the Institute is publishing the book titled ***"Inspiring Farmers of India: Innovations for Transformation"***, which presents the inspiring success stories of these innovative farmers. I am confident that this publication will guide farmers in adopting improved practices and encourage them to innovate and apply innovations in their farming enterprises.

This book will serve as a valuable resource for all stakeholders in the agricultural sector, offering insights that will strengthen learning, innovation, and field-level application. I extend my heartfelt congratulations and best wishes to the scientists whose dedicated efforts and expertise have shaped this publication. I also place on record my deep appreciation for our innovative farmers, whose commitment, ingenuity, and spirit of experimentation continue to drive transformation at the grassroots. Their contributions are instrumental in steering the nation toward the collective vision of *Viksit Bharat 2047*, inspiring progress, resilience, and sustainable growth across rural India.

(Rajbir Singh)

भा.कृ.अ.प.-भारतीय कृषि अनुसंधान संस्थान, नई दिल्ली–110012 (भारत)
ICAR - INDIAN AGRICULTURAL RESEARCH INSTITUTE
(A Deemed to be University under Section 3 of UGC Act, 1956)
New Delhi-110012 (INDIA)

डॉ. सीएच. श्रीनिवास राव
निदेशक
Dr. CH. SRINIVASA RAO, *FNA, FNASc, FNAAS*
Director

Phones : +91 11 2584 2367, 2584 3375
Fax : +91 112584 6420
Email : director@iari.res.in
Website : www.iari.res.in

Message

The ICAR-Indian Agricultural Research Institute, New Delhi, has long been dedicated to advancing Indian agriculture and improving the lives of farmers through its contributions in research, education, and technology dissemination. In line with the national vision of a *Developed India*, the Institute continues to develop and promote modern technologies as well as high-yielding, climate-resilient, and nutrient-rich crop varieties. Along with strengthening farmers' skills for the effective use of proven technologies, encouraging innovation and agri-preneurship has become equally important. Across the country, many farmers have emerged as successful entrepreneurs through their creativity, dedication, and hard work, and the Institute consistently acknowledges such progressive farmers so they may inspire others.

To promote and recognize innovation at the grassroots level, ICAR–IARI has instituted two prestigious awards - the "IARI-Fellow Farmer Award" and the "IARI–Innovative Farmer Award." These awards are presented annually during the Pusa Krishi Vigyan Mela to the distinguished farmers from across India. A special technical session is also organized during the Mela, where award-winning farmers share their experiences with fellow farmers, scientists, students, and visitors. This initiative plays a significant role in identifying, appreciating, and disseminating farmer-led innovations.

I am pleased that the Pusa Institute, the harbinger of the Green Revolution, is organizing the Innovative Farmers' Conclave on 23–24 December 2025. The participation of the IARI Innovative Farmers as well as IARI Fellow Farmers will enrich the event with valuable experiences and practical insights. This conclave will serve as an important platform for progressive farmers nationwide to exchange knowledge, discuss modern practices, and share success stories.

I am delighted that the Institute is also publishing a book titled ***"Inspiring Farmers of India: Innovations for Transformation"***, which documents the achievements and innovations of these outstanding farmers. Their contributions will undoubtedly inspire many others.

My heartfelt appreciation goes to all the Innovative and Fellow Farmers whose cases have been covered in this book. I also extend warm congratulations and best wishes to the scientists involved in bringing out this important publication.

(Ch. Srinivasa Rao)

भा.कृ.अ.प. – भारतीय कृषि अनुसंधान संस्थान, नई दिल्ली–110012 (भारत)
ICAR - INDIAN AGRICULTURAL RESEARCH INSTITUTE
(A DEEMED TO BE UNIVERSITY UNDER SECTION 3 OF UGC ACT, 1956)
NEW DELHI - 110012 (INDIA)

डॉ. रवीन्द्र नाथ पडारिया
संयुक्त निदेशक (प्रसार)
Dr. Rabindra Nath Padaria
Joint Director (Extension)

Phones : 011 2584 2387 (O)
Mob. : 9968966766
E-mail : jd_extn@iari.res.in
Website : www.iari.res.in

Preface

Significant progress has been made in developing and adopting modern agricultural technologies. Yet, with rising global challenges, climate variability, shrinking natural resources, and shifting markets, a closer collaboration between scientific institutions and grassroots innovators has become more essential than ever. Farmers, with their deep understanding of local conditions, often identify emerging problems early and devise practical and need-based solutions. Their innovations form an important base of science-led refinement.

Across generations, farmer-led practices, whether in conserving indigenous crop diversity, managing pests with minimal resources, or adopting sustainable soil and water management, have contributed immensely to resilient agriculture. The true value of these innovations lies not only in recognising them but in systematically validating, assessing, and refining them so that their benefits can reach to the larger communities.

To realise this potential, stronger linkages between farmers, researchers, extension systems, and policymakers are vital. A collaborative ecosystem that enables co-creation, joint experimentation, and timely technical support will accelerate the evolution and scaling of promising innovations. Such partnership-driven approaches can enhance farm livelihoods, while reinforcing the long-term sustainability of Indian agriculture.

Frugal and experience-based innovations, often developed when formal technologies are inadequate or inaccessible, deserve particular attention. These solutions should be carefully documented, evaluated for scientific soundness, improved through joint effort, and disseminated widely. Institutional mechanisms within R&D organisations must continue to work closely with farmer-innovators to strengthen this process.

The ICAR-Indian Agricultural Research Institute has been a national leader in promoting and supporting farmers' innovations. Each year, outstanding farmers are honoured as "IARI-Innovative Farmers" and "IARI-Fellow Farmers" during the Pusa Krishi Vigyan Mela. The awardee farmers have been invited to participate in the "Innovative Farmers Conclave" on 23-24 December, 2025, being organised as part of the Kisan Diwas celebrations. Their deliberations will promote cross-learnings among them as well as the scientists.

The compilation titled as, ***"Inspiring Farmers of India-Innovations for Transformation"***, presents the notable technologies and innovations developed by these distinguished farmers. I express my gratitude to Dr. Ch. Srinivasa Rao, Director, ICAR-IARI, for his leadership and insightful guidance in synthesis of farmers' innovations. I extend my sincere appreciation to the innovative farmers for their contributions as well as the scientists and technical teams involved in compilation and editing of this publication. I convey my best wishes to all the farmer innovators for their continued success.

(Rabindra N. Padaria)

Contents

CHAPTER 1

Documentation and Validation of Farmers' Innovations

Introduction

Farmers across the globe continually generate practical and inventive solutions to address local challenges related to crop cultivation, livestock management, soil fertility, water use, and natural resource conservation. These innovations are shaped by lived experience, keen observation, and adaptive responses to evolving environmental and socioeconomic realities. Despite their value, many grassroots innovations remain undocumented, unvalidated, and largely overlooked by formal research and extension systems. Systematic documentation and validation not only preserve indigenous knowledge but also pave the way for policy alignment, wider dissemination, replication, and scaling. Centered on scientific, participatory, and ICT-enabled processes, this chapter explores innovative approaches, frameworks, and best practices for identifying, assessing, and mainstreaming farmer-led innovations.

Concept and Significance of Farmers' Innovations

Farmers' innovations refer to locally developed technologies, practices, or organizational models that are original or significantly improved within a specific context. Unlike formal research driven innovations, they are need based, context specific, and emerge from bottom-up processes. These innovations play a critical role in conserving traditional knowledge, empowering farmers as knowledge stewards, generating low-cost and adaptive solutions, and strengthening the resilience and sustainability of agri-food systems.

Farmer-led innovation represents the co-evolution of knowledge rooted in farmer experimentation, enriched through scientific collaboration, and guided by local wisdom. FLIs are influenced by a complex interplay of economic constraints (high input costs or food insecurity), environmental pressures (climate variability, degraded soils, limited land), social dynamics (migration, labour scarcity, health crises), cultural norms (ritual usage of specific crops), and political contexts (subsidy-driven input use or policy incentives).

Today, farmer-led innovations form a cornerstone of sustainable agricultural transformation, showcasing the ingenuity and resilience of farming communities. Through continuous experimentation, farmers have conserved indigenous crops and evolved improved varieties, developed cost-effective processing technologies that enhance value addition and marketability and engineered tools and implements that improve efficiency.

Women farmers, in particular, have made significant contributions in seed preservation, post-harvest operations, and value addition, resulting in better household nutrition and enhanced farm incomes.

Evolution of Farmer-Led Innovation Approaches

Professor Y. P. Singh pioneered systematic scientific inquiry into farmers' indigenous knowledge in India, guiding what are considered among the earliest postgraduate theses on indigenous agricultural knowledge during mid sixties (1965–1967). The conceptual shift toward recognizing farmers as active innovators emerged prominently during the late 1980s and early 1990s with the Farmer First movement (Chambers, 1989). This initiative challenged the traditional top-down model of agricultural research and extension that treated farmers as passive recipients of technology, instead promoting a participatory paradigm that emphasized farmer knowledge, experimentation, and local problem-solving capacities. The Farmer First approach catalyzed research into methods for documenting farmer innovations and integrating indigenous knowledge into formal research and extension frameworks, marking a transition from technology transfer to problem-oriented, farmer-centred research (Chambers, 1989).

The Indian Council of Agricultural Research (ICAR) launched a nationwide Mission Mode Project on "Collection, Documentation and Validation of Indigenous Technical Knowledge (ITK)" in agriculture in 2002 under the National Agricultural Technology Project. Experimental validation of selected ITKs was subsequently carried out in farmers' fields across ICAR institutes and State Agricultural/Animal Science Universities during 2002–2004. During the 1990s and 2000s, this participatory orientation became institutionalized through the development of participatory research methods such as Participatory Varietal Selection (PVS) and Participatory Plant Breeding (PPB). These methods enabled farmers and scientists to jointly evaluate and refine crop varieties under real field conditions, thereby validating farmer innovations within their local agroecological contexts (Ashby, 2009; Ceccarelli, 2020; Walker, 2006). By integrating farmers' experiential insights into formal experimentation, these approaches operationalized the concept of co-produced validation, extending beyond laboratory-based testing to participatory field evaluation. Institutions like the World Bank and FAO also recognized PVS and PPB as critical tools for participatory agricultural development and adaptation to diverse farming systems (Walker, 2006).

From the 2000s onward, attention shifted toward grassroots innovation systems and networks that focus on identifying, documenting, and disseminating farmer-led innovations at scale. Notably, the Honey Bee Network and the National Innovation Foundation (NIF) in India have become global exemplars in this regard (Gupta, 2006; Gupta et al., 2019). These initiatives function as innovation ecosystems that scout and catalogue local innovations, foster peer-to-peer learning, and connect grassroots innovators with research institutions, funding agencies, and markets. Through such mechanisms, documentation evolved from a passive recording exercise into an active brokerage process that bridges local creativity with institutional recognition and policy support.

Institutional Support Mechanisms for Farmers' Innovations

In India, a diverse set of policies, platforms, and institutional programs has been established to identify, validate, refine, protect, and scale grassroots technological solutions emerging from farming communities. National organizations such as ICAR, State Agricultural Universities (SAUs), and the National Innovation Foundation (NIF) offer structured support through participatory research partnerships, field-level validation, intellectual property facilitation, and incubation services. The Honey Bee Network, founded by Dr. Anil K. Gupta, has been a pioneering movement devoted to scouting, documenting, and recognizing farmer and grassroots innovations, ensuring that knowledge flows ethically with due acknowledgment to local innovators. Additionally, government initiatives such as RKVY-RAFTAAR (Rashtriya Krishi Vikas Yojana, Remunerative Approaches for Agriculture and Allied Sector Rejuvenation) provide financial incentives and policy support for nurturing and scaling rural innovation. Together, these mechanisms have strengthened the ecosystem for farmer-led technological advancement, enabling farmers to transition from technology users to active co-creators, innovators, and agripreneurs within India's evolving agricultural landscape.

The ICAR- Indian Agricultural Research Institute (IARI) has institutionalized the recognition of grassroots ingenuity through its Innovative Farmer Awards presented annually during the Pusa Krishi Vigyan Mela, one of the country's most prominent agricultural fairs. These awards honor farmers who have developed pioneering technologies, practices, or farm enterprises that demonstrate significant impact in enhancing productivity, sustainability, and livelihood security. The initiative encourages farmers to be active experimenters and contributors to scientific advancement rather than passive adopters. Awardees are selected through a rigorous process of field verification, expert evaluation, and impact assessment, ensuring that innovations are practical, scalable, and beneficial to the farming community. By celebrating farmer scientists on a national stage, IARI fosters a culture of innovation, inspires knowledge sharing, and strengthens the partnership between formal research systems and grassroots innovators, contributing to a more democratic and inclusive agricultural innovation ecosystem.

The National Innovation Foundation (NIF–India) has played a pivotal role in institutionalizing the documentation, validation, and promotion of grassroots innovations, including those developed by farmers across the country. Established as an autonomous body under the Department of Science and Technology, NIF works in close collaboration with networks such as the Honey Bee Network to scout and record locally developed technologies, traditional practices, and inventive solutions that address agricultural and rural challenges. Its nationwide campaigns such as Shodh Yatra, Innovation Competitions, and the Grassroots Technological Innovation Awards serve as platforms to identify innovators directly from villages, ensuring representation of marginalized and remote communities. NIF not only documents these innovations but also supports their technical refinement, intellectual property protection through patent facilitation, and commercialization in partnership with research institutions and industry. By creating

an ecosystem that bridges informal creativity with formal science, NIF has significantly advanced the recognition and scaling of farmer-led innovations, contributing to inclusive development and the preservation of indigenous knowledge systems.

Many international programs such as Prolinnova, UNDP–GEF Small Grants Programme, FAO's Globally Important Agricultural Heritage Systems (GIAHS) and IFAD-supported farmer innovation platforms enhances visibility, recognition, and resource access for farmer innovators while strengthening community resilience and fostering sustainable agri-food systems globally. Prolinnova (Promoting Local Innovation in Ecologically Oriented Agriculture and Natural Resource Management) is an NGO-initiated international network and community of practice that promotes local innovation processes in ecologically oriented agriculture and natural resource management (NRM). It focuses on recognising the dynamics of indigenous knowledge (IK) and enhancing capacities of family farmers (including pastoralists, fishers and forest dwellers) to adjust to change, to develop their own site appropriate systems and institutions of resource management so as to gain food security, sustain their livelihoods and safeguard the environment. Through its network based approach, Prolinnova works to document local innovations, promote joint research to improve or adapt them, and influence policies that recognize farmers as key drivers of ecological and sustainable agriculture. The initiative stresses equitable knowledge sharing and ensures that local creativity is acknowledged, protected, and scaled in ways that benefit farming communities. By bridging informal knowledge systems with formal scientific processes, Prolinnova advances an inclusive agricultural innovation ecosystem centered on sustainability, resilience, and farmer empowerment.

The UNDP–GEF Small Grants Programme provides catalytic funding and technical support to community-based initiatives, enabling farmers to pilot and scale innovative ecological practices and livelihood solutions rooted in indigenous knowledge. FAO's GIAHS initiative recognizes and conserves traditional farming landscapes that embody time tested, culturally rooted agricultural practices, thereby promoting farmer-led innovations in conservation agriculture, agroecology, and biodiversity management. Meanwhile, IFAD-supported farmer innovation platforms foster collaborative learning where farmers, researchers, and extension agencies jointly experiment, validate, and refine grassroots solutions, ensuring farmer voices inform research priorities and policies.

The CGIAR's CCAFS (Climate Change, Agriculture and Food Security) program focuses on climate-smart farmer innovations that enhance resilience, productivity, and carbon efficiency in vulnerable regions. FAO's Dimitra Clubs promote community-driven solutions with a strong emphasis on gender equality, collective action, and the empowerment of women and youth as innovators. The World Bank's Farmer Innovation Fund provides financial and technical support for experimentation, refinement, and scaling of locally developed technologies and practices. Similarly, UNDP's Accelerator Labs identify, test, and validate grassroots innovations that contribute to the Sustainable Development Goals (SDGs), creating pathways for replication and policy adoption.

Global Approaches to Documentation

Documentation is the systematic recording of farmers' innovations in a manner that preserves their originality, process, and potential for wider use. Globally, documentation methods have evolved from traditional case documentation to advanced digital and participatory tools.

Participatory Documentation

Participatory documentation places farmers at the center of the knowledge gathering process by actively involving them along with researchers, extension personnel, and community institutions in identifying, describing, and analyzing innovations. This approach draws on experiential insights and peer validation through platforms such as Farmer Innovation Fairs and Contests, including those organized by the National Innovation Foundation (India) and Prolinnova's African Farmer Innovation Fair. Tools under Participatory Rural Appraisal (PRA) such as social mapping, innovation timelines, and matrix rankings allow farmers to articulate the evolution, relevance, and impact of their innovations. Farmer Field Schools (FFS) further contribute by documenting practices developed through collective experimentation and adaptive learning in real field conditions. In addition, learning and sharing workshops widely adopted across Latin America and Asia facilitate peer-to-peer exchange, enabling the systematic recording of innovation stories while strengthening community ownership of knowledge.

Institutional and Repository Based Documentation

Institutional and repository based documentation involves the systematic collection, classification, and preservation of grassroots innovations through structured databases managed by national and international organizations. The National Innovation Foundation–India (NIF) stands as a global leader with its extensive database of more than 315,000 documented innovations, offering formal recognition, patent support, and commercialization pathways. International platforms such as Prolinnova facilitate cross-country exchange and documentation under Participatory Innovation Development, while the African Innovation Platform consolidates community-driven innovations in sustainable land and resource management. Global indigenous knowledge repositories managed by entities like FAO, UNESCO, and WIPO integrate traditional practices into knowledge systems, ensuring long-term preservation, policy visibility, and cross-cultural learning. These repositories not only safeguard local knowledge but also create linkages for research collaboration, IP protection, and scaling.

ICT-Based and Digital Documentation

ICT-based and digital documentation has transformed the speed, scale, and accessibility of recording farmer-led innovations by leveraging mobile technologies, artificial intelligence, and multimedia platforms. Mobile and web-based applications now enable real-time geo-tagging, video uploads, and evidence-based reporting of innovations directly by farmers or extension workers. Crowd sourcing platforms, including global initiatives such as the Global Open Data for Agriculture and Nutrition (GODAN),

allow collective reporting and open sharing of grassroots solutions. Meanwhile, multimedia story telling and digital archives championed by organizations like Digital Green in India and Access Agriculture globally use participatory video and local-language content to capture and disseminate innovation processes. These digital approaches democratize documentation, enhance visibility for grassroots innovators, and facilitate rapid scaling through virtual learning networks and global knowledge exchange. AI tools are being used to analyze field-level data and predict scalability potential of grassroots innovations.

Validation of Farmers' Innovations

Validation involves scientific testing, participatory assessment, and contextual analysis to ensure the reliability, adaptability, and scalability of the innovation. It is a crucial process to ensure that grassroots solutions emerging from field-level experimentation are scientifically sound, contextually relevant, and scalable across diverse farming systems. Since farmer innovations are shaped by experiential learning, indigenous knowledge, and unique local challenges, systematic validation helps establish their credibility and enhances the prospects for wider dissemination and institutional support. By validating innovations, extension systems can bridge the gap between scientific research and traditional wisdom, ensuring that practical solutions are fine-tuned, recognized, and integrated into mainstream agricultural development.

A combination of approaches is used for validation of farmer innovations. Joint experimentation, wherein researchers and farmers collaboratively test the innovation under real field conditions, allows mutual learning and builds ownership. Adaptive research trials are conducted to compare the performance of the farmer-developed practice with the recommended or standard scientific practice across multiple environments and seasons. Participatory Technology Development (PTD) frameworks provide structured methods for co-learning, iterative refinement, and consensus building among farmers, researchers, and extension functionaries. Additionally, documentation and peer review, involving local experts, scientists, and fellow farmers, ensures authenticity, eliminates subjective bias, and facilitates knowledge exchange. Cost–benefit and impact assessments evaluate economic returns, labour savings, resource-use efficiency, and broader environmental and socio-economic implications, including effects on women and vulnerable groups.

The validation of farmer innovations is assessed based on critical criteria. Technical effectiveness determines whether the innovation performs consistently and solves the intended problem. Economic viability measures affordability, profitability, and potential for income enhancement. Environmental sustainability evaluates resource conservation, soil health, biodiversity impact, and reduction in chemical use. Social acceptability considers cultural alignment, ease of adoption, and community interest, while gender responsiveness examines whether the innovation reduces drudgery or enhances opportunities for women farmers. Systematic validation not only strengthens innovation credibility but also empowers farmers as co-creators of knowledge, ultimately accelerating inclusive and sustainable agricultural development.

The QUIK method is a rapid and systematic approach used to validate Indigenous Technical Knowledge (ITK), ensuring that traditional practices are credible and relevant before being promoted for wider application. QUIK stands for Quick, Useful, Inexpensive, and Knowledge-based validation. It emphasizes a fast validation cycle that relies on farmers' experiential knowledge, expert judgment, and small-scale trials rather than long-duration scientific experiments. This method can be used to validate farmer innovations as well, particularly at the preliminary stage of screening and assessing their relevance. Since many farmer-led innovations emerge from practical experience and local problem-solving, QUIK offers a rapid, low-cost, and participatory method to determine whether the innovation is promising enough for more detailed scientific validation.QUIK is effective as a first-level validation tool, it may need to be supplemented with additional methods such as on-farm trials, participatory technology development, and cost–benefit analysis for large-scale promotion.

Determinants of Wider Adoption and Upscaling of Farmers' Innovations

The wider adoption and upscaling of farmer-led innovations are shaped by a combination of technical, economic, socio-cultural, and institutional determinants that influence their relevance and adaptability beyond the originating context. Technical soundness and demonstrable effectiveness across varied agro-ecological conditions are foundational, as innovations that consistently solve problems such as reducing costs, increasing productivity, or improving resilience gain faster acceptance. Economic viability, affordability, ease of use, and low risk encourage adoption, particularly among small and marginal farmers. Innovations that rely on locally available resources and require minimal specialized skills are more likely to scale. Social acceptance also plays a vital role; when innovations align with community practices, reduce gender-based drudgery, and provide equitable benefits for youth and women, they gain broader household-level support and diffusion through informal networks.

Institutional and market-related determinants further enhance upscaling potential. Formal recognition through extension systems, research engagement, and award mechanisms builds credibility and motivates replication. Access to innovation funds, incubation support, and intellectual property protection provides incentives for refinement and commercialization. Market linkages, input supply chains, and buy-back arrangements can transform farmer innovations into viable enterprises. Effective communication, digital platforms, and farmer-to-farmer knowledge exchange amplify visibility, trust, and reach. Ultimately, wider adoption and upscaling are successful when farmer-led innovations are supported by an enabling ecosystem that integrates scientific validation, policy support, financial mechanisms, community participation, and market opportunities.

Opportunities and Challenges in documentation and validation of Farmers' Innovations

The growing emphasis on farmer-led innovation presents a wide range of opportunities to strengthen agricultural transformation through collaboration, capacity building, and

institutional support. Knowledge integration offers a pathway for enhanced collaboration between farmers and researchers, allowing the blending of local wisdom with modern scientific approaches for context-specific and sustainable solutions. Capacity building initiatives such as participatory experimentation, tinkering labs, and innovation platforms can further strengthen farmers' problem-solving and technical skills. The advancement of documentation and digitalization enables the development of standardized protocols, repositories, and ICT-based tools for efficient mapping, cataloguing, and sharing of innovations across regions. Equally important is participatory validation, which emphasizes the use of multi dimensional assessment tools that evaluate technical effectiveness, economic viability, social relevance, and environmental sustainability of innovations. The scaling and institutionalisation of proven innovations can be achieved by leveraging extension systems, innovation funds, and public–private–community partnerships, complemented by accelerator labs and incubators that facilitate broader diffusion and commercialization. Strong policy linkages also exist to align farmer innovation systems with national frameworks such as the National Innovation Foundation (NIF), MANAGE, and ICAR's agricultural extension initiatives, thereby ensuring continuity and support. Finally, greater inclusivity through the active participation of women and youth in innovation processes can lead to a more gender-responsive and generationally balanced innovation ecosystem, reinforcing the long-term sustainability of farmer-led innovation in India.

Despite the growing recognition of farmers' innovations, several challenges hinder their systematic documentation and validation. A major concern is the lack of standardized documentation protocols, leading to inconsistencies in how innovations are recorded, evaluated, and shared across regions and institutions. Additionally, limited incentives for farmers to disclose their innovations often result in underreporting or reluctance to participate in formal documentation processes, as farmers may fear exploitation or lack trust in external agencies. The weak linkage between formal research and development systems and grassroots innovations further restricts opportunities for scientific validation, scaling, and policy integration. Moreover, unresolved issues related to intellectual property rights and equitable benefit sharing pose ethical and legal barriers, preventing fair recognition and reward for farmer innovators and limiting the diffusion of their locally developed solutions.

Way Forward

To effectively scale up valuable farer-led innovations, it is essential to adopt a bottom-up approach that emphasizes active farmer participation in reorienting research and outreach programmes. This process involves the systematic identification of promising farmer-led innovations, followed by their scientific validation and refinement to enhance reliability, adaptability, and impact. Innovative technologies developed in a particular region should be popularized and scaled out to similar agro-ecological regions through systematic documentation, publication, and dissemination of success stories. Such efforts facilitate cross-learning and replication of locally relevant solutions. Promoting agro-tourism centered on farmers' innovative practices can further enhance public awareness,

generate additional income, and foster community participation in the conservation of rich agro-biodiversity. Beyond scaling specific innovations, concerted efforts are required from all stakeholders, ranging from farmers and extension personnel to national and international research scientists to share and institutionalize approaches that encourage and support farmer experimentation. Farmer-led research can motivate individuals to move beyond household-level benefits and actively contribute to community-wide development initiatives. To strengthen this process, emphasis should be placed on knowledge management systems, provision of comparative learning experiences, effective conflict management mechanisms, facilitation of multi-stakeholder negotiations, and the development of alliances with the private sector, market actors, and non-governmental organizations. Farmers should be encouraged to initiate collective action in production processes, which can enhance efficiency, bargaining power, and sustainability. Furthermore, appropriate mechanisms for fair remuneration must be ensured to compensate farmers for their additional efforts and risks. Strong institutional arrangements and stakeholder networking platforms are necessary to transform existing challenges into opportunities, thereby enabling the sustainable scaling up of farmer-led innovations (Manjeet Singh Nain et al, 2024).

Strategic actions are essential to strengthen the documentation and validation of farmers' innovations. First, it is important to develop context-specific protocols that combine scientific rigor with participatory validation approaches, ensuring that innovations are assessed both for technical soundness and local relevance. Second, efforts should be made to establish open-access global databases with multilingual documentation systems to facilitate wider sharing, cross-learning, and preservation of grassroots knowledge across diverse cultural and linguistic contexts. Third, there is a need to promote capacity building in participatory research and innovation facilitation, enabling researchers, extension agents, and community organizations to effectively engage with farmer innovators. Finally, institutionalizing reward and recognition mechanisms for farmer innovators will motivate continued creativity and ensure that farmers receive due acknowledgment and benefits for their contributions to sustainable agricultural development.

Globally, farmers' innovations represent a powerful resource for sustainable agricultural transformation. Documenting and validating these innovations ensure that local ingenuity contributes to global knowledge systems. Moving toward participatory, inclusive, and technology-enabled methods can bridge the gap between informal innovation and formal science, fostering a more equitable and resilient agri-food future.

CHAPTER 2

Innovations in Crops and Horticultural Science

Introduction

Farmer-led innovation in crop and horticultural sciences refers to the dynamic process through which farmers independently experiment, modify, and develop new practices, crop varieties, propagation methods, or tools that enhance productivity, resilience, quality, and profitability. Such innovation is rooted in farmers' deep experiential knowledge of their microclimates, soils, local biodiversity, and socio-economic conditions. This proximity to real-time challenges enables farmers to identify and implement solutions more rapidly, practically, and cost-effectively than formal research institutions in many contexts. Farmers, particularly those involved in fruit and spice cultivation, have developed a range of innovative propagation techniques such as modified grafting and budding methods, use of biodegradable materials for air layering, and improved nursery practices that enhance seedling vigour and survival. In addition, farmer-generated protocols for pest and disease management in horticultural crops play a critical role in ensuring access to disease-free and location-specific planting material, particularly in areas where certified nursery systems are inadequate.

Given the high perishability of horticultural produce, a significant proportion of farmer-led innovations also focus on storage, processing, and packaging. Many entrepreneurial farmers have successfully developed value-added products including fruit candies, pickles, spice powders, herbal teas, dried flowers, and plant-based dyes that command premium prices in local and emerging online markets. These innovations not only extend shelf life but also stimulate rural enterprise development, creating opportunities for women and youth-led agri-businesses. In light of their practical relevance and potential for wider adoption, farmer-led innovations in crop and horticultural sciences need to be systematically documented, validated, and disseminated. This will enable large numbers of farmers across diverse regions to benefit from context-specific solutions that originate from grassroots ingenuity.

Varietal Development

Historically, farmers have been the pioneers of crop domestication and varietal selection. Even today, in many regions, farmers continue to modify and maintain crop diversity through selective breeding and seed saving. For example, farmer-bred landraces

of rice, millets, vegetables, and pulses are known for their tolerance to drought, salinity, and floods. Such varieties often carry unique traits suited to local cuisine, culture, and niche markets. Participatory plant breeding initiatives have further empowered farmers to co-develop climate-resilient crop varieties by combining scientific tools with farmer-led selection.

The conservation of plant genetic resources like seeds, landraces, wild relatives, and traditional cultivars has historically depended not only on formal gene banks and research institutions but significantly on farming communities themselves. Farmers, often guided by tradition, observation, and necessity, have developed innovative decentralized methods to conserve germplasm that are low-cost, location-specific, and culturally rooted. These innovations safeguard biodiversity, support resilience against climate shocks, and ensure the continuity of agricultural heritage.

In India, the Protection of Plant Varieties and Farmers' Rights Act (PPV&FRA), 2001 provides a legal framework for the registration and recognition of such farmer-developed varieties, acknowledging farmers as breeders and granting them rights over the conservation, cultivation, exchange, and commercial benefit sharing of their varieties. This recognition not only safeguards traditional knowledge but also incentivizes grassroots crop improvement efforts by ensuring equitable benefits to the farming communities responsible for preserving and developing these genetic resources.

Preservation of Landraces and Indigenous Varieties

Farmers have long practiced in-situ conservation by repeatedly selecting and saving seeds from desired mother plants based on criteria such as taste, storability, drought tolerance, pest resilience, aroma, or cooking quality. Through this farmer-led selection, distinct ecotypes of crops have evolved to thrive in varied micro-climates from flood-prone deltas to arid drylands. In many tribal and hill regions, farmers maintain more varieties per acre than other agricultural landscapes maintain across entire districts, thereby serving as living repositories of genetic diversity.

Farmers continuously adapt and improve germplasm by experimenting with selective breeding, mass selection, and controlled crossing in their fields. This dynamic conservation increases genetic diversity rather than freezing it in time. For instance, farmers may bulk seed lots based on resistance observed during a drought year or isolate unique lines that performed better against newly emerging pests. These grassroot breeding practices sustain evolutionary processes and help crops adapt to changing agro-climatic conditions.

Farmer innovations in germplasm conservation are vital for food security, climate resilience, dietary diversity, and future breeding efforts. Unlike centralized gene banks, farmer-led conservation keeps germplasm alive, evolving, and culturally relevant. Farmers conserve not only seeds but also the knowledge of cultivation practices, processing methods, and culinary uses making their role irreplaceable in safeguarding agricultural biodiversity.

Innovative Propagation Techniques

Farmers have played a significant role in advancing innovative propagation techniques in horticultural crops by adapting traditional practices to local conditions and resource availability. Many growers have refined grafting and budding methods to enhance success rates, reduce juvenile phase, and develop varieties suited to specific microclimates. Farmers have adopted innovative orchard rejuvenation techniques such as hard pruning and scientific training in old sapota plantations, which stimulate new canopy growth, improve aeration and light interception, and significantly enhance fruiting and overall plant health. The use of air layering for multiplication of clonal rootstocks in temperate fruit crops ensures uniformity, early bearing, and better adaptation to local soil and climatic conditions. Practices like girdling are also being applied by progressive farmers to mobilize nutrients toward developing fruits, resulting in increased yield and improved fruit size. Collectively, these innovations contribute to higher productivity and ease of operations in perennial fruit crops.

These farmer-led innovations are particularly valuable in remote areas where access to certified nurseries is limited, ensuring timely availability of quality planting material and supporting diversification into high-value fruit, spice, and ornamental crops. Collectively, these grassroots innovations demonstrate farmers' capacity to transform available resources into scalable, sustainable propagation solutions.

Innovations in pest and disease management

Farmer-led innovations in pest and disease management have played a crucial role in enhancing crop resilience while reducing dependency on chemical pesticides. Drawing from traditional knowledge and field experience, farmers have developed eco-friendly solutions such as botanical extracts, fermented bio-pesticides, pest-repellent intercrops, and trap crops tailored to local pest dynamics. In recent years, progressive farmers have also introduced drone technology for precise nutrient and pest management in crops like banana, enabling uniform application of fertilizers and bio-pesticides with reduced labour and input use. This technology allows targeted spraying based on real-time field conditions, minimizes exposure to chemicals, and ensures timely operations even in difficult field terrains. The adoption of drones showcases how farmers are integrating modern tools with local expertise to enhance efficiency and improve crop health.Community-based innovations such as coordinated spraying schedules, shared pest surveillance, and collective decision-making also help manage outbreaks efficiently. These farmer-driven approaches not only lower production costs but also support environmental safety, conserve beneficial organisms, and promote sustainable, low-input agriculture.

Conclusion

Farmer-led innovations in crops and horticulture sector are inclusive, adaptive, and cost-effective. They promote ownership, local relevance, and rapid response to problems that may not yet be addressed by formal research systems. Furthermore, they contribute to

biodiversity conservation, reduce input dependence, and build resilience against climate variability. These innovations challenge the conventional linear technology transfer model and reinforce the concept of farmers as co-creators of agricultural knowledge.Farmer-led horticultural innovations are critical because the sector is highly sensitive to climate, seasonality, and market preferences. These innovations facilitate low-cost production, improve quality, reduce losses, and create livelihood opportunities. Importantly, these are bottom-up, sustainable, and inclusive responding directly to local needs, indigenous knowledge, and consumer expectations. They also empower farmers as entrepreneurs, not merely producers, contributing to resilient and diversified rural economies. The next section features notable farmer-led success cases that demonstrate how these innovations translate into measurable improvements in productivity, resilience, and livelihood outcomes.

Name : Shri Avanish Patra
Address : Village Chichinya, Block Devbhog,
District Gariaband,
Chhattisgarh – 493888
Contact No. : +91-7999352920
Email : avanishpatra.80@gmail.com

Personal Profile and Farming Background

Shri Avanish Patra is a pioneering progressive farmer and integrated farming advocate with over 22 years of experience in horticulture, livestock, and multi-enterprise agriculture in Chhattisgarh's red lateritic soils. Managing 4 ha of irrigated land, Shri Avanish focuses on betel leaf cultivation, field crops, fruit orchards, forestry, medicinal and aromatic plants and livestock. His journey from initial shade net trials to orchard-based commercial production exemplifies adaptive, climate-resilient practices in central India's tropical climate.

Innovation overview and motivation

His flagship innovation is commercial betel leaf (varieties Bilauri, Bangla, Meetha, Kapoori) cultivation in mango orchards, initiated after analyzing micro-climate. Starting with shade net, he later shifted to open-field intercropping by 2023, achieving space efficiency and dual income. This integrated model combines field crops (rice, groundnut, pigeonpea), fruit orchards (mango, guava, lemon, pomegranate, custard apple), forestry (amla, teak, rudraksha, bamboo, mahogany), medicinal and aromatic plants (ashwagandha, aloe vera), dairy (22 cows) and poultry (200 birds). The technical guidance was provided by Indira Gandhi Krishi Vishwavidyalaya (IGKV) Raipur and Krishi Vigyan Kendra (KVK) Gariaband.

Technical Features, Novelty and Development Process

The betel-mango system uses trellising for vertical growth (reducing shading conflicts), drip fertigation for precise nutrition, and bio-mulches from crop residues to retain humidity. Novelty lies in adapting high-value betel to existing orchards without land expansion, boosting returns. Initially cultivating betel in shade net structures, he later, in consultation with IGKV and KVK, shifted the production to mango orchards, optimising temperature and moisture conditions.

Institutional Linkages, Mentorship and Validation

The technical guidance was provided by Indira Gandhi Krishi Vishwavidyalaya (IGKV) Raipur and Krishi Vigyan Kendra (KVK) Gariaband.

Challenges Faced and problem-solving Approaches

Initial issues included high initial costs, the time invested in testing and validating the innovative practice. Further, he faced challenges like disease and pest management, uneven production quantity, skepticim of fellow farmers to adopt the new method, climate challenges. Shri Avanish resolved it through proper guidance from IGKV and KVK.

Utility, applications and user Benefits

The model yields Rs. 15 lakhs annually, cuts inputs via recycling, and diversifies risks. Betel intercropping enhances biodiversity, improves orchard microclimate, and provides year-round employment; overall, it promotes nutrient self-sufficiency and eco-friendly farming for smallholders.

Adoption, Outreach and Scaling Up

Adopted by 25 farmers via trainings, demonstrations and exposure visits, conducted in collaboration with KVKs and NGOs. Outreach targeted for farmers of chattisgarh, Odisha, Jharkhand, BIhar, West Bengal, Assam, Madhya Pradesh.

Impact Assessment (Economic, Social and Environmental)

Economically, integrated units raised incomes with substantial resource savings. Socially, this innovation has led to employment of locals full-time, empowerment of women in SHGs via collecting, sorting, grading and packing of betel leaves and its value-addition. Environmentally, intercropping sequesters carbon, recycles waste, and conserves water, enhancing soil organic matter for Chhattisgarh's climate-vulnerable farms.

Recognition, Awards and Media Coverage

He received the ICAR Innovative Farmer Award (2025) at Pusa Krishi Vigyan Mela, Millennium Farmer of India (2023), and Krishak Samriddhi Award. Coverage in Media, IGKV newsletters, and local Chhattisgarh TV segments highlighting betel innovation and farmer trainings.

Future Vision and Way Forward

He plans to expand betel cultivation to additional acreage using improved shade-net systems and promote value-added products such as betel extracts. He aims to train nearly 500 rural youth through village-level training camps, on-field demonstrations, and exposure visits organized by KVKs. His strategy also includes strengthening SHGs and FPOs for betel-based value addition, creating digital platforms, documenting farmer success stories, and facilitating the formation of district-level FPOs dedicated to betel. Further research by agricultural universities is required to enhance quality betel production under mango-based agroforestry, focusing on efficient water, shade, and nutrient management, and on the development of climate-resilient varieties. To scale these efforts, betel cultivation should be integrated into national agroforestry and horticulture missions, and included in state agricultural schemes for wider outreach. Additionally, incentives, credit support, and insurance coverage for betel farmers need to be expanded to encourage adoption and ensure economic resilience.

Name : Shri Dhirendrabhai Bhanubhai Desai
Address : At & Post Panetha,
Taluka Jhagadiya, District Bharuch,
Gujarat – 393120
Contact No. : +91-9428687219
Email : ddhiren2219@gmail.com

Personal Profile and Farming Background

Shri Dhirendrabhai Bhanubhai Desai, aged 51, is an SSC-pass farmer with 34 years of experience, cultivating 5 hectares of fully irrigated sandy soil in Jhagadiya, Bharuch. Agriculture is his primary occupation, supported by drip irrigation, borewell systems, tractor, rotor, and cultivator. He is also the Founder and Director of Shree Reva Bagayat Mandal FPO (est. 1991) and initiated the district's first SHG in 1999, contributing significantly to collective farming and farmer empowerment.

Innovation Overview and Motivation

His key innovation is the successful cultivation of banana using drip irrigation, tissue culture technology, and integrated bio-nutrient management. He was motivated by the need to overcome limitations of traditional farming and to make agriculture profitable, sustainable, and technologically progressive. Inspired by the national vision of doubling farmers' income, he aimed to introduce modern, efficient, and scalable practices to uplift fellow farmers.

Technical Features, Novelty and Development Process

His model integrates drip irrigation with tissue culture plants, ensuring uniform growth and optimal water and nutrient use. The system combines Integrated Bio-Nutrient Management (IBNM), green manuring, and bio-composting to improve soil fertility while reducing chemical dependence. A major novelty is achieving three banana harvests within 27 months from a single planting, along with developing low-cost crop-cutting techniques and introducing drone technology for precision nutrient and pest management.

Institutional Linkages, Mentorship and Validation

His work has been supported by Jain Irrigation Limited, senior scientists of KVK Chanswad, and experts from Navsari Agricultural University, who provided scientific guidance, validation, and technical strengthening of his innovations.

Challenges Faced and Problem-Solving Approaches

He initially faced resistance from farmers to adopt new technologies, along with financial and infrastructural constraints. Climate challenges such as irregular rainfall and extreme heat added difficulty. These were addressed through continuous farmer education, field demonstrations, cooperative mobilisation, and persistent motivation, which eventually led to wider acceptance of his methods.

Utility, Applications and User Benefits

His innovations significantly enhance productivity and efficiency, enabling three harvests in 27 months, improving fruit quality, and reducing input use. Drip irrigation saves 70% water, 65% energy, and 60% labour, while tissue culture plants ensure uniform yield and superior bunch quality. Over 1,000 farmers across Gujarat, Maharashtra, Madhya Pradesh, and Uttar Pradesh have benefited from his training and guidance.

Adoption, Outreach and Scaling Up

His innovations have been adopted across 3 hectares and disseminated widely through farm visits, cooperative initiatives, FPO platforms, and multi-state training programs. After receiving the IARI award, he expanded digital outreach, strengthened his cooperative society, and advanced value addition through banana chips and ripening chambers.

Impact Assessment (Economic, Social and Environmental)

Economically, his methods have increased incomes through higher productivity, export-quality produce, and cost savings of 70% water, 65% energy, and 60% labour. Socially, he has empowered thousands of farmers, established value-added enterprises, and generated employment for 20–25 labourers on his farm alone. Environmentally, drip irrigation, green manuring, bio-composting, and precision input use support sustainable, climate-resilient banana cultivation with reduced chemical dependency.

Recognition, Awards and Media Coverage

He has earned 2 international and over 30 national and state-level awards, including the IARI Fellow Farmer and Innovative Farmer Award and the Jagjivan Ram Abhinav Kisan Puraskar. His work has been featured across DD Kisan, BBC News, TV9 Gujarati, and leading newspapers like TOI, Better India, Gujarat Samachar, Divya Bhaskar, and Indian Achievers'. He is active on social media and widely documented through print, electronic, and digital platforms.

Future Vision, Suggestions and Way Forward

He plans to expand high-tech banana cultivation through more training programs, digital advisory services, and strengthened FPO-led collective marketing. He advocates policy support for modern technologies, research on high-yield crops and bio-nutrient systems, and robust extension services to scale sustainable practices. His long-term vision focuses on precision farming, value addition, and empowering farmers across multiple states.

Name : Shri Ketanbhai Jashbhai Patel
Address : Village Boria, Agas, Taluka Petlad,
District Anand,
Gujarat – 388130
Contact No. : +91-9825458529
Email : ketan.patel43@yahoo.com

Personal Profile and Farming Background

Shri Ketanbhai Jashbhai Patel, aged fifty-two, has nearly twenty-five years of farming experience. He manages twelve hectares of Goradu soil with assured irrigation from three borewells. His farm is diversified with banana and potato as major crops and includes a dairy enterprise of about twelve Gir and HF crossbred animals. His operations are mechanised, market-oriented, and supported by a pucca residential infrastructure.

Innovation Overview and Motivation

His principal innovations comprise an Integrated Bio-Nutrients Management (IBNM) system, a set of practices for producing export-quality bananas, and the introduction of summer banana cultivation in Gujarat. His objective was to reduce cultivation costs, improve soil health, and achieve higher net returns from banana. Market standards for exportable fruit and the above objective motivated the systematic refinement and operationalisation of these innovations on his commercial farm.

Technical Features, Novelty and Development Process

The IBNM system is an on-farm bio-nutrient formulation combining cow dung, cow urine, buttermilk, pulse flour, jaggery and local materials fermented in 25,000-litre tanks for soil and foliar applications. Export-quality banana production requires tissue-culture seedlings, precise nutrient and irrigation scheduling, de-leafing, bunch covering, floral removal, fruit thinning and careful harvesting with post-washing processes. Summer banana adaptation modifies these standards for heat tolerance. All components were refined through multi-season on-farm experimentation.

Institutional Linkages, Mentorship and Validation

He maintains long-term institutional linkages with Anand Agricultural University (AAU), contributing to research council, local management and zonal research–extension committees. His IBNM and banana management technologies have been validated and showcased through ATMA farm school trainings, ICAR–IARI Agri Fair presentations, ASSOCHAM summits and international conferences related to food security and horticulture. These platforms facilitated wider dissemination and provided external endorsement of his production protocols.

Challenges Faced and Problem-Solving Approaches

Key challenges included convincing farmers about the efficacy of bio-nutrient systems, ensuring buyer acceptance for export-quality fruit, and adapting banana cultivation to high-temperature summer conditions. He addressed these through repeated on-farm demonstrations at JK Patel Farm, structured trainings, field-based lectures, and sustained engagements with farmers, buyers and extension personnel. Empirical evidence on yield and quality outcomes further reduced scepticism and supported continued adoption of the modified practices.

Utility, Applications and User Benefits

The IBNM system improves soil fertility, enhances nutrient-use efficiency, and reduces dependence on chemical fertilisers without requiring additional expenditure beyond regular farm inputs. In banana, his integrated production protocols have increased yields to approximately 121 tonnes per hectare and improved fruit uniformity for export. User benefits include higher net income, reduced production costs, diversified value-chain opportunities such as banana powder and tissue-culture plant enterprises, and improved sustainability of intensive banana systems.

Adoption, Outreach and Scaling Up

He has facilitated adoption of his practices across major banana-growing regions of Gujarat, where IBNM-based approaches align with ongoing national initiatives promoting natural farming. He has trained more than 1,000 farmers through ATMA farm schools, RAWE programmes, seminars and field demonstrations. Engagement with Farmer Producer Organisations enables structured scaling, while participation in professional and national platforms strengthens communication, farmer-to-farmer learning, and wider uptake of export-quality banana technologies.

Impact Assessment (Economic, Social and Environmental)

Year-wise farm records indicate consistently higher banana yields and net profits for Patel relative to neighbouring farms. Economically, raw banana income is reported at approximately ₹4,21,000 per acre, increasing to about ₹5,71,000 per acre with improved marketing channels. Environmentally, reduced chemical inputs and higher organic matter contribute to soil health and climate resilience. Socially, his training programmes and farm-level employment support capacity-building and local livelihood enhancement within the farming community.

Recognition, Awards and Media Coverage

His contributions have received state and national recognition, including the Sardar Patel Krushi Sanshodhan Puraskar and the ICAR–IARI Innovative Farmer Award (2017). He has also received multiple certificates from ATMA, ASSOCHAM and horticulture agencies for his work on IBNM and banana technologies. His model farm has been featured in conferences and professional interactions involving national figures and scientific leaders, contributing to wider awareness and visibility of his innovations.

Future Vision, Suggestions and Way Forward

He aims to scale IBNM and export-oriented banana technologies across Gujarat through sustained training, farm-based demonstrations and FPO networks. His approach aligns with national natural farming policies and indicates the need for institutional integration of low-cost bio-nutrient systems within extension frameworks. Future directions include strengthening tissue-culture nursery capacity, formalising export-quality management protocols in public advisory systems and enhancing farmer training to support long-term horticultural sustainability.

Name : Shri Rajeshkumar Ratanchand Shah
Address : At Post Fansa, Taluk Umargaul
District Valsad,
Gujarat-396140
Contact No. : 91+9825251012
Email : shahrr11@gmail.com

Personal Profile and Farming Background

Shri Rajeshkumar Ratanchand Shah, 64-year-old farmer, has more than forty-five years of agricultural experience of alphonso mango cultivation by using innovative practice of pruning, training and girdling in mango. This innovative farmer of Gujrat has revived 125 years old senile mango trees to harvest 2.3 lakh kgs mangoes annually. Mr. Rajesh Shah loves Alphonso mangoes and it is his love that stopped him from felling old trees planted by his grandfather. Instead, he used the 'girdling' technique that is quite popular among mango farmers in Gujarat.

Innovation Overview and Motivation

He is widely recognized for practicing innovative method of 'girdling' in old mango trees and using plastic mulching technique while planting a mango plant. Mr. Rajesh Shah has produced more than 1.5 times of alphonso mangoes in his 7.5 hectares of orchard by using this innovative technique of 'girdling' in mango. Normally, a mango tree starts giving fruits when it is 4-year-old and a healthy tree gives about 200 to 300 kg of mangoes in a season. But through new technique of 'girdling' in agriculture, a tree has been giving 400 to 500 kg of quality mangoes for the last two years.

Technical Features, Novelty and Development Process

Using this 'girdling' technique in mango tree, the mangoes of his orchard ripe 15 days ahead of the normal crop. This allowed people to taste mangoes half-a-month early and earned good market price. He has learned this new method of pruning after a visit to Israel. About 20 per cent of the tree branches are pruned from the bottom. Once the tree is pruned, it does not register any unnecessary growth. The tree stays stable at 20 to 30 feet height and water and plant nutrients required for a good fruit reach the top comfortably. He uses the plastic mulching and drip irrigation method to conserve water and maintain humidity around the tree trunk and its roots. He is the first to adopt this method of humidity conservation in mango orchard in Gujarat.

Institutional Linkages, Mentorship and Validation

He has developed linkages with Navsari Agricultural University for associating, guiding and validating his innovation in alphonso mango. He received extension support from Krishi Vigyan Kendra, Valsad for his innovation. He has also developed linkages with State department of Horticulture, *Krishi Vigyan Kendra* and ICAR institute, and Farmers Producer Organizations.

Challenges Faced and Problem-Solving Approaches

Many challenges like lack of fund support, high cost of inputs, lack of skill labours, non-

availability of skill labours and lack of government support were faced by Shri Rajesh Shah during his initial stages of agriculture.

Utility, Applications and User Benefits

This innovative technique is good for enhancing the life span of mango tree, better aeration in mango orchard, increase in mango production, easy to control pest & diseases and enhance the quality of fruits for export.

Adoption, Outreach and Scaling Up

More than 5000 hectares mango area is under cultivation in Gujarat and more than 700 farmers are using this 'girdling' technique of mango for rejuvenation of tree for enhancing production. This technique decreases cost of cultivation and increase the quality of mango. After receiving the awards, many government officials visited his farm and he has given training on 'girdling' technique to the farmers to increase mango production by high density plantation in mango.

Impact Assessment (Economic, Social and Environmental)

The girdling technique significantly enhances mango production, improves fruit quality, and extends the productive lifespan of senile trees, generating higher income and reducing cultivation costs. Socially, it has encouraged widespread farmer adoption across Gujarat and strengthened skills through trainings. Environmentally, the method improves orchard aeration, reduces pest and disease incidence, conserves water through mulching and drip systems, and supports sustainable mango cultivation.

Recognition, Awards and Media Coverage

He has received many prestigious awards such as the Krishi Rishi (2006), Sardar Patel Krishi Sanshodhan Purskar of Govt. Gujarat (2009), Vibrant Gujarat World Krishi Summit Award (2013), ICAR Award (2014) and IARI Innovative Farmer Award (2018) for his outstanding contribution in agriculture.

Future Vision, Suggestions and Way Forward

His aims is to expand this innovation to many farmers in his district with the help of scientist and extension experts of Navsari Agricultural University and *Krishi Vigyan Kendra*, Valsad, as the technique is effective for resource use efficiency especially decrease water requirement, low input like pesticide, fungicide and labour.

Name : Shri Samsudin Nurali Jariya
Address : Bhalchhel village, Sasan Gir,
Taluka Mendarda,
District Junagadh, Gujarat-362135
Contact No. : +91-8822630427
Email : sumeet.jariya9@gmail.com

Personal Profile and Farming Background

Shri Samsudin Nurali Jariya, aged 62, is an experienced mango orchard farmer from Bhalchhel village near Sasan Gir, Gujarat. Educated up to BA, he cultivates 4.96 ha of fully irrigated black soil with exotic and hybrid mango varieties sourced from India and abroad. With decades of practical experience, he has gained expertise in mango cultivation, orchard management and agri-tourism. He also operates an agri-tourism resort, making his farm a learning platform for visitors, farmers and students.

Innovation Overview and Motivation

His key innovations include establishing a Mango Germplasm Museum with over 300 cultivars and founding Anil Farms Gir Jungle Resort, the first agri-tourism initiative in the Gir region. The innovation arose from his need to identify which exotic and hybrid varieties perform well under Gir's changing climate, supporting diversification beyond traditional mangoes. The resort, initiated in 2000, addressed the lack of lodging facilities and aimed to integrate agriculture, conservation, learning and income diversification.

Technical Features, Novelty and Development Process

The Mango Museum systematically displays more than 300 cultivars, enabling farmers and visitors to compare varietal performance, climate resilience, productivity and market suitability. His farm demonstrates modern techniques including ultra-high-density planting, drip irrigation, fruit bagging, biofertilizers and biopesticides. The agri-tourism resort evolved from a two-room farmhouse into a 25 room facility with a swimming pool, conference hall and visitor amenities, creating a unique blend of mango biodiversity conservation and rural tourism development.

Institutional Linkages, Mentorship and Validation

His innovations were developed independently without direct mentorship. Although there is no formal institutional validation of his mango germplasm collection, recognition from IARI, ATMA and Gujarat government agencies reflects credibility and practical value. Continuous visits by farmers, students and tourists for exposure learning serve as indirect validation. His orchard and resort function as demonstration and learning sites, reinforcing the utility and relevance of his innovations.

Challenges Faced and Problem-Solving Approaches

Major challenges included sourcing authentic exotic mango planting material due to limited access to reliable nurseries. Another challenge was the absence of an agri-tourism policy in Gujarat, making it difficult for farmers to adopt this enterprise despite its success in other states. Despite this, he expanded the resort step-by-step with personal investment and continuous improvements. To address the challenge of varietal authenticity, he relied on trusted sources, farmer networks, and gradual collection over years.

Utility, Applications and User Benefits

The Mango Museum enables farmers to observe varietal performance directly, understand climate-resilient traits and evaluate market premiums. It also introduces tourists to lesser-known varieties, supporting future market acceptance. The agri-tourism model diversifies income, generates rural employment, promotes sustainable tourism and connects agriculture with society. Combined, these innovations benefit farmers, youth, consumers, researchers and tourists by offering education, exposure and diversified livelihood opportunities.

Adoption, Outreach and Scaling Up

Since receiving the IARI Innovative Farmer Award, he expanded his resort capacity with six additional rooms and a new conference hall. The mango collection grew from 200 to 300 cultivars. His agri-tourism model inspired more than 500 farmhouses in the Gir region, making it one of the largest rural tourism clusters in India. Through social media outreach and farm visits, he promotes new mango varieties among both farmers and consumers, encouraging widespread adoption.

Impact Assessment (Economic, Social and Environmental)

Economically, exotic and hybrid mango varieties fetch nearly double the price of traditional cultivars, significantly increasing income. The resort generates ₹85–100 lakh annually and provides employment to about 50 local persons. Environmentally, drip irrigation reduces water use, and biofertilizers and biopesticides lower chemical dependency. Socially, his innovations expose farmers to new technologies, support diversified livelihoods and promote climate-resilient mango cultivation practices.

Recognition, Awards and Media Coverage

He has received several major awards including the ASM Udyan Ratna Award (2024), IARI Innovative Farmer Award (2022), Best ATMA Farmer Award (2019–20), and an award from then Chief Minister Shri Narendra Modi (2007). His resort has earned tourism awards such as the Gujarat Tourism Award (2016), VTV Awards, TripAdvisor Excellence Awards (2020–2023) and Booking.com Traveller Review Awards (2021–2023). His work is widely covered across print, electronic and social media.

Future Vision, Suggestions and Way Forward

He plans to further increase awareness of exotic mango varieties using social media and outreach campaigns. He strongly advocates for a dedicated Agri-Tourism Policy for Gujarat to support farmer adoption. He recommends government-led consumer awareness for hybrid varieties and research on fruit-protection technologies for late-ripening cultivars. His long-term vision is to establish mango museums nationwide to identify region-specific climate-resilient varieties and safeguard future mango cultivation.

Name : Shri Genabhai Darghabhai Patel
Address : Village Sarkari Goliya, Post Agathal,
Taluka Lakhani, District Banaskantha,
Gujarat – 385535
Contact No. : +91-9925557177
Email : patelgenabhai77@gmail.com

Personal Profile and Farming Background

Shri Genabhai Patel, Padma Shri Awardee, aged 61, is a nationally recognised horticulture innovator from Banaskantha, Gujarat, with forty years of farming experience. He pioneered scientific, drip-irrigated pomegranate cultivation in a drought-prone region, shifting from low-income crops to achieve world-class yields of 50,000 kg/ha. His work transformed Banaskantha and trained thousands of farmers in Gujarat and Rajasthan.

Innovation Overview and Motivation

His core innovation is an integrated pomegranate system using drip irrigation, fertigation, mulching, rainwater harvesting and improved post-harvest practices. Developed in response to groundwater depletion, high evaporation and low crop returns, he adopted drip irrigation in 2004–05, proving its water-saving and income-boosting potential. Rising demand for Bhagwa and NHM support encouraged regional scaling.

Technical Features, Novelty and Development Process

His model integrates 95% water-efficient drip irrigation, fertigation saving 30–40% fertilizers, mulching to reduce evaporation, hydrogel-based nutrients to prevent fruit cracking and air-layering for uniform plants. Marigold intercrops suppress nematodes, and solar traps manage pests. Scientific grading, pre-cooling and cold storage boost market value. Developed through trials and expert support, the system raises incomes 4–6 times.

Institutional Linkages, Mentorship and Validation

His work is supported by KVK Banaskantha, State Agricultural Universities, National Horticulture Mission, PMKSY, NABARD, and the district horticulture department. These institutions provided technical testing, variety validation, drip-system optimisation, and large-scale farmer training. He is recognised as a Model Farmer by state agencies and a key mentor in regional horticulture programs. His achievements are documented by IHDS, NABARD case studies and agricultural universities, reinforcing scientific legitimacy.

Challenges Faced and Problem-Solving Approaches

He faced severe water scarcity, high capital costs for drip systems, limited knowledge of pomegranate management, pest/disease outbreaks, and lack of quality planting material. He overcame these constraints through water-saving drip irrigation, rainwater harvesting, adoption of drought-tolerant varieties, IPDM practices, marigold trap crops, and farmer-to-farmer mentoring. Government subsidies and NABARD credit support enabled scaling. Structured training and on-farm demonstrations addressed knowledge gaps and built regional confidence in the model.

Utility, Applications and User Benefits

His system drastically reduces water use, improves fertilizer efficiency, stabilises soil moisture, and produces export-quality fruit with uniform colour and size. Farmers adopting this model earn ₹15–25 lakh/ha, compared to ₹2,000–4,000/ha from traditional crops. The technology is climate-resilient, suitable for semi-arid regions, and enhances household income even on marginal land. Drip irrigation reduces labour, electricity and pest incidence, while improved post-harvest handling enables better market prices and shelf-life.

Adoption, Outreach and Scaling Up

More than 50,000 farmers across Gujarat and Rajasthan have adopted his model. District pomegranate area expanded from 210 ha in 2005 to 14,300 ha in 2019, with annual production reaching 236,665 MT. He has trained over 100,000 farmers through KVK programs, farmer field schools and national conclaves. Banaskantha now stands as a major pomegranate hub, with value-added enterprises, nursery units and drip-system markets flourishing.

Impact Assessment (Economic, Social and Environmental)

Economically, pomegranate yields of 50,000 kg/ha provide 4–6 times higher profits, generating more than ₹709 crore annual income district-wide. Socially, the model reduced migration, increased youth engagement and provided employment to 5,000+ local workers. Environmentally, drip irrigation saves 40–70% water, reduces runoff and minimizes fertilizer and pesticide use. Intercropping enhances biodiversity and mulching increases soil carbon. The model transforms water-scarce land into highly productive horticultural systems.

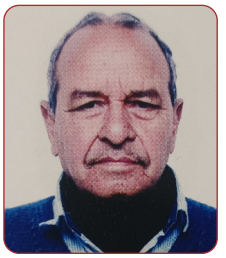
Recognition, Awards and Media Coverage

Shri Genabhai Patel received the Padma Shri (2017) for his outstanding contribution to Indian agriculture. Other recognitions include the British Parliament Bharat Gaurav Award, Krishi Samrat Award, ICAR-IARI Innovative Farmer Award, Haldhar Shiromani, Atma Award, and several Gujarat state honours. His work has been widely featured in national media, agricultural documentaries, and government success stories on drip irrigation and the pomegranate revolution.

Future Vision, Suggestions and Way Forward

He aims to expand drip-irrigated pomegranate cultivation to over 20,000 hectares, establish farmer-run nurseries, promote value-added processing and strengthen export channels. He advocates climate-resilient horticulture, IPDM and post-harvest training, and FPO-led marketing. His long-term goal is a sustainable, water-efficient horticulture ecosystem supporting small farmers in semi-arid regions.

Name : Shri Hariman Sharma
Address : Village Paniyala, P.O. Kothi,
Tehsil Ghumarwin, District Bilaspur,
Himachal Pradesh – 174021
Contact No. : +91-9817284251
Email : sharmaharimanfarm@gmail.com



Personal Profile and Farming Background

Shri Hariman Sharma, Padam Shree Awardee, born in 1956, is a progressive smallholder farmer from Bilaspur district, Himachal Pradesh, with nearly fifty-two years of continuous agricultural experience. Having studied up to matric level, he has devoted his full professional life to farming, without any secondary occupation. He cultivates approximately 20–22 bighas of land (around 3–3.5 ha), nearly 20 bighas of which are irrigated. His farm is situated on medium-textured, slightly stony loam soils and is managed with the support of power tillers and power sprayers for orchard and field operations.

Innovation Overview and Motivation

Shri Hariman Sharma is the innovator of the HRMN-99 apple variety, developed for low-hill, warm agro-ecologies and known as the "apple for warm areas." His motivation began in 1995 after heat severely damaged his mango orchards, prompting him to seek a heat-tolerant fruit crop. By 1999, he initiated systematic development of a warm-area apple variety.

Technical Features, Novelty and Development Process

Beginning with a single seedling, he first grafted it onto plum rootstock, which improved fruit size and quality. Later working onto standard apple rootstock produced a superior variety named HRMN-99. The variety offers better colour, shape, taste, and yield under warm low-hill conditions and bears from August to November. Its multi-year refinement, propagation and evaluation required an estimated investment of about ₹50,000.

Institutional Linkages, Mentorship and Validation

HRMN-99 has been technically evaluated and supported by ICAR–Indian Agricultural Research Institute (IARI) and the National Innovation Foundation (NIF), with additional linkages to farmer-rights and biodiversity-conservation bodies. The variety has been cited in ICAR award documentation as a notable example of farmer-led varietal development and is now recognised nationally as a promising low-chill apple suitable for warm regions. These institutional validations have strengthened credibility and accelerated adoption across multiple states.

Challenges Faced and Problem-Solving Approaches

He developed HRMN-99 in a non-traditional warm apple region despite no technical precedent, limited early support, and strong scepticism. He managed financial and climatic risks through stepwise trials, grafting experiments, and multi-season evaluation. Documentation, demonstrations, and meetings built confidence, and later validation by NIF and ICAR-IARI

enabled large-scale nursery production and dissemination.

Utility, Applications and User Benefits

HRMN-99 allows successful apple cultivation in warm, low-elevation areas where traditional mid-hill varieties fail due to inadequate chilling and high heat stress. It produces fruits reliably under challenging climatic conditions, enabling diversification away from low-value or heat-sensitive crops such as mango in vulnerable pockets. Its extended harvest window (August–November) enhances price realization and market opportunities, while improved fruit colour, flavour and shelf life contribute to higher profitability.

Adoption, Outreach and Scaling Up

After recognition by IARI and NIF, he partnered with NIF to expand planting-material dissemination and technical support. HRMN-99 is now adopted in 29 Indian states and in countries such as Nepal, Bangladesh, Germany, Oman, and Mauritius. He has guided about 7,000 farmers through trainings and exposure visits, with NIF programmes further enhancing outreach.

Impact Assessment (Economic, Social and Environmental)

His innovation, HRMN-99, has enhanced economic benefits by increasing yields, enabling off-season supply, and lowering crop failure risk. It adapts well to existing irrigation, needing no special high-altitude environment. The variety supports employment for about 15 workers on his farm and boosts livelihoods for nursery workers, orchard laborers, and trained youth in grafting and planting.

Recognition, Awards and Media Coverage

Shri Hariman Sharma has received about 25 national and 32 state/district awards from ICAR, NIF, and state governments. In 2025, he was honored with the Padma Shri for pioneering apple cultivation in warm regions. His HRMN-99 apple variety and achievements are widely covered in media, with detailed documentation on his website “Hariman Sharma Apple Nursery”.

Future Vision, Suggestions and Way Forward

For wider expansion of HRMN-99 in warm and low-hill regions, Shri Sharma stresses institutional support for farmer-breeders, stronger planting-material systems, and proactive extension. With nursery accreditation, region-specific practices, and climate-resilient measures, HRMN-99 can drive diversification and enhance livelihood security in climate-sensitive, non-traditional apple-growing areas.

Name : Shri Pawan Kumar
Address : Tiwari Saloni,
District Chamba,
Himachal Pradesh- 176330,
Contact No. : +91-9805057988
Email : pg679376@gmail.com

Personal Profile and Farming Background

Shri Pawan Kumar, aged 39, is a dedicated and progressive farmer with over 20 years of farming experience in crop cultivation, livestock management, and modern agricultural practices. His journey in farming is built on continuous learning, experimentation, and field-based innovation. Over the years, he has refined his understanding of soil health, nursery development, and sustainable resource utilization. His strong work ethic, scientific approach, and passion for horticulture have enabled him to successfully manage farm operations while exploring new techniques that enhance productivity and profitability.

Innovation Overview and Motivation

His key innovation involves the multiplication of apple clonal rootstocks through vertical expansion of nurseries using air layering under greenhouse and open-field conditions by air layering using soilless rooting medium-developed by the ICAR-Central Institute of Temperate Horticulture Srinagar from 2021. The motivation behind adopting and scaling this innovation came from the scientific guidance, support, and exposure provided by ICAR-CITH Srinagar.

Technical Features, Novelty and Development Process

The innovation introduces air layering as an additional and highly effective propagation method for clonal rootstocks of apple, cherry, pear, and stone fruits. Traditionally, India relied mainly on stooling and trench layering, which limited rootstock quantity and wasted the upper plant portion. With this new method, the upper section of the plant is utilized, increasing multiplication efficiency up to four times. The technique requires well-timed layering, a soilless rooting medium, controlled humidity, growth hormones, and nursery management skills. This process results in uniform, true-to-type planting material and significantly boosts propagation efficiency.

Institutional Linkages, Mentorship and Validation

The innovation is directly supported and validated by ICAR-Central Institute of Temperate Horticulture, Srinagar (J&K). Scientific mentorship from Dr. Wasim Hassan Raja, Fruit Scientist at ICAR-CITH, played a crucial role in refining the technology, standardizing field practices, and strengthening technical guidance for scaling.

Challenges Faced and Problem-Solving Approaches

Initial adoption faced resistance as many growers were unfamiliar with air layering for temperate fruit crops and hesitant to change from traditional methods. Standardizing the process required repeated trials, proper timing, and precision in hormone application and moisture control. Climatic fluctuations and limited technical manpower affected rooting success. Nursery owners also lacked adequate infrastructure and training. Through demonstrations, continuous farmer engagement, training workshops, and social media outreach, awareness grew and confidence increased. Personal follow-

ups, farmer-to-farmer communication, and visible early success helped overcome skepticism and accelerate adoption.

Utility, Applications and User Benefits

This innovation enables productive use of previously unused plant portions, allowing significantly higher propagation from a single mother plant. The method increases multiplication efficiency, reduces production time, and ensures availability of uniform, disease-free, true-to-type clonal rootstocks. It lowers the cost of planting material, reduces dependence on imported varieties, and supports nursery growers, orchardists, and commercial fruit producers with reliable and scalable plant propagation.

Adoption, Outreach and Scaling Up

After receiving the IARI Award, he actively promoted the technology among farmers in Himachal Pradesh and neighbouring regions. He proudly mentions that he is the first farmer in India to adopt the technology of multiplication of clonal rootstocks developed by ICAR-Central Institute of Temperate Horticulture, Srinagar (J&K), which is now being adopted in Jammu & Kashmir and Himachal Pradesh. Outreach through demonstrations, media engagement, and digital platforms including YouTube, Facebook, and Instagram has expanded awareness and inspired nursery entrepreneurship. The technology has high potential for scaling across temperate regions including Uttarakhand, Arunachal Pradesh, Sikkim, and the Northeast.

Impact Assessment (Economic, Social and Environmental)

Economically, the multiplication rate has increased 2–3 times without expanding infrastructure, reducing per-plant production costs and increasing nursery income. Socially, the technology has empowered rural youth, women, and small nursery growers by offering a skill-based, low-investment opportunity. Environmentally, it supports local propagation, reducing dependency on imported stock and preventing entry of foreign pests and diseases.

Recognition, Awards and Media Coverage

Shri Pawan Kumar has received several honours, including the IARI Innovative Farmer Award 2024, District Millionaire Farmer of India Award 2023, and the Best Nursery Grower Award 2022. His work is featured by ICAR, print media, and social platforms, and he holds two licensed technologies from ICAR-CITH.

Future Vision, Suggestions and Way Forward

He envisions large-scale demonstrations, farmer trainings, and model nurseries in collaboration with State Horticulture Departments, KVKs, ICAR institutions, private nurseries, and FPOs. He recommends integrating this technology into government schemes, improving nursery certification, enhancing disease-free planting material supply, and expanding digital outreach to accelerate adoption and strengthen self-reliant nursery entrepreneurship.

Name : Shri Bharat Bhushan
Address : Village Lerote, Tehsil Bhalla,
District Doda,
Jammu & Kashmir – 182221
Contact No. : +91-9906018686
Email : bkotwal47@gmail.com

Personal Profile and Farming Background

Shri Bharat Bhushan, aged forty-eight, is a distinguished aromatic-crop innovator from Doda district, Jammu & Kashmir, with nearly three decades of farming experience. Starting as a traditional hill farmer, he shifted to lavender cultivation suited to Himalayan foothills. Managing nine hectares of mixed lavender, rosemary, tagetus, and apple orchards with steam-distillation, he leads HEOPCL supporting 14,000 farmers. His work drives the "Purple Revolution" transforming livelihoods in the Chenab Valley

Innovation Overview and Motivation

His central innovation is an Integrated Aromatic Farming and Essential Oil Processing System that includes lavender cultivation, decentralized distillation, product diversification, and market-linked FPO activities. Driven by low incomes from maize–wheat farming and import dependence on essential oils, he adopted lavender for drought tolerance and high oil value, aiming to secure stable incomes, develop a domestic oil industry, reduce imports, and provide climate-resilient crops for hill communities.

Technical Features, Novelty and Development Process

Lavender (*Lavandula angustifolia*) is cultivated on dry, sloping terrain with minimal irrigation and low chemical inputs. His system yields 15–20 kg of essential oil per 100 kg of dry flowers. Decentralized steam-distillation at village level preserves oil quality and increases farmer income. Residuals are used for zero-waste products like soaps and aromatherapy oils. Production grew from 100 L in 2019 to over 1,200 L in 2024, refined through field trials and CSIR-IIIM mentorship.

Institutional Linkages, Mentorship and Validation

His innovations are supported by CSIR–IIIM Jammu under the Aroma Mission, which provides planting material, scientific validation and quality testing. SBI formalised a financial MoU with HEOPCL for credit and KCC access, while NABARD aided FPO development. SKUAST Jammu and KVK Doda offered training and demonstrations, ensuring quality control, credibility and regional scaling.

Challenges Faced and Problem-Solving Approaches

Initial challenges included low demand for raw lavender, price fluctuations from Bulgarian imports, lack of distillation units and limited farmer awareness. Shri Bhushan resolved these by creating decentralized distillation units, launching value-added products, organizing HEOPCL for collective marketing and securing institutional buyers, supported by CSIR-IIIM planting material and extensive trainings.

Utility, Applications and User Benefits

The aromatic farming model yields 4–8 times higher income than maize or wheat, with drought tolerance enabling cultivation on rainfed, degraded soils. Its perennial nature ensures multi-year returns with low inputs. Essential oils and value-added products boost profitability, create local jobs, enhance women's participation in processing and reduce rural out-migration in hilly regions.

Adoption, Outreach and Scaling Up

Through HEOPCL, Shri Bhushan has influenced more than 14,000 farmers across India, especially in Doda, Bhaderwah and adjoining Himalayan districts. Over 750 hectares are currently under lavender cultivation, with more than 4,000 farmers trained through KVKs, CSIR-IIIM programs and company-led demonstrations. His decentralized processing model and branded product lines have enabled farmers to capture higher value, leading to widespread adoption of lavender as a sustainable, high-income crop in marginal lands.

Impact Assessment (Economic, Social and Environmental)

Economically, farmers now earn ₹15,000–20,000 per kanal from lavender compared to ₹2,000–4,000 from maize or wheat, with regional oil production rising over tenfold since 2019. Socially, the model has created 2,500 jobs, including 450 for women. Environmentally, lavender conserves water, prevents erosion, supports pollinators and enables zero-waste, climate-resilient farming.

Recognition, Awards and Media Coverage

Shri Bharat Bhushan has received numerous national and institutional honours, including the Innovative Farmer Award (KVK Doda), Innovative Farmer Award (SKUAST Jammu), ICAR-IARI Innovative Farmer Award, and official Startup Recognition by the Department for Promotion of Industry and Internal Trade (DPIIT). He has been honoured by CSIR-IIIM, the Ministry of Science & Technology, the Lieutenant Governor of J&K, and the District Agriculture Department. His work is widely featured in national media, startup expos, agricultural conclaves, and documentation on India's "Purple Revolution."

Future Vision, Suggestions and Way Forward

His vision includes expanding lavender cultivation across Himalayan and semi-arid regions, scaling essential oil production to export levels, and establishing community-based distillation hubs. He aims to strengthen HEOPCL as a national brand, promote farmer-led startups in aromatherapy and natural cosmetics, and achieve ISO-certified production standards. Long-term goals include transforming Doda into India's largest aromatic farming cluster, integrating youth entrepreneurship, expanding product diversity and encouraging policy support for aromatic crops, processing infrastructure and farmer credit access.

Name : Shri Rudrappa Amallappa Zulapi
Address : Post Hulyal, Taluka Jamkhandi
District Bagalkot,
Karnataka-587301
Contact No. : +91-9901615773
Email : ulapirudrappa1010@gmail.com

Personal Profile and Farming Background

Shri Rudrappa Amallappa Zulapi, 56, from Hulyal village, Bagalkot district, Karnataka, has over 35 years of farming experience and cultivates 12 acres of black soil using borewell irrigation and modern machinery. As the president of Jamkhandi Organic FPC, he markets organic products generating ₹12.5 lakh (2023–24) and ₹16.75 lakh (2024–25). His integrated system includes sugarcane, banana, maize, brinjal, teak, Hebbevu, neem, and livestock comprising of 10,000 poultry, 100 goats and 5–8 cattle.

Innovation Overview and Motivation

The cornerstone of his innovations is the conservation of the indigenous brinjal variety HZKB-1, producing 3-kg purple-black fruits with 5–7-day shelf life and inherent pest resistance. He has also advanced the local wheat variety HZG-30 through long-term trait refinement. These efforts trace back to his mother Smt. Laxmibai Mallappa Zulapi's seed-preservation work, nationally recognised by the President of India. His chemical-free cultivation on black soils uses FYM, green manures and biofertilizers to sustain biodiversity and reduce input costs.

Technical Features, Novelty and Development Process

HZKB-1 delivers 335 q/ha yields—10–16% higher than BR-112, Pant Rituraj and Hisar Shyamal with 240 g fruits (13.94 × 12.11 cm), 122-day maturity and negligible pest damage, validated in Uttarakhand and J&K trials. HZG-30 improves wheat through stronger disease tolerance. The novelty stems from 55 years of conservation, rigorous seed selection, pest-protected storage and KVK-validated, low-input adaptation to raised-bed brinjal and traditional wheat systems.

Institutional Linkages, Mentorship and Validation

The wheat research division of UAS, Dharwad supported refinement of HZG-30, complemented by NIF financial assistance, while KVKs and agriculture departments facilitated seed testing, distribution and organic certification (ORG-2503-000153, valid until 2026). She engages actively in extension, integrated farming and FPC leadership, drawing primary mentorship from Laxmibai. ICAR validated HZKB-1 through multi-state RMFITs and FMTs, ensuring rigorous quality assurance and scalability without external sponsorships.

Challenges Faced and Problem-Solving Approaches

His conservation efforts faced challenges in locating pure desi seed, preserving it against pests, ensuring viable storage and overcoming farmer reluctance. These were addressed through guidance from Smt. Laxmibai, KVK trainings, rigorous germination and contamination checks, and FPC-led marketing. Post-IARI recognition, he expanded integrated farming, micro-irrigation and demonstrations, strengthening departmental collaborations and farmer interest.

Utility, Applications and User Benefits

These indigenous varieties enable chemical-free brinjal cultivation with higher yields and strong market acceptance, while wheat production benefits from reduced costs through FYM and biofertilizers and improved grain quality. HZKB-1's pest resistance and its long shelf life suit commercial supply chains. Applicable across organic vegetable and grain systems, the innovations reduce labour through mechanization and micro-irrigation, enhancing profitability, sustainability and climate adaptability through conserved genetic biodiversity.

Adoption, Outreach and Scaling Up

He has disseminated seeds to over 550 farmers spanning multiple states, encompassing 1,425 acres, while guiding more than 1,000 individuals across three decades through training sessions, YouTube and Facebook platforms, and Farmer Producer Company outlets. His scaling up initiatives took help of Krishi VigyanKendras, agricultural departments, and integrated farming paradigms to propel broader organic adoption via targeted demonstrations and community networks.

Impact Assessment (Economic, Social and Environmental)

Economically, organic practices increased brinjal and wheat yields, reduced chemical and labour costs, and generated stable income through FPC channels, supporting 25 field positions and five company roles. Socially, they strengthened women's and youth participation via SHGs and producer groups. Environmentally, eliminating chemicals enhanced biodiversity and soil health, while micro-irrigation improved water and energy efficiency.

Recognition, Awards and Media Coverage

He earned national recognition for seed conservation through the IARI Innovative Farmer Award, Mahindra National Award, Dharti Mitr National Award and Aspee Foundation Award, alongside state honours such as Krishi Pandit and Krishi Prashasti and multiple district awards. Smt. Laxmibai received NIF and Presidential recognition. Newspapers, television, YouTube and Facebook widely documented their conservation achievements.

Future Vision, Suggestions and Way Forward

He envisions instituting Krishi Vigyan Kendra-facilitated germination and dust testing protocols for sustained conservation, alongside establishment of village-level seed banks, comparative research on conventional versus desi varieties, digital extension mechanisms, and value-added processing with robust legal and financial policy frameworks. This field-validated paradigm heralds scalable organic agriculture through community-centric stewardship.

Name : Shri S.S. Paramesha
Address : Post Kodiyala, Chelur (Hobli),
District Tumkur,
Karnataka-572117
Contact No. : +91-9902794969
Email : parameshseegenahalli@gmail.com

Personal Profile and Farming Background

Shri S.S. Paramesha, 45 years old, with an education of second PUC, with 7.0 ha of land have 25 years of farming experience. His occupation is farming and jackfruit nursery business. His innovation emerged from a 35-year-old ancestral tree planted by his father Siddhappa. He became popular for the development of the copper-red-fleshed "Siddu Jackfruit".

Innovation Overview and Motivation

The core innovation of this work lies in identifying, conserving, and scaling up a genetically unique jackfruit variety "Siddu" distinguished by its copper-red flakes and high nutritional value. Growing public interest, rising demand for coloured-flake jackfruit, and the broader need to conserve indigenous fruit diversity motivated formal collaboration with scientific institutions to validate and promote this variety responsibly.

Technical Features, Novelty and Development Process

"Siddu Jackfruit" is distinguished by its small fruit size (about 2-5 kg), brilliant copper-red flakes, exceptional sweetness, firm texture, very high phytochemical richness, good shelf life, and consistent productivity. Scientifically tested samples show 8 times higher carotenoids; 28 times higher lycopene and superior antioxidant content compared to common white-fleshed varieties. The tree yields nearly 450 fruits annually, each containing 25-30 edible bulbs of 24-25 g. Uses a normal jackfruit seedling as rootstock and lets it grow upto ~ 2 ft. Then he grafts a bud from the "Siddu" mother-plant onto it via the bud-graft method. After 8–9 months, the grafted plant becomes ready to transplant into the field.

Institutional Linkages, Mentorship and Validation

His work received strong scientific backing from horticultural research institutions, particularly ICAR-IIHR, which conducted systematic surveys, sampled over a hundred trees across multiple districts and identified Siddu as one of three elite accessions. Dr.G.Karunakaran, Sr. Scientist IIHR Bangalore is a mentor. Researchers validated its morphological, nutritional and functional qualities over several years. Institutional partnerships enabled air-layering training, quality propagation, phytochemical testing, documentation and national-level presentation.

Challenges Faced and Problem-Solving Approaches

Grafting success has been affected due to unfavorable climatic conditions, resulting in a reduced success rate of about 65%. The reproduction of this plant breed was impacted by pirated saplings, and misinformation spread about the Siddu jackfruit.

Utility, Applications and User Benefits

The Siddu variety offers unique advantages. Its small fruit size suits family use; extremely

high carotenoid and lycopene levels give strong antioxidant and nutraceutical value; vegetative propagation ensures uniformity and fruiting within 2-3 years. Less water requirement low maintenance, suitability for organic farming, long shelf-life and superior market price make it ideal for resource-limited farmers and commercial horticulture.

Adoption, Outreach and Scaling Up

This variety is being promoted through a strategic collaboration with Indian Institute of Horticultural Research (IIHR) under a Memorandum of Understanding (MOU) focused on sapling reproduction and dissemination. Extent of adoption is 900 ha in southern region and 10,000 farmers have been guided and benefitted. This variety was granted Plant Breeder's Rights by Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA) in 2022 for a period of 18 years.

Impact Assessment (Economic, Social and Environmental)

Economically, Siddu represents a high-value horticultural innovation that generates attractive returns from fruit sales and sapling production. After planting, the tree usually begins yielding fruit in about five years. Around 15 rural women are regularly employed in nursery. Socially, it promotes community pride in local biodiversity. Environmentally, Siddu contributes to long-term biodiversity conservation, strengthens tree-based farming systems and supports climate resilience due to jackfruit's drought tolerance and low input requirements. Nutritionally, its high carotenoid and lycopene content positions it as a valuable health-promoting fruit supporting national nutritional security goals.

Recognition, Awards and Media Coverage

He has been honoured by national horticultural research bodies as "Custodian of Novel Jackfruit Types with High-Nutritive Value and Attractive Coppery Red Flakes" for the red-fleshed Siddu jackfruit variety. His jackfruit has been formally documented both in institutional publications of Indian Institute of Horticultural Research (IIHR) and in national agricultural forums. Media outlets including Deccan Herald have widely featured his work, especially when Siddu was granted exclusive rights under Protection of Plant Varieties and Farmers' Rights Authority (PPVFRA).

Future Vision, Suggestions and Way Forward

He plans to expand Siddu propagation via farmer-run nurseries and certified planting-material hubs. He also aims to promote value-added jackfruit products such as vacuum-dried bulbs, pulp, chips and nutraceuticals. Training in grafting, processing and orchard management will support wide adoption. By linking farmers, research institutions and markets, he seeks nationwide scaling up. The long-term goal is to conserve India's jackfruit heritage and enable farmers across tropical/subtropical regions to benefit from this nutritious, climate-resilient fruit.

Name : Shri Nagaraj M. Mohan Naik
Address : Kadle Mane, Village Kagal,
Taluk Kumta, District Uttar Kannada,
Karnataka-581351
Contact No. : +91-9741374244
Email : info.ataryahagro@gmail.com

Personal Profile and Farming Background

Shri Nagaraj Mohan Naik, aged 44, is an innovative farmer from a traditional farming family, he inherited deep values of natural farming from his grandfather, who practiced agriculture without chemicals. This legacy shaped his passion for sustainable, eco-friendly farming. Over the years, he transitioned from conventional methods to a fully natural farming system focused on soil health, biodiversity conservation, and nutritional integrity of crops.

Innovation Overview and Motivation

His innovation centers on conserving and reviving indigenous rice varieties that are disappearing due to modern hybrid seed dominance. His motivation stems from concerns over declining soil fertility, loss of native seed diversity, and reduced farmer autonomy. He envisioned a farming model where natural inputs, traditional knowledge, and local biodiversity strengthen food systems, farmer incomes, and ecological resilience. His mission evolved into seed conservation, natural farming, value addition, and community empowerment.

Technical Features, Novelty and Development Process

The uniqueness of his initiative lies in growing and preserving over 600 indigenous rice varieties, including disease-resistant, saline-tolerant, and medicinal types. These are cultivated using natural farming principles involving organic composting, crop rotation, mulching, and biological pest management. Seed samples are dried, processed, catalogued, and stored in controlled environments to maintain purity and longevity. Along rice, he diversified into honey production, vermicomposting, dairy farming, cold-pressed oils, and traditional Kokum butter processing, demonstrating a holistic integrated farming system.

Institutional Linkages, Mentorship and Validation

His work is strengthened through technical collaboration with Goa University, Dharwad Agricultural University, Mandya VC Farm, Bhramavar KVK, and IISc Bengaluru. These institutions assist in seed characterization, research trials, nutritional analysis, and scientific documentation. The collaborations validate the conservation work and ensure scientific credibility, policy relevance, and scaling potential.

Challenges Faced and Problem-Solving Approaches

Some key challenges include maintaining seed viability over long durations, lack of infrastructure, limited awareness among farmers, and absence of premium markets for native varieties. He addressed these challenges by developing personal storage facilities, documenting varieties, forming farmer networks, and promoting community seed exchange. Gradually,

awareness programs and demonstrations encouraged farmers to adopt traditional varieties, ensuring continuity and acceptance.

Utility, Applications and User Benefits

His innovation benefits farmers by providing climate-resilient seeds requiring minimal external inputs. Consumers gain access to clean, chemical-free, nutrient-rich food. Researchers and institutions benefit from a conserved genetic pool essential for breeding and climate adaptation studies. Additionally, value-added products like honey, cold-pressed oils, and Kokum butter generate enhanced income opportunities.

Adoption, Outreach and Scaling Up

To promote wider adoption, he conducts farmer training, field demonstrations, seed distribution, and awareness programs. A Community Seed Bank model is being developed to ensure local custodianship and protect native seeds from corporate ownership. Plans are underway to digitally market his brand "Namma Kagga" and expand agro-processing units for larger outreach.

Impact Assessment (Economic, Social and Environmental)

Economically, farmers adopting native seeds can reduce input costs and can access premium organic markets. Socially, the initiative revives traditional knowledge, strengthens community seed sharing, and supports rural livelihoods. Environmentally, the shift to natural farming improves soil fertility, biodiversity, and climate resilience, while reducing chemical dependence and groundwater contamination.

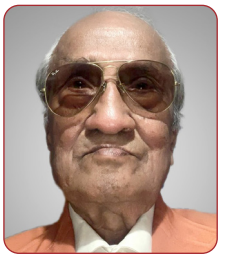
Recognition, Awards and Media Coverage

He has received appreciation from agricultural departments, universities, and farming communities for his exemplary work in native seed conservation and natural farming. His work has been featured in print media, farmer networks, and institutional platforms, enhancing visibility and credibility.

Future Vision, Suggestions and Way Forward

He envisions up scaling the preservation initiatives of indigenous crops through nationwide farmer networks, digital seed exchange platforms, and collaborative research projects. Future goals include expanding value-added product lines, strengthening processing infrastructure, and mainstreaming native rice varieties in consumer markets. His long-term vision is to build a resilient ecosystem where natural farming, biodiversity conservation, and farmer prosperity coexist sustainably.

Name : Shri Narendra Singh Sipani
Address : 8 Housing Board Colony,
Nai Aabadi, Kambal Kendra Road,
Mandsaur, Madhya Pradesh – 458001
Contact No. : +91-9425105100; +91-8799085447
Email : narendrasinghsipani@gmail.com



Personal Profile and Farming Background

Shri Narendra Singh Sipani, an 86-year-old graduate farmer, has more than fifty years of agricultural experience supported by a deep personal commitment to research and development. He owns five hectares of fully irrigated black cotton soil in Mandsaur, Madhya Pradesh, where he cultivates a diverse mix of field and horticultural crops. His farm is well-equipped with modern mechanization tools, enabling continuous varietal trials, micronutrient formulation testing, and field-based innovation activities that shaped his expertise over the decades.

Innovation Overview and Motivation

He is widely recognized for developing improved wheat, soybean, maize, pigeonpea, mustard, cotton, and methi varieties, as well as for creating India's earliest micronutrient and PGR-based agricultural formulations. His work was deeply inspired by his involvement in the Green Revolution, where he assisted in disseminating the Mexican wheat varieties Lerma Rojo (PV-18) and Sharbati sonora under the guidance of Dr. M. S. Swaminathan. This experience motivated him to devote his life to farmer-led scientific innovation.

Technical Features, Novelty and Development Process

His innovations span more than seventy targeted micronutrient formulations, synthesis of PGRs such as NAA, CCC, MH, Triacontanol, and a distinguished portfolio of crop varieties including Mohan Wonder, Waman, Sona Sharbati, Sipani-555, WA-6058, CN-5, WA-2022, WD-7003 in wheat, SKF-SPS-11, SKF-BS-9, SKF-433, SKF-148 in soybean, Star-2011 in maize, and SKF-A1 (Shivna) in pigeonpea. He jointly patented a nano-copper formulation with IARI, marking a pioneering scientific contribution from a farmer innovator.

Institutional Linkages, Mentorship and Validation

His innovations have been validated through collaborations with major institutions including IARI, NCL Pune, ICRISAT Hyderabad, MPUAT Udaipur, and the National Soybean Research Lab (USA). He has been guided by experts such as Dr. M. S. Swaminathan. In 2018, IARI established its first Collaborative Outstation Research Centre at his farm—an extraordinary recognition of his scientific capabilities and contributions.

Challenges Faced and Problem-Solving Approaches

Limited funding, inadequate machinery, low farmer awareness about micronutrients and PGRs, poor transport systems, and labour shortages initially hindered his progress. However, persistent experimentation, personal financial investment, and strong linkages with scientific institutions helped him successfully overcome these constraints.

Utility, Applications and User Benefits

His micronutrient formulations and PGRs enhance crop growth, nutrient balance, and productivity under varied agronomic conditions. The crop varieties he developed offer high yield, quality grain, and strong tolerance to heat, drought, and soil limitations, ensuring ease of adoption and tangible benefits to farmers.

Adoption, Outreach and Scaling Up

More than two thousand farmers use his varieties annually, supported by the production of roughly two thousand quintals of seed each year. His wheat variety Mohan Wonder alone is cultivated on approximately 15 million hectares, and all his varieties together cover about 20 million hectares across eight states. After receiving IARI recognition, he expanded training, marketing, institutional partnerships, and farmer outreach.

Impact Assessment (Economic, Social and Environmental)

His technologies have improved yields and incomes by 30–40 percent while promoting resource-efficient agriculture. His enterprise employs twenty-five people and supports rural livelihoods. Environmentally, his climate-resilient varieties and eco-friendly nutrient formulations contribute significantly to sustainable crop production and lower input dependence.

Recognition, Awards and Media Coverage

He has received prestigious awards such as the IARI Fellow Award and the Genome Saviour Award from PPV&FRA, Government of India. His contributions are widely recognized by scientific institutions and highlighted in media reports.

Future Vision, Suggestions and Way Forward

He aims to expand nano-formulations, improve crop-specific micronutrient solutions, and develop more climate-resilient varieties. He suggests simplifying regulatory approvals, incentivizing indigenous innovations, and strengthening public–private–farmer research partnerships.

Name : Major Manmohan Singh Verka
Address : Village Firvariah, P.O. Vachhoa,
Tehsil Ajnala, District Amritsar,
Punjab – 143102
Contact No. : +91-98555 21092

Personal Profile and Farming Background

Major Manmohan Singh Verka, aged eighty-one, is a distinguished progressive farmer from Ajnala, Amritsar, renowned for pioneering high-density horticulture and diversified orchard systems in North India. With over twenty-five years of scientific orchard management experience, he has transformed nearly 150 acres of family land into a highly productive integrated horticultural model. His farm, situated on clay-loam and sandy-loam soils with assured tube-well irrigation, combines dense fruit orchards, forestry components and small livestock units, creating a resilient, resource-efficient production system.

Innovation Overview and Motivation

His primary innovation is the design and refinement of dense plantation models for pear and kinnow orchards. Departing from PAU's recommended spacing of 25 × 25 feet, he tested closer layouts such as 26 × 13, 28 × 14 and 25 × 20 feet, increasing pear density to 90–130 plants per acre. For kinnow, he adopted 20 × 10 feet spacing to achieve nearly 220 plants per acre. Driven by the need to raise income per unit area, he refined these models through continuous experimentation and expert consultations.

Technical Features, Novelty and Development Process

Major Manmohan Singh Verka's dense plantation system uses intermediate and reduced spacings to optimize kinnow orchard geometry for early bearing and sunlight. Systematic pruning maintains compact canopies at high densities to prevent shading. It integrates micro-irrigation, fertigation, balanced manuring, mulching, and science-based plant protection per university guidelines. Improved post-harvest washing, grading, and packing strengthen market value, all based on trials and continuous monitoring spamming many years.

Institutional Linkages, Mentorship and Validation

His work is closely connected with Punjab Agricultural University and the Department of Horticulture, Punjab, whose experts have offered sustained technical guidance and periodic field validation. At the national level, his contributions have been recognised by major institutions through awards such as the Jagjivan Ram Innovative Farmer Award and the IARI Innovative Farmer Award, reflecting the scientific merit and replicability of his orchard designs. His innovations have also drawn appreciation from various state and national bodies engaged in horticultural development.

Challenges Faced and Problem-Solving Approaches

While establishing dense orchards, he encountered challenges related to the high cost of quality planting material, infrastructure for irrigation and the increased management demands of closely spaced orchards. The unfamiliarity of farmers with his alternative spacing models created

initial scepticism. Major Verka addressed these concerns by gradually establishing dense blocks, adopting precise annual canopy management, using drip irrigation to mitigate competition and showcasing side-by-side performance comparisons with traditional orchards. Regular field demonstrations played an important role in building confidence among neighbouring farmers.

Utility, Applications and User Benefits

The dense plantation model enhances fruit yield per unit area, ensures better orchard utilisation and provides faster economic returns. Improved root-zone and canopy management resulting in efficient water use, better fruit colour development and higher market quality. For farmers with limited landholding or those seeking higher-value perennial systems, the model offers a reliable path for income enhancement and risk reduction.

Adoption, Outreach and Scaling Up

Nearly 200 farmers across Punjab have adopted his dense orchard practices, while several hundred more have benefitted through training programmes, exposure visits and on-farm demonstrations. His work has contributed to a significant shift toward high-density orchard establishment in the state, influencing private farmers and departmental schemes promoting intensified fruit cultivation.

Impact Assessment (Economic, Social and Environmental)

Economically, dense orchards can raise returns by up to 40 percent, often allowing one acre under his model to outperform two acres under traditional spacing. Socially, his innovations have supported farmer capacity-building, increased seasonal employment in orchard operations and encouraged youth to adopt horticulture. Environmentally, higher tree density provides better soil cover, contributes to microclimate stability and enhances biomass and carbon sequestration, supporting climate-resilient agriculture.

Recognition, Awards and Media Coverage

He has received numerous prestigious honours, including the Chief Minister Award in Horticulture, Punjab State Awards, the Mahindra Samriddhi Award, the Prof. N.G. Ranga National Award and the IARI Innovative Farmer Award. His work has been widely documented across newspapers, magazines and electronic media.

Future Vision, Suggestions and Way Forward

He envisions expanding dense orchard systems across Punjab through farmer training, exposure visits and collaboration with horticulture departments. His future priorities include standardising high-density orchard packages of practices, improving certified nursery systems and strengthening hands-on skill development. His long-term goal is to establish highdensity horticulture as a central pillar of sustainable, climate-resilient and income-enhancing agriculture in the region.

Name : Shri Amarjeet Singh Dhillon
Address : Village & PO: Bargari,
District Faridkot,
Punjab-151208
Contact No. : +91-9814322390
Email : asbargari@gmail.com

Personal Profile and Farming Background

Shri Amarjeet Singh Dhillon, 50, a B.Tech and PG Diploma holder in Mechanical and Production Engineering, owns a farm of farm 4.8 hectares of sandy loam soil in Bargari, Faridkot, Punjab. Using canal and borewell irrigation and modern machinery, he cultivates Kinnow, grapes and guava, intercropping vegetables such as gourds, cabbage, garlic, turmeric, onion, broccoli and capsicum as per PAU–ICAR recommendations. He also produces guava-based value-added products generating ₹1.5-2 lakh (2023–24) and ₹2-2.5 lakh (2024–25).

Innovation Overview and Motivation

He developed a year-round income model from fruits and vegetables since 2002 by designing an overlapping harvesting schedule that ensured monthly marketable produce. With an investment of ₹10 lakh in water tanks, drip, solar pumps and hard-pan removal, he intensified per-acre income. Kinnow and guava yielded in winter, gourds and garlic in summer, and grapes in June–July. This steady cash flow reduced mandi-based risks of the rice–wheat system. He worked independently without formal mentorship, addressing groundwater scarcity and soil compaction himself.

Technical Features, Novelty and Development Process

The novelty of his system lies in a calendared overlap of crops: January–February produced Kinnow, guava, cabbage, broccoli and turmeric; in March–April it was capsicum, bottle gourd and garlic; May–July for gourds, onion and grapes (Perlette, Flame Seedless); August–October prosheed guava and bower-grown gourds; and November–December winter vegetables. Paddy-straw mulch conserved moisture, no residue burning occurred, and solar-powered drip saved 40% water and fertilizer. These practices increased income by 40% and provided year-round employment for six labourers.

Institutional Linkages, Mentorship and Validation

Punjab Agricultural University, Ludhiana provided trainings, and KVK Faridkot supplied varietal guidance supporting his horticultural system. He regularly guided visiting farmers and was appointed to the PAU Board of Management in January 2025. University linkages validated his practices and strengthened the scientific basis of his year-round production model.

Challenges Faced and Problem-Solving Approaches

He faced hardpan soil, saline groundwater and wide climatic fluctuations. He addressed these constraints by breaking the hardpan, constructing canal-fed storage tanks, installing solar-powered drip irrigation and adopting paddy-straw mulching awaiting residue burning. After receiving awards, his direct farm sales expanded through WhatsApp-based orders.

Continued support from Punjab Agricultural University strengthened field trials and validated his year-round horticultural and intercropping practices.

Utility, Applications and User Benefits

Small cooperative farmers benefited most from his diversified horticultural system. Family labour enabled steady monthly incomes, while net profits increased on a per-acre basis. Crop diversification conserved water and improved produce quality, strengthening market returns. Sale of garlic and turmeric seed added income streams. These practices contributed to salaried-like financial stability similar to regular salary for farming households in Punjab villages.

Adoption, Outreach and Scaling Up

He implemented his year-round horticultural model on 12 acres, drawing frequent farmer and student visits that encouraged wider adoption. His role on the PAU Board of Management strengthened scaling efforts through KVKs and Farm Advisory Service Centres. Group-based dissemination focused on smallholders, promoting practical uptake of diversified cropping, water-saving practices and residue-free orchard–vegetable integration.

Impact Assessment (Economic, Social and Environmental)

Income increased by 40% compared to the wheat–paddy system, and six labourers received year-round employment. Farmer visitors including women and youth adopted diversification practices. Drip irrigation and mulching conserved water, while straw mulches improved soil health. The system enhanced climate resilience and sustained production without residue burning, strengthening economic and environmental outcomes in orchard–vegetable systems.

Recognition, Awards and Media Coverage

He received the IARI Innovative Farmer Award and two national Awards of Excellency from the All-India Co-ordination Committee on fruits, along with zonal recognition from IIVR Varanasi. Honours from Punjab include the Chief Minister's Innovative Farmer Award (PAU, 2006), ATMA Award (2010), State Agriculture Award (2014), Horticulture Award (2021) and PAU produce prizes. His work is documented in print media, Facebook and a formal research paper.

Future Vision, Suggestions and Way Forward

He advocates stronger KVK and FASC-led popularization of diversified horticulture–vegetable systems to enable wider farmer adoption. His model demonstrates potential for nationwide village-level replication, supported by policies promoting year-round cropping, water-saving technologies and residue-free production. Cooperative structures provide an effective mechanism for scaling these practices, enhancing income stability and strengthening climate resilience across smallholder farming communities.

Name : Shri Abdul Rahman
Address : Ward No. – 1, Near Maszid,
Sipahiyon ka Mohalla, Pokhran,
District Jaisalmer, Rajasthan - 345021
Contact No. : +91-9414763768

Personal Profile and Farming Background

Shri Abdul Rahman, aged 73, is a progressive farmer with over five decades of experience in agriculture and allied sectors. With formal education up to Senior Secondary level, he has successfully integrated traditional wisdom with modern agricultural practices, mechanization, irrigation efficiency, and systematic resource management. His farming journey demonstrates resilience and innovation in Rajasthan's arid zone, achieving high productivity despite climatic limitations.

Innovation Overview and Motivation

His primary innovation is the successful establishment and commercial up scaling of date palm cultivation in the sandy desert soils of Jaisalmer. Motivated by the need to improve profitability, diversify income streams, and create livelihood opportunities, he adopted scientific farming practices and integrated drip and sprinkler irrigation systems. Additionally, he has developed a propagation model using suckers, enabling better nursery development, orchard expansion, and income generation for neighbouring farmers.

Technical Features, Novelty and Development Process

The innovation combines natural farming principles, resource-efficient irrigation, and the mechanization of operations. Date palm saplings are prepared using mature plant suckers and are grown using ring irrigation to optimize water use. Soil fertility is enhanced through organic inputs like vermicompost, waste decomposer, and biofertilizers. Mechanization including tractors, threshers, sprayers and solar dryers supports orchard management and post-harvest processing. The novelty lies in the integration of organic inputs, scalable nursery development, mechanized farming, and climate-resilient desert agriculture, achieving high yields of 90–100 kg per plant. This model evolved through continuous experimentation and refinement over years.

Institutional Linkages, Mentorship and Validation

While being largely self-driven, his innovations received recognition and validation from Krishi Vigyan Kendra, Pokaran, and SKRAU, Bikaner. Participation in national and international exposure visits and agricultural summits including government-led delegations supported technical learning and strengthened institutional linkages.

Challenges Faced and Problem-Solving Approaches

Key challenges included poor soil fertility, water scarcity, limited technical knowledge on

date palms, propagation barriers, and market access. These were addressed through drip and sprinkler irrigation, adoption of solar dryers for product diversification, and capacity building in organic input usage. Mechanization ensured efficiency and labour savings, while farmer-to-farmer sharing enabled knowledge dissemination.

Utility, Applications and User Benefits

The innovation benefits farmers through higher income stability, sustainable water use, and improved soil quality. Propagating suckers created additional revenue streams and employment opportunities. Adoption of organic inputs reduced dependency on chemical fertilizers and promoted ecological sustainability. Overall, the model offers diversified income sources, reduced risks, mechanized efficiency, and improved farm resilience.

Adoption, Outreach and Scaling Up

Shri Abdul Rahman has supported more than 200 neighbouring farmers in adopting date palm cultivation and improved crop practices. Between 2019 and 2021, he produced 500 saplings from 2,500 suckers, earning ₹25 lakh. His model is now widely referenced for up scaling desert agriculture and date palm expansion across Rajasthan.

Impact Assessment (Economic, Social and Environmental)

Economically, productivity and profitability increased across field and horticultural crops. Integration of livestock and poultry contributed additional income. Socially, peer learning enhanced community empowerment and farmer confidence. Environmentally, the use of organic fertilizers, drip irrigation, and efficient mechanization improved soil health, reduced chemical inputs, and promoted climate-resilient agriculture.

Recognition, Awards and Media Coverage

He has received multiple prestigious recognitions including Best Agri. Entrepreneur (GRAM 2016), Best Farmer Award (Government of Rajasthan, 2012), recognition at Vibrant Gujarat Global Agriculture Summit (2013), and the Innovative Farmer Award at Pusa Krishi Vigyan Mela, IARI, New Delhi. His achievements have been widely published, exhibited, and documented.

Future Vision, Suggestions and Way Forward

He aims to expand date palm cultivation and mechanized desert agriculture practices across the region. He advocates for wider adoption of organic inputs, efficient irrigation, and value addition. According to his opinion Strengthening training systems, FPO linkages, and documentation of successful models will ensure greater scalability and sustainability for future generations.

Name : Shri S. Venkateswaran
Address : 42, Mariamman Kovil Street,
Kavalkarapalayam, Sirugamani District,
Tamil Nadu – 639115
Contact No. : +91- 9994443695
Email : fisherwife98@gmail.com

Personal Profile and Farming Background

Shri S. Venkateswaran, aged 52, has qualifications in D.E.C.E., P.D.C.A., and B.B.A. have 16 years of farming experience.

Innovation Overview and Motivation

His breakthrough innovation, the Capsule Method of Rice Cultivation, originated from the need to simplify paddy cultivation without raising nursery to save water. Observing challenges faced by small and marginal farmers particularly during nursery raising and transplanting, he conceptualized a technique requiring minimal seeds, labour, and water. His objective was to design a method that was simple, scalable, and suitable for sustainable, low-input farming.

Technical Features, Novelty and Development Process

Seeds are coated or encapsulated in water-soluble films or capsules, enabling planting before water availability; these remain intact until rainfall or irrigation dissolves them, releasing seeds for germination. Sown directly at uniform spacing (e.g., 25 × 25 cm grid) with few seeds per capsule (e.g., two paddy seeds), seed rates drop from 30 kg to 2.4 kg per acre, eliminating nursery needs resetting in greater scheduling flexibility. Films incorporate controlled-release nutrients or protectants to cut fertilizer use and boost soil health; PVA-based polymers offer predictable dissolution and permeability, with additives like biochar, clay, nutrients, or microbes enhancing vigor and yield. Moisture control delays germination until thearrival of favourable conditions, improving good establishment and uniforms crop stand.

Institutional Linkages, Mentorship and Validation

Support from Krishi Vigyan Kendras, Trichy in Tamil Nadu, local agriculture extension officials, and farmer networks helped strengthen and validate his innovation.

Challenges Faced and Problem-Solving Approaches

Challenges encompassed precise film engineering, uniform coating viability, and material supply shortages; high R&D costs; farmer payment reluctance; training needs; regulatory hurdles; and weak supply chains. Automation in encapsulation and sowing addresses these by improving precision, speed, consistency, and crop performance while cutting damage and labor costs.

Utility, Applications and User Benefits

The capsule method significantly reduces labour demand and eliminates hassles of nursery maintenance, seedling pulling, and transplanting. Farmers require just 2.4 kg of seeds per acre lowering input cost considerably. The method promotes strong root establishment, uniform plant spacing, and better nutrient uptake. Women and elderly farmers benefit substantially as the process reduces drudgery and heavy physical effort.

Adoption, Outreach and Scaling Up

The practice is more suited to rainfed and borewell irrigates area. More than 300 farmers adopted this innovation. 25 per cent yield increase was observed. He is spreading the innovation through All India Radio (5 broadcast); local TV talks (10 no.); Group Meetings (22 Nos); Newspapers and Magazines (10 Nos). Other social media like YouTube was also used for spreading his innovation.

Impact Assessment (Economic, Social and Environmental)

The innovation has contributed to measurable improvements in agricultural productivity and sustainability. Farmers adopting the method reported yield increases of up to 25%. It also reduces the drudgery of women involved in transplanting. Environmentally, the method supports improved soil health, water conservation, and reduced dependence on chemical inputs.

Recognition, Awards and Media Coverage

Shri S. Venkateswaran's innovation has received Innovative farmer award by TNAU AT 2016; Innovative farmer award by IARI - New Delhi and Innovative award by CRIDA-Hyderabad at 2018, best farmer award to innovative best sowing techniques by News 18 TV channel.

Future Vision, Suggestions and Way Forward

His policy suggestions includes availability of Government supports including subsidies, tax incentives, and streamlined regulatory approvals for water-soluble films and encapsulation machinery to reduce entry barriers and accelerate market access, while integrating the technology into climate-smart agriculture programs. Research recommendations includes prioritize R&D for climate-adapted film formulations, affordable automation for capsule filling and sowing, and multi-location trials to validate yield gains, input savings, and economic viability. His opinion for extension strategies includes implementation of farmer training via demonstration plots, partnership with agro-input firms for technical support, and development of digital tools for real-time guidance on seed handling and machinery use.

Name : Shri Narendra Singh Mehra
Address : 82 Malla Devla, P.O. Kunwarpur,
Gaulapar, Haldwani, District Nainital,
Uttarakhand – 263139
Contact No. : +91-9897130131
Email : narendra.mehra1012@gmail.com

Personal Profile and Farming Background

Shri Narendra Singh Mehra, a 66-year-old farmer with 40 years of experience, holds an M.A. degree in Geography and a Diploma in Tourism. His primary occupation is farming, complemented by secondary acception of dairy farming, and he is a member of the Nainital Dugdh Utpadak Sahakari Sangh Limited.

Innovation Overview and Motivation

He developed new wheat variety Narendra 09. He also has set world record on turmeric-based innovation, received national recognition for sugarcane cultivation in mountains, recognition for intercropping of garlic in wheat. In the hilly region of Uttarakhand, there was a need for a wheat variety that would be climate-compatible and capable of providing good yield under diverse conditions. This variety has all the traits suitable for the local environment. He worked for 12 years to develop this variety.

Technical Features, Novelty and Development Process

Narendra 09 wheat variety delivers high yield with 50-80 grains per stalk versus 20-25 in traditional types, exhibits all-climate resilience thriving across mountains, plains, and diverse terrains, supports organic sustainable farming without chemical fertilizers, proves water-efficient in low-irrigation conditions, and achieves high productivity up to 2,800-2,900 kg per acre as reported by farmers.

Institutional Linkages, Mentorship and Validation

Shri Narendra Singh Mehra collaborated with G.B. Pant University of Agriculture and Technology (Pantnagar), Vivekananda Mountain Agriculture Research Institute (Almora), KVK Jolikot, and the National Innovation Foundation for mentorship.

Challenges Faced and Problem-Solving Approaches

He faced challenges in developing Narendra 09 wheat, including a 12-year journey of seed preservation. Family and departmental support from institutions like GB Pant University proved essential, while persistence through on-farm trials across diverse regions addressed validation hurdles. Once successful, media coverage and natural promotion via word-of-mouth information dessemination among farmers resolved adoption barriers, turning innovation into a widespread organic, high-yielding practice.

Utility, Applications and User Benefits

Today, he is recognized as an innovative farmer whose contributions have brought significant benefits to the farming community. The innovations he introduced have helped many other farmers who adopted them, including those from outside Uttarakhand, enabling them to

improve productivity and profit. One of his key achievements is the development of a climate-compatible wheat variety capable of providing high yields under diverse and challenging conditions. His innovations offer strong utility value by improving resilience, reducing risk, and enhancing overall farm income, making them highly beneficial and user-friendly for farmers across regions.

Adoption, Outreach and Scaling Up

He has successfully extended his innovations not only within his own state but also to neighbouring ones. Through the training of 800 farmers in his district and the active sharing of knowledge via social media and WhatsApp groups, he has created a wide outreach network. As a result, an estimated 10,000 to 15,000 farmers have benefited from his guidance and innovations, demonstrating strong adoption, effective outreach, and significant potential for scaling up across regions.

Impact Assessment (Economic, Social and Environmental)

His innovations have delivered strong economic, social, and environmental benefits across the region. By increasing crop yields by nearly 30% and promoting practices focused on water conservation, input savings, and reduced labour, he helped farmers to raise income while lowering costs. Introducing sugarcane cultivation in the hilly areas of Pithoragarh which proved transformative in enhancing jaggery production, improving fodder availability for women, and creating local jobs through sugarcane juice machines. Sugarcane nurseries further provided rural youth with sustainable livelihoods. Overall, his work boosted ecological sustainability, strengthened the rural economy, and uplifted communities.

Recognition, Awards and Media Coverage

He attended specialized training on nematode management at a university and actively participated in a national seminar, where he was also invited to deliver expert talks. His contributions to agriculture have earned him notable recognition, including an Honorary Doctorate Award in 2022 in the field of agriculture and organic farming by the Magic Book of Records, and the State Millionaire Farmer of India Award in 2023. His achievements have received significant media coverage, further highlighting his role as an innovative and influential figure in modern agriculture.

Future Vision, Suggestions and Way Forward

According to Sh. Narendra Singh Mehra, at the national level, the central government should establish an Innovation Policy Commission chaired or co-chaired by an innovative farmer, with one innovative farmer from each state nominated as a member. Agricultural universities and research directorates should conduct research on such innovations, while agricultural science centers should be responsible for their promotion.

Name : Shri Agya Ram Verma
Address : Village Kharka Devri,
Post Kodai, District Basti,
Uttar Pradesh – 272131
Contact No. : +91-8299664133
Email : agyaram45@gmail.com

Personal Profile and Farming Background

Shri Agya Ram Verma, aged 58, is a progressive farmer from Basti district, Uttar Pradesh, with twenty-five years of experience in agriculture. He is known for farmer-led varietal selection, seed improvement and mechanisation suited to small holders. He cultivates five hectares of irrigated loam soil under a mixed farming system of crops, vegetables, fruits and livestock, supported by tractors, seed drills, laser leveler, rotavator, drone and dairy activities. He is also an active member of the FPO Kodai, Basti.

Innovation Overview and Motivation

His key innovations include the wheat variety AR-64, Captan Basti sugarcane selection, Kala Namak rice selections (101, 102, Kiran) and a mini-combine adapted for small farms. Since 2005, he has improved varieties for yield and resilience, motivated by the need for locally suited, low-cost options, strengthened through KVK and university trainings.

Technical Features, Novelty and Development Process

His AR-64 wheat selection yields about 64 quintals per hectare, featuring bold grains, strong stems, and good disease tolerance. The Captan Basti sugarcane selection produces nearly 1000 quintals of came per acre. Kala Namak rice selections 101, 102, and Kiran offer long grains, strong aroma, superior taste, and improved productivity. His tractor-mounted mini-combined harvester enables efficient grain harvesting on small plots, reducing residue and eliminating stubble burning.

Institutional Linkages, Mentorship and Validation

He has longstanding engagement with Krishi Vigyan Kendras, agricultural universities, and the National Innovation Foundation, which have supported his training, varietal validation and field demonstrations. His work has been recognised in extension events, research evaluations and farmer–scientist interactions across Uttar Pradesh. Guidance from state agriculture departments and ICAR-linked institutions helped him to refine seed production, document varietal performance and promote his innovations across districts.

Challenges Faced and Problem-Solving Approaches

Key challenges included the difficulty of popularising farmer-bred varieties among growers accustomed to conventional seeds, limited availability of machinery suited to small fields and initial hesitation about the feasibility of a mini-combine adapted to tractors. He addressed these constraints through repeated demonstrations, maintaining foundation seed purity, conducting local trials and collaborating with KVK experts for technical refinement. His willingness to experiment openly on his own fields helped build trust and encouraged farmers to adopt his varieties and machines.

Utility, Applications and User Benefits

His innovations offer visible agronomic and economic benefits. AR-64 wheat improves grain yield and is lodging resistant; Captan Basti sugarcane ensures high tonnage and strong ratooning capacity; Kala Namak selections revived a premium, indigenous scented rice with higher market demand. The mini-combine harvester reduces harvesting drudgery, lowers labour costs, minimises crop residue and supports clean fields without stubble burning. Collectively, these innovations improve productivity, reduce input wastage and stabilise farmer income.

Adoption, Outreach and Scaling Up

Thousands of farmers across Basti and neighbouring districts have adopted his wheat, sugarcane and Kala Namak selections. His seed production efforts have expanded through FPO channels, ensuring availability of quality seed with reliability and traceability. The mini-combine has been adopted or replicated by many farmers managing fragmented or small landholdings. State agriculture officers, KVKs and farmer groups regularly invite him for training programmes and demonstrations.

Impact Assessment (Economic, Social and Environmental)

Economically, farmers report higher yields, more stable production and cost savings due to reduced inputs and mechanised harvesting. Socially, his innovations have strengthened farmer self-reliance, enhanced seed availability locally and created opportunities for rural youth in seed production, machine operation and marketing. Environmentally, reduced residue load and avoidance of stubble burning have improved air quality, while improved varieties supported efficient water and nutrient use.

Recognition, Awards and Media Coverage

Shri Agya Ram Verma has received numerous honours over the past decade from Uttar Pradesh Agricultural Universities, KVKs, State Agriculture Departments and research centres. His recognitions include the Jagjivan Ram Innovative Farmer Award, multiple progressive and innovative farmer awards, state-level honours and certificates acknowledging his contributions to varietal development, sustainable agriculture and mechanisation. His achievements have been featured in exhibitions, extension literature and media reports, highlighting him as a key contributor to farmer-centric innovation in eastern Uttar Pradesh.

Future Vision, Suggestions and Way Forward

He aims to expand the dissemination of AR-64 wheat, Captan Basti sugarcane and Kala Namak selections through certified seed systems and FPO-based marketing. He suggests greater institutional support for farmer-breeders, subsidies for small-machine mechanisation like mini-combines and accelerated promotion of climate-resilient, locally adapted seed varieties. His his long-term vision is to empower farmers through high-quality seed, low-cost mechanisation and sustainable production systems that strengthen livelihood security in eastern Uttar Pradesh.

CHAPTER 3

Innovations in Natural Resource Management: Organic farming, Integrated Farming System and Crop Diversification

Introduction

Natural Resource Management (NRM) has emerged as a critical pillar for the sustainability, resilience, and profitability of Indian agriculture. With increasing challenges of land fragmentation, declining soil fertility, water scarcity, rising production costs, climate variability, and market volatility, the traditional resource-intensive agricultural model is no longer adequate to feed a growing population while safeguarding ecological balance. In response, farmers, research institutions, and policy initiatives have shifted their focus towards resource-efficient technologies, bio-based production systems, and diversified farm enterprises. Transformative approaches likeOrganic Farming, Integrated Farming Systems (IFS), and Crop Diversificationhave shaped the contemporary discourse on sustainable agriculture and rural livelihood enhancement.

NRM-driven innovations are not limited to laboratory research; they are significantly shaped and accelerated by farmer-led experimentation. Across India, farmers have developed, adopted, and improvised technologies to respond to emerging challenges such as residue management, cost reduction, quality enhancement, labour scarcity, and changing consumer demands. Innovations such as natural farming inputs, low-cost manure production units, baby corn and sweet corn cultivation linked with value addition, sugarcane ring-pit methods, solar-powered irrigation systems, music therapy for crop growth stimulation, Pusa decomposer adoption, seed production-based diversification, Horticulture based IFS models and jute-based IFS models reflect a new paradigm in grassroots NRM innovations. The growth of Farmer Producer Organizations (FPOs), start-up enterprises, and value chain-linked marketing has further strengthened these innovations, ensuring inclusive benefit sharing and improved market access.

Innovations in Organic Farming

Organic farming has become a central strategy for reducing chemical dependency, restoring soil health, and producing residue-free food for health-conscious consumers. Farmers practicing organic and natural farming adopt bio-inputs created from locally available materialsincluding fermented plant extracts, cow-based microbial formulations,

composted biomass, bioinoculants, and green manuring cropsto recycle nutrients within the farm ecosystem. Many farmers have innovated and modified manure production techniques, expanding from traditional composting to enriched compost, vermicompost, slurry recycling, and bio-fermented boosters.Some innovators have demonstrated agriculture integrated with cultural and environmental wellness, including unique interventions like music therapy for crop plants, wherein rhythmic sound frequencies are used to stimulate physiological responses and crop growth. Others, including Padma Shri awardees, have scaled organic approaches into community models, positioning natural farming as a viable entrepreneurial pathway rather than an alternative subsistence practice.

The innovation potential in organic farming goes beyond production. Farmers have developed value-added products such as sweet corn, baby corn, millet-based mixes, pickles, oils, and herbal preparations, linking organic production with rural enterprise development. These initiatives contribute not only to NRM but also to youth engagement, women entrepreneurship, and the strengthening of local food value chains.Farmer-led innovations in organic product branding emerge from farmers' ability to leverage their unique production stories, locality identity, and natural resource stewardship as core value propositions for consumers. Instead of selling produce as undifferentiated commodities, innovative farmers adopt niche branding strategies such as labeling farm-origin stories, traceability assurance, chemical-free certification through Participatory Guarantee Systems (PGS), and eco-friendly packaging. Many farmers create collective brands through FPOs or cooperatives to market under a unified identityhighlighting attribute like "hill-grown," "tribal cultivated," "heirloom variety," or "regenerative practices," which build authenticity and consumer trust. Use of digital platforms, farm-to-home delivery, QR-code-based transparency, experiential marketing like farm visits, and storytelling through social media allow farmers to directly connect with urban conscious buyers who value health, sustainability, and provenance. As a result, branding shifts from merely selling organic products to selling a holistic experiencerooted in purity, ethics, locality, and farmer empowermentleading to premium pricing, stronger market positions, and community-level livelihood enhancement.

Innovations in Integrated Farming System

Integrated Farming Systems (IFS) represent an advanced NRM approach that optimizes resource flows across multiple interconnected enterprises. The IFS framework has evolved significantly from traditional mixed farming to innovative models such as horticulture-based IFS, jute-based IFS, biogas slurry utilization, and *Dalhan–Tilhan* (pulse–oilseed) mixed farming modules formulated by progressive farmers in different agro-climatic zones. Farmer-led innovations in Integrated Farming Systems (IFS) demonstrate efficient resource circulation, where the waste generated from one farm component becomes a valuable input for another. Such systems reduce risk through diversified income streams, create year-round employment for family labour, and improve soil carbon and nutrient

balance through organic recycling. They also enhance productivity per unit of land, water, and energy. For example, integrating Napier grass cultivation as livestock feed with biogas production, and subsequently recycling slurry into nutrient-rich manure, reflects a sustainable circular bioeconomy approach. Likewise, IFS models combining horticulture, dairy, fishery, and field crops have proven effective in improving risk management and income stability. In hill ecosystems, crop diversification within IFS has enabled farmers to successfully adapt to sloped terrains, shallow soils, and water constraints by introducing high-value crops, medicinal plants, spices, and seed production enterprises.

The diffusion of scientific practices in IFSsuch as solar-powered automatic irrigation systems, mechanized residue recycling, bioinoculant application, and crop-livestock synergyillustrates how farmers are effectively integrating modern science with traditional knowledge. The adoption of Pusa Decomposer for in-situ residue management marks another significant milestone, enabling farmers to convert crop waste into bio-manure while reducing stubble burning, greenhouse gas emissions, and nutrient loss.

Innovations inCrop Diversification

Crop diversification has emerged as a strategic response to climate variability, soil degradation, and fluctuating commodity prices. Farmers across India are transitioning from monoculture to diversified cropping systems, adopting alternative crops like pulses, oilseeds, floriculture, medicinal and aromatic plants, sugarcane intercropping, and relay cropping systems. These practices contribute to NRM by improving soil fertility, breaking disease cycles, reducing pest incidence, and maximizing income from small landholdings. Innovations in diversification include ring-pit method of sugarcane planting for increased tillers and water-use efficiency. Relay cropping to manage time overlap and maximize land use. Seed production of niche crops as an enterprise. Diversified hill agriculture models integrating vegetables, fruits, and spices.

Diversification have played a pivotal role in enhancing income resilience, risk mitigation, and sustainable utilization of farm resources. Drawing from hands-on experience and local ecological insights, farmers have experimented with integrating high-value horticultural crops, floriculture, mushroom cultivation, beekeeping, fish-cum-livestock systems, and on-farm value addition enterprises tailored to emerging market opportunities. Many farmers have pioneered climate-resilient diversification options such as drought-tolerant fruit orchards, protected cultivation of vegetables, and cultivation of medicinal and aromatic plants in marginal lands, thereby optimizing resource use and reducing dependence on single-crop income. Farmer-developed models such as multi-tier cropping in coconut and arecanut gardens, backyard poultry–vegetable integration, and agro-tourism ventures reflect their capacity to innovate based on social demand, consumer preferences, and local agroecology. These farmer-driven diversification pathways not only enhance economic returns but also generate employment within rural households, contributing to more resilient and sustainable livelihoods.Consumers' demand shift towards healthier

foods has strengthened diversification as a business model. FPOs, cooperatives, and farmer innovators have leveraged branding, GI tagging, farm tourism, and start-up models to capture higher market value, especially in organic and specialty crop segments.

Conclusion

NRM innovations succeed when knowledge is shared, validated, and collectively adopted. Farmer-to-farmer diffusion, experiential learning, field schools, social media dissemination, and digital advisory platforms are transforming how innovations spread. Technologies such as CRM (Crop Residue Management), DSR (Direct Seeded Rice), Pusa decomposer, solar irrigation systems, bioinoculant usage and resource conservation technologies are being adopted by farmers who understand the ecological and economic benefits.Innovations in organic farming, IFS, and crop diversification reflect a fundamental shift from input-heavy agriculture to resilient, resource-efficient, and knowledge-intensive farming. These approaches are not passive reproduction of traditional knowledge; they represent dynamic and creative responses to modern challenges, led by farmers who serve as practitioners, problem-solvers, and entrepreneurs. Together, they demonstrate how grassroots innovation is redefining agricultural sustainability and shaping the future of food systems. The following success stories demonstrate how farmers have effectively implemented these NRM innovations, translating concepts such as organic farming, IFS, and diversification into measurable ecological and economic gains.

Name : Shri Satish Babu Gadde
Address : 5-44, Vidhyut Nagar,
Near Govt. ITI College, Eluru,
Andhra Pradesh– 534007
Contact No. : +91-9912511244
Email : satishg1607@gmail.com

Personal Profile and Farming Background

Shri Satish Babu Gadde, aged 55, is a progressive farmer with 38 years of extensive agricultural experience, managing 20 hectares of fully irrigated land in Eluru, Andhra Pradesh. A postgraduate in commerce, he applies strong analytical approaches to an integrated crop–livestock system comprising paddy, maize, blackgram, coconut, and Murrah buffaloes. His diversification into rice marketing and tender coconut enterprises reflects significant entrepreneurial capacity and ecological understanding.

Innovation Overview and Motivation

His innovation, termed *Cattle-Based Agriculture*, emerged in 1987 and draws on traditional ecological wisdom gained through early mentorship. By observing how cattle movement, grazing patterns, and manure deposition enhance soil fertility, structural stability, and biological activity, he conceptualized a holistic, livestock-integrated model. Designed to reduce input costs, mitigate soil degradation, and strengthen productivity in water-scarce regions, the system promotes nutrient cycling, ecological balance, reduced chemical dependency, and long-term agro-ecosystem resilience.

Technical Features, Novelty and Development Process

The model operates through natural soil regeneration driven by cattle movement, organic nutrient recycling, and minimal external inputs. Continuous cattle activity enhances aeration, microbial populations, and organic matter incorporation, while dung and urine deposition replace chemical fertilizers. It prevents mastitis, suppresses weeds, and improves soil porosity, groundwater percolation, and moisture retention. Designed as a long-investment, low-maintenance, self-sustaining system, it requires only initial female calves and becomes self-perpetuating through integrated livestock-soil-crop interactions.

Institutional Linkages, Mentorship and Validation

The innovation has been evaluated, validated, and widely supported by several scientific institutions. Key collaborators include Dr. Y.S.R. Horticulture University, Indian Institute of Soil Science (IISS), Bhopal, KVK Venkatramannagudem, Buffalo Research Station, Indian Institute of Rice Research (IIRR), and various farmer associations. These institutions have conducted field assessments, scientific analyses of soil health, and independent yield evaluations. His work has further received dissemination support from ONGC Rajahmundry, which facilitated outreach activities, farmer meetings, and awareness programmes. Such institutional engagement has strengthened scientific validation and accelerated adoption across multiple districts.

Challenges Faced and Problem-Solving Approaches

He reports that this system is easy to implement and posed no major challenges. He strengthened adoption by demonstrating the model on his farm, simplifying the concept for farmers, and guiding them closely, especially in regions facing acute water scarcity.

Utility, Applications and User Benefits

The innovation improves soil fertility, enhances natural moisture retention, prevents mastitis and weeds, and significantly increases yield compared to conventional methods. It reduces dependency on fertilizers, irrigation, and external inputs while supporting healthier livestock and more resilient crop production.

Adoption, Outreach and Scaling Up

The model has been adopted across nearly 90 hectares, with around 120 farmers benefiting from his guidance. After receiving recognition from IARI, he began promoting the innovation as a project model for implementation in drought-prone regions, working through farmer groups and institutional partnerships to expand its reach.

Impact Assessment (Economic, Social and Environmental)

Economically, the model often results in double income from single-crop cultivation due to improved yields and reduced expenditure on water, fuel, labour, and chemical inputs. Socially, it has generated local employment for eight individuals and strengthened farmers' knowledge, confidence, and orientation toward ecological agriculture. Environmentally, it reduces water and diesel consumption by nearly 50%, enhances soil structure and organic matter, improves long-term fertility, and enhances climate resilience-particularly valuable under increasingly erratic rainfall patterns.

Recognition, Awards and Media Coverage

He has been honoured with several national-level recognitions, including IARI - Innovative Farmer Award, Best Organic Farmer and IIRR Best Farmer with his work also receiving coverage across print, electronic, and social media platforms.

Future Vision, Suggestions and Way Forward

He plans to scale cattle-based regenerative farming across drought-affected regions by working with farmer groups and community institutions. He advocates policy support for promoting natural, low investment farming models and emphasizes the long-term economic and ecological benefits that arise from integrating cattle, soil, environment, and human health into a unified agricultural system.

Name : Shri Jitendra Kumar Singh
Address : Village Namidih,
Post Ghataro, District Vaishali,
Bihar – 844119
Contact No. : +91-9431441369
Email : haritkrishak.27@gmail.com

Personal Profile and Farming Background

Shri Jitendra Kumar Singh, aged 65, is an experienced farmer with thirty-five years in agriculture. A B.Sc. and LLB graduate, he manages eight hectares of irrigated sandy loam land in Vaishali district. His diversified system includes field crops, horticulture, agroforestry, and fisheries. An active member of farmer organizations, he effectively applies scientific practices and innovations suited to local agro-ecological conditions.

Innovation Overview and Motivation

His key innovations include high density okra cultivation and a comprehensive Integrated Farming System. Responding to challenges of low rural income, fragmented landholdings, and limited diversification, he adopted scientific methods such as DSR, SRI, zero tillage, canopy management, and intercropping.

Technical Features, Novelty and Development Process

His technical innovations span diverse crop and resource management practices. He introduced canopy management in mango and litchi orchards, improving sunlight penetration and fruiting. He adopted SRI and DSR in paddy to enhance germination and reduce water use, and zero tillage in wheat to conserve moisture and reduce labour. Sprinkler irrigation, high density okra cultivation, potato planters, mulching, poly tunnel nurseries, and organic inputs further improved crop vigour, nutrient use, and overall yields.

Institutional Linkages, Mentorship and Validation

ATMA Vaishali and KVK Vaishali have played significant roles in training, mentoring, and supporting him through exposure visits, demonstrations, and technical guidance. These institutions helped refine and validate the innovations he adopted and promoted. The effectiveness of his practices has been further demonstrated through adoption by farmers across multiple blocks of Vaishali district.

Challenges Faced and Problem-Solving Approaches

Initially, he faced major challenges related to limited farmer awareness, inadequate technical support, and insufficient infrastructure for adopting scientific cultivation methods. Many farmers were hesitant to adopt new practices due to traditional preferences and perceived risks. He addressed these challenges through field demonstrations, Kisaan Pathshalas, farmer group meetings, exposure visits, and continuous training activities. By demonstrating improved yields, lower input costs, and visible crop benefits, he increased farmer confidence and encouraged wider adoption.

Utility, Applications and User Benefits

His innovations improved multiple crops: DSR reduced irrigation and costs, high-density okra raised yields to 550–600 kg and zero tillage enhanced wheat output while conserving moisture. Canopy management and bee-box placement improved fruit set. These practices increased income, crop quality, sustainability, and strengthened farmers' adoption of climate-resilient methods.

Adoption, Outreach and Scaling Up

The innovations he promotes are implemented on his eight hectares of land and have been adopted on more than ten hectares by associated farmers. He plays an active outreach role through Kisaan Pathshalas, field visits, farmer group activities, and FPO-level initiatives. His systematic guidance has supported capacity building among farmers and encouraged adoption of techniques such as DSR, SRI, zero tillage, mulching, and canopy management across neighbouring villages.

Impact Assessment (Economic, Social and Environmental)

His technologies have resulted in significant yield increases and reduced input costs across crops. Practices such as mixed cropping, agroforestry, mulching, and the use of organic inputs contributed to improved soil structure, enhanced soil organic matter, and greater climate resilience. Through his FPO, employment opportunities were created for approximately 200 individuals, supporting rural livelihoods.

Recognition, Awards and Media Coverage

He has received numerous prestigious awards, including the IARI Fellow Farmer Award , IARI Innovative Farmer Award, Kishan Gaurav Award (Government of Bihar, 2019), Jagjivan Ram Innovative Farmer Award, IFFCO Award, Litchi Ratan Award , Farmer of the Year (IEL Foundation, 2015), and several honours from state and national institutions. He was awarded by Shri Narendra Modi in 2013 for innovative farming. His work has been widely covered across print, electronic, and social media platforms.

Future Vision, Suggestions and Way Forward

He aims to strengthen innovation dissemination through enhanced extension services, structured farmer trainings, and participatory learning approaches. He emphasizes group farming, improved market linkages, sustainable cultivation methods, and wider adoption of DSR, SRI, zero tillage, mulching, intercropping, and canopy management. Through his FPO, he plans to expand value addition, branding, and collective marketing to improve farmer incomes and ensure long-term agricultural growth.

Name : Shri Krishna Murari Singh
Address : Village Barma, PO: Kaithma
District Sheikhpura,
Bihar-811107
Contact No. : +91-9955563465, +91-8651485295
Email : kmskisan@gmail.com

Personal Profile and Farming Background

Shri Krishna Murari Singh AKA 'Kisan' the innovative farmer from Sheikhpura, Bihar. He was born on 10 June 1952. He owns 5 ha of land of whch 4 has are irrigated by borewell. He also has a pond where he carries out pisciculture apart from poultry as animal resource for income. He owns usual agricultural machinery including tractor, cultivator etc. He is involved in paddy seed production in 1 ha of land, vegetable cultivation, guava and mango orchard and agro-forestry of sheesham trees.

Innovation Overview and Motivation

He primary innovation centersaround production of paddy seed. He grows paddy varieties Rajshree, Jaishree, BPT 5204 and lentil cop. He also brought some modification in diesel engines he used. He has also developed kala chana (chickpea) variety Jai.

Technical Features, Novelty and Development Process

Shri Krishna Murari Singh integrates organic and mechanized farming, reducing labour by 50% through cow dung–based inputs and efficient sowing, harvesting, and threshing. A recognized authority in Vedic and natural farming in Bihar, he has reportedly developed black chickpea and revived Khesari cultivation, as noted by the Times of India. Beyond farming, he is a prolific author on ancient agricultural systems, with 15 government-published books and a Limca Book of Records Award (1999).

Institutional Linkages, Mentorship and Validation

After resigning from the Bihar Administrative Services to pursue social development, Sh. Singh credits government and NGO training programmes across India for upgrading his technical competencies. He served on the Union Planning Commission's Agriculture Subcommittee (2011) as a consultant for five years and was Secretary of the Bharatiya Kisan Union, Munger.

Challenges Faced and Problem-Solving Approaches

Sh. Krishna Murari Singh faced multiple obstacles in his agrarian journey, overcoming them through sustained effort and extensive study of ancient Indian farm literature. He systematically gathered, classified, and published materials through articles, books, short communications, and extension folders. Engaging both farmers and academicians, he advocated natural farming and local resource use. As reported in The Times of India (2017), he spent ten years developing improved Lathyrus varieties with biotechnologists, addressing stigma and promoting acceptance among farmers.

Utility, Applications and User Benefits

The works of Sh. Krishna Murari Singh 'Kisan' hold significant archival value amid rising dependence on costly inputs and related soil–water degradation. He systematically documented indigenous farming knowledge of the northern Gangetic plain from folklores and ancient texts, preserving practices otherwise fading under market-driven agriculture. His contributions parallel classical agricultural scholars such as Cato, Varro, Columella, Palladius, and Indian author Surpal. He effectively bridged ancient wisdom with contemporary natural, organic, and PrakritikKheti applications.

Adoption, Outreach and Scaling Up

He has a wide base of acknowledgement among farmers and academician. His works benefits hundreds of farmers who can access farming knowledge in interesting and earthly language format from locally available newspapers, magazines. His works have been recognized by many national and international agencies.

Impact Assessment (Economic, Social and Environmental)

The agrarian and publication activities of Sh. Krishnamurari Singh 'Kisan' have encouraged wider farmer participation in organic and natural farming. His farmer-to-farmer seed dissemination preserved local varieties, including the 'kalachana' chickpea he identified, preventing their disappearance. His publications reduced cultivation costs and facilitated adoption of organic practices, increasing the availability of healthy food. Overall, his work strengthened environmentally safe input use, benefiting biodiversity and the agro-ecosystem through sustainable crop husbandry and protection.

Recognition, Awards and Media Coverage

Shri Krishna Murari Singh 'Kisan' has received numerous recognitions from national as well as international level. He received special award from China, he got a special prize from Uzbekistan's Taskent Radio for a quiz competition. He received IARI Innovative farmer award (2017) and Fellow farmer Award (2025).

Future Vision, Suggestions and Way Forward

Sh. Krishna Murari Singh 'Kisan' wishes to carry forward his activities of farm-oriented publication in guiding farmers and persons enthusiastic about agriculture and organic food production in economic use of natural resources, use of natural resources as mentioned in our ancient scriptures and as practiced by indigenous people of our country which saves money, saves resources and saves health. He also wants to carry out his farming activities to proliferate his knowledge about popular crop varieties for their preservation and economic use.

Name : Shri Arjun Singh
Address : Village & P.O. Masona,
Block Sanjhauli, District Rohtas,
Bihar - 802220
Contact No. : +91-7250991479
Email : arjunsingh725099@gmail.com

Personal Profile and Farming Background

Sh. Arjun Singh is a 51-year-old progressive farmer and marketing innovator with 32 years of hands-on experience in cereal cultivation, vegetable production, and sustainable crop management. A graduate, he has evolved from traditional rice farming to pioneering variety registration and eco-friendly practices in Bihar's clay loam landscapes. He integrates on-farm production with market linkages like the Tomato Hub, addressing post-harvest losses and income volatility.

Innovation Overview and Motivation

His core innovations include registering the indigenous rice variety Nataki and bottlegourd variety Sweta under the PPVFR Act, 2001, and developing a Tomato Hub that supports collective marketing, packaging, and transportation of produce to urban and international markets. His work is strongly supported and motivated by KVK Rohtas, Bikramganj, and Bihar Agricultural University, Sabour.

Technical Features, Novelty and Development Process

The new technologies adopted by Sh. Arjun include Inter-cropping, Relay cropping, Mixed cropping, Green manuring, Waste land management, Soil and Water management, Protected cultivation, Rain water harvesting, Micro-irrigation, Mulching, Zero tillage, SRI in paddy and SWI in wheat. With the tomato hub, he ensures the collective marketing of the produce to national and international markets (Nepal, Bangladesh, Pakistan).

Institutional Linkages, Mentorship and Validation

He has established links with Bihar Agricultural University (BAU) Sabour for variety testing, KVK Rohtas for technical support, ATMA for financial support. NABARD facilitated the formation of farmer groups '*Kishak hit Samooh*' and '*Pragatisheel Kisan Club*' at Masona.

Challenges Faced and Problem-Solving Approaches

Challenges encompassed poor market access for perishables like tomatoes and financial constraints. He formed the Tomato Hub for collective bargaining and achieving the economies of scale. Trainings, funding and handholding support from KVK, ATMA Rohtas and NABARD overcame the initial challenges.

Utility, Applications and User Benefits

The Tomato Hub fetches higher prices via graded packaging, online marketing and selling in international markets, doubling the average income of the group members. Field innovations slash chemical use via decomposers, enhance soil microbes, reduce erosion, save water through mulching, and secure seed sovereignty in rice and bottle gourd with farmer varieties 'Nataki' and 'Sweta' respectively.

Adoption, Outreach and Scaling Up

Adopted by approx 10,000 farmers, her innovations spread widely through KVK trainings, demonstrations, and field visits. The Tomato Hub she helped establish now serves farmers associated with Kishak Hit Samooh and Pragatisheel Kisan Club, providing technical guidance, market linkages, and coordinated production support. This network has strengthened collective learning, improved incomes, and accelerated technology adoption across the region.

Impact Assessment (Economic, Social and Environmental)

Economically, Tomato hub sales raised farm incomes by 35% (Rs. 8-10 lakhs annually), with decomposer savings at Rs. 15,000/hectare. Farmer varieties like 'Nataki' and 'Sweta' helped in seed sufficiency. Socially, FPOs empowered the members in marketing roles, fostering community cooperatives. Environmentally, zero-till cuts emissions, mulching conserves water, and residue management boosts soil health.

Recognition, Awards and Media Coverage

He received the Plant Genome Saviour Award under PPV & FRA from the Hon'ble President of India (for 'Nataki' registration), Best Grassroot Innovator Award from Dr. Prem Kumar (Bihar Agriculture Minister), Certificate of Appreciation from Shri Radha Mohan Singh (Farmer Union Agriculture Minister), Millionaire Farmer of India Award, and various other awards from BAU Sabour and KVK Rohtas. Coverage includes BAU Sabour success story publications, local media on Tomato Hub (e.g., Rohtas farmer bulletins), and Doordarshan features.

Future Vision, Suggestions and Way Forward

Shri Arjun Singh aims to expand the Tomato Marketing Hub across the entire district, strengthening market access and coordinated production. His vision focuses on increasing FPO incomes by promoting sustainable seed systems, efficient aggregation, and well-managed marketing hubs. Through this model, he seeks to contribute directly to Bihar's mission of doubling farmers' income through improved value chains and farmer-led market empowerment.

Name : Shri Rajinder Singh Padda
Address : 484, Baldev Dairy Farm,
Sindhiya Nagar, Durg,
Chhattisgarh-491001
Contact No. : +91-9329526664
Email : padda1673@gmail.com

Personal Profile and Farming Background

Shri. Rajinder Singh Padda, aged 52, is a post-graduate (BE in Production & MBA in Production) with over 20 years of farming experience. He is the Director of Sai Bioresources Pvt. Ltd., with agriculture as his secondary occupation. He manages 28.32 hectares of leased black soil land, fully irrigated through borewells.

Innovation Overview and Motivation

In 2024, he adopted Napier Grass as a sustainable and high yield feedstock for India's Compressed Bio-Gas (CBG) sector. The innovation addresses the growing demand for non-food, non-fossil feedstock and ensures a consistent year-round biomass supply. Motivation stemmed from the need to provide farmers with reliable income opportunities while supporting renewable energy initiatives like SATAT and MNRE bio-energy programs.

Technical Features, Novelty and Development Process

His model delivers 120–150 tons of green biomass per acre annually through four harvests. Perennial Napier Grass improves soil health, prevents erosion, and allows closed-loop nutrient management using organic manure and CBG slurry. The technical process involves optimized irrigation, nutrient management, and mechanized harvesting. The novelty lies in integrating agriculture with the bio-energy value chain, establishing a commercially viable, climate-resilient, and environmentally sustainable biomass model. The development evolved through field trials, experimentation, and collaboration with bio-energy companies to refine crop management practices and supply chain logistics.

Institutional Linkages, Mentorship and Validation

The innovation has been supported by Sai Bioresources Pvt. Ltd. and Sai Bioenergy Pvt. Ltd., which provided a practical platform for demonstration, validation, and scaling. Their technical and operational guidance helped establish pilot plantations, implement organic fertilization methods, and link farmers through buy-back arrangements.

Challenges Faced and Problem-Solving Approaches

Key challenges included farmer awareness, higher initial costs for irrigation and land preparation, lack of mechanized harvesting equipment, and absence of standardized buy-back agreements. Rajinder addressed these through demonstration plots, farmer training, cluster-based cultivation models, and digital monitoring for consistent supply and quality. Persistent engagement and pilot-scale validation helped overcome skepticism and technical barriers.

Utility, Applications and User Benefits

The innovation ensures a steady biomass supply for CBG plants, offering farmers an additional income of ₹50,000–₹60,000 per acre annually. Soil health improves through perennial cover, and the use of organic fertilizers reduces input costs by 20–25%. The system also generates rural employment, supports bio-energy entrepreneurship, and aligns agricultural practices with renewable energy goals.

Adoption, Outreach and Scaling Up

Currently, Napier Grass is cultivated on more than 7,500 acres across Durg, Khairagarh, and Rajnandgaon districts. The program is expanding via cluster-based models, linking 500 to 1,000 acre units to CBG plants. Over 180 farmers have been trained in cultivation, silage management, and feedstock supply through field demonstrations, digital platforms, and FPO-led initiatives.

Impact Assessment (Economic, Social and Environmental)

Economic impact includes consistent farmer income, reduced input costs, and profitability from bio-energy linkage. Socially, it empowers small farmers, women, and rural youth by providing skill-based employment. Environmentally, Napier Grass cultivation reduces CO_2 emissions by 70% compared to fossil fuels, enhances soil carbon, and prevents erosion, contributing to climate resilience.

Recognition, Awards and Media Coverage

He was awarded the title of "Innovative Farmer" in 2022 at PUSA Krishi Vigyan Mela, New Delhi. The innovation has been recognized by the Chhattisgarh State Bio-Energy Mission and covered in local media as a pioneering renewable energy-linked agriculture model.

Future Vision, Suggestions and Way Forward

Plans include expanding Napier Grass cultivation to 15,000 acres, establishing standardized cluster-based CBG feedstock units, and implementing digital monitoring platforms. He recommends recognizing Napier Grass as a national energy crop, introducing feedstock security contracts, encouraging research on biomass efficiency, and facilitating financial support through NABARD and SIDBI. These steps aim to create a replicable model linking rural agriculture with India's clean energy transition.

Name : Shri Kunal Gahlot
Address : 176, Gahlot Niwas,
Tigipur Village,
Delhi – 110036
Contact No. : +91-7011861592
Email : kunalgahlot78@gmail.com

Personal Profile and Farming Background

Shri Kunal Gahlot, aged 47, is a progressive farmer from Tigipur, Delhi, with 27 years of experience. He transformed from wheat-paddy to an intensive multi-enterprise farm model including protected cultivation, vegetable intensification, mushroom and certified seed production. Managing 10 hectares of leased, irrigated land with modern mechanization, he links peri-urban agriculture with science, markets, and FPO collective action.

Innovation Overview and Motivation

His major innovations include direct-sowing cabbage technology, off-season cucumber cultivation in poly houses, white button mushroom production, a multi-cropping cereal–vegetable–mushroom rotation, and certified seed production. Motivated by low cereal returns and Delhi's urban market demand, he sought to improve income, generate rural youth employment, modernize agriculture through mechanization and protected cultivation, and reduce market dependency through seeds.

Technical Features, Novelty and Development Process

Shri Gahlot's direct-sowing cabbage method eliminates nursery transplantation, raising germination to 85-90% and reducing crop duration by 20–30 days. His off-season cucumber cultivation uses poly-houses, black-mulch passive heating, and drip irrigation for early January–February harvests. Mushroom cultivation involves precise fermentation, spawning, and climate-specific management. His multi-cropping system staggers cereals, vegetables, legumes, banana, and mushrooms, improving soil health and market stability through trials and mentorship from IARI and KVK Ujwa scientists.

Institutional Linkages, Mentorship and Validation

He works closely with ICAR-IARI, receiving guidance on variety selection, IPM and seed certification. His direct-sowing and protected-cultivation methods are showcased through KVK Ujwa and IARI field days. An MoU with the National Seed Corporation enabled certified seed production, while horticulture departments supported poly-house adoption, ensuring scientific monitoring and strengthening credibility.

Challenges Faced and Problem-Solving Approaches

Key constraints included limited technical information on non-traditional vegetables in early 2000s, labor-intensive operations, high price volatility for off-season produce, and lack of certified seed availability. He addressed these by investing in mechanization, establishing protected structures with government subsidies, forming the GROFREE FPO to stabilize market access, and partnering with NSC for reliable seed certification. Technical complexity was overcome through regular mentoring from scientists and conducting farmer demonstrations. Crop-health challenges

were managed through integrated pest management and variety rotation.

Utility, Applications and User Benefits

His innovations increase cropping intensity, enable 2-3 crop cycles annually, and provide steady income through winter mushroom harvests and off-season cucumbers. Direct-sown cabbage reduces labour and seed cost, while protected cultivation produces pesticide-free vegetables with uniform size and premium market value. The multi-cropping model improves soil nitrogen through legumes, enhances resilience, and ensures year-round income. Certified seed production benefits hundreds of farmers by ensuring access to high-quality, reliable planting material.

Adoption, Outreach and Scaling Up

Shri Kunal Gahlot has trained more than 350 farmers across Delhi-NCR and neighboring states through demonstrations, FPO meetings and IARI-KVK programs. His systems as direct-sowing cabbage, off-season cucumber, and mushroom production have been adopted on approximately 1,000 acres regionally. GROFREE FPO supports collective procurement, seed distribution and marketing, enabling scaling of innovations among progressive growers.

Impact Assessment (Economic, Social and Environmental)

His diversified model has raised annual farm income from ₹12-15 lakhs to ₹35-40 lakhs, with certified seeds contributing ₹30-32 lakhs. Off-season vegetables earn 15-20% premiums, and mushroom cultivation adds ₹2.2-2.5 lakhs per season. Socially, his work boosts youth involvement, empowers women in grading and mushroom units, and reduces out-migration. Environmentally, multi-cropping improves soil health, drip irrigation saves 20-30% water, and protected structures reduce climate risks.

Recognition, Awards and Media Coverage

He is recipient of major national recognitions, including the N.G. Ranga National Farmer Award, ICAR-IARI Innovative Farmer Award and IARI Fellow Farmer Award. His work has been featured on Doordarshan, All India Radio, ANI news coverage, and in leading agricultural publications.

Future Vision, Suggestions and Way Forward

His goals include expanding seed production beyond 100 quintals annually, setting up more polyhouses in adopter villages, scaling mushroom farming to 2-3 acres, and strengthening GROFREE FPO as a hub for vegetables and seeds. He envisions building a peri-urban protected cultivation cluster, promoting export seed systems, and creating a farmer-training academy. Long-term aims include policy support for protected cultivation, seed certification, and farmer-scientist research collaboration.

Name : Shri Abhishek Dhama
Address : House No 2,
Village & PO Kullakpur
Palla, Delhi - 110036
Contact No. : +91-9911157118, +91-9540298888
Email : abdhama@gmail.com, adhirayansh@gmail.com

Personal Profile and Farming Background

Shri Abhishek Dhama, 34, from Kullakpur (Delhi NCR), has nine years of primary farming experience alongside hospitality management. He cultivates 16 ha of irrigated sandy loam land (9 ha owned, 7 ha leased) using tubewells and drip systems. Equipped with extensive mechanization, he integrates dairy with a 30 m^3 biogas plant whose slurry enriches fields. As a member of Adhirayansh Organics Producer Company Limited, he also hosts regular farmer training visits.

Innovation Overview and Motivation

His innovation focuses on a fully organic, integrated farming system combining vertical and multi-layer cropping, on-farm biofertiliser and biopesticide production (vermicompost, jeevamrit, microbial inoculants, neem formulations), and large-scale biogas slurry utilization. He incorporates medicinal and aromatic crops with processing and Pusa Sunfridge-based pre-cooling. Developed between 2017–2021, the model addresses health concerns over chemical residues and creates commercially viable organic supply chains linked to FPO-driven B2B/B2C markets.

Technical Features, Novelty, and Development

Key features include vertical farming for cucurbits, multi-layer crop integration, and precision irrigation through drip, sprinkler, rain-gun and fogger systems. On-farm inputs reduce chemical dependence, while biogas slurry is applied through tractor tankers. Pusa Sunfridge supports post-harvest cooling. Novel medicinal crop integration (Stevia, geranium, vetiver, chamomile, moringa, Mucuna) enables value-added processing. Crop rotations diversified across field crops, horticulture and agroforestry during 2023–24 and expanded further in 2024–25.

Institutional Linkages, Mentorship and Validation

The system was mentored and validated by IARI Pusa experts, CSIR-IHBT Palampur, CSIR-CIMAP Lucknow and FFDC Kannauj, providing guidance on organics, aromatics and post-harvest management. These institutions supported Stevia, geranium, vetiver and chamomile cultivation and Sunfridge usage. FPO structures strengthened market outreach and vegetable aggregation.

Challenges Faced and Problem-Solving Approaches

Challenges included mindset shifts toward organics, ensuring consistent quality of organic inputs at scale, and capital requirements for biogas and cooling systems. He addressed these through phased adoption, institutional mentoring, and self-funded investments of ₹10–15 lakh. Additional obstacles involved biogas slurry handling, infrastructure gaps and organic input production. These were resolved through equipment upgrades, input standardization and diversification into medicinal crops to balance risk and stabilize system performance.

Utility, Applications and User Benefits

The model enhances profitability through organic vegetables, medicinal crops and value-added products, supported by improved soil organic matter from slurry recycling and reduced chemical loads. Crop-specific incomes include bottle gourd (~₹1,25,000/acre), brinjal (~₹2,15,000/acre) and Stevia (~₹80,000/acre). Post-harvest cooling improves quality; precision irrigation reduces inputs; and diversification strengthens resilience. Employment is generated through processing, aggregation and training, benefiting youth and women via FPO-linked operations.

Adoption, Outreach and Scaling Up

Organic practices now span 11–16 ha, with FPO outreach to 170–229 farmers. After receiving IARI awards in 2020 and 2024, scaling occurred through expanded FPO marketing, ~1,000-ton vegetable supplies and ~₹5 crore turnover. Interstate farmers, foreign delegations and digital platforms (YouTube and media channels) enhanced visibility. Demonstrations and training sessions facilitated adoption across Delhi NCR, with replication potential supported by producer-organization structures.

Impact Assessment (Economic, Social and Environmental)

Economically, the system generated ₹318 lakh turnover in 2023–24, projected ₹400–450 lakh in 2024–25 through papaya, turmeric and Stevia processing. Socially, employment and training programs strengthen youth and farmer participation. Environmentally, chemical reduction, slurry recycling and diversified cropping improve soil health and biodiversity. Efficient irrigation lowers water and input use, while organic systems enhance climate resilience and reduce emissions across field, horticultural and aromatic crop sectors.

Recognition, Awards and Media Coverage

Recognition includes IARI Innovative Farmer Award 2020, IARI Fellow Farmer Award 2024, Sumer Memorial Award 2024, ICAR-NDRI Dairy Training 2021 and IARI Smart Urban Farming 2023, along with Fambo Appreciation 2024. Media coverage spans The New Indian Express, Dainik Jagran, DD Kisan, The Better India, NCDEX Mandi TV and multiple YouTube channels. Institutional reports from CSIR-IHBT, CIMAP and FFDC document his aromatic crop work.

Future Vision, Suggestions and Way Forward

He plans expansion of papaya, turmeric and Stevia processing including papain, pulp, powders and curcumin, alongside FPO-led B2C supply chains, additional Sunfridge units and stronger cold-chain infrastructure. Suggested policy measures include subsidies for decentralized organic inputs, support for medicinal crop incubation, distillation facilities and improved market linkages. Strengthened FPO networks and institutional partnerships can enable nationwide replication of his integrated, income-enhancing organic farming model.

Name : Shri Pritam Singh
Address : Village Urlana Khurd,
District Panipat,
Haryana – 132103
Contact No. : +91-9416735898
Email : pritamhanjra@gmail.com

Personal Profile and Farming Background

Shri Pritam Singh, aged 59, is a progressive farmer from Urlana Khurd, Panipat, with 45 years of agricultural experience. Despite formal education only up to the eighth standard, he has gained extensive practical knowledge through experimentation and institutional engagement. He manages twenty hectares of irrigated land, cultivating cereals, pulses, vegetables, and some horticultural crops. His dairy unit with Murrah buffaloes and Sahiwal cows strengthens his crop–livestock integration. Over time, his farm has become a learning hub for improved crop management, conservation agriculture, and seed processing practices.

Innovation Overview and Motivation

His key innovations centre on Direct Seeded Rice, Crop Residue Management, and farmer-to-farmer seed distribution. He adopted DSR in 2010 to tackle declining groundwater, labour shortages, and the high costs of puddled transplanting. His CRM efforts emerged from concerns about pollution and the need to use paddy straw productively rather than burn it. Motivated by goals of conserving water, reducing labour dependence, lowering costs, and promoting climate-resilient farming, he also focused on seed production and distribution to ensure reliable, high-quality seed availability within the local community.

Technical Features, Novelty and Development Process

The technical strength of his work lies in integrating mechanised sowing, soil and water conservation, and improved agronomic efficiency into one coherent system. Through DSR, he eliminated puddling and adopted seed drills, zero-till equipment, and DSR-specific drills that reduce irrigation needs, save fuel, and minimise labour. His CRM approach uses machinery such as super seeders to incorporate straw into the soil, improving porosity, organic matter, and moisture retention. The novelty of his model lies in aligning machinery use with ecological principles. His seed processing and marketing unit ensures local access to high-quality seeds and adds economic value.

Institutional Linkages, Mentorship and Validation

His innovations have been strengthened through sustained engagement with agricultural research and extension institutions at both state and national levels. These institutions provided technical guidance, opportunities for demonstrations and independent validation of his DSR and CRM practices. Regular participation in field days, farmer interactions and training programmes helped refine his methods and facilitated their wider acceptance among neighbouring farmers.

Challenges Faced and Problem-Solving Approaches

During the early stages, he encountered challenges related to the availability and cost of appropriate machinery and difficulties in managing weeds under DSR. He addressed these through

timely acquisition of suitable implements, modification of sowing schedules and employment of appropriate mechanical and chemical weed management practices. Demonstrations on his own fields played a crucial role in reducing scepticism among farmers and showcasing the advantages of the new system.

Utility, Applications and User Benefits

The innovations introduced by Shri Pritam Singh offer multiple benefits. Direct Seeded Rice saves substantial water, eliminates labour-intensive transplanting, reduces fuel use, and enables timely sowing for better crop establishment. Crop Residue Management improves soil health, prevents burning-related pollution, and enhances soil structure. His seed distribution system ensures local availability of quality seed while generating additional income.

Adoption, Outreach and Scaling Up

His innovations have achieved substantial outreach, with DSR and CRM practices being adopted across Panipat, Sonipat, Rohtak, Jind and Karnal, covering an estimated three to four thousand hectares. He has guided hundreds of farmers through field days, farm visits and local training programmes. After receiving institutional recognition, he intensified awareness efforts and refined his practices to further enhance productivity and profitability.

Impact Assessment (Economic, Social and Environmental)

His innovations have increased yields by about ten percent and improved grain quality, while DSR saves ₹7,000–10,000 per acre and further reduces cultivation costs. Water use, labour needs, and fuel consumption have declined significantly. His system also creates seasonal employment in machinery operation, CRM work, and seed marketing. Environmentally, it reduces stubble burning, conserves nutrients, and supports climate-resilient agriculture.

Recognition, Awards and Media Coverage

Shri Pritam Singh has been honoured with several recognitions, including the IARI Fellow Award, Krishi Ratna, Kisan Puraskar, IARI-Innovative Farmer Award and the State Best Farmer Award. His innovations have been widely featured in print, electronic and social media, contributing to broader awareness of sustainable farming practices.

Future Vision, Suggestions and Way Forward

He aims to expand DSR and CRM through field days, Kisan Gosthis, and video-based training. He recommends better access to machinery, especially CRM equipment, and emphasizes exposure visits to progressive farms for wider learning. His long-term vision is a resource-efficient, environmentally sound farming model that conserves soil and water while engaging rural youth in agriculture.

Name : Shri Ishwar Dayal
Address : Village and P.O. Sambhli,
District Karnal,
Haryana - 132001
Contact No. : +91-9813010481
Email : ishwardyal281@gmail.com

Personal Profile and Farming Background

Shri Ishwar Dayal is a progressive farmer with over forty years of experience, managing 2.4 hectares of owned land and 6 hectares leased, totalling 8.4 hectares of irrigated clay soil. Farming is his primary occupation, complemented by leadership roles in cooperative societies. He practices diversified agriculture, including field crops, vegetables, agroforestry, and dairy farming with Tharparkar and Sahiwal cattle. This integrated system enhances resource efficiency, reduces risk, and sustains productivity, forming the foundation for his innovations in crop residue management.

Innovation Overview and Motivation

His key innovation is the development and promotion of an in-situ crop residue management model tailored to regional farming needs. As part of climate-smart agriculture, he advocates laser levelling, zero tillage, and resource-conserving practices. A major contribution is his modification of a combine into a Super SMS harvester for efficient residue handling. Motivated by resource conservation and climate concerns, he focused on preventing stubble burning to protect soil biology and air quality. His model enhances soil health, organic matter, residue retention, and overall productivity.

Technical Features, Novelty and Development Process

Between 2016 and 2018, he upgraded a standard combine into a Super SMS combine that finely chops and uniformly spreads straw, promoting in-field residue decomposition and avoiding burning. He also developed a three-row spatial zero-till machine that improves seed placement in heavy residues and wider row spacing. Together, these innovations enable direct drilling, conserve soil moisture, cut field preparation time, and enhance soil health for climate-resilient, low-input farming.

Institutional Linkages, Mentorship and Validation

His innovations received guidance, technical support, and validation from several reputed institutions, including CIMMYT, CSISA, and the CCAFS project, alongside collaborations with ICAR-IARI. These linkages provided scientific feedback, exposure to improved technologies, and platforms for knowledge sharing, ensuring that his innovations aligned with evidence-based agricultural practices.

Challenges Faced and Problem-Solving Approaches

The major challenges he encountered included the high initial investment required to modify machinery and the widespread lack of awareness among farmers regarding scientific residue management practices. Many farmers initially hesitated to adopt in-situ residue management due to concerns about sowing difficulties and perceived risks.

He addressed these constraints through continuous field demonstrations, awareness campaigns, and practical evidence showing positive results.

Utility, Applications and User Benefits

His model eliminates the need for burning straw before the next sowing cycle, thereby protecting soil fertility and conserving valuable nutrients. It improves organic matter levels, enhances soil structure, conserves moisture, and contributes to increased yield potential. The approach is particularly useful for regions with intensive cereal-based cropping systems.

Adoption, Outreach and Scaling Up

The model has been adopted across several hundred acres surrounding his village. Through his cooperative society 'Unnat Kisan Samiti', he systematically disseminates the techniques using farmer meetings, field demonstrations, and structured training programmes. His outreach efforts emphasize peer learning, community mobilization, and exposure to practical evidence, thereby facilitating broader scaling of residue management technologies.

Impact Assessment (Economic, Social and Environmental)

Economically, his innovations reduce fuel, labour, and fertilizer costs while increasing production and farm income. Socially, thousands of farmers have gained skills and awareness through his demonstrations, promoting responsible resource management. Environmentally, his model prevents stubble burning, improves soil organic matter, lowers greenhouse gas emissions, and strengthens climate resilience through resource conservation technologies.

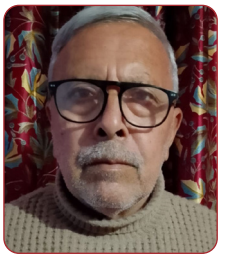
Recognition, Awards and Media Coverage

He has received multiple recognitions for his contributions to sustainable agriculture, including the Innovative Farmer Award, IARI Fellow Farmer Award, and appreciation at the Haryana Krishi Vikas Mela. His work has gained considerable visibility through coverage in print, electronic, and social media platforms.

Future Vision, Suggestions and Way Forward

He plans to scale the model through frontline demonstrations, enhanced social media outreach, and active participation in Krishi Melas. His policy suggestions emphasize strengthening ground-level farmer meetings on natural resource management, promoting village-level residue management campaigns, and establishing more farmer-based organizations like Unnat Kisan Samiti to support collective action and advance sustainable agricultural practices.

Name : Shri Saroop Chand Sharma
Address : Village Dhadpeth, Tehsil Mughalmaidan,
District Kishtwar,
Jammu & Kashmir – 182205
Contact No. : +91-60052 38655
Email : saroopsharma56@gmail.com



Personal Profile and Farming Background

Shri Saroop Chand Sharma is an experienced farmer with over 42 years in agriculture, practicing on 5 hectares of land, of which 1 hectare is irrigated. His education is up to higher secondary level, and his primary livelihood is farming. He cultivates a diverse range of field crops such as pulses and cereals, along with horticultural crops like apricot, walnut, cherry, pomegranate, *kalazera*, and saffron. He also maintains 10 desi cows and oxen, contributing to milk production and mixed farming activities. His horticulture and milk-based enterprises generate a turnover of ₹3 lakh, while saffron, pomegranate, walnut, and cherry bring an additional ₹6 lakh annually.

Innovation Overview and Motivation

His major innovation lies in sustained adoption and community dissemination of organic and natural farming, practised consistently since 2011. Motivated by the desire to provide chemical-free, healthy food and to safeguard soil and water resources, he shifted from conventional input-heavy farming to a biologically driven natural system rooted in traditional wisdom and ecological sustainability. This motivation was reinforced by his commitment to improving community health, ensuring long-term soil fertility, and creating a farming model that future generations could adopt without financial or environmental burden.

Technical Features, Novelty and Development Process

He has also adopted freshwater pearl farming, an innovative aquaculture system integrating mussels with fish culture. The novelty lies in using indigenous mussel species for pearl production in freshwater ponds, maintaining controlled grafting conditions, and promoting biodiversity. The model enhances water-use efficiency, integrates fish rearing, and diversifies farm income. The refinement mainly involved time, water management, and low-cost resource inputs.

Institutional Linkages, Mentorship and Validation

His innovation journey was strengthened by continuous guidance from university experts in horticulture, agriculture and fisheries, along with support from his parents and community elders. The agriculture department, KVKs and fisheries officers provided training, demonstrations and exposure visits, enabling scientific validation of pearl-farming viability, natural-farming improvements and income potential for rural households.

Challenges Faced and Problem-Solving Approaches

He faced constraints such as limited finances, lack of scientific information, difficulty convincing farmers about natural methods and frequent power interruptions. He overcame these through self-learning, small pilot trials, labour efficient practices, community demonstrations and regular consultations with scientists, gradually building trust and proving the economic and productivity benefits of sustainable farming.

Utility, Applications and User Benefits

His innovations offer major benefits for small farmers and rural youth. Pearl farming provides high returns with low investment and can be integrated into existing ponds. Natural farming improves soil organic matter, biodiversity and ecosystem health, enabling residue-free food and supplementary income. Enhanced water quality and pond biodiversity further elevate ecological value.

Adoption, Outreach and Scaling Up

After achieving initial success, he expanded demonstrations through KVKs, ATMA programmes and ICAR-supported capacity-building initiatives. His integrated model has now spread across rural regions where farmers have established new water bodies for pearl culture and shifted towards organic practices. He has trained and guided more than 3,000 farmers through on-farm sessions, camps and interactive meetings, enabling widespread replication of both pearl culture and natural farming.

Impact Assessment (Economic, Social and Environmental)

Economically, farmers earn three to four times more than in conventional farming with low investment and stable returns. Socially, the model empowers youth and women through roles in grafting, mussel handling and pond management. Environmentally, it improves water quality, biodiversity, soil moisture and carbon sequestration, enhancing climate resilience and reducing vulnerability to rainfall variability.

Recognition, Awards and Media Coverage

He has received appreciation from district authorities, agricultural departments and extension agencies for promoting sustainable, low-input farming models. His innovations have been covered in local print and electronic media, highlighting his contribution to water-use efficiency, ecological farming and rural livelihood strengthening. These recognitions have encouraged wider adoption and inspired many rural youths to explore diversified farming as a viable career.

Future Vision, Suggestions and Way Forward

He plans to develop additional model farms, expand demonstrations across more villages, and use digital platforms for wider dissemination of sustainable practices. He recommends targeted subsidies, support for low-cost technologies, timely training programmes and greater institutional backing to help rural farmers adopt organic and integrated aquaculture models. His long-term vision is to create a resilient, eco-friendly agricultural ecosystem that empowers smallholders, improves rural incomes, and promotes sustainable, chemical-free food production across the Himalayan region.

Name : Shri Dhareppa Parappa Kittur
Address : Near Siddeshwara Temple,
At/Post Terdal, Taluk Terdal,
Karnataka – 587315
Contact No. : +91-9916238273
Email : dpkittur@gmail.com

Personal Profile and Farming Background

Shri Dhareppa Parappa Kittur, aged 57, is a pioneering organic farmer from Terdal, Bagalkot, with over 34 years of experience. He developed a comprehensive Integrated Organic Farming System on six hectares, combining crops, horticulture, livestock, aquaculture, beekeeping, and renewable energy. His transition to organic farming began in the 1990s to avoid chemical harm, adopting eco-friendly, resource-efficient, and farmer-friendly technologies.

Innovation Overview and Motivation

His principal innovation is an Integrated Organic Farming System (IOFS) based on mixed cropping, biological nutrient cycling, renewable energy, on-farm input production, low-cost technologies and local resource use. The innovation emerged from his desire to reduce dependence on external inputs, revive traditional ecological knowledge and make farming resilient in the semi-arid region of Bagalkot. A unique component of his approach is the use of instrumental music therapy for crops, inspired by Dr. J.C. Bose's research on plant sensitivity. By playing tabla, shehnai and jalatarang from 10 PM to 6 AM, he has consistently observed 5–10% improvement in crop vigour and reduction in disease incidence.

Technical Features, Novelty and Development Process

His farm integrates over 75 horticultural species, 50 exotic fruits, and diverse intercrops in a multi-layer system. Crops include sugarcane at 5 × 2 ft spacing, Javegodi wheat, legumes, millets, marigold, coriander, onion, and cabbage. Organic inputs used are Jeevamrutha, Beejamrutha, Panchagavya, Dashaparni ark, Gokripamrita, bio-pesticides, and vermicompost producing 35–40 tons annually. Livestock, aquaculture, solar pumps, rainwater harvesting, and instrumental music therapy complete the circular system.

Institutional Linkages, Mentorship and Validation

His work is regularly supported by KVK Bagalkot, Department of Agriculture, University of Agricultural Sciences Dharwad and University of Horticultural Sciences Bagalkot. He also draws conceptual inspiration from Shri Subhash Palekar, Late Narayan Reddy, other progressive farmers and his father. His integrated farm is widely used as a case study for climate-resilient, low-cost organic farming by universities and agricultural institutions.

Challenges Faced and Problem-Solving Approaches

He overcame early resistance from local farmers, limited technical guidance on organic inputs, financial constraints, labour shortages and lack of organic market differentiation. Systematic experimentation, gradual scaling, water-harvesting structures, crop diversification, and family involvement helped stabilize the system. Climate variability and drought cycles were addressed through micro-irrigation, biomass recycling and soil-organic-carbon enhancement.

Utility, Applications and User Benefits

His model enhances productivity, reduces input costs, improves soil health, increases water-use efficiency and ensures year-round diversified income. It creates employment, strengthens nutritional security, enables zero-waste processing, and expands local value chains through turmeric powder, jaggery, wheat flour, pulses and vegetables. Music therapy, renewable energy and biological pest management further reduce environmental footprints.

Adoption, Outreach and Scaling Up

Over 300–400 farmers have been directly trained, and nearly 1,000 farmers and rural youth have indirectly benefited through demonstrations, workshops and exposure visits. Several small holders have replicated his mini-integrated farm models (1–2 acres) across Bagalkot, Belagavi, Dharwad, Vijayapura and neighboring districts. His farm is frequently visited by students, policy makers and extension officers.

Impact Assessment (Economic, Social and Environmental)

Economically, his approach improves returns through diversified income streams such as turmeric, jaggery, vegetables, dairy, poultry, fish and bee products. Socially, he has become a mentor for women, youth and aspiring organic entrepreneurs. Environmentally, soil organic carbon has reached nearly 1%, water efficiency has risen through solar irrigation and nutrient recycling has approached zero-waste farming.

Recognition, Awards and Media Coverage

He has been honoured with several state and national recognitions for his outstanding contributions to natural farming, biodiversity conservation and integrated horticulture. His accolades include the IARI Fellow Farmer Award, Mahindra Samriddhi Award, Best Progressive Farmer Award, Natural Farming Excellence Award, State-level Horticulture Innovation Award, and multiple honors from the Department of Agriculture and KVKs for exemplary demonstrations and knowledge sharing. His work has been featured widely in print, electronic and digital media, strengthening his reputation as a leading model farmer in Karnataka.

Future Vision, Suggestions and Way Forward

He plans to convert his 19-acre integrated farm into a certified Model Organic Training Centre, strengthen seed conservation, expand multi-storey cropping, scale up value-added products and promote farmer-led organic clusters. His long-term vision is to demonstrate that sustainable, climate-resilient, low-input agriculture can ensure prosperity for small and medium farmers across dryland regions.

Name : Shri Mavuram Mallikarjun Reddy
Address : 1-180, Village Peddakurumapalli,
PO Revelly, Mandala Choppadandi,
District Karimnagar, Telangana-505415
Contact No. : +91-9704090613
Email : mavuram@gmail.com

Personal Profile and Farming Background

Shri Mavuram Mallikarjun Reddy, 45, a B.Tech graduate with 11 years of farming experience, manages 46.5 ha across multiple soil types in Telangana, integrating livestock with paddy, groundnut, sesame, red gram and horticultural crops. With mixed irrigation sources, his diversified system achieved turnovers of ₹16 lakh in 2023–24 and ₹25 lakh in 2024–25.

Innovation Overview and Motivation

Shri Reddy's innovations include a self-designed manual weeder and soil enhancer for paddy (2021), a low-cost non-venturi organic matter delivery system, a rainwater-harvesting method using six 600-ft horizontal bores from an open well, and AWD in paddy. Costing ₹5,000, ₹750, ₹1 lakh and ₹600 respectively, these address chemical dependence, water scarcity and soil degradation. His efforts are informed by field experimentation, farmer feedback and guidance from KVK scientists.

Technical Features, Novelty and Development Process

The innovation provides low-cost, manual weed control and organic enrichment without venturi mixers, enabling direct microbial application and reducing chemical inputs. The horizontal-bore recharge system captures runoff to improve groundwater, while AWD dries soil to 15–20 cm, saving 30% water and reducing methane. Developed through 2021–23 trials on 116 acres, these practices integrate livestock waste, jeevamrut and neem to support scalable nutrient cycling for smallholders.

Institutional Linkages, Mentorship and Validation

His innovations includes soil enhancer, manual weeder, AWD and the non-venturi system are validated by PJTSAU and recognised by the Telangana Government. He serves as an ATMA member and KVK advisor, with mentorship from field interactions, trainee officer visits, a Dabur MOU for 100 acres of medicinal plants, and regular university student exposure visits confirming yield and sustainability gains.

Challenges Faced and Problem-Solving Approaches

Financial constraints, farmer skepticism, and technical guidance shortages posed hurdles, addressed through self-funded demonstrations, proven field results, and KVK collaborations to popularize innovations via workshops without external sponsorships. Water scarcity led to bore innovations, while chemical reliance shifted via organic tools, with continuous motivation from peer networks enabling scaling.

Utility, Applications and User Benefits

These tools improve soil health, reduce input costs by 20-30%, increase yields by 20%, and optimize water, inputs, and labor via efficient manure use and AWD, suiting paddy, pulses, and integrated farms. Users benefit from sustainable profits, less drudgery, and climate resilience across diverse operations. The low-cost, scalable designs make eco-friendly farming accessible for broader adoption.

Adoption, Outreach and Scaling Up

Innovations have spread across Telangana districts and Andhra's East/West Godavari, reaching 10,000 farmers through trainings, demos, and social media, with post-IARI 2025 award scaling via KVK partnerships and workshops. Community ties like SHG Laxmi Group membership enhance outreach, supported by equipment such as tractors and seed drills. This grassroots dissemination drives wider uptake.

Impact Assessment (Economic, Social and Environmental)

Economically, adopters see 20-30% cost savings and 20% yield gains, often doubling incomes; socially, year round jobs empower women and youth through mixed cropping and training. Environmentally, water conservation, methane reductions, and chemical cuts foster resilience and soil restoration. These outcomes build long-term farm viability.

Recognition, Awards and Media Coverage

He has received more than 30 recognitions, including the IARI Fellow Farmer Award 2025, ICAR Innovative Farmer Award 2021, District Millionaire Farmer 2024, Sakshi Excellence 2025, and interaction with the Prime Minister during Viksit Bharat 2024. He was also honoured with Rythu Nestham 2021 and PJTSAU Best Farmer, with national visibility through PM India, Sakshi and other media platforms, underscoring his progressive agricultural practices.

Future Vision, Suggestions and Way Forward

He envisions wider adoption of his field tested innovations through strengthened support from KVKs, demonstrations and farmer youth engagement programs. He urges policymakers, researchers and extension agencies to integrate his low-cost tools as soil enhancer, weeder, non-venturi system and AWD into formal sustainable agriculture initiatives. He advocates building climate-smart regional networks to accelerate dissemination, enhance resource-use efficiency and enable scalable, environmentally sound farming practices across rainfed and irrigated areas.

Name : Shri Bairapaga Raju
Address : H.No 2/22 Gummakonda,
Thimmajipet,
District Nagarkurnool, Telangana-509406
Contact No. : +91-8186886807
Email : bairapagaraju7@gmail.com

Personal Profile and Farming Background

Shri Bairapaga Raju, aged 40 years and a graduate, is a full-time progressive farmer who has been practising agriculture for the last 14 years on his own 12-hectare farm in Thimmajipet Mandal of Nagarkurnool district, Telangana. Coming from a traditional farming family, he cultivates a variety of field crops following a deep-rooted connection with agriculture.

Innovation Overview and Motivation

Shri Bairapaga Raju developed a low-cost integrated organic farming system combining drip irrigation, rainwater harvesting, bio-fertilizers, natural pest management, crop diversification and farmer-to-farmer knowledge sharing. Motivated by rising input costs, soil degradation, water scarcity and chemical hazards, he aimed to show that small farmers can achieve higher yields, lower costs and protect the environment using locally available indigenous solutions.

Technical Features, Novelty and Development Process

He developed a farmer-led, low-cost integrated organic farming model featuring locally fabricated drip irrigation, rainwater harvesting, contour bunding, on-farm vermicompost and bio-fertilizer units, and natural pest management using neem–garlic–jaggery formulations. Combined with crop diversification and digital outreach, the entire system costs ₹70,000–₹75,000. Its novelty lies in merging modern water-saving methods with traditional organic practices into an affordable, replicable package for dryland and small farms.

Institutional Linkages, Mentorship and Validation

He has received guidance from Professor Jayashankar Telangana State Agricultural University experts and regularly collaborates with KVKs, Agricultural Officers, farmer groups, and NGOs for demonstrations and training programmes. His farm serves as an official demonstration and training site for government departments and agricultural universities.

Challenges Faced and Problem-Solving Approaches

In the initial years he faced lack of institutional support, limited financial resources, climate challenges, lack of awareness among fellow farmers, and delay in recognition. He overcame these through self-funding, continuous on-field experimentation, persistent farmer-to-farmer knowledge sharing, and building strong local networks. His transparent results and visible success on his own farm gradually removed scepticism and attracted institutional attention.

Utility, Applications and User Benefits

The model dramatically reduces cultivation cost, increases crop yield and soil fertility,

conserves water, eliminates chemical inputs, improves farmer health, and generates additional income through community training. Farmers adopting his practices report up to 40% higher net income, 60–70% reduction in fertilizer and pesticide expenses, better drought resilience, and complete freedom from debt traps caused by high input costs.

Adoption, Outreach and Scaling Up

More than 350–400 farmers have been directly guided by him, and 1,500–2,000 have adopted his practices across multiple districts in Telangana and parts of Andhra Pradesh. He conducts regular demonstrations, trainings and digital outreach. After receiving the IARI Award, he expanded field activities, collaborated with universities and KVKs, and initiated systematic documentation for wider dissemination.

Impact Assessment (Economic, Social and Environmental)

Economically, adopting farmers achieve higher yields with drastically lower costs, leading to 30–40% increase in net income. Socially, his work has empowered small and marginal farmers, promoted community learning, and made farming dignified and knowledge-based again. Environmentally, the model has restored soil health, conserved water, promoted biodiversity, reduced carbon footprint, and created a cleaner rural environment through complete elimination of chemical fertilizers and pesticides.

Recognition, Awards and Media Coverage

His outstanding contributions have been recognised at the national level with the prestigious IARI Innovative Farmer Award. He enjoys wide respect among farming communities, agricultural universities, KVKs, and government departments in Telangana. His farm and practices are regularly featured in training programmes, field visits by officers and scientists, and farmer success stories across the state.

Future Vision, Suggestions and Way Forward

Shri Bairapaga Raju aims to transform thousands of farms across dryland regions into self-reliant, chemical-free, climate-resilient units through massive replication of his model. He plans to intensify training and awareness programmes, strengthen collaborations with agricultural universities and government bodies, promote digital documentation, and build farmer producer organisations for marketing organic produce. He suggests that the government should widely promote and subsidise such low-cost integrated organic models, establish more farmer-led demonstration farms, and include successful grassroots innovators in policy-making for sustainable agriculture.

Name : Shri R. Raveendran
Address : Reji Bhavan, KRA-172, Panachavila Lane, Ulloor, Pongummoodu, Medical College Thiruvananthapuram, Kerala – 695011
Contact No. : +91-8848748403
Email : sraveendran3@gmail.com

Personal Profile and Farming Background

Shri R. Raveendran, aged seventy, is a highly respected urban farmer-innovator from Thiruvananthapuram, Kerala, known for pioneering organic manure technologies and terrace based intensive food production. Trained as an automobile engineer, he began developing a scientific farming system on his modest 0.036-hectare homestead, transforming it into a model of urban agriculture. With over twenty-five years of experience in organic, terrace and homestead farming, he combines engineering skills with ecological principles, enabling high productivity in extremely limited space. His work integrates tuber crops, vegetables, fruit plants, medicinal species and terrace-cultivated paddy, supported by backyard poultry and organic input production.

Innovation Overview and Motivation

His core innovations include three organic manure technologies viz. Hridhayamruth, Human Hair Vermi-Compost, and Sasyamruth, along with an integrated terrace-gardening system. Starting between 1998–2002, he addressed high fertilizer costs, low soil fertility, and limited land by experimenting with kitchen waste, green leaves, fish residues, cow dung, poultry excreta, and hair waste, aiming to reduce input costs, improve soil health, recycle waste, and achieve high productivity in small spaces.

Technical Features, Novelty and Development Process

Hridhayamruth is a nutrient-rich liquid fertilizer made by aerobic-anaerobic fermentation of organic residues, jaggery, rice water, cow dung, cow urine, fish amino acid, and vermi-wash. Human Hair Vermi-Compost, produced with barber-shop hair, coconut fiber, cow dung, and Eudrilus earthworms, enhances root growth and drought tolerance. Sasyamruth is a poultry-based manure fermented with plantain and jaggery, providing a balanced NPK profile. His terrace model uses grow bags, vertical supports, and organic inputs for higher yields.

Institutional Linkages, Mentorship and Validation

His formulations and terrace-farming methods have been validated by Kerala State Biodiversity Board, ATMA, and experts in tuber crops and organic farming. Government recognition through national awards confirms the scientific value. Testing covered nutrient content, microbial safety, crop response, and scalability. His terrace farm is a recognized demonstration site for urban agriculture, hosting regular training for farmers, students, and urban gardeners.

Challenges Faced and Problem-Solving Approaches

Major constraints included limited land, heavy reliance on purchased fertilizers, scepticism about Human Hair Vermi-Compost, and need for scientific validation. He overcame these with terrace innovations, waste-based inputs, practical demos, simplified protocols in Malayalam and English, and collaboration with ATMA, CTCRI, and state biodiversity boards. Institutional testing and

farmer-led demonstrations-built trust, enabling adoption beyond his locality.

Utility, Applications and User Benefits

His organic inputs enhance soil organic matter, microbial activity, nutrient cycling and water retention, supporting vegetables, fruits and tubers with substantially improved growth, yield uniformity and shelf life. Waste-derived inputs make farming economical for small and urban growers, while terrace models provide food security and nutritional diversity for households with minimal land. The manures are affordable, locally replicable and adaptable to urban, peri-urban and rural systems.

Adoption, Outreach and Scaling Up

Over 500 farmers have directly adopted his techniques through ATMA trainings and field demonstrations. His terrace-gardening principles have spread across multiple districts of Kerala and neighboring states. Production of Hridhayamruth, Hair Vermi-Compost and Sasyamruth has scaled through farmer groups, while documented manuals and media coverage support wider replication.

Impact Assessment (Economic, Social and Environmental)

His innovations reduce fertilizer costs by 70–80%, increase per-square-foot productivity, and ensure year-round household food supply. Waste recycling substantially lowers landfill burden, while organic inputs improve soil carbon and biodiversity. The model promotes women's participation, youth engagement and urban food self-reliance. Terrace vegetation reduces ambient temperature, improves microclimate and enhances resilience to drought stress.

Recognition, Awards and Media Coverage

Shri Raveendran has received more than one hundred recognitions, including the Limca Book of Records (2011) for cultivating the world's largest African white yam (275 kg). He is a recipient of the ICAR-IARI Innovative Farmer Award, IARI Fellow Farmer Award, Plant Genome Saviour Recognition, Pandit Deen Dayal Upadhyaya Krishi Puraskar, Indian Science Congress Award, and multiple honours from CTCRI, ATMA and the Kerala State Biodiversity Board. His work has been widely featured in national newspapers, TV channels, documentaries and agricultural journals.

Future Vision, Suggestions and Way Forward

He aims to expand terrace-gardening adoption across South India, establish community organic manure units, standardise quality protocols and strengthen farmer-scientist collaborations. His long-term vision is to integrate urban agriculture into state policy, promote organic waste recycling, and build climate-resilient, community-based food systems that empower small and urban farmers.

Name : Shri Rao Gulab Singh Lodhi
Address : Nanhe Gaon (Bor), PO Karakbel,
Tehsil Gote Gaon, District Narsinhpur,
Madhya Pradesh-487114
Contact No. : +91-9303950547
Email : lodhiraogulabsingh@gmail.com

Personal Profile and Farming Background

Shri Rao Gulab Singh Lodhi, 65 years age has been pursuing farming as a profession for the last 45 years. He has studied up to higher secondary level. He owns 7 ha of irrigated farmland with black cotton soil and he carries out his farming with some widely accepted and used agricultural machinery e.g., tractor, thresher, seed drill, plough and he has sprinkler irrigation facility installed in his farm.

Innovation Overview and Motivation

Rao Gulab Singh Lodhi adopted innovative, scientifically validated farming practices, cultivating soybean JS 20-116, lentil RVL 31, mustard Raj 31 as intercrops, and green gram Virat and Janaki using ridge-furrow techniques, earning Rs.1,37,000. He also earned from milk sales, tractor–thresher hiring (Rs.60,000), babool/firewood (Rs.99,000), and Kadaknath fowls (Rs.20,000). With total costs of Rs.1,47,000 and gross income of Rs.5,09,200, his net profit was Rs.4,47,000.

Technical Features, Novelty and Development Process

Shri Lodhi took an innovative initiative in sowing techniques of field crops, especially pulses and oilseeds. Aligning with the national mission for self-sufficiency in pulses and oilseeds and addressing climate change in dryland farming, he created a unique mixed cropping model to cut input costs, reduce ecological toxicity, and counter abiotic and biotic stresses. He planted 2 mustard lines after 27 lentil lines using ridge–furrow method; mustard acted as bird perches, reduced insect pests, and improved irrigation without altering the seed drill.

Institutional Linkages, Mentorship and Validation

Shri Lodhi is indebted to old farmer friends and mentors, State agriculture departments and ICAR- Indian Agricultural Research Institute, New Delhi for guidance and mentorship. In fact, the awards he received from IARI paved his way in getting access to the world of expert advisory in agriculture sector. After receiving the awards, he has been invited to various farmers' meets through which the spread of the message of his innovations has become easy.

Challenges Faced and Problem-Solving Approaches

Apart from the usual initial hitches in convincing other farmers about the merit of the innovations, the chief problems with the spreading the innovation among farmers are the falling price of pulses at mandi level, labour shortage and other problems associated with labour engagement e.g. encompassing of infrastructure development and construction works

under income guarantee schemes raised the labour wages that affected the flow of labour forces in agriculture sector and also the ability of common farmers to employ labourers.

Utility, Applications and User Benefits

The model developed by Sh. Lodhi aimed at increasing the crop productivity leading to enhanced farm income aided by reduced input cost simultaneously and the use of less resources and inputs to counter adverse climatic effect on the crop.

Adoption, Outreach and Scaling Up

Farmers close to his area are fast adopting his methods of sowing and crop planning due to low input engagement in his method. It increased his income as well as his fame far and wide. The method of Shri Lodhi has been adopted in over 150 to 200 ha farm area and it has benefitted 200 to 300 farmers. He has guided nearly 1000 to 5000 farmers.

Impact Assessment (Economic, Social and Environmental)

The innovation of Shri Lodhi yielded on an average 30q per ha of final produce, a flat 8q/ha increment over conventional yield and the quality of produce has enhanced by 3 per cent. Use of negligible amount of plant protection chemicals improved the quality of grain and reduced environmental pollution. As the target crops require much less irrigation compared to wheat, the saving of precious ground water needs no separate qualification in putting merit to the innovation.

Recognition, Awards and Media Coverage

The work of Shri Rao Gulab Singh Lodhi has been widely acknowledged in the public knowledge domain. He has received various awards as Utkrish Kisan Samman, IARI – Innovative Farmer Award, IARI- Fellow Farmer Award, Pragatisheel Kisan Puraskar from various organizations. His achievements have been published in various newspapers and he has been invited in TV programmes to discuss his experience with renowned experts in the field of agriculture.

Future Vision, Suggestions and Way Forward

Farmers in central India face falling pulse prices and rising labour wages, affecting small and marginal farmers, while irrigated areas also need stronger custom hiring centres. Shri Lodhi plans farmers' meets and social media outreach to share his innovations and promote pulse self-sufficiency. He suggests motivating students through peer guidance, awards, and farm visits, funding field research, and creating digital platforms to support development of innovative farming practices.

Name : Shri Hemraj Yadav
Address : Village Khama Kheda, Hujur,
District Bhopal,
Madhya Pradesh- 462038
Contact No. : +91-9098419959
Email : hemrajyadav46162@gmail.com

Personal Profile and Farming Background

Shri Hemraj Yadav is a progressive farmer from Khamkheda village in Bhopal district, Madhya Pradesh. He cultivates 2.74 hectares of land and maintains a diversified farming system integrating crops and livestock. His family background in agriculture has enabled him to develop practical knowledge, while his exposure to modern agricultural training has strengthened his technical competence. His farm operations include the cultivation of paddy, wheat, soybean, garlic, guava (*Allahabad safeda*) supported by livestock comprising cows and buffaloes.

Innovation Overview and Motivation

His principal innovations involve the adoption of crop diversification, scientific land and water management practices, integrated nutrient and pest management through organic manures and bio-pesticides, grading and marketing of garlic for enhanced income. His motivation stemmed from the need to improve crop productivity, reduce input costs, and overcome recurring challenges such as pest incidence and climatic variability.

Technical Features, Novelty and Development Process

His practices include crop diversification, conservation agricullture, use of organic inputs and manaintainace of dairy unit for enhanced income generation. He alongwith 200 other farmers have formed '*Vat Savitri* Farmer Producer Company Limited' which helps them in collective purchase of inputs, strengthened their bargaining power in market dynamics and helped set up a Vermicompost unit. These technical interventions were developed gradually through field experimentation and institutional guidance.

Institutional Linkages, Mentorship and Validation

He has received structured training and technical support from the Indian Institute of Soil Science (IISS), Bhopal. Additionally, guidance from KVK Bhopal, CIAE Bhopal, State Agriculture Department and various national agricultural schemes helped him with technical and financial support. Demonstrations, soil testing reports, expert consultations, and field evaluations have provided scientific validation and further refinement to his farming methods.

Challenges Faced and Problem-Solving Approaches

He initially faced challenges such as low soil fertility, pest attacks, irregular rainfall, and limited access to modern technologies. Through systematic efforts, he adopted soil amendments, improved crop rotation, and integrated pest and disease management practices. Water scarcity was addressed through micro-irrigation and the construction of water-harvesting structures with institutional support. To tackle market fluctuations, some of the farmers of the region collectively formed the '*Vat Savitri* Farmer Producer Company Limited', which ensured better returns.

Utility, Applications and User Benefits

His innovations have enhanced soil fertility, reduced production costs, and improved crop yield and quality. Adoption of improved agronomic practices and organic inputs has increased resource efficiency, reduced the use of chemical inputs, and promoted environmentally sustainable farming. Farmers in his locality have benefited from his knowledge-sharing efforts, demonstrations, and guidance, which have encouraged wider adoption of improved agricultural techniques.

Adoption, Outreach and Scaling Up

His improved practices have been adopted by multiple farmers in his village and neighbouring areas. He has guided 100 farmers on crop planning, pest and disease management, and soil health improvement. Through participation in institutional programmes and model training courses, he has contributed to the dissemination of scientific farming methods. His demonstration fields have become learning sites for farmers seeking practical exposure to modern agricultural practices.

Impact Assessment (Economic, Social and Environmental)

Economically, his improved crop management practices have increased production and net returns, ensuring greater financial stability for his household. Socially, his work has encouraged youth participation in agriculture and strengthened community-level learning. Environmentally, his adoption of organic amendments, reduced dependency on pesticides, and improved water-use efficiency have contributed to sustainable resource management. His integrated system, combining crops and livestock, also enhances nutrient recycling and reduces waste.

Recognition, Awards and Media Coverage

He has been honoured with several recognitions, including the IARI Innovative Farmer Award and selections for district- and state-level farmer excellence programmes. His achievements in crop diversification, soil health management, and efficient resource utilisation have been acknowledged by agricultural institutions and extension agencies. His work has been featured in agricultural meetings and training documentation, highlighting his contributions to improved farming practices.

Future Vision, Suggestions and Way Forward

He aims to expand sustainable farming practices in his region by promoting soil testing, water-saving technologies, diversified cropping systems, and integrated livestock management. He envisions strengthening farmer groups for collective marketing and input procurement. His long-term vision is to contribute to environmentally sound, economically viable, and socially inclusive agricultural development.

Name : Shri Prakash Mohanlal Bafna
Address : Padmohan Bungalow, Plot No. 63,
Vidyasagar Colony, Market Yard,
Pune, Maharashtra– 411037
Contact No. : +91-9822439639
Email : prakash@bafnagroup.com

Personal Profile and Farming Background

Shri Prakash Mohanlal Bafna, a veteran progressive farmer from Pune with thirty-six years of experience, manages forty hectares with full irrigation from river water, borewells, and a 3.5-crore-litre farm pond. His diversified system includes sugarcane, fodder crops, grapes, pomegranate, guava, dairy, and desi cow breeding through IVF. He also operates Jay Research and Biotech Pvt. Ltd., producing biofertilizers and biopesticides.

Innovation Overview and Motivation

His principal innovations include converting non-cultivable, calcareous, stony soils into productive farmland using microbial inoculants, adopting subsurface drip irrigation, reducing pesticide residues in grapes through microbial degradation, and developing disease-free pomegranate and guava cultivation. He established lab-to-land models, IVF laboratories, and bio-compost units, with early failures motivating scientifically guided, microbial-based sustainable technologies.

Technical Features, Novelty and Development Process

His innovations centre on the systematic use of targeted microbial inoculants identified through field observations. *Trichoderma* is applied for pesticide-residue degradation, reduction of soil calcium and sodium, and fungal disease prevention. *Paceilomyces* is used for nematode control, while *Pseudomonas* and *Bacillus* manage bacterial and fungal infections. NPK biofertilizers enhance nutrient uptake and reduce chemical fertilizer use by nearly 40 percent. He introduced *Metarhizium* for tick control and integrated subsurface drip irrigation. Development began in 1997–98, followed by a laboratory in 2001–02 and establishment of Jay Research and Biotech Pvt. Ltd. in 2006–07.

Institutional Linkages, Mentorship and Validation

His work has been shaped by guidance from spiritual mentor Late Shri Anna Maharaj of Narayanpur and agricultural expert Shri Ram Bhau Dhokare of Nashik. Research collaborations with NCL Pune, ICAR–NRC Grapes, ICAR–NRC Pomegranate, MPKV, and the Department of Agriculture, Maharashtra, validated his innovations through technical support on residue management, soil analysis, crop protocols, and disease control.

Challenges Faced and Problem-Solving Approaches

Initially, access to reliable bio-inoculants posed a major challenge, leading him to establish his own production facility. Convincing farmers of the value of microbial-based agriculture was difficult in the beginning, as many preferred chemical intensive methods. Through consistent demonstrations, improved soil health, export-quality produce, and rising yields, he gradually built

trust among farming communities. The challenge of calcareous soils and high pesticide residues was addressed through sustained microbial interventions, soil-conditioning practices, and precision irrigation, resulting in demonstrable improvements that encouraged wider adoption.

Utility, Applications and User Benefits

His innovations transformed degraded soils into fertile land with 2–3% organic carbon. Microbial residue management enabled grape exports meeting EU standards, while soil inoculants reduced nematode damage, fungal load, and bacterial blight. Subsurface drip irrigation with microbes prevented guava wilt. These interventions lowered chemical costs, improved produce quality and shelf-life, and strengthened sustainable production systems.

Adoption, Outreach and Scaling Up

His innovations are widely adopted, with most grape exporters and pomegranate growers in Maharashtra using his microbial technologies. Over ten thousand farmers have benefited through visits, consultations, and demonstrations. After recognition from ICAR–IARI, he expanded adoption by integrating AI-assisted microbial application trials in sugarcane. His farm now serves as a national demonstration hub for soil health and crop sustainability solutions.

Impact Assessment (Economic, Social and Environmental)

Economically, his innovations reduced pesticide and fertilizer use by forty percent and increased crop productivity by about twenty percent, generating significant savings and higher income. Environmentally, microbial inoculants lowered chemical contamination, restored soil microflora, and improved water-use efficiency through subsurface irrigation. Socially, his work enabled capacity-building for farmers, women, and rural youth, and his enterprise employs 115 skilled workers, strengthening rural development.

Recognition, Awards and Media Coverage

He has received major recognitions, including the IARI Farmer Award (2024), Lokmat Marudhar Award (Singapore, 2024), NRCP Farmer Award (2022), and an Appreciation Award from ICAR–NRC Grapes (2020). He was also honoured at the International Agriculture Trade Fair (2018), IIHR Technology Adoption Award (2016), and Krishi Samrat Sanman (2014), with wide media coverage of his innovations.

Future Vision, Suggestions and Way Forward

He aims to expand microbial-based sustainable agriculture through farmer field schools, demonstrations, and interactive workshops. His priorities include wider acceptance of bio-inoculants, policy reforms for low-chemical farming, and greater visibility via televised programmes to educate farmers on soil health, microbial applications, and innovative irrigation systems.

Name : Shri Sachin Sadhu Sangale
Address : Post Kurawali Bk.,
Taluk Phaltan, District Satara,
Maharashtra - 415523
Contact No. : +91-8411985500
Email : sachinsangale5500@gmail.com

Personal Profile and Farming Background

Shri Sachin Sadhu Sangale, aged 41, is a progressive farmer with nearly three decades of agricultural experience. He cultivates 9.92 hectares, including nine hectares irrigated, integrating horticulture, field crops, and agroforestry. His mechanized farm supports livestock enterprises, and he actively participates in farmer-producer organizations.

Innovation Overview and Motivation

He has developed and implemented four major innovations, including drip irrigation technology introduced in 2001–02, an imported blower for efficient grape spraying adopted in 2005, a field-based meteorology centre established in 2011, and an automatic solar-powered drip irrigation system. Motivated by progressive farmers, agricultural exhibitions, and state agricultural schemes, and further encouraged by interactions with scientists at the Agriculture University and the National Grape Research Station, Pune, he systematically integrated modern technologies to enhance productivity, resource efficiency, and climate resilience on his farm.

Technical Features, Novelty and Development Process

His drip atomization system integrates soil sensors that monitor moisture, electrical conductivity (EC), and temperature, enabling automatic irrigation and fertigation. The meteorology centre records temperature, humidity, air pressure, sunlight, wind velocity, and rainfall, supporting weather-based crop management. The solar-powered automatic system conserves energy and ensures consistent irrigation supply, while the imported blower enhances spray precision, reduces chemical waste, and cuts labour requirements. These technologies forecast pest and disease risk and ensure pre-emptive management.

Institutional Linkages, Mentorship and Validation

His innovations are validated by regular visits from the Agriculture Department of Maharashtra, Agriculture University scientists, and officials from National Grape Research Station, Pune. These institutions provide technical advice, field validation, and recommendations for refinement. He also collaborates with innovative farmers from Nashik District, and his work is recognized in radio broadcasts and local newspapers.

Challenges Faced and Problem-Solving Approaches

He faced challenges like limited capital, unpredictable market prices, adverse weather, and labour shortages. He overcame these by adopting solar-based automation to cut costs, multi-source irrigation for drought resilience, continuous scientist guidance, and efficient mechanization to reduce labour dependency and stabilize operations.

Utility, Applications and User Benefits

His innovations increased production and reduced costs by nearly 20%, while improving soil fertility and climate resilience. Farmers visiting his field observe technology benefits firsthand, including 50% water saving, 35–40% input efficiency, and reduced dependence on manual labour. His model promotes profitable, eco-friendly agriculture, blending traditional wisdom with modern data-driven systems.

Adoption, Outreach and Scaling Up

The drip automation system covers 8.2 ha of his farm, while the meteorology centre supports weather monitoring for surrounding farmers. Over 1,000 ha across neighbouring villages benefit indirectly through advisories and replication. Since receiving the IARI Innovative Farmer Award, more farmers have visited and adopted his systems. He has guided and motivated over 5,000 farmers in the last 15 years through field demonstrations and mentoring sessions.

Impact Assessment (Economic, Social and Environmental)

His innovations boosted yields by 25% and productivity by 40% over traditional methods. His grape raisin production reached 13 tons in 2024–25. Energy use fell 52–70%, water efficiency doubled irrigated area, and 25–30 daily jobs were created. Socially, it empowers rural youth and women through advanced practices; environmentally, perennial crops reduce temperature by 1–2°C, enhance microclimate, and build climate resilience.

Recognition, Awards and Media Coverage

For his pioneering efforts, he has received the Udyan Pandit Award for horticultural innovation, Krushi Bhushan Award from the Maharashtra Government, and IARI Innovative Farmer Award for excellence in farmer-led research and technology. His achievements have been featured in agricultural journals, exhibitions, and local radio programs, inspiring farmers across the region.

Future Vision, Suggestions and Way Forward

He envisions a climate-smart, eco-friendly agricultural system through farmer-scientist collaboration and participatory research. He aims to scale his model via government-private partnerships for large-scale demonstrations, focusing on lower production costs, better water efficiency, and chemical-free food. He suggests including farmers in policy, research committees, creating 'Model Innovation Plots,' Innovative Farmer Fellowships, and CSR-funded research to promote soil health, sustainability, and value addition for resilient farming.

Name : Shri Balbir Singh Jaria
Address : Vill. Dharamgarh, Amloh
P.O. Khanian District Fatehgarh Sahib
Punjab-141801
Contact No. : +91-9814031866
Email : balvirjarhia@gmail.com, jariaseedstore@gmail.com

Personal Profile and Farming Background

Shri Balbir Singh Jaria, a Class 10–educated farmer with 46 years of experience, cultivates 12 hectares of irrigated land under paddy, basmati, wheat, sugarcane and vegetables. He operates a certified paddy and wheat seed unit earning ₹60 lakh annually. His farm is known for scientific planning, water management and modern mechanization. Over the years, he has developed strong technical insight through observation, experimentation and exposure to multiple agricultural institutions.

Innovation Overview and Motivation

His innovations focus on water efficiency, higher productivity and sustainable cultivation. He practices DSR-based bed planting in paddy, raised-bed planting in wheat and mustard, and uses tensiometers for precise irrigation. Aiming to cut labour, pesticides and costs, he continually updates his skills through PAU, IARI and Agriculture Department guidance, reflecting strong commitment to soil health and long-term sustainability.

Technical Features, Novelty and Development Process

Over the past 5–6 years, Shri Balbir Singh has used PUSA decomposer for quick stubble breakdown, improving soil health and preventing burning. In the last two years, he adopted raised-bed DSR for PUSA Basmati 1979 and 1985, reducing water use and improving establishment. His intercropping systems, including Napier, Bajra–berseem and Gobi, Sarson–Napier, Bajra, enhance fodder and soil fertility. Reduced tillage, elimination of puddling and tensiometer-based irrigation lower costs and ensure precise water use, backed by continuous field refinement.

Institutional Linkages, Mentorship and Validation

He maintains strong linkages with PAU Ludhiana, KVK Fatehgarh Sahib, IARI New Delhi and the Punjab Agriculture Department. These institutions guide him on agronomy, seed production, mechanization, pest control and water conservation. His practices are regularly validated through field visits, trainings and demonstrations. An appreciation letter from a former PAU Vice-Chancellor for his silage-making innovation further boosts his credibility.

Challenges Faced and Problem-Solving Approaches

He encountered several challenges, especially labour shortages, which affected time-sensitive operations such as seed roguing and weed control. He addressed these constraints by training available labourers, shifting to mechanized systems like DSR and bed planting and reorganizing his farm activities to optimize labour-use efficiency. He also explored cost-effective machinery, improved his scheduling of irrigation and adopted PUSA decomposer to reduce manual field preparation tasks. His proactive engagement with experts allowed him to solve technical barriers early and prevent crop losses.

Utility, Applications and User Benefits

His innovations provide multiple benefits, including higher yields, better crop health and substantial water savings. Raised-bed planting eliminates puddling, improves aeration and enhances nutrient uptake, while tensiometer-based irrigation significantly reduces water wastage. Farmers using his certified seeds report improved germination, disease tolerance and productivity, leading to strong repeat demand. His methods reduce pesticide use, improve soil structure and lower cultivation costs, making them especially suitable for farmers seeking sustainable alternatives.

Adoption, Outreach and Scaling Up

His innovations are currently practiced over 30 acres of his own land, and he regularly guides nearly 700 farmers every year through field visits, demonstrations and farmer meetings. His recognition at the national level, especially after receiving the IARI Award, has motivated him to expand outreach activities by promoting DSR, raised-bed methods and water-saving technologies across more villages. He plans to widen his seed production system and increase access to high-quality certified seeds.

Impact Assessment (Economic, Social and Environmental)

Economically, his techniques reduce operational costs, save irrigation expenses and enhance productivity, resulting in higher net returns for farmers. Socially, his influence has led many local farmers to adopt improved agronomic practices and start seed production as a supplementary income source. Environmentally, DSR and raised-bed planting improve water-use efficiency, prevent soil degradation and reduce chemical load. His seed unit generates year-round employment for at least 10 workers, contributing to local livelihood security.

Recognition, Awards and Media Coverage

He has received multiple prestigious recognitions, including the IARI Fellow Farmer Award, IARI-Innovative Farmer Award, awards from PAU Ludhiana, the Borlaug Institute for South Asia and the Wheat & Barley Institute, Karnal. His work is regularly featured in newspapers, digital platforms and agricultural TV media, highlighting his contribution to scientific farming in Punjab.

Future Vision, Suggestions and Way Forward

His future plans include expanding his seed production unit, promoting DSR and raised-bed planting across a larger landscape and encouraging farmers to adopt tensiometer-based irrigation for large-scale water saving. He suggests increased canal water availability in Punjab, widespread training on modern seed production and enhancing farmer capacity to adopt scientific technologies. His long-term vision is to create a region-wide, sustainable farming ecosystem that enhances productivity while conserving natural resources.

Name : Shri Gurmeet Singh
Address : Kattianwali, Tehsil Malout,
District Muktsar Sahib,
Punjab-151210
Contact No. : +91-9872397000
Email : sandhugurmeet6969@gmail.com

Personal Profile and Farming Background

Shri Gurmeet Singh, 42, a Railway Ticket Collector with 20 years of farming experience, operates 6.5 ha of irrigated alluvial land equipped with complete mechanization and multiple irrigation systems. He maintains stable areas under wheat, paddy, moong and Kinnow orchards, newly adopting PB-1401, and derives significant income from dairy livestock and a 2-acre fish pond.

Innovation Overview and Motivation

The innovative achievements of Shri Gurmeet Singh centre on his continuous on-farm use of Pusa Decomposer technology for over eight years to manage paddy straw and farm residues, and his restoration of 4 acres of completely barren land within a 16-acre holding. This land, dominated by Sarkanda grass (*Tripidium bengalense*) and damaged by wild boars, was once deemed unsalvageable until interaction with ICAR-IARI Microbiology scientists affirmed its revival through scientific Pusa Decomposer application.

Technical Features, Novelty and Development Process

Pusa Decomposer, a microbial consortium that accelerates in field decomposition of crop residues and hard weeds, enhances soil organic matter, structure and nutrient availability. Its novelty here lies in continuous farmer-led application of liquid, wettable powder, ultra low volume and granular formulations to decompose Sarkanda, recycle nutrients and rehabilitate degraded land. The process involved ploughing Sarkanda, spraying and incorporating Decomposer, maintaining moisture, and sequentially cultivating moong, paddy and wheat while refining methods for efficiency and scalability.

Institutional Linkages, Mentorship and Validation

The innovation is closely linked with ICAR–IARI, New Delhi, particularly the Division of Microbiology, which supplied Pusa Decomposer and provided scientific support. Principal Scientist Dr. Livleen Shukla mentored field application, monitored residue decomposition and guided the transition to wettable powder, ultra-low-volume and granular forms. Through on-farm trials, demonstrations, trainings and institutional documentation, the practice gained scientific validation and alignment with national initiatives on residue management and sustainable soil health.

Challenges Faced and Problem-Solving Approaches

Major challenges included deep skepticism and ridicule from fellow farmers, who believed the barren, Sarkanda infested land could not be revived and that Pusa Decomposer would fail. Agro-ecological constraints—wild-boar damage and extremely low soil productivity made initial trials risky. These were overcome through sustained collaboration with IARI scientists, precise improvements in dose, timing and moisture management, and stepwise validation with moong, paddy and wheat, whose visible successes gradually convinced earlier sceptics.

Utility, Applications and User Benefits

On the innovator's farm, Pusa Decomposer has been applied to paddy straw, wheat stubble, moong residues and wild Sarkanda, converting them into in-situ organic manure and enhancing soil health. The technology enabled moong yields of about 2.5 quintals per acre on previously uncultivable land, followed by productive paddy and wheat. Benefits include 30–40% reduced fertilizer use, 15–20% lower irrigation needs, decreased tillage and labour, and more resilient, profitable cropping systems.

Adoption, Outreach and Scaling Up

He applies Pusa Decomposer across his 16 acre farm, covering wheat (HD 3226, HD 2967, HD 3086, HD 3386), paddy (PB-1692, PB-1121, PB-1401, Pusa 44), moong and a 2 acre Kinnow orchard during 2023–24 and 2024–25. He experiments with wettable powder, ultra-low-volume and granular formulations, and his trainings have directly reached over 200 farmers and indirectly thousands through demonstrations, workshops and FPO networks across Punjab, Haryana and Delhi.

Impact Assessment (Economic, Social and Environmental)

Pusa Decomposer technology, implemented on Sh. Gurmeet Singh's 16 acre farm, extends across Punjab, Haryana, Delhi, and beyond, spanning thousands of acres with pan-India adoption in diverse agro-climatic zones. Economically, his reclaimed 4 acre moong plot yielded 2.5 quintals/acre, adding ₹50,000–₹60,000 income while saving ₹10,000–₹12,000/season on fertilizers; others report 20–30% yield gains, reduced labor/fuel. Socially, it employs 20–25 laborers, engages 50 women and 30 youth. Environmentally, in-situ decomposition curbs emissions, boosts soil organic matter, water retention, and climate resilience.

Recognition, Awards and Media Coverage

The innovator received the IARI Innovative Farmer Award (2020) for sustained microbial residue management and the IARI Fellow Farmer Award (2022) for leadership in promoting Pusa Decomposer. His work has been widely reported in print media, including The Print, Dainik Bhaskar, Dainik Jagran, The Times of India (Delhi), Jag Bani and Punjabi Tribune, and disseminated through electronic and social media, with YouTube demonstrations on platforms such as ApniKheti inspiring farmers across states.

Future Vision, Suggestions and Way Forward

Shri Gurmeet Singh envisions 20–25 annual on-farm demonstrations and 10–15 hands-on trainings for 200–300 farmers, women and youth, in collaboration with universities, ICAR and KVKs across diffferent states. He aims to promote liquid, wettable powder, ultra-low-volume and granular Pusa Decomposer formulations to 800–1,000 farmers yearly. His policy recommendations include subsidies, large-scale demonstrations, and integration with organic schemes, increased R&D and strengthened extension through digital outreach and monitoring.

Name : Shri Gurinder Pal Singh
Address : Zaildar Farm House, Bhawanigarh,
District Sangrur,
Punjab – 148026
Contact No. : +91-9463514919
Email : gurinderpalzaildar@gmail.com

Personal Profile and Farming Background

Shri Gurinder Pas Singh is a progressive farmer from Sangrur district, Punjab, with fifteen years of agricultural experience. He holds a bachelor's degree and manages 11 hectare fully irrigated farm comprising arid and brown soil. His cultivation profile includes wheat, rice, mustard, and a diverse range of horticultural crops, complemented by dairy farming with buffaloes and desi cows. His farm is well mechanised with modern implements such as a tractor, seed drill, super seeder, rotavator, harrow, clod crusher, and leveller. He also operates a successful plant nursery, demonstrating his commitment to diversified and sustainable agriculture.

Innovation Overview and Motivation

His key innovations include the adoption of Direct Seeded Rice (DSR) for conserving water, paddy straw decomposition as an alternative to stubble burning, cultivation of organic wheat varieties, crop diversification through fruit orchards, nursery establishment, and the integration of dairy farming with traditional and organic practices. His motivation stemmed from growing environmental concerns in Punjab, especially groundwater depletion, soil degradation, and air pollution from stubble burning. These challenges encouraged him to adopt climate-resilient, resource-efficient, and ecologically responsible farming methods.

Technical Features, Novelty and Development Process

His innovations are technically distinct and rooted in practical experimentation. The DSR method enables rice sowing without puddling, saving 30–40% water and reducing labour. Paddy straw decomposition involves microbial solutions for in-situ residue management, enriching soil organic matter and eliminating stubble burning. He has promoted organic wheat cultivation by selecting suitable disease-resistant, high-yielding varieties. His 0.25-hectare fruit orchard with mango, guava, sapodilla, jamun, mandarins, and *amla* strengthens diversification. Integrated dairy farming provides natural manure for organic soil health. These interventions demonstrate a holistic approach to sustainable crop and nutrient management.

Institutional Linkages, Mentorship and Validation

His innovations have been encouraged and guided by esteemed institutions. He received mentorship from Dr. Ashok Kumar Singh, former Director, ICAR–IARI. His work has been recognised by ICAR- IIWBR, PAU Ludhiana, and ICAR-IARI.

Challenges Faced and Problem-Solving Approaches

His innovations initially encountered social and operational challenges. Farmers in the region were traditionally accustomed to puddling and stubble burning, making behavioural change a major hurdle. Learning microbial decomposition techniques, acquiring equipment, and shifting to organic farming also required financial investment and technical adaptation. He addressed these issues through demonstrations, peer learning, and consultation with scientists, gradually building awareness and acceptance among neighbouring farmers.

Utility, Applications and User Benefits

His innovations have resulted in measurable improvements. DSR significantly reduces water consumption, labour, and greenhouse gas emissions. Straw decomposition enhances soil fertility, organic carbon, and moisture retention while eliminating air pollution. Organic wheat and diversified fruit crops offer healthier produce and multiple income streams. Integrated dairy practices strengthen nutrient cycling, reduce chemical dependence, and stabilise farm productivity. Collectively, these innovations promote sustainable agriculture while ensuring economic resilience.

Adoption, Outreach and Scaling Up

He has expanded these innovations across his own farm and guided farmers in his local block. Approximately ten farmers have adopted practices such as DSR and straw decomposition after witnessing successful demonstrations. His recognition through national awards further strengthened his reach, enabling him to promote sustainable farming through training, field demonstrations, and community engagement. He continues to scale up these initiatives through structured knowledge-sharing.

Impact Assessment (Economic, Social and Environmental)

Economically, his innovations have reduced irrigation costs, chemical input expenses, and labour requirements, thereby increasing overall profitability, with creation of multiple diverse sources of income. Socially, his work has inspired rural youth and farmers to shift towards environment-friendly methods, reducing reliance on traditional, harmful practices. Environmentally, his methods conserve groundwater, reduce emissions, enhance soil quality, improve the produce quality and promote biodiversity. The orchard, organic farming, and dairy integration contribute to climate-resilient and resource-efficient production systems.

Recognition, Awards and Media Coverage

He has earned several distinctions for his contribution to sustainable agriculture, including the Millionaire Farmer of India Award (2024), Pusa Innovative Farmer Award (2024), and Promoter Award (2023) conferred by ICAR–IIWBR. He has also been recognised by Punjab Agricultural University for preventing stubble burning in 2023. In addition, he has received multiple acknowledgements from ICAR, district authorities in Sangrur, and various national agricultural platforms. His work has been widely featured across print, social, and electronic media.

Future Vision, Suggestions and Way Forward

He aims to expand the dissemination of DSR, paddy straw decomposition, organic wheat cultivation, and integrated farming across Punjab. His plans include conducting training programmes, strengthening demonstration plots, and collaborating with agricultural universities and government departments to promote sustainable crop management. He suggests policy support for incentivising eco-friendly methods, expanding research on region-specific organic varieties, and enhancing extension mechanisms for wider adoption of sustainable innovations.

Name : Shri Rajesh Saini
Address : H. No. 219 ,Dashmesh Nagar
Opp. Golden Public School
Mukerian, District Hoshiarpur, Punjab-144211
Contact No. : +91-9815169598
Email : sr.raja_saini@yahoo.co.uk

Personal Profile and Farming Background

Shri Rajesh Saini, aged 50 and a graduate, has 20 years of full-time farming experience and he owns 7 acres of fully irrigated land. His farm has clay to sandy loam soils irrigated by borewell. He has access to his family-owned machinery including tractor, trolley, tiller, border blade, and super seeder with which he carries out complete *in-situ* crop residue management. A resident of Dashmesh Nagar, Mukerian, and active member of the Innovative Farmers Association, Saini diversifies across 6 acres of field crops (paddy, wheat, sugarcane) and 1 acre of litchi orchards with vegetable intercrops and limited agroforestry on bunds.

Innovation Overview and Motivation

His core innovation is the continuous on-farm use of Pusa Decomposer technology since 2018 for in-situ management of paddy, wheat and other crop residues. Prior to adoption, he faced stubble problems after combine harvesting, with burning or costly manual removal as his only options. Seeking a sustainable alternative, he approached ICAR-IARI's Division of Microbiology, where Dr.Livleen Shukla supplied liquid Pusa Decomposer and technical mentorship, enabling a shift toward microbial decomposition and improved soil health.

Technical Features, Novelty and Development Process

He applies the Pusa Decomposer consortium seasonally by spraying 10 L/acre on standing stubble and residues, followed by tractor incorporation, recycling 20–25 t annually across 7 acres. This accelerated decomposition, raised soil organic carbon from 0.30% to 0.55%, improved nutrient availability, weed suppression, and eliminated burning. Trials with liquid, wettable powder, ultra-low-volume and granular forms, plus composting, showed paddy yields rising from 25 to 30 q/acre, wheat 18 to 20 q/acre, with 30–35% fertilizer reduction saving ₹12,000–15,000 yearly.

Institutional Linkages, Mentorship and Validation

He maintains strong institutional linkages with ICAR-IARI's Microbiology Division, receiving technical guidance, formulation supplies and monitoring for over 20 on-farm trials, along with support for demonstrations and trainings. His work has been reviewed and endorsed through institutional visits, documented by national innovation agencies, and featured in policy reports on biomass-based manure production.

Challenges Faced and Problem-Solving Approaches

Initial adoption faced strong social resistance. 40 of 50 neighboring farmers openly discouraged him, claiming soil would not improve and predicting wasted effort and investment. Sh. Saini countered them through evidence-based engagement conducting 3 seasonal on-farm demonstrations for two years, inviting farmers' observations of decomposition and crop performance, and maintained frequent consultation with ICAR-IARI scientists. By year three, 15 neighbors adopted the technology over 25 acres; today, more than 30 farmers in the area use it regularly, demonstrating how persistence and visible results overcome skepticism.

Utility, Applications and User Benefits

Pusa Decomposer revitalized previously unproductive land into fertile, productive farmland. Over eight years, soil organic carbon increased to 0.55%, enhancing fertility and moisture retention while reducing chemical fertilizer reliance by 30%. The technology efficiently controls weeds, boosted yields of paddy, wheat and sugarcane by 10-15%, enabled 100% residue recycling, and reduced input costs and labor. Users benefitted from annual savings of Rs 25,000-30,000 from enhanced productivity, demonstrating how effective residue management combines environmental and economic gains for sustainable intensification.

Adoption, Outreach and Scaling Up

Beyond his 7-acre farm, Pusa Decomposer has been promoted across 10,000 acres in more than 50 villages of five states. Shri Saini has directly trained 100 farmers and reached over 5,000 indirectly. Following institutional recognition, he expanded demonstrations and collaborations with KVKs, state agencies and FPOs, targeting 500 acres through multi-state partnerships.

Impact Assessment (Economic, Social and Environmental)

Economically, Shri Saini and over 250 adopters achieved 10–15% yield gains, seasonal savings of ₹10,000–15,000 per acre, 30–35% fertilizer reduction, 15–20% lower fuel use and 20–25% reduced irrigation. Socially, his work created a replicable model for sustainable residue management. Environmentally, complete in-situ decomposition eliminates burning emissions, increases soil carbon, strengthens drought resilience and qualifies for carbon credits under recognised agricultural land management methodologies.

Recognition, Awards and Media Coverage

The farmer has received multiple awards for his innovative and sustainable work in crop residue management, including the IARI Innovative Farmer Award (2022) and the IARI Fellow Farmer Award (2024) for on-farm application of microbial residue management technology. He was earlier recognized by the Department of Agriculture and Farmers Welfare, Punjab (2018), KVK Bahowal, Hoshiarpur (2019), and the Deputy Commissioner, Hoshiarpur (2020) for adopting new technologies and outstanding contributions to in-situ stubble and crop residue management.

Future Vision, Suggestions and Way Forward

Sh. Saini plans 20–25 annual on-farm demonstrations and 10–15 trainings to reach 200–300 farmers, rural youth and women each year. He aims to scale adoption across 10–15 states through collaboration with ICAR, KVKs, universities and FPOs, promoting all Pusa Decomposer formulations. His vision prioritizes institutionalizing carbon credits for residue recycling and recommends subsidies for bio-inputs, large demonstrations, stronger digital extension and continued research on crop-specific and organic integration protocols.

Name : Shri Bhanwar Lal Kumawat
Address : Gram Bhagwanda Kalan,
Post Bhana, District Rajsamand,
Rajasthan – 313324
Contact No. : +91-9571034500
Email : kumawatbhanwarlal537@gmail.com

Personal Profile and Farming Background:

Shri Bhanwar Lal Kumawat, aged 54, is a progressive farmer with thirty-two years of experience, cultivating three hectares of irrigated loamy soil. He practices diversified farming involving field crops, vegetables, floriculture, and dairy, ensuring efficient resource use and risk reduction. Actively involved in cooperatives and farmer groups, he contributes to collective learning and development, enabling him to adopt and promote innovative, low-cost, sustainable agricultural practices.

Innovation Overview and Motivation:

His key innovations include marigold intercropping with vegetables and using marigold as a guard crop to manage nematodes, insect pests, and blue bull damage while generating additional income. The practice emerged from field experience, recurring crop losses, and the need for eco-friendly solutions. Training, exposure visits, and institutional guidance refined the idea, motivating him to reduce pesticide use, improve crop health, and promote income diversification for small farmers.

Technical Features, Novelty and Development Process:

His innovation involves planting marigold lines within crop rows and around field boundaries to suppress root-knot nematodes, deter blue bulls, and divert insect pests such as fruit borers from vegetables like okra. Marigold's natural nematicidal properties, strong aroma, and attractant flowers support pest diversion and field protection. First tested in 2021-22 and refined in 2023-24, the low-cost, eco-friendly practice fits regular operations and aligns with integrated pest and crop management principles.

Institutional Linkages, Mentorship and Validation:

He received technical guidance and support from KVK Rajsamand, MPUAT Udaipur, and the State Agriculture Department, which played essential roles in refining and validating the innovation. Various demonstrations, field visits, and farmer fairs enabled wider visibility and practical assessment at the community level. Institutional involvement strengthened technical credibility, improved adoption rates, and facilitated structured dissemination across several blocks. These partnerships also encouraged scientific documentation, field testing, and systematic refinement of the practice.

Challenges Faced and Problem-Solving Approaches:

He initially faced skepticism from farmers who were hesitant to adopt marigold as an intercrop or guard crop. Awareness gaps and doubts regarding its effectiveness in controlling pests and blue bulls posed major hurdles. Additionally, generating visibility and acceptance required continuous

demonstration efforts. He addressed these challenges through repeated field demonstrations, participation in farmer fairs, use of local media, and direct engagement with farmers. Over time, evidence from field performance convinced farmers of its practical benefits, overcoming early resistance.

Utility, Applications and User Benefits:

The innovation effectively controls nematodes, reduces blue bull damage, and lowers pesticide use by minimizing pest infestation in main crops. Marigold also provides additional income from flower sales without significantly increasing cultivation costs. As a botanical, low-cost, and chemical-free approach, it supports safe production, reduces environmental contamination, and improves crop health. Farmers benefit from higher yield stability, lower production risk, and diversified income streams.

Adoption, Outreach and Scaling Up:

The practice has expanded widely across seven blocks of Rajsamand and adjoining districts including Pali, Udaipur, Bhilwara, and Chittorgarh. It now covers more than 10,000 hectares and has benefited over 5,000 farmers through trainings, exposure visits, and demonstrations. Continuous outreach through KVKs, fairs, and farmer groups has enabled rapid scaling and strong acceptance across diverse farming systems.

Impact Assessment (Economic, Social and Environmental):

Economically, the innovation enhances yield, minimizes pest-related losses, and provides supplementary income through marigold cultivation. Socially, it is widely acceptable, easy to adopt, and improves farmer confidence in low-cost ecological solutions. Environmentally, the practice reduces pesticide dependency, supports soil and plant health, saves water and labour, and contributes to climate-resilient agriculture through sustainable biological control mechanisms.

Recognition, Awards and Media Coverage:

He has received several recognitions including the IARI Innovative Farmer Award, ATMA Award, Vibrant Gujarat Award, All India Farmers Alliance Award (2017), and multiple university and institutional appreciations. His work has been highlighted through print and electronic media.

Future Vision, Suggestions and Way Forward:

He aims to expand the innovation through pilot projects in KVKs, publication of success stories, and large-scale demonstrations. He suggests increased media support, research-based refinement, and policy encouragement to mainstream such affordable, eco-friendly practices. Strengthening institutional backing can further scale adoption and promote sustainable solutions for pest and animal management.

Name : Shri Ganga Ram Sepat
Address : Sepat Organic Krishi Farm, Kalakh,
Tehsil Jobner, District Jaipur,
Rajasthan- 303328
Contact No. : +91-9887782381
Email : skrpublic2000@gmail.com

Personal Profile and Farming Background

Shri Ganga Ram Sepat, 50, with Master's degrees in Geography and Education and 14 years of farming experience, manages a 1.40-ha irrigated Sepat Organic Krishi Farm in Kalakh, Jaipur, using full farm machinery, drip and sprinkler systems, and participating in Kalakh AgroNavfed FPO and dairy cooperatives. The farm integrates 0.50 ha of wheat and barley, 0.80 ha of high-value horticultural crops, 0.10 ha agroforestry, livestock and fish units, generating ₹25 lakh in 2023–24 and ₹26.5 lakh in 2024–25.

Innovation Overview and Motivation

Shri Ganga Ram Sepat's core innovation includes a 1-ha integrated model for Rajasthan's drylands—merges rainwater harvesting in a 50×50×4 m pond (~7.5 million litres), fish culture, protected cultivation, exotic vegetables, and organic farming. Replacing single rainfed crops, it enables three annual cycles of cucurbits, strawberry, lettuce, broccoli, bottle gourd, sweet corn, bajra, wheat, and clusterbean, with nutrient recycling from fish pond water enhancing sustainability.

Technical Features, Novelty and Development Process

The model integrates water harvesting via a lined pond supplying drip and sprinkler irrigation; fish-based nutrient recycling using multi-species culture (Rohu, Katla, Mrigala, common, silver, golden and grass carp) to enhance yields by 8–10%; protected and exotic vegetable cultivation in a 4,000 m² solar-powered polyhouse and low tunnels; on-farm microbial culture of key bioagents; and organic inputs including vermicompost, super compost, farmyard manure and formulations such as Jeevamrut, Ghana Jeevamrit and Panchparni Ark.

Institutional Linkages, Mentorship and Validation

Shri Ganga Ram Sepat's work is supported through institutional linkages with SKN Agricultural University, KVK Jaipur, Kalakh AgroNavfed FPO, and local dairy cooperatives, which provide platforms for training, demonstrations and farmer mobilisation. Continuous interaction with scientific and extension personnel validates his practices in water harvesting, organic inputs, protected cultivation and integrated farming. These institutional partnerships strengthen technical refinement, wider dissemination and formal recognition of his model across dryland regions.

Challenges Faced and Problem-Solving Approaches

Operating on arid, sandy soils with high temperatures and severe water scarcity, Shri Sepat faced constraints in irrigation efficiency, soil fertility and year round cultivation. He addressed these challenges through construction of a 50×50×4 m pond, adoption of drip and sprinkler systems, mulching, raised beds, protected cultivation, on-farm organic input production and integration of livestock and fisheries. These interventions stabilised yields, enhanced soil moisture retention, reduced costs and enabled profitable diversification into horticulture and agroforestry.

Utility, Applications and User Benefits

The integrated model provides water-efficient production, year-round vegetable supply, nutrient recycling and diversified income sources. Fish-based nutrient enrichment enhances yields 8–10%, while organic inputs reduce fertiliser dependence. Drip irrigation lowers water use by about 60% and increases wheat yields by 10%. Protected cultivation enables crops even at 3°C to 45°C. Livestock, agroforestry and composting enhance soil health, improve system resilience and support sustainable income generation for small and marginal farmers.

Adoption, Outreach and Scaling Up

Through daily farm visits, demonstrations and WhatsApp outreach, Shri Sepat has influenced adoption of integrated and protected farming practices across Rajasthan. About 250 farmers adopted polyhouse cucurbit cultivation, while 150 villagers and roughly 400 farmers from other districts adopted pond-based water harvesting and protected cultivation. His farm also trains around 450 university students annually. These results illustrate strong scalability through institutional partnerships, farmer groups and targeted support for water harvesting and protected agriculture.

Impact Assessment (Economic, Social and Environmental)

Economically, the model generates annual turnovers of ₹25–26.5 lakh through diversified horticulture, field crops, livestock and fisheries. Socially, extensive farmer training and student Exposure visit conducted strengthen community capacity in organic and integrated farming. Environmentally, pond-based irrigation reduces groundwater dependence, organic inputs improve soil fertility, mulching and drip save nearly ~60% water, and nutrient recycling reduces chemical use. The system enhances climate resilience, sustainability and livelihood security in arid agro-ecosystems.

Recognition, Awards and Media Coverage

Shri Sepat has received major recognitions including the IARI Innovative Farmer Award (2021), Pandit Deendayal Upadhyay Antyodaya Krishi Puraskar (2020) and IARI Fellow Award (2022). State honours include awards from the Rajasthan Agriculture Department and SKN Agriculture University, along with multiple KVK Jaipur recognitions. His work has been widely featured across DD Kisan, DD Rajasthan, Patrika TV, Krishi Jagran, The Better India, ETV and Zee Rajasthan, strengthening public visibility and outreach.

Future Vision, Suggestions and Way Forward

Shri Sepat envisions expanded training on water harvesting, organic inputs, protected cultivation and integrated farming for farmers in dry regions. He emphasises wider adoption of pond-based irrigation, polyhouse vegetable cultivation, microbial inputs and agroforestry to enhance climate resilience and profitability. Strengthening institutional support, digital extension, market linkages and farmer-to-farmer learning can accelerate scaling. His model offers a replicable blueprint for sustainable intensification and income enhancement in arid smallholder systems.

Name : Shri Shyam Sharma
Address : Harit Organic Farm, Village Post Didwana,
Tehsil Lalsot, District Dausa
Rajasthan- 303503
Contact No. : +91-9782958633, +91-9413971770
Email : shyam.sharma06@gmail.com

Personal Profile and Farming Background

Shri Shyam Sharma, aged forty-two, is a trained graduate with over two decades of farming experience on 4.62 hectares of irrigated clay-loam land. He follows an integrated, resource-efficient system combining field crops, horticulture, agroforestry and livestock developed through sustained learning and experimentation.

Innovation Overview and Motivation

Since 2018–19, he has advanced twelve grounded innovations, including indigenous seed conservation, low-gluten wheat development, rainwater harvesting, drip irrigation, biodiversity enhancement, organic nutrient systems, biogas-based energy, eco-friendly pest traps, pollinator-supporting trees, and local marketing under "Harit Organic Farm," guided scientifically by KVK Nagaur and farmer mentor Sh. K.L. Soni.

Technical Features, Novelty and Development Process

His technical innovations include conservation of low-gluten wheat (2–5%), harvesting nearly sixty-three lakh litres of rainwater annually, generating biogas from crop residues, deploying pheromone and sticky traps for pest management, and establishing pollinator-supportive agroforestry, refined through continuous trials and a ₹20-lakh investment in water- and input-management systems.

Institutional Linkages, Mentorship and Validation

His innovation trajectory is strengthened through structured mentorship from KVK Nagaur, supported by state agriculture and animal husbandry departments and ICAR-linked institutions. Validation occurred through exposure visits, farmer interactions and technical assessments following his IARI recognition. Linkages with NIF and Atal Innovation Mission further enabled technology refinement, incubation support and broader extension outreach.

Challenges Faced and Problem-Solving Approaches

Major challenges included limited scientific awareness, intermediary-driven market exploitation, shortage of skilled labour, high cultivation costs, inadequate marketing systems, and declining soil organic carbon. He addressed these constraints through structured demonstrations, strengthened organic market linkages, daily local employment generation, biogas-based input self-reliance, and soil-health restoration using residue recycling and biodiversity-centred practices.

Utility, Applications and User Benefits

His innovations enhance soil fertility, improve crop quality, increase water-use efficiency and reduce chemical dependence. Biodiversity interventions strengthen pollination, while biogas and solar drying lower energy use and post-harvest losses. Users benefit through reduced input costs, higher profitability and access to chemical-free produce across field crops, horticulture, agroforestry and livestock enterprises.

Adoption, Outreach and Scaling Up

He has implemented all innovations on his entire 4.62-hectare farm, establishing it as a practical demonstration platform. Nearly 2,000 farmers have been trained through field visits and ICAR–IARI programmes. Upscaling is supported through farmer groups, cooperatives, demonstration units, and strengthened market linkages that facilitate wider regional adoption.

Impact Assessment: Economic, Social and Environmental

Economically, his innovations reduced input costs through organic amendments and drip systems, enabling a turnover of about ₹25 lakh in 2023–24. Socially, his farm generated daily employment for 10–15 rural workers and encouraged youth participation in organic farming. Environmentally, he enhanced biodiversity, improved soil organic carbon, and saved sixty-three lakh litres of rainwater annually. Reduced chemical use and biogas adoption contributed significantly to carbon reduction and ecosystem health.

Recognition, Awards and Media Coverage

He has received more than sixteen recognitions, including the prestigious ICAR Boussingault Krishak Puraskar (2023), IARI Innovative Farmer Award (2023), a state-level organic farming award of ₹1 lakh (2022–23), and multiple district honours for wheat and dairy performance. His work has been highlighted in local and regional media, agricultural magazines, and government publications, establishing him as an important practitioner of organic, water-efficient, and biodiversity-supportive agriculture in Rajasthan.

Future Vision, Suggestions and Way Forward

He plans to expand farmer training, strengthen cooperative structures, scale value-added products, enhance seed and livestock improvement programs, and build a stronger brand for organic farm produce. He recommends establishing local testing laboratories, improving marketing and processing infrastructure, supporting seed systems, enhancing soil fertility schemes, and enabling digital crop insurance platforms. His long-term vision emphasizes sustainable, science-based, and self-reliant farming systems in arid and semi-arid landscapes.

Name : Dr. Sharvan Kumar Yadav
Address : Village Sunderpura,
Kishangarh Renwal,
Tehsil Phulera, Rajasthan-303602
Contact No. : +91-7976996775
Email : sharvan5825@gmail.com

Personal Profile and Farming Background

Dr. Yadav is thirty-five years old and holds a Ph.D. in Agronomy with a specialisation in Organic Farming. He has sixteen years of practical farming experience and operates one of India's largest vermicompost units. On his five-hectare sandy loam farm, he cultivates pearl millet, cluster bean, mustard, green gram, lucern, potato, sugarbeet, carrot, bottle gourd, Thai apple ber, and Malabar neem, while also managing a goat enterprise. He maintains 2800 vermibeds in 2 ha land area, generating 1500 tons of vermicompost per annum.

Innovation Overview and Motivation

His innovation work covers organic farming, vermicompost production, crop diversification, and water conservation. He conserved indigenous seed of bottle gourd, identified wheat varieties suitable for organic systems, and expanded horticultural crop cultivation. He prepares liquid organic manures like *Vermiwash*, *Jeevamrit, Beejamrit, Neemastra, Panchagavya,* etc. His motivation arose from his academic training, which encouraged him to pursue sustainable farming practices.

Technical Features, Novelty and Development Process

Dr. Yadav refined multiple vermicompost production methods through on-farm experimentation. He developed above-ground, underground, flour-based, HDPE bed, and windrow systems to suit different conditions. He created numerous organic formulations, including *brahmastra, ghanjeevamrit, dashparni ark*, herbal pesticides, and enriched vermicompost pellets. His unit now operates 2500–2800 beds with a capacity of about fifteen hundred tonnes per year.

Institutional Linkages, Mentorship and Validation

He has been mentored by Dr. S. K. Sharma, ADG (HRM), ICAR. His work received grants from Shri Karan Narendra Agriculture University, Jobner; ATMA, Govt of Rajasthan and official licenses from the Rajasthan Agriculture Department. ICAR institutes, state universities, and ATMA officials have validated his innovations through visits, trainings, and technical interactions. Marketing of his products is mainly through social media and e-commerce platforms like Amazon and Flipkart.

Challenges Faced and Problem-Solving Approaches

Initially, he faced social criticism as people questioned why a highly qualified person chose to work with organic inputs. He overcame these challenges through consistent demonstrations, scientific practices, and clear, measurable results. Over time, his achievements transformed public perception, encouraging wider acceptance of organic methods and inspiring many

farmers to adopt sustainable practices based on the credibility he established.

Utility, Applications and User Benefits

His technologies allow faster and efficient vermicompost production while converting waste into valuable manure. His organic inputs help reduce pesticide use, improve soil carbon, and enhance water-holding capacity. Farmers adopting his methods experience improved soil health, better yields and reduced reliance on chemicals. Soil biodiversity increased with reported increase in the number of beneficial insects. His income increased ten times by adopting vermicomposting and apple *ber* farming as compared to the traditional farming.

Adoption, Outreach and Scaling Up

Dr. Yadav has trained more than one lakh thirty thousand farmers across India, strengthening skills in sustainable agriculture. His digital outreach through YouTube, Facebook, Instagram, and online markets enables nationwide dissemination, with videos reaching over six hundred million viewers. Farmers from more than twenty states regularly participate in his training programmes, expanding his impact and accelerating technology adoption.

Impact Assessment (Economic, Social and Environmental)

His enterprise generates an annual turnover of about two crore rupees and has significantly increased his income compared to traditional farming. He provides employment to twenty-five people, creating more than nine thousand labour days. The rural youth are motivated to become agripreneurs in vermicomposting. His organic systems have improved biodiversity, soil carbon, earthworm populations, and overall ecological resilience.

Recognition, Awards and Media Coverage

Dr. Yadav has received honours such as the Best Innovative Farmer Award, Best organic farmer award by ATMA and the Millionaire Farmer of India Award. His father has also been recognised at state and district levels for organic farming. His work has been covered extensively by national and regional media, including *Aaj Tak*, Brut India, The Better India, *Doordarshan* Rajasthan, and leading newspapers.

Future Vision, Suggestions and Way Forward

He aims to expand organic input production and strengthen farmer training nationwide by scaling enriched formulations and widening outreach. His vision focuses on promoting farmer-led innovations, improving access to quality organic inputs, and building entrepreneurship at the grassroots level. He also advocates policies that support organic enterprises, enhance market opportunities, and encourage the use of digital platforms to accelerate awareness, capacity building, and technology adoption among diverse farming communities across the country.

Name : Shri Sethpal Singh
Address : Village-Nandi, Post-Nandi Firozpur,
District Saharanpur,
Uttar Pradesh– 247001
Contact No. : +91-9012911278, +91-9639912524
Email : ss9012911278@gmail.com

Personal Profile and Farming Background

Shri Sethpal Singh, Padam Shree Awardee is an innovative farmer from Saharanpur, Uttar Pradesh, managing 12.4 hectares of fully irrigated land supported by tube wells, drip, and sprinkler systems. His integrated farming includes crops, horticulture, agroforestry, fisheries, dairy, vermicomposting, vegetables, mushroom and value addition. Trained by IARI, NDRI, and agricultural universities, he applies diversified, scientific and sustainable practices.

Innovation Overview and Motivation

He is known for refining Singhara cultivation, introducing fenugreek-based crop rotation, and promoting a holistic crop diversification model. His motivation is to ensure daily income of farmer, enhance soil health and integrate field crops, vegetables, fruits, pulses, oilseeds, fisheries, mushrooms and organic inputs. These innovations aim to strengthen sustainability, improve productivity and reduce dependence on single-crop systems.

Technical Features, Novelty and Development Process

His technical contributions include developing Singhara cultivation methods suitable for normal fields, expanding production beyond traditional water bodies. He also promotes lotus cultivation, integrated crop diversification and extensive use of organic inputs such as vermicompost, biofertilizers and green manure to improve soil quality. With machinery like laser levellers, seed drill and ridge makers, he enhances precision, soil health and ecological stability, supporting sustainable, diversified productivity.

Institutional Linkages, Mentorship and Validation

He has received extensive training and technical guidance from ICAR institutes including IARI, NDRI, agricultural universities, Krishi Vigyan Kendras and state departments. His work has been validated through multiple state and national level recognitions, participation in government programmes and assessment by agricultural institutions. These linkages strengthened the credibility, refinement and field-level dissemination of his diversified and organic farming model.

Challenges Faced and Problem-Solving Approaches

He initially faced challenges in modifying Singhara cultivation for normal fields and convincing farmers to adopt diversified and integrated farming systems. Limited awareness and hesitation regarding organic inputs and new crop rotations were common barriers. Through continuous experimentation, on-farm demonstrations, efficient resource use, and organic cultivation practices, he successfully popularized an integrated farming model that is sustainable and profitable.

Utility, Applications and User Benefits

His innovations ensure regular income for farmers by integrating multiple enterprises such as crops, horticulture, livestock, fisheries, and mushrooms. Diversification reduces risk, enhances soil fertility and improves long-term productivity. Organic practices reduce dependence on chemicals, promote healthier produce and strengthen ecological farming. The model also generates local employment, supports year-round farming activities and enhances resilience against market and climatic uncertainties.

Adoption, Outreach and Scaling Up

His diversified crop model has been widely adopted across his region. He actively participates in farmer fairs, training programmes, exposure visits, and state and national government initiatives, promoting sustainable agricultural practices. Through demonstrations and community-level interactions, he supports the adoption of Singhara cultivation, organic inputs, crop rotation, and integrated farming systems, contributing to large-scale dissemination.

Impact Assessment (Economic, Social and Environmental)

Economically, enterprises such as Singhara, horticulture, vegetables, mushrooms, fisheries, and dairy provide stable and diversified income. Socially, his work motivates farmers to diversify production and adopt sustainable technologies. Environmentally, practices such as organic inputs, green manuring, and systematic crop rotation enhance soil health, reduce chemical use, promote biodiversity, and support ecologically sustainable farming.

Recognition, Awards and Media Coverage

He has received more than 100 national and state awards, including the Padma Shri Award (2021), N.G. Ranga Farmer Award, ICAR-IARI Fellow Farmer Award, Jagjivan Ram Innovative Farmer Award, IARI-Innovative Farmer Award, and multiple Krishak Samman Awards. He has been recognized by SVBPUAT Meerut, ICAR institutes, KVKs, ATMA, APEDA, NHM, and major media houses. His work is widely reported in newspapers, magazines, agricultural media, and national platforms, and he was invited to the Vibrant Gujarat Global Agri Summit.

Future Vision, Suggestions and Way Forward

He aims to continue promoting crop diversification, organic farming, Singhara and lotus cultivation, value addition, and farmer training for sustainable agricultural development. He emphasizes strengthening extension services, farmer capacity building, and technology adoption to improve incomes and ensure long-term rural growth. His focus remains on expanding integrated, resource-efficient, and ecologically aligned farming systems for future generations.

Name : Shri Solleti Jayapal Reddy
Address : Thallapusapally,
Kesamudram Mandal,
District Mahabubabad, Telangana - 506101
Contact No. : +91-9440424999, +91-7032717747
Email : sjreddyformer@gmail.com

Personal Profile and Farming Background

Shri Solleti Jayapal Reddy, aged 71, is a progressive farmer with 50 years of agricultural experience. With a Bachelor of Science (B.Sc.) degree and a family legacy rooted in farming, he has dedicated his life to advancing sustainable agriculture and improving farmer livelihoods. His role extends beyond production, as he is also deeply engaged in value addition and Farmer Producer Organization activities to strengthen farmer networks and enhance market access. As the chairman of the federation of Farmers Producer Organizations, he leads collective initiatives that empower farmers through capacity building, technology adoption, and better price realization.

Innovation Overview and Motivation

His primary innovation is a fertilizer-free and fungicide-free cultivation model using organic manure, biochar, and natural bio-solutions to enhance soil fertility and crop yield. The motivation to pursue climate-friendly, cost-effective farming was strengthened by consistent guidance from the Department of Horticulture, KVK scientists and agricultural universities.

Technical Features, Novelty and Development Process

His model integrates multiple progressive approaches to improve productivity, resource efficiency and sustainability. The SRI method in rice cultivation increases yield while saving water and reducing labour dependency. Organic cultivation of turmeric, chilies, mango, and paddy ensures chemical-free production that enhances soil health and improves the nutritional quality and market value of produce. The Ultra-High Density Mango Plantation model significantly boosts orchard productivity while integrating complementary activities such as beekeeping for pollination and intercropping with chillies and turmeric to diversify income sources. Further, the Integrated Farming System (IFS) harmonizes crops, livestock, beekeeping, and value-addition activities, ensuring efficient resource recycling, risk reduction, and year-round income stability.

Institutional Linkages, Mentorship and Validation

Strong collaboration with Agriculture University, RARS Warangal, KVK Wyra, and State Agricultural Marketing institutions strengthened scientific validation and capacity building. Key mentors viz. Dr. Praveen Rao (Former VC, PJTSAU), Dr. Uma Reddy (RARS Warangal), Dr. Her Namath (KVK Wyra), and Shri. Venkatram Reddy provided guidance and support.

Challenges Faced and Problem-Solving Approaches

Farmers faced low unstable income from paddy, lack of mechanization for transplantation and harvesting and limited access to funds for diversification. Capacity building, exposure to demonstrations and low-cost organic inputs helped overcome barriers, reducing cultivation cost and increasing revenue.

Utility, Applications and User Benefits

Organic value-added products and processing enhanced marketability and profitability. Low-input paddy varieties requiring no chemical fertilizers reduced production cost and improved soil quality. Eco-friendly practices enabled higher net returns with reduced environmental footprint.

Adoption, Outreach and Scaling Up

After receiving the IARI Award, he expanded farmer awareness on natural farming, low-emission carbon paddy cultivation and value addition. Self-marketing strategies, community knowledge sharing, and FPO-based scaling strengthened farmer adoption and access to premium markets.

Impact Assessment (Economic, Social and Environmental)

Economic gains include doubled income through seed production, organic processing and diversified enterprises. Social impact is reflected in a 100% increase in FPO share value, increased participation of women in cold-pressed oil and processing units and growing youth interest in modern sustainable agriculture. Environmentally, practices like Alternate Wetting and Drying (AWD) reduced water use, improved soil carbon (up to 2%) and lowered dependency on chemicals.

Recognition, Awards and Media Coverage

He received the Best Farmer Award from then Chief Minister Shri Narendra Modi ,Gujarat, the IARI Innovative Farmer Award, PJTSAU Best Farmer Award, and the Best Horticulture Farmer Award from CHAI Trust, recognizing excellence in sustainable farming and farmer leadership.

Future Vision, Suggestions and Way Forward

His vision is to increase regional soil organic carbon to 2% while promoting climate-resilient crop varieties, mechanization and satellite-based crop insurance protocols. Strengthening value addition, FPO coordination, and cost-effective production systems will help build a resilient and profitable farmer ecosystem.

Name : Shri Kamlesh Singh
Address : Village Kallipur,
Post Mirjamurad, Block Arajiline,
District Varanasi, Uttar Pradesh – 221307
Contact No. : +91-9794894815
Email : kamleshsingh1965@gmail.com

Personal Profile and Farming Background

Shri Kamlesh Singh is a progressive farmer with 35 years of agricultural experience and a landholding of 3.5 hectares of fully irrigated loam to sandy loam soil. He practices diversified farming that integrates field crops, horticulture, agroforestry, dairy and fisheries. His farming system includes paddy, wheat, mustard, pigeon pea, chickpea, mango, guava, apple ber, *teak, safeda* and a livestock unit comprising *Sahiwal, Gangatiri* and Friesian cattle, along with composite fish culture of Rohu, Catla, Nain. His long experience and systematic field practices reflect a strong commitment to sustainable and natural agriculture.

Innovation Overview and Motivation

His innovation, named *Harit Kavach*, is a natural formulation designed to protect crops from blue bulls and stray cattle. The preparation uses locally available plant materials and fermented liquids, making it cost-effective and environmentally acceptable. He developed this solution in response to recurring crop losses caused by increased animal movement due to urbanisation and shrinking grazing lands. His deep interest in natural and cow-based farming motivated him to refine this innovation over several years.

Technical Features, Novelty and Development Process

The formulation combines *dhatura* leaves, *madar* leaves, *neem* leaves, sour buttermilk, and cow urine. These ingredients are fermented for ten days to generate a strong odour that effectively repels animals for eight to ten days. The mixture also supports plant protection by exhibiting anti-microbial and anti-fungal properties. Its novelty lies in the exclusive use of local materials and its dual benefit of crop protection from mammalian pest and natural disease management. The final process was standardised after several trials to ensure consistent performance.

Institutional Linkages, Mentorship and Validation

His innovation has been recognised and supported through collaborations with Krishi Vigyan Kendra, Varanasi; Banaras Hindu University and NDUAT, Ayodhya. These institutions have encouraged field demonstrations and provided technical validation for broader dissemination.

Challenges Faced and Problem-Solving Approaches

The main challenge was identifying the correct proportion of ingredients and the precise fermentation period required to produce an effective formulation. Achieving uniform results and gaining farmer trust required repeated experimentation. Limited awareness among

local farmers and initial hesitation were addressed through demonstrations, open-field testing, and continuous feedback from neighbouring farmers.

Utility, Applications and User Benefits

The innovation effectively protects crops from stray cattle, reducing losses and strengthening farm security without the need for fencing or chemical repellents. The formulation is completely natural, inexpensive, and compatible with organic and natural farming systems. It improves soil quality and avoids harmful residues, offering an environmentally safe method for crop protection. Farmers benefit from lower input costs, reduced damage and better crop survival.

Adoption, Outreach and Scaling Up

More than five thousand farmers across Eastern Uttar Pradesh, Bundelkhand, Awadh, and parts of Bihar have adopted this formulation. Demonstrations, field visits and cluster meetings have helped in its rapid expansion. Regular interactions with community groups, and farmer meetings have further expanded the reach of his work.

Impact Assessment (Economic, Social and Environmental)

The innovation significantly reduces crop losses and lowers expenses related to fencing, chemical repellents and crop replanting. Natural farming practices promoted by his work have enhanced yields, improved soil fertility and reduced carbon footprint. His seed production of paddy, wheat, pulses and oilseeds, along with natural farming enterprise generate local employment and support a stronger rural economy.

Recognition, Awards and Media Coverage

Shri Singh has received numerous honours for his work, including the Organic India Award by APEDA, MFOI award, IARI Innovative farmer award, multiple certificates and awards for dairy, fisheries, residue management, and natural farming from KVK Varanasi, Banaras Hindu University and NDUAT, Ayodhya. His achievements have been widely covered in newspapers such as *Dainik Jagran, Amar Ujala, Hindustan and Rashtriya Sahara*.

Future Vision, Suggestions and Way Forward

He aims to upscale natural farming practices across the region through structured training programmes and participatory demonstrations. His vision includes supporting farmers with low-cost techniques and enhancing climate-resilient agricultural models. He advocates strengthening the KVK outreach system, promoting eco-friendly farming inputs and developing farmer-led innovations that are practical and locally adaptable.

Name : Shri Achal Kumar Mishra
Address : Medaipurwa, Post Dharmapur,
Tehsil Palia, District Lakhimpur Kheri,
Uttar Pradesh – 262901
Contact No. : +91-8299379800
Email : achalbhira@gmail.com

Personal Profile and Farming Background

Shri Achal Kumar Mishra, aged 42, holds degrees in humanities and law and has nearly two decades of farming experience alongside job experience in the petroleum sector. He manages six hectares of fully irrigated loam to sandy-loam land, cultivating sugarcane, wheat, pulses, vegetables, fruit and timber, supported by a three-tonne jaggery unit and FPO membership.

Innovation Overview and Motivation

His principal innovation is a modified trench ring pit method for sugarcane planting combined with systematic intercropping of oilseeds, pulses, potato, garlic, gladiolus and marigold. Although initially resisted for departing from conventional geometry, significant yield gain and resource saving validated the approach to improve profitability, labour efficiency and cropping intensity.

Technical Features, Novelty and Development Process

The modified trench ring pit method employs two-feet-wide trenches with rings spaced approximately twenty-one inches apart, planting two-bud sets, about ten per ring, using an iron frame to increase millable cane numbers. Combined with intercropping and live mulching, it improves yield by 25–30 percent, reaching 1800–2000 q/ha on his farm, while reducing labour by one-fourth compared to conventional ring pits. Estimated development cost is ₹75,000 per acre with crop-specific intercropping costings.

Institutional Linkages, Mentorship and Validation

His innovation has been guided by scientific mentorship from experts associated with national and state institutions engaged in sugarcane improvement. Technical refinement and validation were undertaken through KVK Jamunabad, UPCSR, Shahjahanpur, NBRI CSIR Lucknow and ICAR–SBI centres. ICAR News documented Co 0238 performance, affirming standardisation and institutional endorsement of his trench ring pit system.

Challenges Faced and Problem-Solving Approaches

Early adoption was constrained by farmer skepticism toward modified planting geometry, intensified intercropping and altered labour organisation. He addressed these constraints through on-farm demonstrations, dissemination of verified yield and income data and structured workshops and field days. Digital outreach, including YouTube content with substantial viewership, further reduced hesitation and facilitated wider dissemination of the improved method.

Utility, Applications and User Benefits

The technology improves cane yield, enhances sugar recovery, and enables profitable integration of pulses, vegetables and floriculture crops within the same field. Live mulching improves soil structure, reduces irrigation frequency, suppresses weeds, and decreases labour needs by about twenty-five percent. Intercropping diversifies income, raises land-use efficiency and strengthens overall system resilience.

Adoption, Outreach and Scaling Up

The innovation has expanded to about two hundred acres, benefiting roughly one thousand farmers who have achieved 300 to 400 q/ha or more using the improved practices. Dissemination is facilitated through his FPO, training programmes, on-farm demonstrations and digital communication. His YouTube based extension substantially widened reach beyond district boundaries. Scaling is supported by structured workshops, exposure visits, and farmer-to-farmer learning mechanisms that reinforce practical adoption.

Impact Assessment (Economic, Social and Environmental)

Economically, his system produces approximately 1800 q/ha of sugarcane, generating about ₹7.2 lakh/ha gross income and nearly ₹5.55 lakh/ha net income, with additional gains from intercropping and jaggery processing. Socially, his 430-member FPO and related enterprises provide around 225 days of employment. Environmentally, trash mulching enhances moisture conservation, soil biological activity, carbon sequestration and overall climate resilience in sugarcane-based systems.

Recognition, Awards and Media Coverage

He is a two-time state winner in highest sugarcane yield competitions (2007–08, 2017–18) and a four-time district winner under the National Agriculture Development Scheme. He has received awards from UPCSR Shahjahanpur, IFFCO, ICAR–SBI Karnal and the Utkrisht Ekikrit Krishi Puraskar (2020–21). He was recognised nationally as “Millionaire Farmer of India” in 2023 and 2024. His work is extensively reported in print, electronic and CSIR media platforms.

Future Vision, Suggestions and Way Forward

He intends to expand trench ring pit–based sugarcane cultivation, strengthen floriculture linked intercropping and enhance FPO-based collective marketing and processing. He emphasises farmer-driven research planning, improved real-time field data utilisation, stronger extension on validated on-farm technologies and structured capacity building for students. He advocates inclusive policy frameworks, improved crop insurance platforms and wider integration of farmer innovations into institutional training and developmental schemes.

Name : Shri Khushi Ram Dabral
Address : Chopdiyal Village,
District Tehri Garhwal,
Uttarakhand-249145
Contact No. : +91-9411145733
Email : khushiramdabral733@gmail.com

Personal Profile and Farming Background

Shri Khushi Ram Dabral, aged 58, a progressive farmer, has over 25 years of experience in agriculture and allied sectors. With education up to the 12th standard, he practices both agriculture and horticulture, managing a 2-hectare landholding in a hilly terrain. His farm is rainfed, supported by micro-irrigation systems in polyhouses and rainwater harvesting structures.

Innovation Overview and Motivation

His innovation Horticulture-Centric Integrated Farming (HCIF) which was adopted in 2015 and later refined in 2020 to suit local hill ecology was named location specific Horticulture-centric integrated farming. The shift was motivated by the need to increase productivity, year-round income, and farm sustainability in fragile mountain ecosystems with limited irrigation and market access. Guidance from scientists and institutions strengthened his motivation toward adopting a systematic model.

Technical Features, Novelty and Development Process

The HCIF model is a diversified, climate-smart, resource-efficient farming system integrating horticultural orchards, field crops, livestock, beekeeping, mushroom units and protected cultivation to form a self-sustaining circular ecosystem. High-value fruits such as apple, peach, plum, pear and kiwi are systematically aligned with seasonal vegetables for continuous harvests and market supply. Mulching, rainwater harvesting, drip irrigation and on-farm nutrient recycling reduce input dependence, while polyhouses enable off-season, high-yield production. Crop rotation and integrated pest–nutrient management strengthen soil health and reduce climate and pest vulnerabilities. Developed through training, institutional linkages and iterative experimentation, the model is scalable for hilly and resource-constrained regions.

Institutional Linkages, Mentorship and Validation

He received technical guidance from VCSG Uttarakhand University of Horticulture & Forestry, Bharsar, HNB Garhwal University, and the District Horticulture Department. Mentorship from Dr. T.S. Bisht and Dr. Laxmi Rawat was instrumental in refining the HCIF model. These linkages supported training access, planting material procurement, and exposure to modern technologies.

Challenges Faced and Problem-Solving Approaches

Initial barriers included fragmented landholdings, lack of irrigation, harsh winters, limited quality planting material, high establishment cost, inadequate service delivery system, poor storage and transport facility, lack of mechanisation and poor market linkages. He addressed

these constraints through water harvesting structures, mechanization, protected cultivation, government scheme support, and direct institutional engagement. Gradual scaling and diversification helped mitigate risks associated with mono-cropping.

Utility, Applications and User Benefits

The HCIF model offers diverse benefits including higher productivity, low input dependency, improved soil fertility, reduced chemical usage, and continuous income flows from multiple components. Recycling animal waste enhances soil health, while crop diversity provides nutritional security. The system is resource-efficient, climate-resilient, and suitable for small and marginal hill farmers.

Adoption, Outreach and Scaling Up

After receiving wider recognition, he began guiding farmers and promoting HCIF-based practices. He has supported approximately 100 farmers across Tehri Garhwal and nearby districts. The model is now viewed as a replicable system for mountain agriculture and protected cultivation.

Impact Assessment (Economic, Social and Environmental)

His innovation has resulted in 5-10-fold improvement in yield and production efficiency. Income diversification and resource optimization significantly reduced farming risks and improved household returns. The model generated local employment for 10 farm families, improved soil fertility, reduced monocropping pressure, and enhanced climate resilience. Socially, it encouraged farmer learning, exposure visits and youth engagement.

Recognition, Awards and Media Coverage

He has received several recognitions, including the Dev Bhoomi Bagwani Puraskar (ISHRD Society) and Namomacy Kisan Puraskar (ICAR). His work is well documented through institutional case studies, media articles and digital platforms, contributing to wider visibility and appreciation.

Future Vision, Suggestions and Way Forward

He envisions expanding HCIF through high-density plantations, protected cultivation, post-harvest management, herbal crops, horticulture-tourism, and advanced water management. For upscaling, he suggests enhanced farmer training, technology transfer, financial support, market linkages, and supportive government policies. Collaboration across institutions, FPOs and stakeholders will be critical for widespread adoption.

Name : Shri Harsh Singh Dangwal
Address : Village Sunkiya,
Post Bhatelia, District Nainital,
Uttarakhand-263132
Contact No. : +91-7417369500
Email : dangwal53@rediffmail.com

Personal Profile and Farming Background

Shri Harsh Singh Dangwal, a 72-year-old graduate and ex-serviceman, has over 15 years of farming experience. On his 0.35 ha homestead he practices diversified horticulture, vegetables, fish farming and livestock recycling, using essential implements and rainwater harvesting based irrigation.

Innovation Overview and Motivation

Shri Dangwal is known for establishing a fully integrated zero-budget natural and organic farming system that combines fruit orchards, vegetables, livestock units, on-farm bio inputs and water harvesting structures. His motivation for adopting natural farming arose from observing the declining fruit quality, high cost of chemical inputs, and rising chronic illnesses and cancer cases in his village, which he associated with excessive agro-chemical use. This inspired him to transition to a holistic, chemical-free model that prioritizes soil health and human well-being.

Technical Features, Novelty and Development Process

His innovations include diverse natural farming formulations such as Beejamrit, Jivamrit, Ghana Jivamrit and botanical extracts like Kunap Jal, Amritpani, Brahmastra, Dashparni Ark and Neemaster. Soil carbon is enhanced through residue decomposition, vermicompost and mulching. Contour planting of Napier grass reduces erosion and conserves moisture. His diversified orchards of temperate fruits, kiwi and spices, developed through experimentation since 2010, form a self-reliant, low-cost hill farming model.

Institutional Linkages, Mentorship and Validation

His farming system is strengthened through guidance from ICAR institutes of horticulture, livestock health and aquaculture, with PGS India certification and FSSAI registration adding credibility. Scientists regularly visit his "Jaiwik Pathshala" learning centre to validate his practices, conduct trainings and refine his innovations.

Challenges Faced and Problem-Solving Approaches

He faced major constraints including wild animal damage, erratic weather (untimely rainfall, droughts, frost), and high packaging and transport costs in the remote hill terrain. He addressed these challenges through construction of rainwater harvesting ponds, fish–horticulture integration, local-level processing and direct marketing, and proposals for protective structures and solar fencing. His continuous modification of the system based on field observations has helped him overcome resource limitations.

Utility, Applications and User Benefits

His natural farming model delivers safe, chemical-free food grains, fruits, vegetables, milk and water while restoring soil fertility, enhancing biodiversity, and reducing production costs to near zero. Farmers adopting his methods benefit from improved soil structure, fewer pest and disease problems, and easy access to on-farm bio-input formulations that require locally available materials. The model is highly replicable for small and marginal farmers in hill and rainfed regions.

Adoption, Outreach and Scaling Up

Approximately 102 hectares in nearby areas have adopted his innovations, and more than 3,000 farmers have been trained directly through his free trainings, organic school activities, and farmer group mobilization. He also assists farmers in accessing interest-free loans, crop insurance and subsidized machinery. The outreach facilitated through "Jaiwik Pathshala" has significantly advanced natural farming practices across the region.

Impact Assessment (Economic, Social and Environmental)

The integrated natural farming model has reduced cultivation costs, enhanced household savings, and secured premium prices through direct procurement by traders. Environmentally, rainwater harvesting structures, fish ponds, recharge pits and Napier grass bunds have curbed soil erosion, revived springs, improved groundwater and enriched biodiversity. Socially, the system has improved community nutrition, encouraged safe food habits, increased farmer participation and strengthened local ecological awareness and social capital.

Recognition, Awards and Media Coverage

Shri Dangwal has received multiple honours including Innovative Farmer awards, Kisan Shri, Devbhumi Horticulture Award, Organic India Award, district recognition as a "Million Farmer of India," and a Life Time Achievement Award in organic farming. His work is widely disseminated through All India Radio, Green TV, YouTube and print media, which frequently feature his farm and training activities.

Future Vision, Suggestions and Way Forward

He aims to expand his system through construction of polyhouses, installation of solar fencing, and establishment of a clonal nursery laboratory for high-quality planting material. He advocates for widespread adoption roottop solar panel to make Uttarakhand energy-surplus. He recommends enhanced policy and extension support for natural farming, mass campaigns promoting rainwater harvesting, dissemination of low-cost bio-formulations, and large-scale tree plantation to address soil health decline, climate change and rural youth migration.

Name : Shri Bapi Shaikh
Address : Mirjapur Village, Kalna I Block,
District Purba Bardhaman,
West Bengal-713405
Contact No. : +91-9734213386
Email : bapishaikh13@gmail.com

Personal Profile and Farming Background

Shri Bapi Shaikh, aged 38, is a progressive farmer with 20 years of experience in diversified agriculture. A graduate by education, he practices farming as his primary occupation and also works as a contractual law enforcer (Civic volunteer). He serves as the Chairman and CEO of Dhatrigram Agro FPO while also being an active member of Mirjapur Samabaya Krishi Unnayan Samiti.

Innovation Overview and Motivation

His major innovation is a Jute-Based Integrated Farming System developed in 2021. The motivation emerged from declining profitability in traditional mono-cropping of jute, rising labour and input costs, post-harvest losses, and market fluctuations. Inspired by the potential of integrating crops, fishery, livestock, poultry, and horticulture, he adopted a circular, resource-efficient system to improve income, climate resilience, and farm sustainability.

Technical Features, Novelty and Development Process

He designed a highly synergistic farm model integrating jute cultivation with vegetables, paddy, fishery, fruit trees, goatery, dairy, poultry, and apiary. Novel features include precision irrigation through sprinklers and drip systems, mechanical weeding in jute, microbial retting of jute using CRIJAF SONA, agroforestry, crop residue recycling, paira (relay) cropping in mustard, conservation tillage, and natural farming inputs such as *Jeevamrit*, vermicompost, and NADEP compost. He constructed a 3-bigha pond under MGNREGA support, added polyhouse cultivation, and established low energy onion storage structure, enhancing year round productivity.

Institutional Linkages, Mentorship and Validation

His innovation has been technically guided and validated by Krishi Vigyan Kendra (KVK) Burdwan under the mentorship of Dr. Dipankar Ghorai, Subject Matter Specialist. The farm serves as a model demonstration unit for training and farmer exposure visits.

Challenges Faced and Problem-Solving Approaches

The journey involved constraints such as lack of mechanization in jute, fragmented landholdings, high labour demand, limited credit access, and integration complexity. Market volatility, inadequate cold-chain facilities, price uncertainty, and climate-induced retting challenges added risks. To overcome these, he adopted mechanization,

diversified enterprises, improved irrigation, followed scientific guidance, reinvested profits, demonstrated the model locally, and mobilized collective action through FPOs.

Utility, Applications and User Benefits

The model enhances farm income, reduces cost, improves soil fertility, strengthens resilience, and generates year-round employment. Resource recycling alone saves approximately ₹18,600 annually, while integrating crops, fish, livestock, and vegetables improves net profitability. The system reduces risk, increases self-sufficiency, supports farm-to-market continuity, and benefits small and marginal farmers by demonstrating a scalable, climate-smart livelihood model.

Adoption, Outreach and Scaling Up

Through FPO leadership, farm demonstrations, and farmer-to-farmer learning, 78 small and marginal farmers across Kalna-I, Kalna-II, and Purbasthali blocks have adopted JBIFS principles. He is preparing to lease additional land to upscale the model with ICT tools, renewable energy systems, and mechanized jute processing.

Impact Assessment (Economic, Social and Environmental)

Economically, the system generated a total annual gross income of ₹10.94 lakh with a net return of ₹6.45 lakh. Socially, it provides 890 man-days of employment over three years, strengthens farmer confidence, and supports women and youth participation. Environmentally, jute cultivation sequesters nearly 15 tons CO_2/ha and enriches soil organic carbon, while recycling biomass, agroforestry, and reduced chemical dependency contribute to improved biodiversity and resilience.

Recognition, Awards and Media Coverage

He has received multiple awards, including Krishak Ratna (2016), ICAR Krishi Karman Awards (2018, 2021), IARI Innovative Farmer Award (2021), SATSA Award (2022), and Kriti Krishak Award (2023), recognizing his leadership and innovation in sustainable integrated farming.

Future Vision, Suggestions and Way Forward

He envisions expanding model through cluster-based adoption, establishing jute-based value-addition units, strengthening digital advisory systems, and integrating renewable energy. He suggests policy convergence, access to credit, FPO-linked processing hubs, and farmer-scientist collaboration to scale JBIFS across eastern India as a climate-smart, economically viable farming model.

CHAPTER 4

Farmer Mobilization and Entrepreneurship: Strengthening Collective Action for Inclusive Rural Transformation

Agriculture in India is undergoing rapid and multi-dimensional transformation, influenced by market diversification, technological innovations, climate uncertainties, and evolving consumption patterns. These changes present new opportunities for farmers, but they also amplify existing structural barriers, particularly for the country's large population of small and marginal producers. More than 85 percent of Indian farm households operate fragmented landholdings, often below one hectare, limiting their access to markets, institutional credit, modern technology, and agronomic information. The inability to collectively negotiate prices, aggregate produce, secure logistics, or invest in value-addition infrastructure keeps many farmers confined to subsistence level production. Within this context, farmer mobilization through Farmer Producer Organizations (FPOs), Farmer Interest Groups (FIGs), cooperatives, and other collective institutions has emerged as a transformative strategy to strengthen producer agency and integrate smallholders into modern agricultural value chains. Complementing this shift is the growing emphasis on entrepreneurship within rural communities, which repositions farmers not only as cultivators but also as innovators, market actors, and value creators. This dual focus on mobilization and entrepreneurship reflects a broader development paradigm wherein collective action and enterprise development operate together to strengthen resilience, enhance incomes, and foster inclusive agricultural growth. Farmer mobilization organizes producers to overcome structural barriers, while entrepreneurship equips them with business capacities, innovation skills, and market orientation. When aligned, these two processes can change how rural households engage with agriculture and how rural economies evolve over time.

Significance of Farmer Mobilization

Farmer mobilization signifies a transition from isolated, fragmented production systems to collaborative and organized participation in agricultural value chains.

Mobilized farmer groups create economies of scale by aggregating produce, pooling input demand, and reducing transaction costs. As a result, they gain improved bargaining power in procurement and marketing, enabling higher price realization and more stable market access. Such collectivization also facilitates access to extension services, government schemes, credit facilities, and technological demonstrations, thereby reducing information asymmetry and supporting the diffusion of innovations. Beyond economic advantages, farmer collectives act as crucial social institutions that reinforce community cohesion and local leadership. Organized groups enhance peer learning, stimulate collective problem-solving, and foster participatory decision-making, enabling farmers to negotiate climate risks, production uncertainties, and market volatility more effectively. Through FPOs and FIGs, farmers access a platform where marginalized voices especially those of women, youth, and smallholders can engage in leadership roles and influence development agendas. Thus, mobilization becomes a vehicle for empowerment and a foundation for inclusive, community-driven rural development.

Entrepreneurship as a Driver of Rural Transformation

Entrepreneurship introduces a dynamic dimension to agriculture by encouraging farmers to explore opportunities beyond conventional production practices. Entrepreneurial farmers innovate by experimenting with new crops, technologies, and management practices or by adding value through processing, branding, and direct marketing. In many cases, entrepreneurship emerges from the need to respond to local resource constraints, market failures, or climate uncertainties. By adopting entrepreneurial strategies, farmers can transition from being passive price takers to active market participants positioned to capture better returns along the value chain. Within farmer collectives, entrepreneurship extends the conventional domain of primary production into enterprises such as input manufacturing, custom-hiring centers, aggregation and grading units, rural retail hubs, and processing ventures. Entrepreneurial capacities such as financial literacy, business planning, negotiation skills, and market intelligence enable both individual farmers and groups to manage risks more effectively and identify high-value opportunities. As rural markets diversify and demand evolves for quality-assured, traceable, environmentally sustainable produce, entrepreneurship becomes a key mechanism through which smallholders can remain competitive. Entrepreneurship also plays a critical institutional role within FPOs and FIGs. Many successful producer enterprises are led by farmer-entrepreneurs who mobilize peers, leverage government schemes, and establish professional

management systems. Their leadership catalyzes innovation, investment, and collective action, thereby positioning farmer organizations as rural business entities rather than mere aggregation platforms. This evolution underscores the importance of nurturing entrepreneurial talent within collectives to stimulate long-term enterprise growth.

Barriers to Effective Mobilization and Enterprise Development

Despite their transformative potential, farmer organizations and entrepreneurship initiatives encounter numerous institutional, financial, and socio-cultural challenges. Many FPOs face bureaucratic delays during registration, limited managerial expertise, and inadequate access to working capital. Their operations are often constrained by weak infrastructure for aggregation, storage, grading, and transportation. Market volatility, fluctuating quality requirements, and complex regulatory systems further complicate the functioning of producer enterprises. Social dynamics also shape collective performance. Hierarchies within villages, unequal participation in decision making, lack of trust, and leadership deficits may hinder cohesion. Many farmer groups struggle with inconsistent member participation, non-compliance with governance procedures, and challenges in maintaining transparent records. Capacity gaps in understanding business models, maintaining profitability, ensuring quality control, and complying with food safety standards undermine enterprise viability. Addressing these challenges requires coordinated institutional support, including capacity building, professional handholding, financial inclusion mechanisms, and strong market linkages. Long-term sustainability depends on treating farmer organizations not merely as beneficiaries of programs but as evolving business entities requiring technical expertise, management systems, and supportive policy environments.

A Framework for Strengthening Farmer Mobilization and Rural Enterprise Development

A robust framework for strengthening farmer mobilization must integrate organizational empowerment, enterprise development, and ecosystem facilitation. Organizational empowerment focuses on simplifying institutional processes for forming and managing FPOs, providing governance training, establishing robust managerial systems, and fostering participatory decision making. Strengthening leadership pipelines, building trust-based communication, and promoting transparent operations are essential components of this dimension. Enterprise development requires ensuring access to credit, equity support, and investment for FPO-led businesses. It involves

training members in entrepreneurship, financial literacy, risk management, and value chain analysis. Integrating digital technologies for marketing, traceability, and real-time decision support enhances competitiveness. Strong linkages with private sector actors and agri-startups help co-create business models, promote contract farming arrangements, and expand market opportunities for farmer collectives. Ecosystem facilitation includes enabling policies, supportive institutions, and infrastructural investments. Dedicated agencies for FPO promotion, incubation centers for rural entrepreneurs, and digital platforms for input-output markets are vital components. Government procurement schemes, aggregation-centric incentives, and regulatory reforms create a conducive environment for collective enterprises. This ecosystemic approach recognizes that farmer mobilization and entrepreneurship are embedded within broader structures of governance, markets, and institutions. When these dimensions operate in synergy, farmer organizations transform from subsistence-oriented associations into dynamic rural enterprises capable of driving inclusive and sustainable agricultural growth.

Policy and Institutional Ecosystems Supporting Farmer Entrepreneurship

The evolving policy landscape in India acknowledges the importance of both individual and collective entrepreneurship in shaping rural economies. National programs under Rashtriya Krishi Vikas Yojana (RKVY), Agri-Clinics and Agri-Business Centres, and Start-up India focus on incubation, skill development, and financial support for agripreneurs. They provide seed funding, mentoring, and business development services that help farmers venture into processing, agri-services, protected cultivation, and niche markets. Simultaneously, the government's initiative to promote ten thousand FPOs seeks to strengthen group-based entrepreneurship by offering equity grants, credit guarantees, technical assistance, and institutional linkages. Agencies such as NABARD, SFAC, NCDC, and state rural livelihood missions support producer collectives by facilitating governance training, market integration, and professional management. Partnerships between FPOs and private agribusiness firms contribute to value chain upgrading, quality assurance, and market expansion.

Development organizations, NGOs, and multilateral agencies complement these programs through capacity building, grassroots mobilization, and participatory extension models. Incubation centers, digital platforms, and agri-startups introduce ideas, tools, and services that enhance decision making, risk management, and business diversification. The emergence of digital agriculture encompassing e-markets,

traceability systems, remote sensing advisories, and mobile-based applications further democratizes access to information and reduces asymmetry between smallholders and larger market actors. These policy and institutional ecosystems together form a multilayered support structure that nurtures entrepreneurial farmers and strengthens group-oriented enterprises.

Implications for Research, Policy, and Practice

The synthesis of farmer mobilization and entrepreneurship bears significant implications for agricultural policy and practice. Program design should integrate both individual and collective pathways rather than treating them as competing approaches. FPOs can serve as institutional platforms that reduce transaction costs, enhance risk-sharing, and facilitate access to investment, while enabling members to pursue enterprise-specific strategies tailored to their interests and capacities. Monitoring systems should capture both collective performance indicators and individual entrepreneurial outcomes to ensure that interventions generate broad-based benefits. Capacity-building strategies must address multi-level actors, including farmer-entrepreneurs, FPO leaders, CEOs, local resource persons, and institutional intermediaries. Governance training, business development support, and digital literacy programs are essential for strengthening group cohesion and ensuring the commercial sustainability of collective enterprises. A strong emphasis on equity and inclusion is critical, ensuring that marginalized farmers, smallholders, and rural youth are integrally involved in entrepreneurship initiatives. In fostering resilient agricultural systems, policy must encourage investments in value chains, climate-smart technologies, digital platforms, and innovation networks. Research institutions and universities can play an important role by conducting action research, developing scalable models, and co-designing farmer-led enterprises. The convergence of farmer mobilization, entrepreneurship, and supportive ecosystems has the potential to accelerate income diversification, value addition, and rural prosperity.

Conclusion

Farmer mobilization and entrepreneurship together constitute the twin foundations of inclusive agrarian modernization in India. Mobilization through FPOs, FIGs, and other collective platforms strengthens farmer agency, bargaining power, and institutional integration. Entrepreneurship injects innovation, market responsiveness, and strategic decision making, enabling farmers to move beyond primary production and participate more effectively in evolving value chains. When approached through an integrated

academic perspective, these dimensions reveal pathways for building resilient, market-ready, and community-centered agrarian systems capable of addressing contemporary challenges. In the subsequent section of this book, we present selected success cases that demonstrate the transformative potential of farmer mobilization and entrepreneurship when enabling ecosystems, institutional support, and farmer ingenuity align to drive meaningful agricultural change.

Name : Shri Sanjeev Kumar
Address : At. Chakwara,
PO. Hajipur, District Vaishali,
Bihar – 844101
Contact No. : +91-9852109928, +91-9430428660
Email : sanjeevpf@gmail.com

Personal Profile and Farming Background

Shri Sanjeev Kumar, aged 43, hails from a farming family in Vaishali, Bihar. Raised in an agricultural environment, he was shaped by the values, work ethic, and practical exposure to farming throughout his early life. He completed his education up to matriculation with a science background before fully dedicating himself to agriculture. His agrarian upbringing fostered a strong commitment to advancing and modernizing farming practices for the benefit of fellow farmer.

Innovation Overview and Motivation

Shri Sanjeev Kumar's core motivation stems from witnessing the struggles of farmers dependent on outdated techniques, low yields, and recurring cycles of debt. Inspired by his father and a progressive farmer, Shri Babulal Singh, he decided early in life to dedicate himself to transforming agriculture in his region. The desire to pay back to society and uplift farmers' livelihoods drove him to innovate in high-yield seed development, organic farming techniques, and farmer-centric advisory models.

Technical Features, Novelty and Development Process

Shri Sanjeev Kumar has collaborated intensively with agricultural scientists from KVK Hajipur and Rajendra Agricultural University for more than two decades to advance improved farming technologies and high yielding seed varieties, particularly in cauliflower. His contributions include a high-yielding cauliflower seed registered in 2015, five additional varieties under development, promotion of scientifically tested seeds over home-saved ones, and the integration of organic practices with modern technology, enabling farmers to achieve 40–50% higher yields.

Institutional Linkages, Mentorship and Validation

Shri Sanjeev Kumar has collaborated closely with institutions such as KVK Hajipur, Rajendra Agricultural University, Bihar Agricultural University (Sabour), ICAR–IARI, and PPV&FRA to advance scientific crop improvement. His innovations have been validated through field trials, seminars, and Cauliflower Day demonstrations since 2007, along with institutional assessments. He has also contributed to regional research and extension as a member of the Scientific Advisory Committee of KVK Vaishali and ATMA Vaishali.

Challenges Faced and Problem-Solving Approaches

Sanjeev Kumar encountered challenges such as farmers' reluctance to adopt new technologies, limited scientific awareness, high seed-development costs, and market barriers. He addressed these through regular trainings, on-farm demonstrations, and trust building, while promoting farmer-led seed production and collective learning platforms that strengthened self reliance and supported the community's transition to modern, science-based agricultural practices.

Utility, Applications and User Benefits

His innovations have enabled farmers to double their crop yields as for instance, increasing cauliflower production from 60-70 kg per acre to 120-150 kg, while also ensuring better quality produce and higher market returns. By promoting local seed production, he has reduced farmers' dependency on external inputs and strengthened their technical skills through continuous guidance and training. His emphasis on sustainable practices has further improved soil health and overall farm productivity. Today, thousands of farmers rely on his high yield seed varieties, which have consistently demonstrated superior performance across regions.

Adoption, Outreach and Scaling Up

Shri Sanjeev Kumar has trained 100–150 farmers every month through seminars, fairs, and field schools. Today, 1,00,000 to 1,50,000 farmers benefit directly or indirectly from his work each year. He also leads the Annadata Krishak Club, an agricultural platform with more than 2 million farmers and 30,000 more than agri-products, enabling input access, scientific guidance, and farmer-consumer linkages. He mentors more than 15 FPOs, helping many transition from inactive to fully functional organizations.

Impact Assessment (Economic, Social and Environmental)

Shri Sanjeev Kumar's innovations have delivered notable economic, social, and environmental benefits. His high-yielding seed varieties increased farm productivity and income, while seed entrepreneurship and direct farmer-to-consumer marketing improved self-sufficiency and reduced intermediary losses. His extensive training programmes strengthened farmers' skills and confidence across several states, inspiring rural youth. Environmentally, his focus on organic, low-chemical practices and improved seed varieties promoted sustainability, biodiversity, and long-term ecological resilience.

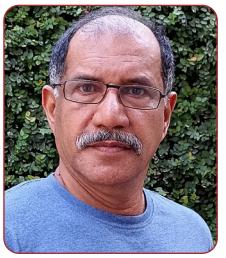
Recognition, Awards and Media Coverage

Shri Sanjeev Kumar has been widely recognised for his contributions, receiving prestigious honours such as the President's Award, recognition by Shri Narendra Modi at the Vibrant Gujarat Agriculture Summit, the IARI Fellow Farmer Award, Jagjivan Ram Innovative Farmer Award, Plant Genome Savior Award, Dhanuka Innovative Farmer Award, Grassroot Innovator Awards, and multiple Progressive and Best Farmer Awards at district, state and at national level.

Future Vision, Suggestions and Way Forward

Shri Sanjeev Kumar envisions expanding high yielding varieties to more regions, strengthening FPOs for collective marketing, and deepening digital advisory services through the Annadata Krishak Club. He aims to promote farmer-to-consumer markets nationwide and inspire youth to view agriculture as a profitable enterprise.

Name : Shri Pandurang S. Patil
Address : House No. 260,
Rivona, Kepem,
Goa – 403705
Contact No. : +91-9850451243
Email : pxpatil@rediffmail.com



Personal Profile and Farming Background

Shri Pandurang S. Patil, aged 63, has been involved in agriculture for over 45 years. A graduate (B.Com), he owns 2.25 hectares of fully irrigated farmland in rocky landscape. His primary farming enterprise includes horticultural crops such as arecanut, black pepper, nutmeg, coconut, and banana. As a Director of Goa Bagayatdar Society, a co-operative with ₹650 crore turnover, he plays a key leadership role in networking farming farmers and knowledge dissemination.

Innovation Overview and Motivation

His two key innovations are (1) a precision spraying system to apply Bordeaux mixture on tall arecanut palms from the ground without climbing and (2) value addition through Nutmeg Jam using the discarded rind. The spraying innovation emerged in response to labour scarcity and disease management challenges in arecanut orchards, where improper Bordeaux application leads to 50% nut drop. The Nutmeg Jam innovation was driven by the need to reduce waste and increase income from nutmeg fruit parts that earlier had no market value.

Technical Features, Novelty and Development Process

The spraying system evolved from a manually held 25-30 ft bamboo pole fitted with a lightweight polymide tube and pneumatic accessories to a highly efficient imported 60-ft telescopic carbon pole connected to a power sprayer. The spray jet reaches an additional 15 feet, enabling precise fungicide delivery even to the tallest trees without climbing. The Nutmeg Jam involves grating the rind and processing it with jaggery and sugar without preservatives. It has a natural shelf life of nine months and offers a product with high value and consumer appeal. Additionally, Patil developed other practical innovations such as a mini cashew roaster, arecanut water extractor, and banana sucker remover.

Institutional Linkages, Mentorship and Validation

His innovations are self-motivated and farmer-driven. Though not formally validated through institutions, the high adoption rate and field performance of his tools serve as proof of effectiveness. His partnership with farmers and his role in advisory committees contribute to informal peer validation.

Challenges Faced and Problem-Solving Approaches

Initially, he faced technical challenges in design, balancing length with manoeuvrability, and ensuring sufficient spraying pressure. Through iterative trials, modifications, and material upgrades, he standardized the system. Value addition efforts required experimentation with recipe formulation and storage stability.

Utility, Applications and User Benefits

The innovations reduce labour dependency, improve disease control, and enhance productivity. The spraying system saves time, prevents risk from climbing tall palms, and ensures uniform application with minimum waste. The nutmeg jam provides income diversification and encourages fruit utilization.

Adoption, Outreach and Scaling Up

The spraying system has been adopted across nearly 100 hectares, with more than 100 carbon poles distributed with Goa government subsidy support. He shares knowledge through workshops, FPO platforms, WhatsApp groups, and YouTube channel *Goan Bagayatdar*, connecting hundreds of plantation growers.

Impact Assessment (Economic, Social and Environmental)

The innovations have increased crop yield by 25-30%, enhanced income, reduced chemical wastage, and minimized labour drudgery. Soil and water conservation practices, including contour bunding and water harvesting pits, strengthened climate resilience. Value addition supports micro-entrepreneurship and rural livelihoods.

Recognition, Awards and Media Coverage

He received State Krishi Vibhushan, State Star Farmer, and Best Farmer awards. He also serves as a director in the Coir Board. His innovations, particularly Nutmeg Jam have been featured in *The Times of India* and other media outlets.

Future Vision, Suggestions and Way Forward

He plans to scale up his innovations through digital content, demonstrations and collaboration with farmer groups to encourage value-added enterprises and mechanization in plantations. He suggests greater government support for grassroots innovations, incubation facilities, and farmer-led product development to strengthen rural innovation ecosystems.

Name : Smt. Meena Kumari
Address : Village Beri Drollan, P.O. Behra Jattan,
Tehsil Bilaspur, District Bilaspur,
Himachal Pradesh – 174042
Contact No. : +91-981606341
Email : meenasunilchandel41@gmail.com

Personal Profile and Farming Background

Smt. Meena Kumari is a 46-year-old visionary woman farmer and floriculture pioneer with 15 years of experience in high-value flower cultivation and apiculture in the subtropical climate of Himachal Pradesh. Holding an M.A. and a B.Ed. degree, she has revolutionized protected cultivation through innovative polyhouse designs, transitioning from traditional agriculture to commercial floriculture. As a key member of *Vatika Floriculture Society*, she has integrated carnation, rose, and exotic flowers with beekeeping, empowering rural women in Bilaspur. Her innovative technique adaptation to high humidity challenges have established her as the first farmer in Himachal Pradesh to introduce Gypsophila, Spray Carnation, Lisianthus, and Green Ball Dianthus, fostering inclusive, export-oriented farming.

Innovation Overview and Motivation

Her innovations pioneer exotic flower introductions in HP: Gypsophila (2018-19), Spray Carnation (2019-20), Lisianthus (2020-21), and Green Ball Dianthus (2023), coupled with modified polyhouse ventilation to combat humidity-induced fungal infections; with guidance from KVK Bilaspur, Department of Horticulture and CSIR-IHBT. Her apiculture integration (50 hives) supports pollination. With initiatives forming women SHGs for polyhouse management, inspiring more than 200 adoptions her endeavour positioned Bilaspur as a floriculture hub.

Technical Features, Novelty and Development Process

Ventilation modification design of Smt Meena Kumari features adjustable roof vents and side flaps for 70-80% humidity control, reducing fungal incidence, boosting compactness of inflorescence and colour and extending carnation yields from 2 to 5 years. She was First to introduce exotic varieties like Gypsophila, Spray Carnation, Lisianthus, Dianthus in HP.

Institutional Linkages, Mentorship and Validation

She has strong institutional linkages with KVK Bilaspur, CSKHPKV, Palampur; CSIR-IHBT Palampur, the Department of Horticulture, Government of Himachal Pradesh, and Dr. YSP UHF Nauni, Solan. These partnerships assures technical guidance, support, training, and market-oriented advisories, enabling her to refine innovations and strengthen horticultural entrepreneurship across the region**.**

Challenges Faced and Problem-Solving Approaches

Challenges She faced included high polyhouse humidity causing fungal infections and mortality, exotic seed sourcing and market access for flowers suited for niche markets. She innovated vents, sourced the exotic varieties from abroad, and formed farmer groups.

Utility, Applications and User Benefits

Her innovation of modified ventilated polyhouses has significantly reduced fungicide use while improving flower quality, including colour, shine, stem strength and compactness. The introduction of exotic flower varieties provides higher market returns, and integrated apiculture enhances pollination efficiency along with additional income. Improved ventilation extends the productive lifespan of polyhouse-grown flowers by nearly three years. Overall, the technology has proven highly profitable for smallholders, demonstrated by an impressive benefit–cost ratio of 2.95, strengthening sustainable floriculture.

Adoption, Outreach and Scaling Up

Her innovations have been adopted by 400 farmers across 100,000 m² in HP lower hills. Outreach through trainings, exposure visits for the group of famers *Vatika Floriculture Society*. Further research needs to study the optimal timing and management of modified ventilation systems in polyhouses, with the goal of improving microclimate regulation, flower quality, and yield across major high-value flower crops.

Impact Assessment (Economic, Social and Environmental)

The ventilated polyhouses lead to cost savings on inputs by reducing energy, water and fungicide costs. She has socially empowered 400 farmers (300 women) via SHGs, creating skilled jobs for rural youth in grading/pollination. Environmentally, ventilation lowers chemical use, runoff, reduces the adverse impact on environment. Apiaries boost biodiversity and also generate additional income through sale of bee hives, honey, pollen and other bee products.

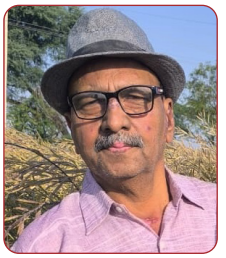
Recognition, Awards and Media Coverage

She received the IARI Innovative Farmer Award 2025 for polyhouse innovations, National Rose Award 2024 by Horticulture Department alongside 3 more national and four state awards for her outstanding contribution to floriculture. Her activities got coverage in Himachal Pradesh farming journals, IHBT newsletters, and local *Doordarshan* segments.

Future Vision, Suggestions and Way Forward

She aims to train youth of HP in floriculture and persuade them to move away from the conventional maize-wheat cropping system. She aims to develop her village into a "Flower Village" by strengthening flower production and value addition. She intends to expand into floral value-addition enterprises, including the production of incense sticks from flower waste and rose water distillation, to create a sustainable circular bio-economy around floriculture.

Name : Shri Dharampal Tyagi
Address : Village Badshahpur,
P.O. Kheri Kalan, District Faridabad,
Haryana – 121002
Contact No. : +91-9313032710
Email : rahultyagi003@gmail.com



Personal Profile and Farming Background

Shri Dharampal Tyagi is a progressive farmer from Faridabad, Haryana, with over thirty years of experience in organic farming, crop diversification, indigenous seed conservation, and farmer-led innovation. Despite limited formal education, he has developed strong agronomic knowledge. On his 12 hectare irrigated farm, he grows diverse crops and maintains cattle, goats, and desi hens, forming a fully integrated farming system.

Innovation Overview and Motivation

Shri Tyagi's key innovation is the Integrated Organic Multicropping and Indigenous Seed Conservation Model, developed between 2015 and 2025. Observing declining soil fertility, rising chemical costs, and the loss of local crop diversity, he designed a system that enhances soil health, reduces external inputs, and builds resilience. His model combines organic formulations, diversified cropping, trap and border cropping, green manuring, and indigenous seed preservation, offering small farmers low-cost, sustainable, and profitable alternatives.

Technical Features, Novelty and Development Process

His model is distinguished by its scientific integration of bio-inputs, crop diversity, and ecologically sound agronomic practices. He prepares bio-formulations such as Jeevamrut, Gokul Amrut, Agniastra, Brahmastra, Dashparni Ark, and neem extracts using local materials. His practices include intercropping, trap cropping, and soil enrichment with dhaincha, blue-green algae, Rhizobium, PSB, and vermicompost. He has refined techniques like optimized spacing for Pusa Basmati 1121, reduced seed rates for wheat varieties, and fruit-size management in vegetables.

Institutional Linkages, Mentorship and Validation

He has benefitted from support and guidance from KVK experts and multiple ICAR institutions. His farm has been visited by international delegations from the US Marine Corps, USDA, and US Air Force Command, who appreciated his low-cost organic innovations. He has been recognized at international fora organized by IFPRI, VARDAN, and Viswa Yuvak Kendra, strengthening the scientific validation of his work.

Challenges Faced and Problem-Solving Approaches

Early adoption was challenging because farmers in his region had limited awareness of organic inputs and diversified cropping systems. Labour management also posed difficulties, and many doubted the impact of low-cost bio-inputs. However, through continuous demonstrations, field days, and evidence of improved yields and lower costs, he steadily built credibility.

Utility, Applications and User Benefits

His innovations enhance soil fertility, improve water efficiency, and reduce pest and disease incidence. The use of organic inputs strengthens root systems, improves grain and vegetable quality, and reduces production costs. One of his practical contributions is the "loose method" of cauliflower transport, where cauliflower is transported without tight packaging, reducing bruising, maintaining freshness, and improving market price realization. His refined seed rates, spacing techniques, and organic pest management practices further enhance yields and profitability.

Adoption, Outreach and Scaling Up

Shri Tyagi's organic and diversified farming practices cover all twelve hectares of his farm and are adopted by more than 1,000 farmers annually through his training sessions. His methods related to blue green algae application, Pusa Basmati spacing, alternate sowing for high-pH soils, and cauliflower transport have spread across 1,700 hectares in Haryana, Uttar Pradesh, and Punjab. His farm acts as a knowledge centre for progressive farmers, extension workers, and agri-startups.

Impact Assessment (Economic, Social and Environmental)

His integrated model has significantly increased productivity and profitability. Several crops such as coriander, cauliflower, tomato, wheat, and paddy show high benefit–cost ratios, reflecting strong economic returns. Socially, he empowers farmers by promoting self-reliance in bio-inputs and indigenous seeds. Environmentally, his system reduces chemical load, enhances soil organic carbon, and supports biodiversity, contributing to climate resilience.

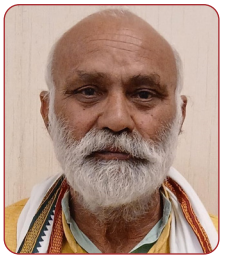
Recognition, Awards and Media Coverage

Shri Tyagi has received multiple prestigious recognitions, including appreciation from the US Marine Corps Command, USDA Secretary Mike Johanns, and Major General Joseph D. Brown. National awards include the IARI Fellow Farmer Award, Best Innovative Farmer Award (IARI & NCIPM), the Mahindra Samriddhi Agri Award, and a Gold Medal from ICAR–IIVR. His work has been widely covered by print, electronic, and social media.

Future Vision, Suggestions and Way Forward

He plans to expand his organic multicropping model through partnerships with KVKs, FPOs, and state agricultural departments. He encourages policies promoting indigenous seeds, farmer-led bio-input production, and incentives for organic produce. His vision is to equip rural youth and farmers with sustainable, low-cost practices that strengthen ecological health and long-term farm income.

Name : Shri Kanwal Singh Chauhan
Address : Village Aterna,
District Sonipat,
Haryana – 131023
Contact No. : +91-9416320765, +91-8398877515
Email : kanwalsingh62@gmail.com



Personal Profile and Farming Background

Shri Kanwal Singh Chauhan, Padma Shri awardee, aged 63, is a leading progressive farmer and agri-entrepreneur from Aterna village, Sonipat, with nearly five decades of experience. With M.A. and LL.B. degrees, he developed an integrated farming system combining crops, dairy, mushrooms, protected cultivation and agro-processing. Starting with modest land, he diversified into vegetables, fruits, cereals and fodder, established a modern processing unit and transformed his farm into a learning hub for improved varieties, organic inputs, residue management and export-focused baby corn production.

Innovation Overview and Motivation

He developed an integrated farming and processing model linking baby corn, sweet corn, mushrooms, and vegetables with organized processing, marketing, and residue use. Addressing market instability, low prices, and residue waste, his Minimum Guaranteed Price system ensures fair returns, income stability, and sustainable resource use, boosting farmer confidence and reducing risks across the value chain.

Technical Features, Novelty and Development Process

His model integrates crop production, dairy, mushroom cultivation, fodder management, and processing into a circular system. Baby corn and sweet corn residues serve as nutritious fodder year-round, boosting milk yield, while paddy straw and sugarcane trash are used as boiler fuel, eliminating field burning. The processing unit produces canned and pureed products and exports baby corn, evolved over two decades through refining cropping, processing, market links, and residue management for sustainable low-waste farming.

Institutional Linkages, Mentorship and Validation

His progress is supported by partnerships with ICAR, state agricultural universities, cooperatives, and regulators. He founded the Gulab Fruits & Vegetables Growers and Marketing Cooperative Society, which offers technical support, marketing integration, and promotes FPOs in vegetable production and residue management.

Challenges Faced and Problem-Solving Approaches

During the development of his model, he faced major hurdles such as market uncertainty, processor default risks, high capital requirements for infrastructure and the challenge of bringing farmers together for collective marketing. Early reliance on external processors failed due to their refusal to procure produce when market prices were low. He addressed this by mobilizing farmers into a cooperative, establishing an in-house processing unit, framing the MGP system and developing a residue-based fuel supply chain.

Utility, Applications and User Benefits

His innovations provide assured procurement and market stability for baby corn, sweet corn, mushroom and tomato growers. The use of crop residues as fodder and boiler fuel significantly improves resource-use efficiency, reduces fodder and energy costs, and enhances soil and environmental quality by eliminating burning. Farmers associated with his cooperative gain better prices, improved bargaining power, access to technical guidance and opportunities to participate in high-value vegetable and mushroom production.

Adoption, Outreach and Scaling Up

His integrated model has encouraged large-scale adoption of baby corn, sweet corn, mushrooms and diversified vegetables in the region. Through the Gulab Cooperative and associated FPOs, farmers participate in residue supply, vegetable marketing and contract production for the processing unit. His farm and processing facility host regular exposure visits, demonstrations and training programmes, enabling widespread dissemination within Haryana and neighbouring states.

Impact Assessment (Economic, Social and Environmental)

Economically, the model enhances farmers' income through assured procurement, export-linked markets and regular demand for crops and residues. Socially, it has strengthened farmer organizations, empowered small producers and created local employment in farming, processing and logistics. Environmentally, the replacement of coal and wood by crop residues as fuel has led to near-zero stubble burning in his village, while integrated residue management and organic inputs improve soil fertility and climate resilience.

Recognition, Awards and Media Coverage

Shri Chauhan's contributions have earned him national recognition, including the Padma Shri (2019), N.G. Ranga Award, IARI Fellow Farmer Award, Agriculture Leadership Award, Mahindra Krishi Samrat Award and other state and national awards. His work has been widely featured across newspapers, magazines, television and digital platforms, highlighting his integrated farming and farmer-led processing model.

Future Vision, Suggestions and Way Forward

He plans to expand vegetable and mushroom cultivation, enhance processing capacity, and strengthen cooperative and FPO-driven marketing. He recommends promoting residue-based energy, replicating the Minimum Guaranteed Price (MGP) model, and supporting farmer-owned processing units to boost value realization and reduce market risks. He advocates for collaboration among farmers, researchers, cooperatives, and policy bodies to build climate-resilient, zero-burn, and income-secure farming systems across India.

Name : Shri Pradeep Singh
Address : House No. 374,
Sector 4, Rohtak,
Haryana – 124001
Contact No. : +91-9812195131
Email : psheoran@gmail.com

Personal Profile and Farming Background

Shri Pradeep Singh, aged 39, is an MBA-qualified progressive farmer-entrepreneur with 17 years of experience. He manages a 5.66 hectare integrated farm in Rohtak, cultivating field crops, horticulture, agroforestry, and running a modern dairy unit of 57 Sahiwal cows and Murrah buffaloes. He also operates a milk-processing and value-addition enterprise under the brand "Nutritious Milk."

Innovation Overview and Motivation

He pioneered an integrated Milk Supply-Chain, Processing and Value-Addition model linking clean, toxin-free A2 milk production with processing, branding and direct marketing. Motivated by low farm incomes, middlemen exploitation and adulterated milk in markets, he aimed to connect farmers directly with consumers through quality, trust and fair pricing, promoting agripreneurship and transforming dairy into a remunerative enterprise.

Technical Features, Novelty and Development Process

He has developed a system of end-to-end scientific milk value chain, including village-level milk testing, 4–5 hour chilled delivery, toxin binder–based feed, A2 milk identification, and has adopted drip irrigation, solar-powered dairy operations, farmer training, mini cold-chain logistics and processing of pure milk into dahi, paneer, ghee and flavoured milk. The novelty lies in eliminating middlemen and building a transparent, technology-enabled short supply chain refined since 2019.

Institutional Linkages, Mentorship and Validation

His work has been guided and supported by Lala Lajpat Rai University of Veterinary & Animal Sciences (LUVAS), ICAR-National Dairy Research Institute (NDRI), ICAR-IARI Pusa, CCS Haryana Agricultural University, Agri Business Incubation Centre, and Department of Animal Husbandry, Haryana. He has received mentorship from scientists of NDRI, IARI, and state universities. His model has been validated through long-term association with these premier institutions and national recognition.

Challenges Faced and Problem-Solving Approaches

Initial challenges included lack of trained manpower, absence of cold-chain technology at village level, difficulty in changing farmers' traditional practices, high initial investment, and building consumer trust in a new brand. He overcame these through continuous farmer training and hand-holding, self-investment of nearly ₹60 lakh, development of low-cost testing and chilling solutions, use of digital payments and transparency, and direct consumer engagement via home delivery and social media.

Utility, Applications and User Benefits

The model ensures farmers a 25% higher price than the local market with assured daily payment, whereas the consumers get tested, pure, fresh and nutritious milk and milk products at reasonable rates. It also eliminates adulteration and middlemen, creates rural employment (currently 14 direct jobs), promotes clean milk production practices, conserves water through drip irrigation in fodder cultivation and provides a replicable template for educated rural youth to become successful agripreneurs.

Adoption, Outreach and Scaling Up

Presently procuring milk from more than 150 farmers across several villages in Rohtak and nearby districts and delivering to over 2,000 urban households daily. He regularly trains new farmers and youth through his own demonstration farm and in collaboration with KVKs and universities. After receiving the IARI Innovative Farmer Award and other national recognitions, he is rapidly expanding the processing capacity, adding more value-added products, and planning franchise models in other cities.

Impact Assessment (Economic, Social and Environmental)

Economically, farmers earn 25–30% more, and the enterprise of Sh. Pradeep Singh generates ₹90–100 lakh annual turnover with stable profits. Socially, the model empowers small farmers, supports youth entrepreneurship and restores dignity to dairy farming. Environmentally, use of toxin binders, scientific feed, drip irrigation and solar energy reduces chemical load, conserves water and lowers the carbon footprint.

Recognition, Awards and Media Coverage

Sh. Singh is a Recipient of the prestigious IARI Innovative Farmer Award, several state and national-level honours from ICAR-NDRI, LUVAS, and Haryana government. His success story is regularly covered by DD Kisan, local and national print media, and he is a sought-after trainer and speaker at agricultural universities and farmer events across Haryana and neighbouring states.

Future Vision, Suggestions and Way Forward

He aims to make Haryana a leader in pure, nutritious milk; expand his model to multiple cities through trained franchise partners; establish a farmer training academy and develop export-quality milk products. He suggests easier credit, subsidies for integrated dairy models, inclusion of clean milk training in schemes, dedicated marketing infrastructure for farmer brands and recognition of successful agripreneurs as role models.

Name : Shri Jigar Pravinbhai Desai
Address : Aajaji Organic Farm, 2/ Pushpjyot Complex, Behind Kadodara Police Station, Block-Palsana, District Surat, Gujarat- 394315
Contact No. : +91-9825111911, +91-9824110106
Email : tirigshi@gmail.com

Personal Profile and Farming Background

Shri Pravinbhai Desai, aged 43, holds a Bachelor of Arts degree and has 14 years of farming experience. His primary occupation is brick manufacturing, with farming as a secondary livelihood. He currently serves as the CEO of SURTAPI FPO, Surat.

Innovation Overview and Motivation

AAJAJI Organic Farm pioneered large-scale scientific organic farming on more than 11 ha area in South Gujarat, developing a low-cost, high-production fruit crop model with year-round rotational harvests. The farm established the AAJAJI brand for statewide and national marketing of organic produce. It provides free training on organic practices and input preparation, which eventually led to the formation of SURTAPI FPO. The land, acquired in 2010 was initially barren and was considered unsuitable for farming. It was reclaimed through systematic interventions including biannual green manuring and application of FYM at 20 tons/ha for two years, guided by scientists and experienced organic farmers.

Technical Features, Novelty and Development Process

He developed an integrated Soil Fertility Module using on-farm inputs such as Jeevamrut, Waste Decomposer, Amrutpani, Gaukrupa Amrutam, and bio-compost from the cow dung of Gir cow breed. Biofertilizers (Azetobacter, PSB, KMB) are sourced from Navsari Agricultural University and sugar factories. Other organic practices include green manuring (Sesbania, Crotalaria) and biodiversity-based pest control. Novel elements include the use of herbal leaf extracts (Neem, Guava, Moringa), microbial biofungicides (Trichoderma, Pseudomonas, *Beauveria bassiana*) and a 3000L automated Jeevamrut fertigation system integrated with drip irrigation for fortnightly application. Annual operational cost is ₹7.5–8 lakh, and infrastructure renewal cost is ₹5–6 lakh every 3–4 years.

Institutional Linkages, Mentorship and Validation

Guidance came from his father Shri Pravinbhai R. Desai, retired scientist Dr. B.N. Kolambe (NAU), scientists from NAU Navsari, Dr. Krishna Chandra (ex-Director, NCOF), KVK Vyara, Department of Horticulture, Vyara, and experienced farmers. Validation occurred through institutional collaboration, on-farm trials, and peer-to-peer farmer learning networks.

Challenges Faced and Problem-Solving Approaches

During the initial 2–3 years, the farm faced economic losses, low yields, and pest and disease problems. Severe issues included rhinoceros beetle and red palm weevil in date palm and fruit fly damage in guava and ber. Marketing challenges existed due to low

institutional linkage. Their solutions come from continued technical consultation, preventive organic protocols, daily monitoring, and repositioning produce through the AAJAJI brand, improved packaging, and sorting.

Utility, Applications and User Benefits

Soil carbon improved from 0.3% (2012) to 0.9% (2021) with improved nutrient status and reduced alkalinity. The farm now earns an annual net return of ₹55 lakh (₹3.38 lakh/ha) from 16.25 ha, producing high-quality, premium-grade fruits, demonstrating the scalability and profitability of scientific organic farming.

Adoption, Outreach and Scaling Up

The model contributed to expanding organic/natural farming to more than 3,000 ha across South Gujarat. The farm receives 1,200–1,500 visitors annually for exposure and hands-on learning. Outreach occurs through Kisan Melas, webinars, ATMA, KVKs, SAUs, and direct market access in Surat, Navsari, Valsad, Bharuch, and Vyara.

Impact Assessment (Economic, Social and Environmental)

AI-based irrigation and fertigation optimized input use. Mechanization reduced labour drudgery. Net returns reached ₹55 lakh (2021), and mango alone contributed ₹52.16 lakh net returns in 2024–25. The initiative employs 8–10 workers, inspires youth participation, and promotes urban gardening. Environmentally, it enhanced soil microbial activity, resilience, and avoids chemical contamination.

Recognition, Awards and Media Coverage

He has received 24 awards, including recognitions from South Gujarat Chamber of Commerce (3), NAU (3), ICAR–IARI (1), SEE Anand (1), Bank of Baroda Surat (1), and Dhanuka Agritech (1). These honors recognize his leadership in sustainable residue management and zero-till farming. His work has garnered widespread media coverage highlighting his efforts and farmer education.

Future Vision, Suggestions and Way Forward

His Priorities include strengthening research on soil microbes and herbal extracts, promoting early adoption of emerging technologies, and expanding AI-based meteorological advisory systems for climate-smart decisions. He also emphasizes enhanced scientist–farmer interaction, upscaling the AAJAJI brand into export markets, and advancing low-cost organic farming models through government convergence and farmer-driven marketing networks.

Name : Dr. Manoj Mohanlal Sharma
Address : 21 Jivan Vihar Society,
Opp. Navyug College,
Rander Road, Surat, Gujarat – 395009
Contact No. : +91-9825412857
Email : mapl.shrimp@gmail.com

Personal Profile and Farming Background

Dr. Manoj Mohanlal Sharma is an experienced aquaculture professional with thirty-one years of expertise in shrimp farming. He manages fifty hectares of leased land along with a five-hectare multiphase indoor nursery project designed for high-quality shrimp seed production. His enterprise includes fifty well-managed culture ponds supported by nursery tanks and advanced water treatment systems. His farming system mainly focuses on Black Tiger shrimp (*P. monodon*) and *L. vannamei*, integrating modern technologies for biosecurity and efficient production.

Innovation Overview and Motivation

His major innovation is the development of a multiphase indoor nursery system for shrimp farming. This model was adopted in 2019 to address prolonged culture duration, disease exposure, weak seed health, and limitations in annual production. He introduced this innovation to reduce risk, boost crop success, enhance survival rates, and enable farmers to harvest two crops per year instead of one. His motivation comes from industry experience and the need for a sustainable, disease-resistant, and profitable method of shrimp cultivation. He is the founder and Director of Mayank Aquaculture Private Limited, where he has played a key role in its establishment and growth.

Technical Features, Novelty and Development Process

The innovation integrates indoor and outdoor nurseries with strict biosecurity, disinfection, and water-quality protocols. Post-larvae stage shrimps pass through sequential phases: indoor nursery, outdoor nursery, and finally grow-out ponds. The system employs biofloc technology, probiotics, mineral supplements, aeration systems, and continuous water quality monitoring. This multiphase rearing ensures uniform seed size, robust health, strong immunity, and high acclimatization efficiency before stocking.

Institutional Linkages, Mentorship and Validation

Dr. Sharma developed the innovation independently, drawing insight from long industry experience. His system aligns with scientific principles used in advanced aquaculture worldwide. He has shared his concept with national and international platforms and received recognition from ICAR, NFDB, and global aquaculture forums. Field demonstrations and farmer interactions continue to validate and expand the model.

Challenges Faced and Problem-Solving Approaches

During development, he faced challenges in standardizing water quality, maintaining biosecurity, and achieving smooth transition from nursery to grow-out ponds. Skilled labour for nursery operations was limited, and farmers were initially hesitant to adopt the new system. Dr. Sharma addressed these issues through regular demonstrations, training, and refinement of protocols that ensured consistent performance.

Utility, Applications and User Benefits

The innovation shortens culture duration significantly: from 180 to 140–150 days in *P. monodon* and from 120 to about 80–90 days in *L. vannamei*. Farmers can achieve two crops annually, obtain stronger and disease-resistant varieties, and reduce feed and energy expenses. The multiphase system improves survival, reduces disease risks, and ensures better farm-gate prices through uniform harvest size, ultimately increasing profitability.

Adoption, Outreach and Scaling Up

Dr. Sharma manages fifty hectares of shrimp farming under this model and has introduced the system across the coastal regions of Gujarat, especially in Surat, Navsari, Bharuch, and Valsad. More than one hundred farmers have been guided through demonstrations, exposure visits, and presentations. After receiving the IARI Award, he intensified field visits and success story sharing, which enhanced farmer confidence and accelerated adoption.

Impact Assessment (Economic, Social and Environmental)

The innovation has doubled annual income by enabling two crops a year and lowering production costs. Comparison shows higher survival, shorter culture duration, and improved B:C, raising profitability from ₹30 lakh to ₹1.5 crore annually under nursery-based stocking. Environmentally, it reduces organic waste, ammonia load, and chemical dependence. Socially, it supports the livelihood of rural youth, creates employment for more than forty workers, and enhances farmer resilience through scientific aquaculture practices.

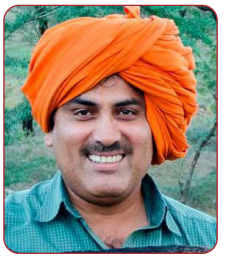
Recognition, Awards and Media Coverage

Dr. Sharma has received several awards, including Best Fish Farmer from ICAR-CIFE (2005), Best Shrimp Farmer Award from NFDB (2018), Agrivision Award (2020), Best Technology Innovation Award from NFDB (2021), and the ICAR-IARI Innovative Farmer Award (2023). International honours include the ARECA Plaque of Recognition (2018) and the Global Industry Impact Award from the World Aquaculture Society (2024). His work has gained wide media attention through national and international aquaculture platforms.

Future Vision, Suggestions and Way Forward

He plans to develop district-level model nursery centres, expand hands-on training programmes, and strengthen collaborations with fisheries departments, KVKs, SHGs, and FPOs. He aims to promote the system through digital manuals, videos, and advisory services. He recommends government support for nursery infrastructure, aeration systems, and technician training, along with further research on disease resilience, microbiome stability, and low-carbon shrimp farming.

Name : Shri Pandurang Bhagvanrao Taware
Address : Flat No C 106, Pancham Society,
Nanded City, Sinhgad Road,
Pune, Maharashtra- 411068
Contact No. : +91-9822090005, +91-8605898774
Email : pandurang@agritourism.in



Personal Profile and Farming Background

Shri Pandurang Bhagvanrao Taware, aged 55, from Pune, hails from a fourth-generation farming family in Sanghavi, Baramati. After two decades in hospitality, he returned to manage his 6.85 hectare rainfed farm, including 1.20 hectares seasonally irrigated part, operating independently without cooperatives or advanced machinery while advancing agritourism initiatives.

Innovation Overview and Motivation

Shri Taware pioneered India's agritourism sector in 2004-2005 through surveys of 2,440 respondents and pilot units in Baramati, establishing the Agri Tourism Development Corporation (ATDC) in 2005. Modeled on European and Japanese practices, the initiative addressed declining rural incomes, youth migration and community aspirations, transforming farms into experiential learning spaces. The motivation blended rural economic revival, cultural preservation and farmer dignity with structured visitor engagement across agricultural, culinary and cultural activities.

Technical Features, Novelty and Development Process

The innovation positions farms as multifunctional tourism-integrated units through ATDC's system of farmer certification, demonstration centers, hygiene standards, hospitality training and cluster cooperatives. Novelty stems from farmer-centric experiential models connecting organic practices with rural culture. Initially self-funded, the approach gained policy validation, including Maharashtra's 2020 agritourism framework, enabling standardized, scalable capacity building.

Institutional Linkages, Mentorship and Validation

ATDC scaled through collaborations with NABARD, KVKs, universities and state agencies for trainings and demonstrations. Maharashtra's 2020 agritourism framework provided policy validation. Engagement with national and international tourism bodies strengthened certification, standards and capacity building, supporting curriculum design, cluster development and farmer empowerment across states without dependence on cooperatives or machinery.

Challenges Faced and Problem-Solving Approaches

Initial challenges included farmer resistance, doubts about attracting tourists to rural settings, privacy concerns and limited hospitality skills. Absence of policy support in 2005 required self-financed infrastructure amid low institutional funding and media skepticism. He addressed these constraints through awareness campaigns, demonstrations and extensive training to build confidence. Additional obstacles e.g. licensing ambiguities, connectivity gaps and COVID-19 disruptions were managed through persistence, standardization and adaptation across India's diverse agro-climatic regions, enabling early breakthroughs and large-scale adoption.

Utility, Applications and User Benefits

Agritourism links agricultural activity with hospitality services, offering farm stays, guided tours, traditional cuisine, cultural programs and direct produce sales. This transforms seasonal farms into year-round enterprises. Farmers gain supplementary annual incomes of ₹4.5–5 lakh and a 40% earnings uplift, with reduced input costs through organic methods, biogas and rainwater harvesting. Visitors access educational exposure to farming and rural culture, while each center generates employment for 5–9 people, especially women and youth.

Adoption, Outreach and Scaling Up

Beginning with a Baramati pilot in 2005, agritourism expanded to more than 5,000 centers across 20+ states. ATDC trained 10,000 farmers directly and supported 100,000 through capacity-building programs with NABARD, KVKs and universities. Maharashtra alone hosts 628 farms in 300 villages, receiving 0.79 million visitors and generating ₹55.79 million by 2020. Digital platforms, virtual tours and cluster models strengthened replication in states such as Gujarat and Tamil Nadu.

Impact Assessment (Economic, Social and Environmental)

Economically, agritourism generates ₹100 crore annually, raises farm incomes by 40% to ₹4.2–5.5 lakh, doubles value-added sales and supports approximately 50,000 jobs with strong multiplier effects. Socially, it empowers 3,000 women through homestays and crafts, revives cultural traditions and enhances farmer dignity. Environmentally, organic transitions reduce emissions 20–30%, expand agroforestry, and promote water-energy efficiency, aligning with SDGs while cultivating community awareness of ecological conservation.

Recognition, Awards and Media Coverage

Shri Taware's recognitions include the Social Entrepreneurship in Tourism Award 2022, Maharashtra State Agri Tourism Award 2022, ZEE Media Krishi SanmanPuruskar 2022, Lakbay Bukid Award 2019, IARI National Innovative Farmer Award 2018 and Indian Responsible Tourism Award. International honours include the 2015 World Responsible Tourism Gold Award and 2014 Sustainable Tourism and Skal recognitions. Media coverage spans the Better India, Krishi Jagran and national television, including Shark Tank India.

Future Vision, Suggestions and Way Forward

His vision prioritizes expansion through partnerships with tourism departments, agricultural universities, NABARD and livelihood missions. Digital platforms, marketplaces, virtual tours and mobile applications help to broaden outreach. Plans include skill development for youth and women, promotion of organic and climate-resilient practices and international collaborations with UNWTO, FAO and global networks. Policy advocacy targets financing, certification and district-level clusters, supporting a Vision 2030 goal of 25,000 centers and one million farmer beneficiaries.

Name : Shri Balasaheb Kadu Deore
Address : Shivparva Agro Tourism, Wajgaon,
Taluk Deola, District Nashik
Maharashtra- 423102
Contact No. : +91-9403402643
Email : vijaydeore280@gmail.com

Personal Profile and Farming Background

Shri Balasaheb Kadu Deore, aged 66, has been actively involved in agriculture for over 52 years. With formal education up to the 10th standard (SSC), his practical farming experience, deep observation skills, and willingness to adopt modern practices have shaped his successful agricultural journey. He owns 20.10 ha of land, with 18.9 ha under irrigation, and also runs Shivparva Agro Tourism on his farm. He is an active member of ShivParvati Farmers Producer Company Ltd., which strengthens his engagement in collective farming and market linkage efforts.

Innovation Overview and Motivation

Motivated by the need to improve income stability, optimize resources, and move beyond traditional crops such as chickpea, pearl millet, and maize, Mr. Deore adopted an innovative farm diversification model. His strategy included large-scale plantation of coconut trees (1,500 plants), establishing orchards of grapes, guava, mango, pomegranate, and other high-value horticultural crops. Additionally, he transformed his farm into an agro-tourism destination, aimed at knowledge sharing, rural experience-based tourism, and demonstration-based learning. Rising market demand, interaction with experts, and exposure to successful horticultural models encouraged his shift.

Technical Features, Novelty and Development Process

His innovation integrates scientific orchard establishment, micro-irrigation (drip), fertigation, solar-powered water management, and intercropping systems. Organic manures, mulching, green manuring, and biological pest control are widely practiced to maintain soil health and reduce chemical dependence. Intercropping of fruit crops during coconut establishment ensures land use efficiency and intermediate income. Innovations like composting, water harvesting structures, and renewable energy use add to the sustainability of the system. Turning the farm into a learning and tourism center adds a unique experiential value beyond production.

Institutional Linkages, Mentorship and Validation

He received technical guidance and validation support from Krishi Vigyan Kendra (KVK), Malegaon, under MPKV Rahuri. Scientists provided support in irrigation scheduling, crop planning, pest management, and varietal selection. The farm is now used for demonstrations, field visits, and exposure programs organized by extension agencies.

Challenges Faced and Problem-Solving Approaches

Key challenges included high initial investment, lack of skilled labor, climatic fluctuations, and hesitation from fellow farmers to accept diversified farming. The long gestation period of fruit crops required patience and financial planning. With expert support and continuous experimentation, he overcame these obstacles by adopting mechanization, training labour, and adopting drip-fertigation systems.

Utility, Applications and User Benefits

His integrated model improves water-use efficiency, enhances soil health, promotes biodiversity, and generates multiple revenue streams farm produce, livestock, value-added activities, and tourism. It reduces risk associated with fluctuating crop prices and weather uncertainties.

Adoption, Outreach and Scaling Up

After receiving the IARI Award, scaling activities accelerated. He expanded fruit crop area, upgraded infrastructure, and strengthened agro-tourism-based training facilities. Over 10,000 farmers have visited and benefited through his demonstrations, capacity-building activities, and field interactions.

Impact Assessment (Economic, Social and Environmental)

Economically, diversification increased income by 30–40%, reduced input costs through drip irrigation, and added additional annual revenue of ₹10–12 lakh from agro-tourism. Environmentally, the model promotes carbon sequestration, soil enrichment, and water conservation. Socially, it empowers farmers, youth, and farm women by creating employment, learning opportunities, and entrepreneurial exposure.

Recognition, Awards and Media Coverage

His innovative work has received recognition at prestigious platforms including IARI Award, and it has also been featured across social media (Facebook, Instagram), WhatsApp platforms, and YouTube.

Future Vision, Suggestions and Way Forward

He plans to strengthen farmer training modules, expand digital outreach, and collaborate with extension agencies to promote climate-resilient, diversified farming. He advocates support policies for irrigation, horticulture, and agro-tourism, and encourages research institutions to focus on climate-smart varieties and scalable integrated farming models.

Name : Shri Shrawan Kumar Gupta
Address : Harmu, Ranchi
Jharkhand - 834002
Contact No. : +91-9431360542
Email : phaludyognursery@gmail.com

Personal Profile and Farming Background

Shri Shrawan Kumar Gupta, aged 52, is a progressive nursery entrepreneur with a B.A. degree and more than two decades of practical farming experience. His primary occupation is nursery management, through which he has mastered the science and art of plant propagation. Over the years, he has developed strong technical expertise, field-based innovation skills, and business acumen, enabling him to establish a trusted nursery enterprise known for reliable, high-quality planting material.

Innovation Overview and Motivation

His innovation focuses on improving plant survival, root development, and availability of quality nursery plants using refined propagation techniques. The initiative was motivated by the frequent mortality of conventional nursery plants, poor-quality propagation material, and the lack of reliable sources for disease-free planting stock. This inspired him to design improved nursery management practices that ensure robust seedlings and enhance farmer confidence in horticultural cultivation.

Technical Features, Novelty and Development Process

The innovation introduces several refined nursery practices that enhance plant survival and quality. Standardized polythene bag sizes (8×10-inch, 9×11 inch, and 10×12 inch) are used to ensure proper aeration, strong root development, and convenient transplanting. The growing medium is improved through the use of a sterilized soil mixture enriched with FYM and wood or paddy straw ash, helping prevent diseases and improve nutrient availability. Additionally, the nursery supplies well-grown, two-year-old plants with established root systems, which significantly improves field survival. Together, these improvements reduce plant mortality, enhance vigor, and ensure reliable and high-quality nursery stock.

Institutional Linkages, Mentorship and Validation

His work is supported and validated through collaboration with ICAR–RCER, FSRCHPR, Plandu (Ranchi), and KVK Divyayan, Ramakrishna Mission. These institutions have provided technical training, scientific validation, and dissemination support, accelerating practical adoption among farmers.

Challenges Faced and Problem-Solving Approaches

Key challenges included financial limitations, organizational resistance, and lack of trained manpower. Translating concepts into functional prototypes and gathering evidence for large-scale acceptance required time, persistence, and continuous experimentation. Through

adaptive learning, field-level validation, and institutional support, he successfully overcame these constraints.

Utility, Applications and User Benefits

The improved nursery system offers healthy, disease-free planting material suitable for orchards, landscaping, farm plantations, and government greening programs. Farmers benefit through higher survival rates, reduced establishment costs, shorter gestation periods, and increased productivity. The approach also supports entrepreneurship in nursery development and horticulture-based livelihoods.

Adoption, Outreach and Scaling Up

The innovation gained momentum after receiving the IARI Award, enabling expansion in production capacity and supply to government departments, nursery networks, and commercial growers. Zero-mortality propagation practices have become a model for wider replication.

Impact Assessment (Economic, Social and Environmental)

The total input cost of the nursery operations is ₹8 crore, while the output or selling value is ₹10 crore. This results in a net profit of ₹2 crore, reflecting strong financial returns and sustainability of the business model. Nearly 10 lakh per year in fruit, timber, and flower plants produced from the nursery have been distributed and planted across more than 40 acres at various locations. This large-scale plantation effort has created livelihood opportunities, encouraged community participation, and inspired farmers, youth, and women to engage in nursery-based entrepreneurship. Through this work, the initiative is contributing to a greener environment while strengthening social and economic empowerment at the grassroots level.

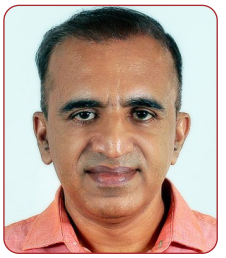
Recognition, Awards and Media Coverage

His contributions to horticulture have earned him multiple prestigious awards, including the JagJivan Ram Award, Innovative Horticultural Farmer Award, and Pragatisheel Kisan Award, reflecting his leadership in advancing nursery science and community empowerment.

Future Vision, Suggestions and Way Forward

He plans to establish a training and demonstration centre to support youth, farmers, and entrepreneurs through structured learning and practical exposure. He advocates government-supported mass propagation programs for indigenous species such as peach, kendu, bel, and jamun to conserve biodiversity and strengthen horticultural resources. Continued research and policy support will help scale these innovations and promote sustainable horticulture across regions.

Name : Shri Aby Baby
Address : Dolphin IBA Nutricosmetics & Cosmeceuticals Pvt Ltd., XIII/107A, PO Ramamangalam, District Ernakulam, Kerala – 686663
Contact No. : +91-9544716677
Email : aby@abybaby.com



Personal Profile and Farming Background

Shri Aby Baby, aged 51, holds a Bachelor's degree in Computer Science and has accumulated nine years of hands-on experience in farming. He is the CEO and Managing Director of Dolphin IBA Nutricosmetics & Cosmeceuticals Pvt. Ltd., emerging as India's pioneering commercial donkey farmer. Based in Ramamangalam, Kerala, Aby has developed a unique farming model that diversifies into niche livestock markets, demonstrating remarkable entrepreneurial vision and leadership.

Innovation Overview and Motivation

Driven by a desire to address the growing prevalence of vitiligo, he developed the Dolphin IBA Skin Cream (Morning & Evening). Vitiligo is a skin condition characterized by loss of pigmentation, mostly affecting visible areas like the hands and face. Through extensive user trials and research, the cream has demonstrated efficacy in halting the progression of vitiligo and promoting gradual repigmentation, typically within one or two treatment cycles. The innovation was motivated by post-COVID increases in vitiligo cases, compounded by limited treatment options in the market. Positive feedback from early users reinforced Aby's resolve to scale production and improve accessibility. By focusing on a rare, high-value agricultural product, he has created a solution that not only addresses a medical need but also strengthens the business case for niche livestock farming.

Technical Features, Novelty, and Development Process

A decade-long exploration of donkey milk revealed its rich nutritional profile, including high vitamin content and antibacterial properties. Aby adopted freeze-drying technology to convert donkey milk into powder, preserving its natural properties without additives while addressing the milk's short shelf life and low yield in liquid form. This innovation enabled the production of high-quality creams with retained bioactive benefits. The process reflects a careful blend of traditional livestock knowledge and modern food technology, ensuring that the creams are both effective and safe for consumers.

Institutional Linkages, Mentorship, and Validation

Shri Aby's work has been strengthened through mentorship by Dr. Anuradha Bhardwaj, formerly of the National Research Centre on Equines (NRCE) and now at the National Dairy Research Institute (NDRI), Karnal. Expert guidance provided scientific validation, insights on production scalability, and best practices in livestock management, ensuring that the product meets high standards of efficacy and safety.

Challenges Faced and Problem-Solving Approaches

Key challenges included the high cost of freeze-dried donkey milk, which drives up product prices, and limited public awareness of vitiligo treatments. Despite quality improvements, scaling production remains constrained by financial resources, a common hurdle in niche agricultural

sectors. Aby has addressed these challenges through incremental production scaling, careful resource management, and leveraging mentorship to optimize processes.

Utility, Applications, and User Benefits

Vitiligo affects over 5% of Gujarat's population, with significant prevalence in Rajasthan and coastal regions. Early diagnosis is critical to halt disease spread. The Dolphin IBA Skin Cream has been validated through user feedback to stop the progression of vitiligo and stimulate skin repigmentation, though consistent and regular usage is necessary. The product addresses a medical and social need while creating a niche market opportunity.

Adoption, Outreach, and Scaling Up

Shri Aby's model has inspired hundreds of donkey farms across Maharashtra, the UAE, and Canada. The brand has expanded globally under ABY BABY Nutri cosmetics and Cosmeceuticals L.L.C., Abu Dhabi, aiming to reach affected populations worldwide. Although product quality and awareness have improved, large-scale adoption remains a work in progress, highlighting the need for strategic investment in farm infrastructure and supply chain logistics.

Impact Assessment (Economic, Social, and Environmental)

The innovation represents a unique and high-value agricultural enterprise. Operating a farm with approximately 1,000 animals and modern machinery could significantly reduce production costs while increasing output, generating employment, and promoting sustainable livestock practices. Socially, it provides solutions for individuals affected by vitiligo, while environmentally, donkey farming requires comparatively low resource input, supporting eco-friendly agriculture.

Recognition, Awards, and Media Coverage

Shri Aby received the IARI Innovative Farmer Award in 2019. His work has been featured in prominent media outlets, including *The Hindu*, *Krishi Jagran*, *Chal Genius*, *Economic Times*, *Deccan Chronicle*, *New Indian Express*, *Mathrubhumi TV*, ETV Bharat, *The News Minute*, and across social media platforms. This recognition establishes him as a pioneer in both donkey milk farming and natural skincare products in India.

Future Vision, Suggestions, and Way Forward

Securing FSSAI certification for donkey milk products is critical for consumer trust, legal compliance, and international market acceptance. Early adherence to regulatory standards will facilitate wider distribution, promote export potential, and enhance the credibility of this niche agricultural sector. Aby's future vision includes expanding production, further research into therapeutic applications, and scaling his model to inspire global adoption of sustainable, high-value livestock enterprises.

Name : Shri Nellikkuzhi Kuriakose Kurian
Address : Building No. VI/239, Kalappurackal,
Kallara South P.O., Kottayam,
Kerala – 686611
Contact No. : +91-9072580500
Email : md@mangomeadows.in

Personal Profile and Farming Background

Shri Kurian is an agripreneur and Managing Director of Mango Meadows Agricultural Theme Park. With a Diploma in Civil Engineering and more than three decades of farming experience, he manages 24 hectares of diversified agricultural land. His enterprise integrates farming, water bodies, livestock, and extensive biodiversity conservation. He has consistently promoted ecological harmony and rural employment through a scientifically structured and culturally inspired farming ecosystem.

Innovation Overview and Motivation

His innovation is the creation of Mango Meadows, the world's first man-made agricultural biodiversity park. The idea was driven by his lifelong passion for plants and his deep concern regarding humanity's increasing detachment from nature. He aspired to develop a landscape where biodiversity, culture, and agriculture could coexist harmoniously. His motivation was strengthened by the need to demonstrate a replicable model that connects communities with sustainable ecological practices.

Technical Features, Novelty and Development Process

The park contains more than four thousand eight hundred plant species, supported by livestock units, aquaculture systems, and organic farming methods. Renewable energy facilities, extensive water harvesting structures, and thematic groves form the foundation of this integrated model. Scientific labelling throughout the park transforms it into a living learning centre. The novelty lies in merging eco-tourism, renewable energy, biodiversity conservation, cultural heritage, education and agriculture into a single functional, carbon-neutral ecosystem that benefits both society and nature.

Institutional Linkages, Mentorship and Validation

He has established linkages with various ICAR institutes, the Kerala Forest Department, Kerala State Diversity Board, Department of Tourism and Mahatma Gandhi University for promotional outreach and certification. These collaborations acknowledge the park's role in biodiversity conservation, education, responsible eco-tourism and sustainable agricultural development. Their involvement ensures scientific accuracy and enhances institutional confidence in the model. However, the model was entirely self-financed by Sh. Kurian with an investment of Rs 30-35 crores.

Challenges Faced and Problem-Solving Approaches

He faced financial limitations, technical complexities, and multiple administrative hurdles in establishing the large-scale biodiversity park. Public scepticism also made initial acceptance difficult. Through systematic planning and sustained field experimentation, he gradually demonstrated the feasibility of the project. His resilience and commitment helped convert challenges into opportunities, ultimately gaining widespread public and institutional support.

Utility, Applications and User Benefits

The innovation conserves thousands of species and creates a micro-ecological system that promotes soil fertility, pollinator activity, and water resource management. It serves as a centre for education, research, and tourism for visitors of all age groups. The park provides sustained employment to more than three hundred people, predominantly women. Its integrated approach showcases how environmental conservation and economic viability can be achieved simultaneously.

Adoption, Outreach and Scaling Up

The model has inspired many entrepreneurs and returning migrants across Kerala, Tamil Nadu, Goa and Karnataka, influencing more than 150 hectares under biodiversity based farming and eco-tourism. More than one thousand two hundred farmers and youth have received practical guidance from the park. Demonstrations, awareness camps, guided tours, training modules, digital outreach and exposure visits with institutional collaborations have encouraged replication in various regions.

Impact Assessment (Economic, Social and Environmental)

The park ensures irrigation independence, renewable energy use (100 KW solar-wind hybrid plant), and improved soil health through organic recycling. It has resulted in 20-25% higher yield, compared to conventional systems and generates an annual turnover exceeding two hundred lakh rupees, demonstrating economic sustainability. It provides direct employment to 200 persons and indirect employment to more than 1000 persons through the various activities. Socially, it empowers local women and youth by creating steady employment opportunities. It has motivated youth to replicate similar models and become agripreneurs, thus reviving community pride and cultural attachment to agriculture. Environmentally, it contributes significantly to microclimate regulation, carbon neutrality, biodiversity enhancement, and climate resilience within the region.

Recognition, Awards and Media Coverage

Shri Kurian has received prestigious honours including the IARI Innovative Farmer Award, Kerala Responsible Tourism Award, the *Vanamitra* Award, and district level ATMA recognitions. The park has been listed in Limca and URF World Records for its biodiversity achievements. His work has been featured widely in print, digital, and television media including the *Hindu, Manorama*, *Mathrubhumi*, *DD Kisan*, Times Now, Asianet News. The coverage has helped disseminate the concept to a wider national and international audience.

Future Vision, Suggestions and Way Forward

He plans to establish satellite biodiversity parks across diverse agro-climatic zones in collaboration with universities and government agencies. His vision includes setting up a Biodiversity Knowledge Centre to train youth and farmers. He also intends to promote digital learning systems for biodiversity awareness and eco-tourism management. His long-term aim is to inspire eco-entrepreneurship and strengthen community-driven conservation efforts across India.

Name : Shri Sudhir Agrawal
Address : 581, Village & Post Bhureka,
Tehsil Matt, Block Naujheel,
District Mathura, Uttar Pradesh – 281205
Contact No. : +91-9412278153
Email : sudhiragrawal.56@gmail.com

Personal Profile and Farming Background

Shri Sudhir Agrawal, aged 69, is a visionary farmer from Bhureka village, Mathura, with five decades of agricultural experience. A postgraduate in Philosophy, he chose farming to advance rural development through scientific practices. Starting with twenty acres, he built a diversified system integrating crops, floriculture, livestock and agroforestry. His farm now serves as a demonstration hub for regenerative agriculture, improved varieties and seed processing, showcasing sustainable, profitable farming.

Innovation Overview and Motivation

The core innovation in his journey is the development of a farmer-led seed production and value addition system that connects research advancements with grassroots needs. Motivated by persistent shortages of quality seed, low replacement rates and limited access to reliable planting material, he prioritised seed production as his main enterprise. He strengthened this system through mechanized sowing, floriculture and horticulture diversification, integrated crop–livestock models and promotion of high-yielding varieties, aiming to improve incomes, soil health and climate resilience across the region.

Technical Features, Novelty and Development Process

The technical novelty of his work lies in integrating high-quality seed production with regenerative agriculture. He procures breeder and foundation seed, coordinates production on farmers' fields and processes it in his modern plant, "Bhawani Seeds and Bio-Tech." His system combines mechanized sowing, improved irrigation, organic manuring and diversification, refining techniques such as bed planting, DSR sowing, nutrient management and residue incorporation to achieve higher yields and superior seed quality.

Institutional Linkages, Mentorship and Validation

His progress has been supported through continuous engagement with agricultural universities, research institutions and seed certification agencies. These institutions provided scientific exposure, technical training, breeder seed access, field validation and participation in national programmes on cereals, oilseeds and horticulture. His farm is frequently used as a training and demonstration site for farmer visits, capacity-building programmes and exposure tours, strengthening the integration of scientific knowledge with field-level adoption.

Challenges Faced and Problem-Solving Approaches

In the early stages, he confronted serious limitations, including lack of breeder seed, financial constraints, absence of storage infrastructure and stiff competition from large seed companies. Seed licensing requirements and the high initial cost of machinery also posed challenges. He overcame these through determination, efficient resource management and timely financial support for establishing his seed processing unit. Practical difficulties such as quality control, farmer

mobilization and transportation barriers were addressed through consistent field engagement, technical guidance and the creation of a farmer network committed to producing certified seed.

Utility, Applications and User Benefits

His innovations have expanded farmer access to reliable, high-quality seeds of wheat, paddy, mustard and other crops, leading to higher yields and better produce. Conservation agriculture, mechanised sowing, refined seed protocols and improved irrigation have reduced costs and optimised labour. Diversification into horticulture, floriculture and livestock has enhanced profitability and ecological balance. Farmers benefit from improved soil fertility, lower inputs, superior seed quality and stronger market linkages.

Adoption, Outreach and Scaling Up

His seed production and dissemination system now reaches farmers across Uttar Pradesh, Madhya Pradesh, Bihar, Haryana, Rajasthan and Punjab. Over 5000 farmers have benefited from his trainings, exposure visits and distribution network. He coordinates seed production on nearly one thousand acres through registered farmers and supports certification. His enterprise also generates rural employment in seed processing, marketing and field operations.

Impact Assessment (Economic, Social and Environmental)

His work has improved farmer incomes through higher yields and better seed quality, often increasing returns by ₹1–1.5 lakh per household annually. Socially, he has empowered small farmers by improving access to technologies, credit, markets and training. Environmentally, his focus on residue management, diversification, reduced tillage and integrated nutrient systems has enhanced soil health, water efficiency and ecological resilience, strengthening climate-smart agriculture.

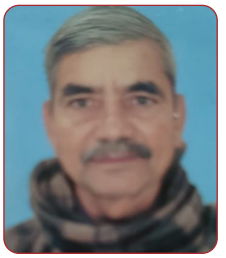
Recognition, Awards and Media Coverage

Shri Sudhir Agrawal has received numerous recognitions, including the IARI Fellow Farmer Award, Progressive Farmer Awards at national and state levels, Krishi Pandit title, District Productivity Awards, the Silver Jubilee Award of NAAS and several honours for seed production, conservation agriculture and farmer training. His success story has been widely covered by newspapers, national media, agricultural channels and digital platforms, highlighting his leadership in seed technology and sustainable agriculture.

Future Vision, Suggestions and Way Forward

He aims to expand seed production across more crops, strengthen farmer–research linkages and promote affordable technologies for wider adoption. His future plans include scaling up training programmes, increasing demonstrations on IARI-recommended practices and supporting exposure visits. He advocates low-cost licensing, better machinery access and stronger collaboration. His long-term vision is a self-reliant, resource-efficient, climate-resilient farming ecosystem that empowers rural youth.

Name : Shri Pritam Singh
Address : Village Nekpur, Post Jawa,
Tehsil Khurja, District Bulandshahar,
Uttar Pradesh – 203141
Contact No. : +91-7017350753; +91-9410490777
Email : pritamsingh9410@gmail.com



Personal Profile and Farming Background

Shri Pritam Singh is an experienced farmer from Nekpur village, Bulandshahar, Uttar Pradesh, with over forty years of agricultural experience. He manages six acres of fully irrigated land and has developed a diversified system supported by bullock-drawn tools, fodder machines, a tubewell and a biogas plant. He grows wheat, barley, mustard, sugarcane, potato, paddy, maize, jowar and fodder, and maintains a small dairy unit with three buffaloes.

Innovation Overview and Motivation

A major turning point in his farming journey occurred in 2004–05 when he participated in radio-based agricultural schools and farmer trainings conducted by national research institutes. These interactions motivated him to adopt scientific farming practices such as zero-tillage, bed planting, System of Rice Intensification (SRI), improved seed production and integrated nutrient management. His motivation stemmed from the need to enhance productivity, reduce cultivation costs and ensure reliable access to quality seeds for himself and neighbouring farmers.

Technical Features, Novelty and Development Process

His innovations integrate conservation agriculture tools such as zero-till seed drills, laser land levelers and bed planters with improved irrigation, seed production and organic inputs. Adoption of the SRI method enabled him to achieve about 20 percent higher rice yields with reduced seed rate, lower disease incidence and nearly 30 percent water savings. He has successfully produced high-quality seeds of wheat, rice, mustard, potato and vegetables, using composted biomass and biogas slurry to improve soil health.

Institutional Linkages, Mentorship and Validation

Shri Pritam Singh has been consistently engaged with national agricultural research institutes and state agriculture departments through training programs, field demonstrations and seed production initiatives. These linkages enabled him to access scientific guidance, participate in on-field varietal demonstrations and gain validation for his agronomic and seed production practices. His leadership roles in cooperative and FPO activities strengthened the institutional support available to farmers in his region.

Challenges Faced and Problem-Solving Approaches

He initially encountered constraints related to lack of quality seed, market uncertainties and limited exposure to scientific technologies among local farmers. He addressed these by motivating farmers to form collectives, conducting awareness meetings, demonstrating

field results and adopting modern implements that reduced labour and input costs. His establishment of a biogas plant also reduced household energy expenses and enabled consistent organic nutrient application.

Utility, Applications and User Benefits

His innovations have enhanced yield, quality and overall profitability. SRI and zero-tillage reduce seed and water use, while bed planting allows efficient moisture management and multi-cropping. His seed production initiatives supply high-quality seed locally, reducing farmers' dependence on external markets. Biogas slurry and composting improve soil fertility and reduce chemical fertilizer needs. The combined system enhances economic efficiency and environmental sustainability.

Adoption, Outreach and Scaling Up

Sh. Singh has mobilized more than 5,000 farmers through training, seed production programs and cooperative activities across multiple districts. His cooperative serves as a regional platform for seed distribution and knowledge dissemination. Participation in state-level agricultural fairs and exhibitions has expanded the reach of his innovations.

Impact Assessment (Economic, Social and Environmental)

His interventions have resulted in yield gains across wheat, rice, mustard and potato, with income increases estimated at 20–30 percent. Seed production provides substantial economic returns and empowers farmers through assured markets. Environmentally, the adoption of zero-tillage, residue management, composting and biogas slurry enhances soil health, reduces air pollution risks and supports climate-resilient farming practices.

Recognition, Awards and Media Coverage

He has received several honours including awards from national agricultural research institutes for wheat, potato and paddy innovation, as well as accolades from state-level agricultural fairs and training programs. His work in seed production, conservation agriculture and sustainable technologies has been featured in newspapers and agricultural publications.

Future Vision, Suggestions and Way Forward

Shri Pritam Singh aims to further expand high quality seed production, strengthen cooperative-based marketing systems and promote renewable energy applications such as biogas in farming. He emphasizes the need for greater institutional support for farmer cooperatives, enhanced training opportunities for rural youth and stronger policy backing for climate-resilient, low-cost agricultural technologies.

Name : Shri Ajay Kumar Singh
Address : Village & Post Imiliya,
Block Barahani, District Chandauli,
Uttar Pradesh–232110
Contact No. : +91-9198560499
Email : ishaniagro@gmail.com

Personal Profile and Farming Background

Shri Ajay Kumar Singh, aged 48, is a progressive farmer with a Master's degree in Commerce and over 25 years of farming experience. His primary occupation is farming and allied activities, where he adopts technology-driven, sustainable and market-oriented practices. Alongside farming, he operates a seed processing plant, enabling high-quality seed availability in the region and strengthening local agriculture systems.

Innovation Overview and Motivation

His core innovation lies in transforming conventional agriculture into a profitable agribusiness ecosystem. By integrating scientific practices, value addition, efficient resource use and market linkages, he promotes a new model of farming that goes beyond production to include branding, processing and organized marketing. His goal is to develop a farming community that is self-reliant, business-minded and capable of competing in modern markets. His motivation has been significantly influenced by the FAARD Foundation, whose training and mentorship encouraged him to adopt innovation, sustainable methods and farmer-centric entrepreneurship.

Technical Features, Novelty and Development Process

A key feature of his work is the introduction of door-to-door campaigns, farmer fairs, and on-field demonstrations that help farmers learn about modern agricultural tools and services offered through the Custom Hiring Centre and FPO. These outreach efforts bridge the knowledge gap, making advanced technology more accessible and understandable to rural farmers. His model demonstrates practical methods to adopt mechanization, improved seed varieties and resource-efficient cultivation, ensuring better productivity and reduced costs.

Institutional Linkages, Mentorship and Validation

Strong institutional linkages have been central to his progress. Collaborations with the Department of Agriculture, Uttar Pradesh Seed Corporation and other government programs have enabled farmers to access high-quality seeds, technical support and incentives. Mentorship from Professor Punjab Singh has been especially transformative, helping him refine strategies around sustainable agriculture, advanced seed systems and community empowerment. Institutional connections play a crucial role in validating his initiatives and ensuring long-term scalability.

Challenges Faced and Solution Approaches

One of the major challenges faced was the farmers' reluctance to adopt new techniques due to traditional practices, limited exposure and lack of confidence in modern technology. To address this, he focused on continuous awareness-building, progressive demonstrations,

training programs and communication strategies that simplify technology adoption. This practical approach helped increase acceptance and encouraged farmers to shift from traditional to scientific cultivation practices.

Utility, Applications and User Benefits

The technology-driven agricultural model introduced by him has significantly improved efficiency, reduced labour dependency and increased overall crop productivity. Compared to traditional methods, farmers now benefit from diversified income sources, reduced cultivation expenses and better market opportunities. This transition has created a stronger business outlook among farmers, demonstrating that agriculture can be a profitable enterprise when supported by modern systems.

Adoption, Outreach and Scaling Up

The approach has been widely adopted across regions, with growing interest from farmers recognizing the advantages of modern farming systems. Through continuous outreach, more farmers are shifting from subsistence agriculture to commercial agribusiness. The model offers huge potential to scale and contribute to rural economic resilience and food system sustainability.

Impact Assessment (economic, social and environmental)

The measurable outcomes of his interventions include nearly a 20% increase in farmer income and a 30% reduction in input costs. Farmers are becoming more empowered to adopt modern technologies, leading to improved productivity and confidence in scientific farming. The initiative has also increased participation of women and youth in agriculture, strengthening inclusiveness and long-term rural development.

Recognition, Awards and Media Coverage

His work has been acknowledged by FAARD Foundation, Uttar Pradesh Government, IIT-BHU, BIRD, the Agriculture Department and research institutions including NBFGR and IRRI. Media platforms like Amar Ujala and Chandauli News have covered his impactful journey.

Future Vision and Way Forward

His future vision includes organizing regular district-level farmer fairs, strengthening branding of niche crops like Adamchini Rice, expanding demonstration plots, improving market networks and establishing collaborations such as an MoU with the Indian Institute of Wheat and Barley Research for seed distribution of high-performing wheat varieties HD 3385 and HD 3386. His long-term goal is to create a strong ecosystem of empowered, technology-enabled and market-driven farmers.

Name : Shri Sukhjeet Singh Bhangu
Address : Village Kanakwal Bhanguah,
Tehsil Sunam, District Sangrur,
Punjab-148028
Contact No. : +91-8558088800
Email : aoneseeds5818@gmail.com

Personal Profile and Farming Background

Shri Sukhjeet Singh is a progressive farmer with 12 years of experience, holding a Master's in Physical Education and a one-year Agriculture Diploma. He manages 15 hectares of fully irrigated alluvial soil and cultivates paddy, wheat, and maize on 20 acres. Alongside farming, he runs A-ONE Seeds, a successful seed enterprise that complements his agricultural activities.

Innovation Overview and Motivation

His key innovation is A-ONE Seeds, a seed production and training initiative established in 2014. The enterprise focuses on modern seed production techniques and high-yielding varieties. He was motivated by exposure at the Pusa Krishi Vigyan Mela (2012), which introduced him to innovative seed technologies and inspired him to develop a scientifically managed seed enterprise for farmers.

Technical Features, Novelty and Development Process

A-ONE Seeds collaborates with farmers to produce high-yielding, climate-resilient varieties of paddy and wheat. The enterprise trains farmers and students directly on the farm using modern seed production techniques. Developed through hands-on trials, variety screening, and continuous refinement, the innovation required an investment of about ₹40 lakh and emphasizes high seed quality standards and scientific management.

Institutional Linkages, Mentorship and Validation

His innovation has received mentorship and institutional support from ICAR–IARI and its associated units, which strengthened technical refinement, extension activities, and validation processes. Guidance from these institutions enhanced the scientific rigor of the seed production system, facilitated wider outreach, and contributed to establishing a credible, systematically managed enterprise grounded in modern seed technology and best production practices.

Challenges Faced and Problem-Solving Approaches

A major challenge was identifying the best-performing varieties and motivating farmers to adopt them. Through on-field demonstrations, performance-based evidence, and continuous support, he built trust among farmers. By showcasing the superiority of improved varieties and maintaining consistent engagement, he gradually overcame resistance and facilitated large-scale acceptance of scientifically produced seeds.

Utility, Applications and User Benefits

Access to high-yielding paddy and wheat varieties strengthened his seed production system and improved farmers' yields. Collaborating farmers benefit from better seed quality, technical guidance, and reduced climate-related risks. The system enhances productivity, ensures reliable seed supply, and supports informed varietal selection, contributing to improved profitability and greater agricultural stability for associated farmers.

Adoption, Outreach and Scaling Up

The innovation currently covers 20 acres, and he guides nearly 500 farmers annually. After receiving the IARI award, he plans further expansion of the initiative and aims to promote organic farming and wider dissemination of improved seed varieties. Regular trainings, demonstrations, and farmer interactions are central to strengthening outreach and scaling efforts.

Impact Assessment (Economic, Social and Environmental)

Economically, farmers observed a 25% yield increase and 1.5-times income enhancement; the enterprise has a ₹92 lakh turnover. Environmentally, climate-resilient varieties support sustainability. Resource efficiency improved with nearly 50% input savings. Socially, employment was generated for 50 people, and rising incomes improved farmer livelihoods and regional agricultural development.

Recognition, Awards and Media Coverage

He has received major recognitions including the India Agri Business Award (2019), Farm Level Seed Processing Award (2018), Progressive Farmer Award (2019), IARI Fellow Farmer Award (2021), and an Award of Appreciation at the M. S. Swaminathan Conference (2025). His work is widely covered in Ajeet Newspaper, Jagbani, Punjabi Tribune, and News-18.

Future Vision, Suggestions and Way Forward

He plans to establish a modern seed production laboratory to further enhance seed quality. He suggests providing low-cost breeder seed and increasing institutional training on scientific seed production. His aim is to promote wider regional adoption by guiding more farmers, strengthening seed systems, and integrating organic farming practices within the existing enterprise.

CHAPTER 5

Empowering Women in Farmer-Led Agricultural Innovations

Introduction

Agriculture remains the backbone of rural livelihoods in India, engaging nearly 900 million people and contributing significantly to the national GDP. Women constitute nearly one-third of the agricultural workforce and undertake a large share of production and post-harvest operations. Despite these extensive contributions, women experience persistent marginalization in access to productive resources, credit, technology, extension services, markets, and decision-making spheres. This systemic exclusion has inhibited their ability to participate meaningfully in innovation processes within agriculture particularly in farmer-led innovations, which are essential for sustainable rural transformation. Farmer-led innovations defined as contextually developed, locally driven solutions emerging directly from farmer knowledge and experimentation offer transformative potential. However, these innovations rarely acknowledge women's traditional knowledge systems or their unique capacities in ecological management, resource optimization, and value addition. Entrenched patriarchal structures often relegate women to invisible roles, despite their centrality to agricultural production. Addressing this disconnect requires a gender-responsive approach that recognizes the intersection of innovation, agency, and equity in Indian agriculture.

Significance of Farmer-Led Innovation

Farmer-led innovation represents an alternative paradigm to top-down technology dissemination. Its defining characteristics include contextual relevance, cost-effectiveness, ecological sustainability, and farmer ownership; make it particularly suited to India's diverse agro-ecological zones. Because these innovations are developed by local actors who understand the nuances of their environment, they provide adaptive solutions to pressing problems such as climate variability, soil degradation, pest pressures, market instability, and post-harvest losses. Unlike externally designed technologies, farmer-led solutions tend to facilitate faster adoption through peer learning and demonstration, transform farmers from passive beneficiaries into agents of change, and embody traditional ecological knowledge that strengthens community resilience. Thus, farmer-led innovation systems not only improve technical fit but also foster sustainability, inclusivity, and local capacity building qualities that are indispensable for long-term agricultural transformation.

The Need for a Gender Perspective in Farmer-Led Innovation

Despite women's substantial labor contributions and knowledge holdings, their role in innovation remains largely invisible. Women perform more than half of many farm operations and dominate crucial functions such as post-harvest processing, seed conservation, and household nutrition management, yet they are credited with only a small fraction of formally recognized innovations. Structural inequities such as landlessness, limited mobility, credit barriers, and exclusion from decision-making bodies constrain women's ability to experiment, adopt new techniques, or participate in collective learning environments where innovations are validated and scaled. Moreover, innovation pathways frequently differ by gender: women often prioritize diversification, nutrition-sensitive approaches, ecological techniques, and low-cost management practices, areas that are systematically under-resourced by conventional extension and research systems. The result is a persistent innovation gender gap in which women's problem-solving capacities remain underutilized. Integrating a gender perspective into farmer-led innovation is therefore not simply corrective; it is strategically necessary. Women's knowledge strengthens household resilience, diversifies livelihood strategies, and expands the repertoire of locally relevant solutions. Gender-responsive innovation processes yield tangible benefits for food security, adaptive capacity to climate shocks, and community cohesion. At the sectoral and national levels, elevating women's role in innovation contributes directly to progress on Sustainable Development Goals such as Zero Hunger, Gender Equality, and Climate Action.

Women's Roles in Agricultural Innovation Systems

Agricultural systems in India are characterized by a pronounced gendered division of labor in which women routinely undertake activities that require considerable skill and tacit knowledge but receive little formal recognition. Women are typically responsible for operations such as transplanting, weeding, harvesting, seed selection, storage, and post-harvest processing tasks that embody experiential understanding of crop phenology, varietal characteristics, local pest cycles, and household dietary priorities. This daily engagement with the cropping system equips women with specific innovation capacities: they conserve and manage seed diversity using informal selection criteria oriented to taste, storage life, and resilience; they monitor pest and disease incidence closely and develop locally tested remedies; they devise low-cost water and nutrient management methods using household and farm residues; and they innovate in value addition, processing, and product diversification to generate additional income. Women also lead many climate adaptation practices at the homestead and field margins, adjusting cropping calendars, diversifying livelihoods, and instituting small-scale buffering systems against shocks. Despite these contributions, prevailing cultural norms frequently obscure women's expertise and constrain their legitimacy as innovators, thereby limiting the transmission of their knowledge into formal agricultural research and extension pathways.

Barriers to Women's Participation in Innovation

Women face a multi-layered set of constraints that impede their effective participation in innovation systems. Institutional barriers, including insecure land tenure, male-dominated extension services, and exclusion from farmer committees, reduce women's visibility and influence within formal agricultural networks. At the household level, heavy workloads and time poverty limit the capacity for experimentation, learning, and attendance at training events. Socio-cultural norms often restrict women's mobility, reduce their legitimacy in public spheres, and curtail leadership opportunities, while economic constraints as limited access to credit, productive inputs, and markets prevent the scaling of successful practices. Additionally, there exists a pervasive recognition gap: women's knowledge is frequently undocumented, informal, and undervalued, which perpetuates a cycle of invisibility and underinvestment. Addressing these constraints requires coordinated interventions across policy, community, and household domains that remove systemic obstacles while creating enabling conditions for women to innovate and lead.

A Multi-Dimensional Framework for Women's Empowerment in Farmer-Led Innovation

Empowerment within agricultural innovation must be conceptualized as multi-dimensional, encompassing economic, social, political, cognitive, and well-being dimensions. Economic empowerment entails enabling women's access to productive assets, credit, market linkages, and entrepreneurship opportunities, while ensuring equitable benefit sharing and control over income derived from innovations. Social empowerment requires strengthening women's collective platforms such as farmer groups and cooperatives, fostering peer learning networks, and elevating women's recognition as legitimate knowledge holders. Political empowerment involves enhancing women's representation in farmer organizations, water user associations, and policy so that they can influence resource allocation, technology choices, and institutional priorities. Cognitive and capability empowerment focuses on building technical skills, literacy and numeracy, financial management, and documentation capacities combined with mentorship and exposure that strengthen confidence and agency. Finally, well-being and drudgery reduction target interventions that reduce labor intensity, improve health and nutrition outcomes, and create support services that free time for participation in innovation activities. An integrated approach that simultaneously addresses these dimensions is more likely to produce durable shifts in women's capacity to develop, adapt, and scale farmer-led innovations.

Integrated Strategy for Strengthening Women's Innovation Systems

Realizing gender-equitable innovation ecosystems require strategic alignment of interventions across institutional, community, and individual levels. At the institutional and policy level, reforms are needed to secure women's land and water rights, redesign extension systems to be gender-responsive, and institutionalize mechanisms for documenting and recognizing women's innovations. Policy instruments should also include targeted financial packages for women-led organizations and obligations for gender representation in

agricultural institutions. At the community level, facilitating the formation of women's farmer groups and peer learning networks can enhance knowledge exchange and collective bargaining power, while engaging men and community leaders in gender-transformative dialogues can facilitate norm change. Community accountability mechanisms and infrastructure that support women's enterprises such as processing units, storage facilities, and market linkages further buttress scaling. At the individual level, capacity building that combines technical training with managerial and business skills, coupled with mentorship and recognition, strengthens women's agency and ability to interface with markets and institutions. When coordinated, these actions create an enabling ecosystem in which women can operate as full and equal contributors to agricultural innovation systems.

Policy Directions for Scaling Gender Responsive Farmer-Led Innovation

A coherent and actionable policy agenda is essential to scale gender-responsive innovation. Institutionalizing recognition mechanisms such as national registries for farmer innovations, women-specific awards, and fellowships would help surface and validate women's contributions. Transforming extension systems to be more accessible and relevant to women involves deploying female extension agents, creating women-only training spaces where appropriate, and developing gender-sensitive curricula that value experiential knowledge. Financial inclusion measures must address collateral constraints and provide simplified loan products, group guarantees, and dedicated credit windows for innovation and enterprise investments. Strengthening women-led producer organizations through technical assistance, governance support, and preferential procurement by public programs can create viable market pathways for women's products. Finally, state and district programs should integrate market linkage mechanisms, value-chain development, and community resource governance models that ensure women's central participation. Together, these policy directions can convert rhetoric into systematic practice, enabling large-scale uptake of women's innovations.

Conclusion

Women's contributions to farmer-led agricultural innovation are indispensable for shaping a sustainable and resilient agricultural future in India. Their knowledge, resourcefulness, and adaptive strategies contribute significantly to strengthening household nutrition, ecosystem health, and community resilience. Yet, despite their centrality, women remain under-recognized and under-supported within formal innovation systems. Building a gender-responsive innovation ecosystem anchored in rights, resources, recognition, and representation is therefore critical for realizing the full potential of India's agricultural sector. Empowering women in innovation is both a developmental imperative and a strategic investment that enhances productivity, equity, and long-term sustainability. In the subsequent section of this book, we present selected success cases of women farmers whose innovative practices vividly demonstrate the transformative possibilities that emerge when women are given the opportunity, recognition, and support to lead agricultural change.

Name : Smt. Binita Kumari
Address : Village Jhirba, Post Chutia,
Panchayat Lakrikola,
District Banka, Bihar – 813102
Contact No. : +91-9199492108
Email : kumaribinita1199@gmail.com

Personal Profile and Farming Background

Smt. Binita Kumari, aged 36, is a leading women agri-entrepreneur from Banka, Bihar, known for developing a low-cost, locally scalable paddy-grain mushroom-spawn technology. With thirteen years of experience in mushroom cultivation and enterprise management, she runs a fully equipped spawn unit on her three-bigha homestead. Integrating oyster, button and milky mushroom production, she supplies year-round spawn, strengthening the mushroom value chain across Bihar and neighbouring states.

Innovation Overview and Motivation

Her key innovation is using paddy grain instead of wheat for mushroom spawn production. Developed in 2021–22, this method lowers costs, enhances shelf life, and improves output per kilogram due to paddy's abundance, longer storage, and farmer-friendliness. This solution strengthens rural mushroom enterprises by making spawn more accessible, profitable, and reliable for women and small farmers.

Technical Features, Novelty and Development Process

Her paddy-grain spawn formulation replaces wheat with a substrate that produces about seven spawn packets per kilogram, compared to five from wheat, improving economic efficiency. Paddy-based spawn remains viable for one to two months at room temperature, reducing refrigeration needs and marketing losses. The process involves grain cleaning, boiling, pH adjustment, autoclave sterilisation, laminar-flow inoculation and incubation.

Institutional Linkages, Mentorship and Validation

Her innovation received technical support from KVK Banka, where scientists validated the feasibility and storage life of paddy-based spawn and provided hands-on microbiological training. Her unit is showcased in farmer trainings, ATMA programs and youth workshops, and growing demand across neighbouring districts reflects strong institutional trust and successful field validation.

Challenges Faced and Problem-Solving Approaches

Initial challenges included limited technical knowledge, contamination issues, inconsistent moisture control, and difficulty convincing farmers about paddy-grain spawn. Equipment shortages, power fluctuations and lack of labs added constraints. She overcame these through strict sterilisation, repeated trials, KVK troubleshooting, Hindi SOPs for women and training programmes, proving longer shelf life and reliability.

Utility, Applications and User Benefits

Her paddy-based spawn significantly reduces input cost for mushroom growers by lowering raw-material expenses and eliminating the need for refrigeration. Longer shelf life allows farmers to

store spawn safely and plan production cycles more flexibly. Local availability reduces dependence on distant suppliers, transportation delays and seed-quality uncertainties. For rural women, the innovation supports small-scale enterprises, household-level production and nutritional self-sufficiency. The spawn is used for oyster, button and milky mushrooms, boosting year-round income opportunities and ensuring steady supply for growing regional demand.

Adoption, Outreach and Scaling Up

Smt. Binita's innovation has spread widely across Banka and adjoining districts. She supplies spawn to more than 11,000 farmers and institutions, supported by her extensive training and outreach. She has directly trained about 1,250 farmers, including women's groups, youth clubs and self-help groups, enabling many households to start mushroom enterprises. Her work has catalysed the emergence of a vibrant mushroom-production cluster in Banka, improving local incomes and generating rural employment.

Impact Assessment (Economic, Social and Environmental)

Economically, her enterprise has achieved significant and steady growth, with annual earnings combining mushroom and spawn sales crossing significant levels. Farmers benefit from reduced input cost, assured spawn availability and improved profitability. Socially, her work has empowered women through micro-enterprise creation and skill development, while youth engagement has reduced migration. Environmentally, the use of paddy grain and residues prevents field burning, reduces pollution and promotes circular utilisation of agricultural by-products. Her innovation strengthens local food systems and enhances rural resilience.

Recognition, Awards and Media Coverage

Smt. Binita's work has been acknowledged through KVK certifications, district-level honours, ICAR-IARI Innovative Farmer Award and inclusion in official training manuals. Her innovation has been showcased in ATMA programs, farmer fairs and media features highlighting women-led agricultural entrepreneurship. The growing demand for her spawn and invitations for demonstration sessions serve as practical indicators of her recognition in the regional agriculture ecosystem.

Future Vision, Suggestions and Way Forward

She plans to expand her spawn unit with higher-capacity autoclaves, energy-efficient incubation rooms and improved cold storage to serve larger farmer clusters. She aims to form a women-led cooperative, promote paddy-grain spawn across Bihar and neighbouring states, develop value-added mushroom products and collaborate with universities for certification, creating scalable, climate-resilient livelihood opportunities.

Name : Smt. Bandana Kumari
Address : P.O. Merha, Block Katoria,
District Banka,
Bihar- 813106
Contact No. : +91-8210230900
Email : bandana.merha83@gmail.com

Personal Profile and Farming Background

Smt. Bandana Kumari, aged 41, is an experienced dairy farmer with thirteen years in agriculture and allied activities. A B.A. and B.Ed graduate, she manages 1.6 hectares, land. She rears Sahiwal, Red Sindhi, and Holstein Friesian cattle, expanding from twelve to twenty one animals, and maintains 0.5 hectare mango orchards supporting diversified livelihoods.

Innovation Overview and Motivation

Her major innovation is roof rainwater harvesting, adopted in 2020 to address acute summer water shortages that restricted dairy operations. Declining groundwater and unreliable supply made maintaining animals difficult from March to July. The recurring challenge of meeting drinking and washing needs for livestock motivated her to establish a structured rainwater harvesting unit, developed out of necessity to secure water for dairy management and to build resilience to local drought conditions.

Technical Features, Novelty and Development Process

Her innovation features a roof rainwater harvesting system that directs runoff into a storage well of 4.5-ft radius, maintaining about 8,281 litres of usable water. With ten dairy cows requiring 1,383 litres of water daily, the system enables storage of nearly 2 lakh litres annually, sustaining operations through lean months. Its low cost and efficient design suit smallholder dairy farmers. Wastewater is reused for fodder production, enhancing resource efficiency and green fodder availability.

Institutional Linkages, Mentorship and Validation

Her innovation was guided by experts from KVK Banka and BAU Sabour, with scientific advisories provided through training and field visits. Dairy scientists refined water use, fodder planning, and management practices. She markets milk and value-added products via a dedicated KVK-created WhatsApp group, enabling direct sales, customer engagement, and better price realization.

Challenges Faced and Solution Approaches

Initially, she faced challenges in storing sufficient water to maintain dairy animals during peak summer months. The lack of technology adoption in the community and financial limitations made it difficult to implement a full-scale solution. Through persistent effort, she designed a cost-effective model using locally available resources. During the lockdown, when milk procurement by cooperatives declined, she addressed marketing challenges by preparing milk products and selling them through WhatsApp groups, ensuring continuous income and reducing wastage.

Utility and Benefits of the Innovation

The innovation ensured uninterrupted water availability for dairy animals and enabled her to maintain ten cows throughout the summer season without stress. Rainwater harvesting enhanced overall farm resilience, reduced dependency on unreliable water sources, and improved herd productivity. The water recycling system supported fodder production, resulting in higher availability at low cost. The model demonstrated economic and environmental benefits by reducing water purchase expenditure and maintaining sustainable dairy operations.

Adoption, Outreach and Scaling Up

More than sixty-two farmers across Banka district have adopted this model after observing its effectiveness. She has guided an equal number of farmers through demonstrations, field interactions, and knowledge-sharing events. Her success in increasing milk production, initiating a women-led self-help group of eleven members, and establishing a dairy enterprise with thirty cows inspired other farmers to follow similar practices. Her linkage with the milk cooperative society further expanded the model's visibility and potential.

Impact Assessment (Economic, Social and Environmental)

The innovation improved productivity, enabling her to rear crossbred cows yielding up to thirty-five kilograms of milk daily. Forming women's groups strengthened entrepreneurship and enhanced rural women's socio-economic status. Water conservation increased climate resilience, while wastewater recycling supported environmental sustainability. Milk value addition include paneer, lassi, buttermilk, and ghee, generated significantly higher income than raw milk sales.

Recognition, Awards and Media Coverage

She has earned several prestigious awards, including the Pandit Deen Dayal Upadhyay Krishi Puruskar (2020), Mahindra Samridhi Zonal Award (2013), Krishak Awards for Water Conservation (2021), and district honours for uplifting women farmers. She received the Best Innovative Farmer Award from ICAR-CRIDA in 2021 and the Utkrist Kisan Samman in 2023. Her work is featured in Prabhat Khabar and agricultural media, and she serves as a resource person for KVK Banka programmes.

Future Vision and Way Forward

She aims to expand rainwater harvesting for dairy farmers and promote milk value addition. She plans to strengthen women's dairy groups, support low-cost storage and processing, and develop digital marketing networks. Her vision encourages rural women to adopt climate-resilient dairy practices and advocates policies supporting smallholder enterprises and efficient water management in drought-prone areas.

Name : Smt. Madhu Patel
Address : Gajendra Bigha,
Post Bhokilapar, Hilsa,
Nalanda, Bihar- 801302
Contact No. : +91-9386301605
Email : madhupatelbmslab@gmail.com

Personal Profile and Farming Background

Smt. Madhu Patel, a 46-year-old entrepreneur and progressive farmer, has 20 years of experience in allied agriculture, specializing in mushroom spawn production and pearl farming. A graduate, she empowers rural communities in Bihar through innovations addressing gaps in Spawn production and high-value aquaculture. Managing a 2-hectare farm with spawn labs, pearl units, and training programs, she has grown from a cultivator in 2008 to a mentor for thousands, promoting women-led diversification.

Innovation Overview and Motivation

Smt. Madhu Patel prioritizes allied enterprises by using her land for experimental mushroom beds and pearl-integrated ponds. Her self-driven innovations includes a mushroom spawn lab (2011) and pearl farming (2018), supported by DMR, Solan and CIFA, Bhubaneswar which address spawn scarcity and aquaculture gaps in Bihar. She propagates 12 mushroom varieties and produces round, half-round, and designer pearls, while promoting mushroom value-added products to improve nutrition and income for SHG women.

Technical Features, Novelty and Development Process

Her mushroom innovation features propagation of 12 strains on paddy straw with controlled 80 to 90% humidity for high-viability spawn distributed in affordable packets. Pearl novelty includes terrace and tank-based culture with designer seeding for smallholders. Development spanned 2008–09 mushroom pilots, 2010 spawn training, a 2011 spawn lab (Rs. 20 lakhs), and a 2018 pearl startup (Rs. 5 lakhs). She trained 10,000 farmers, supported ATMA and KVK, reached 200 pearl trainees, formed 10,000-women SHGs, and trained vulnerable groups.

Institutional Linkages, Mentorship and Validation

Mentored by Dr. B.P. Sharma (Director, DMR, Solan) for mushrooms and Dr. Saurabh (Principal Scientist, CIFA, Bhubaneshwar) for pearls, She partners with ATMA, and KVK for trainings and spawn distribution. Bhagalpur Agriculture University (BAU) and Horticulture College Noorsarai, Nalanda, sends B.Sc. students for internships, training sessions. IARI has recognised her work and awarded her as an Innnovative famer.

Challenges Faced and Solution Approaches

Initial challenges included limited funds for laboratory setup, difficulty in marketing niche mushroom products, high oyster mushroom mortality in humid conditions, and the availability of poor-quality strains. Smt. Madhu overcame these hurdles by receiving training from ICAR institutes such as DMR and CIFA, forming a Self-Help Group (SHG), and securing loans for essential investments. She strengthened institutional linkages with ATMA and KVK, and widely

promoted her enterprise through Doordarshan and Akashvani.

Utility, Applications and User Benefits

These innovations enable landless farming as mushrooms boost incomes by 20-30% via spawn sales (₹50-100/packet), while pearls yield ₹1-2 lakhs/season from small units. Spawn reduces import dependency by 70%, cutting costs for growers; pearl tanks save 50% water vs. ponds. Value addition extends shelf-life, adding 15-20% revenue; overall, they promote drudgery reduction through group labour and chemical-free production for health benefits.

Adoption, Outreach and Scaling Up

Community level demonstrations, trainings, juvenile/school sessions, and KVK field days eventually enabled nearly 10,000 trainees across Bihar, Jharkhand, and West Bengal to adopt mushroom farming and 200 to adopt pearl cultivation. The unemployed women formed SHG and undertook mushroom production, with spawn supplied to ATMA and KVK for famer demos.

Impact Assessment (Economic, Social and Environmental)

The annual net income for operating a mixed mushroom and freshwater pearl farming enterprise is reported to range from ₹3.0 lakh to ₹9.0 lakh per year. Socially, 10,000 women empowered via SHGs, including unemployed rural youth and orphans, fostering leadership in the disadvantaged sections. Environmentally, low-water pearl systems conserve resources, mushroom substrates recycle agro-waste (reducing 20% residue), and organic practices enhance biodiversity with nil chemical runoff.

Recognition, Awards and Media Coverage

Smt. Madhu Patel received the IARI Innovative Farmer Award, Innovative Farmer Award 2022 (Sabour), Women Empowerment Award 2013 (Sabour), Kisan Samman 2024 (KVK Nalanda), Kisan Samman 2023 (ATARI Patna), and Bihar Gaurav Smita Awards 2024 (Ministry of Food Processing Industries). Coverage includes *Doordarshan/Akashvani* Patna interviews, print/ social media features, and case studies in BAU/KVK bulletin.

Future Vision, Suggestions and Way Forward

She plans larger pearl ponds and in-house polishing machinery to cut processing costs and increasing the turnover. She envisions university/KVK trainings for youth, organised visits for the trainees, government subsidies for pearl farming setups and integrating digital sales for mushrooms/pearls. Collaborating with DMR/CIFA for resilient strains, her goal is nationwide SHG replication, empowering 50,000 women by 2030 toward Bihar's women-led bio-economy and national nutrition security.

Name : Smt. Pooja Sharma
Address : Village Chandu,
District Gurugram,
Haryana- 122505
Contact No. : +91-9992029845
Email : poojavashistha844@gmail.com

Personal Profile and Farming Background

Smt. Pooja Sharma, born on 12 August 1979, is an inspiring rural woman entrepreneur from Chandu village in Gurugram district, Haryana. With a 12th-grade education, she leads a successful agro-processing enterprise despite owning no land. She operates 2 acres of leased land for cultivation and uses 6,534 sq. ft. for processing and value addition. As the President of the "Kshitiz" SHG formed in 2013, she has become a pioneer in promoting millet-based nutrition, women empowerment, and rural entrepreneurship, helping rural women become financially independent.

Innovation Overview and Motivation

Deeply motivated by the need for nutritious, healthy, and gluten-free food alternatives, Smt. Pooja Sharma started millet-based value addition under the brands *Zing-N-Zest* (2018) and later *Millet Mom* under "Kshitiz Millets Pvt. Ltd." Her innovation is rooted in the idea of using locally available coarse grains to fight malnutrition, provide healthier snacks, empower rural women, and boost the millet economy. The Feeding India Mission inspired her to produce nutrient-rich ladoos for children and women suffering from undernutrition.

Technical Features, Novelty and Development Process

Her innovation involves developing more than 40 millet-based, gluten-free, vegan and nutritionally fortified products using sorghum, bajra, ragi, barley, oats and gram flour. She replaces refined sugar with jaggery, desi khand, flaxseed and ajwain to enhance health value. Key items include millet cookies, cakes, ladoos, crackers, porridge mixes and snacks. Notably, she produced 9,00,000 nutrition ladoos for Feeding India Mission, demonstrating large-scale nutritional impact.

Institutional Linkages, Mentorship and Validation

Her enterprise is supported by KVK Shikohpur (ARYA project), Access Development Services, DRDA Gurugram, HSRLM, RUDSET and other institutions, which provided technical training, product validation, enterprise development support and branding. Her products are marketed through reputed outlets including Annamaya (Aerocity), 24x7 stores, Reliance stores, Lamarsh, HAFED shops and government retail platforms, strengthening consumer trust and institutional validation.

Challenges Faced and Problem-Solving Approaches

She initially faced challenges related to technical know-how, machinery access, quality control and packaging. Continuous support from KVK and partner institutions helped her overcome production bottlenecks, improve product uniformity, adopt eco-friendly packaging

and strengthen branding. Capacity-building enabled her transition from a small SHG-based unit to a registered private limited company with diversified products and stronger market linkages.

Utility, Applications and User Benefits

Her millet-based products provide high nutrition, gluten-free alternatives suitable for children, adults, and elderly consumers. They help fight anemia, malnutrition, and lifestyle diseases. Her innovations promote healthy eating, empower women through SHGs, create rural employment, and support small farmers by increasing demand for millet crops. Her enterprise ensures quality, safety, and transparency in food processing.

Adoption, Outreach and Scaling up

Her products have gained widespread adoption across Haryana, Delhi, NCR, and are also supplied to exporters through partners like Bliss by Anju. She has trained over 100 women across India and motivated more than 2,500 farmers, youth, students, and rural women who have visited her unit. Her products are showcased in leading national exhibitions like Surajkund Mela, PUSA Krishi Mela, SARAS Fairs, Trade Fair (Pragati Maidan), and state-level food festivals. Her SHG has expanded into 13 federated groups under PV SahyogMahila Gram Sangathan.

Impact Assessment (Economic, Social and Environmental)

Economically, turnover increased from ₹5.15 lakh (2016-17) to ₹40.30 lakh (2024-25). Socially, she generated employment for 24 women, strengthened rural livelihoods and promoted women's leadership. Environmentally, her promotion of climate-resilient millets and adoption of biodegradable packaging support sustainable agriculture and reduced ecological footprint.

Recognition, Awards and Media Coverage

She has received major recognitions including Nari Shakti Puraskar 2022, ICAR–IARI Innovative Farmer Award 2016, Pandit Deendayal Upadhyay Antyodaya Krishi Puruskar 2015, and IARI Women Farmer Award 2024. She also earned state and district honours, certificates from Access Development Services, RUDSET and HSRLM. Her work is widely featured on DD Kisan, Green TV, Amar Ujala, Dainik Jagran, The Better India, Drishti IAS and various digital platforms.

Future Vision, Suggestions and Way Forward

She aims to expand her brand "Millet Mom" nationally and globally, establish a large-scale processing unit and strengthen the millet value chain. Plans include developing additional millet-based products, adopting advanced processing technologies, expanding e-commerce presence and empowering more rural women. She seeks collaborations with global buyers and envisions promoting millets for healthier diets and sustainable agriculture.

Name : Smt. Swapna James
Address : Kulakkattukurissi,
District Palakkad ,
Kerala– 678633
Contact No. : +91-9446369247
Email : swapnjamesp@gmail.com

Personal Profile and Farming Background

Smt. Swapna James, aged 49, post-graduate woman farmer from Kulakkattukurissi, Palakkad district of Kerala, has over 21 years of experience in farming. Her husband, shri James, is the Chairman of Sreekrishnapuram Karshaksree FPO, followed by their elder son, shri. Alen James, who holds a B.Sc. (Horticulture) and a Master's degree in Agribusiness and Plantation Management; their younger son, shri. Kevin James, is an MBA graduate. Together, the family embodies a model of traditional wisdom combined with modern education and entrepreneurial management.

Innovation Overview and Motivation

The primary innovation developed by Smt. Swapna is a fully functional Integrated Organic Farming System (IOFS) combining multilayer cropping, livestock recycling, value-added processing, and agri-tourism. Her motivation emerged from low income from rubber and seasonal crops, rising chemical input costs, declining soil fertility, and the need for farm resilience. She envisioned a system that ensures year-round income, reduces risk, and promotes food security. The desire to inspire rural women and youth further strengthened her resolve.

Technical Features, Novelty and Development Process

She has developed a comprehensive Integrated Organic Farming System (IOFS) that blends ecological sustainability with economic efficiency. The model features a scientifically designed multi-layer cropping system where plantation crops like coconut, rubber, arecanut, and pepper form the upper canopy, complemented by bananas, vegetables, spices, and pulses in lower layers based on light and nutrient requirements, enabling year-round productivity and climate resilience. The system relies entirely on organic soil health management using farm-made bio-inputs eliminating synthetic inputs. Advanced water-saving technologies ensure efficient and energy-smart resource use. Livestock integration featuring Vechur cows, goats, poultry, ducks, and aquaculture creates a closed nutrient loop, while eco-friendly pest control methods like botanical formulations, solar traps, and companion cropping maintain crop health. The model's novelty lies in its synergy of traditional ecological wisdom with renewable technologies such as solar fencing, biogas systems, ICT-enabled irrigation, and decentralized value addition units (solar dryers, grinders, packaging). Waste-to-nutrient systems like the Thumboormuzhi composting method and conservation of diverse crop varieties further enhance environmental value, making the farm a micro gene bank.

Institutional Linkages, Mentorship and Validation

The innovation evolved through collaboration with KVK Palakkad, Kerala Agricultural

University experts, and mentoring from experienced organic practitioners. Her farm is utilized by institutional trainees, FPOs, and students for practical demonstrations, ensuring scientific validation and continuous improvement.

Challenges Faced and Problem-Solving Approaches

She initially faced challenges such as lack of technical knowledge, labour scarcity, market linkage issues, and scepticism toward organic farming. Through experimentation, training, mechanization, digital marketing, and networking, she overcame these barriers. Financial planning helped her manage long gestation crops and infrastructure investments.

Utility, Applications and User Benefits

The model offers a replicable blueprint for sustainable agriculture. Farmers benefit through year-round income, reduced production costs, enhanced soil health, climate resilience, and integrated market opportunities through processing and tourism. It is particularly useful for peri-urban and medium landholding farmers.

Adoption, Outreach and Scaling Up

More than 300 farmers have directly adopted components of her innovation, while over 1,000 have been influenced through exposure visits, digital platforms, and training. After recognition, she expanded her value-added products, training modules, and nursery enterprise.

Impact Assessment (Economic, Social and Environmental)

Economically, her system ensures multiple income streams with an estimated annual turnover of ₹16-18 lakhs. Socially, it empowers rural women, generates employment, and promotes entrepreneurship. Environmentally, the model improves soil organic carbon, enhances biodiversity, conserves water, and sequesters carbon through trees and livestock integration.

Recognition, Awards and Media Coverage

Her work has been featured in local media, social media platforms, and institutional newsletters. Her farm is recognized as a model site for integrated and organic farming in the region.

Future Vision, Suggestions and Way Forward

She aims to establish a Farm Innovation and Training Centre, scale rural enterprises for women, strengthen digital marketing, and promote organic clusters. Her long-term vision includes developing "model organic tourism and education hub" showcasing Kerala's sustainable agriculture heritage. She advocates policies supporting value addition, farm tourism, and climate-smart diversified farming.

Name : Smt. Santosh Devi Khedar
Address : Village Beri,
District Sikar,
Rajasthan- 332031
Contact No. : +91-8949619262
Email : rksedar1996@gmail.com

Personal Profile and Farming Background

Smt. Santosh Devi Khedar is a progressive farmer from Sikar district, Rajasthan, with extensive experience in horticulture, organic farming, and nursery management. She manages 2 hectares of fully irrigated land supported by a tube well and a one-lakh-litre rainwater harvesting structure. She cultivates field crops like pearl millet, cluster bean, and wheat, along with horticultural crops including pomegranate, mosambi, apple, kinnow and *kagzi* lime and 4 cows and a buffalo. She also produces organic inputs such as *jeevamrit, panchagavya,* and *dashparni ark*.

Innovation Overview and Motivation

Her innovation journey began with an interest in soil health, resource conservation, and high-value horticulture. She adopted pomegranate cultivation in 2008 and gradually expanded into mosambi, apple, and nursery production, through establishment of *Shekhawati Krishi* Farm and Nursery in 2013. Her commitment to organic cultivation, water-saving technologies, and improved crop varieties increased her farm productivity. Her motivation stems from a desire to create a sustainable farming model that generates both economic and ecological benefits for the community.

Technical Features, Novelty and Development Process

She has adopted practices like organic cultivation, crop diversification, rain water harvesting, drip irrigation, solar pumping, and bunding and trenching for soil conservation. She modified her orchard layout by integrating mosambi plants between pomegranate rows to maximise income. She developed a jaggery-enriched bio-pesticide mixture which improved pollination rate and increased the presence of beneficial insects. She also established an online marketing system and created a website and YouTube channel under the name "*Shekhawati Krishi* Farm" which broadened her outreach.

Institutional Linkages, Mentorship and Validation

Her work has been supported by various government departments, including the Rajasthan Horticulture Department, the Rajasthan Organic Certification Agency, and national horticulture schemes. The National Horticulture Board has registered her nursery, and her orchard is certified by ROCA. She has been regularly visited and encouraged by senior officials such as Director-level officers, joint directors, and state-level horticulture authorities.

Challenges Faced and Problem-Solving Approaches

One of her major challenges was establishing pomegranate orchards in a semi-arid region with limited water. She addressed this constraint by creating a large water harvesting structure and adopting drip irrigation. She also focused on organic production to reduce external input costs. The consistent nursery production required skilled labour, which she managed by training local workers.

Utility, Applications and User Benefits

Her innovations demonstrate a highly efficient horticultural farming system suitable for arid and semi-arid areas. Farmers benefit from her organic pest management practices, nursery plant production techniques, and water-saving technologies. Her pioneering system has improved soil fertility, promoted biodiversity, and enhanced the availability of high-quality planting material in the region.

Adoption, Outreach and Scaling Up

She established the Shekhawati Krishi Farm and Nursery in 2013 and has since supplied quality planting materials to more than fifty orchards across Rajasthan and neighbouring states. Daily, fifteen to twenty farmers visit her farm to learn organic pomegranate cultivation. Her YouTube and Facebook platforms provide continuous training to farmers, while visits from national and international groups have strengthened the spread of her methods. She has also provided long-term employment to two local youth.

Impact Assessment (Economic, Social and Environmental)

Her enterprise has recorded substantial economic returns, particularly through high-value horticultural crops. Pomegranate cultivation alone provides a high cost-benefit ratio, and her integrated orchard model increases overall profitability. By adopting organic inputs and water-saving methods, she has reduced production costs significantly and improved soil quality. Socially, she has inspired farmers, especially women to pursue horticulture as a sustainable livelihood option.

Recognition, Awards and Media Coverage

She has received several prestigious awards, including state and district-level Best Organic Farmer Awards from ATMA. She was honoured with the *Kisan Vaigyanik Puraskar* by SKRAU, Bikaner, and received recognition from eminent leaders including the former Chief Minister of Rajasthan and senior agricultural ministers. Media houses such as *Dainik Bhaskar, Rajasthan Patrika,* and various documentaries have covered her success stories extensively. Her achievements also include the Millionaire Farmer of India Award sponsored by Mahindra Tractors and appreciation during the 2019 Science Festival in Kolkata.

Future Vision, Suggestions and Way Forward

Her future goal is to expand fruit-based horticulture, enhance nursery capacity, and promote organic orchard management among rural families. She plans to strengthen digital outreach for marketing and knowledge sharing. She recommends increased government support for organic certification, farmer-friendly irrigation subsidies, and training programmes to promote sustainable horticulture models across arid regions.

Name : Smt. Sadhana Tiwari
Address : Hanuman Mohalla, Village Madhavgarh,
Thana Kplgawa, Tahsil Raghurajnagar,
District Satna, Madhya Pradesh - 485113
Contact No. : +91-9165804444
Email : sadhanatiwari224@gmail.com

Personal Profile and Farming Background

Smt. Sadhana Tiwari, aged 39, from Satna distict of Madhya Pradesh has 13 years of experience in farming with focus on crop diversification and integrated farming system. She has 7.5 hectares of agricultural land (5.5 ha on lease) cultivating diverse crop integrating goat rearing, dairy, fishery and mushroom production unit. She runs cowdung purchase centre, milk collection centre also and carries out conservation of local cow breeds and value addition and processing.

Innovation Overview and Motivation

She is an innovative farmer practicing diversified agriculture integrated with goat farm, dairy farm, fishery, mushroom production unit, cowdung purchase centre, milk collection. Her other activities are conservation of local cow breeds and value addition and processing for enhancing farm income. Initially, she got guidance and motivation of diversified farming for enhancing farm income from *Krishi Vigyan Kendra*, Satna. After receiving innovative farmers award from IARI in 2022, she has initiated natural farming, use of pusa decomposer, goat farm, Gaushala for local cow breed conservation for enhancing farm income.

Technical Features, Novelty and Development Process

Smt. Sadhana Tiwari, an innovative farmer started her agriculture journey from 2012. She has initiated several innovations in her farm for enhancing farm income and profitability. The major initiatives include: 1) cow based natural and organic farming 2) seed production 3) collection paddy straw and value addition 4) micro irrigation 5) conservation of local cow breeds 6) mushroom production 7) Goat farming and goat bank 8) cow dung purchase centre 9) value addition and processing 10) milk collection centre and 11) vegetable production.

Institutional Linkages, Mentorship and Validation

She has developed linkages with Nanaji Deshmukh Deendayal Shodh Sansthan, KVK, Satna; Jawaharlal Nehru Agricultural University, Jabalpur; ICAR institute and State Department of Agriculture, Horticulture and Animal Husbandry, Satna. However, she got mentorship and validation of her innovations from, *Krishi Vigyan Kendra,* Chitrakoot.

Challenges Faced and Problem-Solving Approaches

She has faced many challenges in her agriculture journey which includes the responsibility of Sohawal Farmers Producer Organization, effective management of coordination with FPO members.

Utility, Applications and User Benefits

Due to initiation of several subsidiary enterprises in agriculture, the income and profit of Smt. Sadhana Tiwari has increased significantly. Also due to her seed production programme, the seed availability has enhanced in her locality. Progressive farmers in her village are producing cerified seed of different crop varieties. As a result the income and profit of seed producing farmers have increased. Farmers Producers Organization is working smoothly with the help of about 3,167 member farmers.

Adoption, Outreach and Scaling Up

The membership of FPO expanded to 3,167 farmers of 40 villages in her district. Smt. Sadhana Tiwari is instrumental in imparting training to the farmers and farm women on value addition and processing of agri-products. Smt. Sadhana is focusing on crop diversification and integrated farming system integrating different component like goat rearing, dairy, fishery, mushroom production, cowdung purchase, milk collection, medicinal plant, conservation of local cow breeds and value addition and processing. She has trained 673 farm women in value addition and processing for enhancing their farm income.

Impact Assessment (Economic, Social and Environmental)

She has done pioneering work in promoting Gaushala, dairy, processing and value addition among 43 tribal families in their livelihood. She has trained 673 farm women in value addition and processing for enhancing their farm income. Smt. Sadhana is also working as a 'Drone DiDi' in her district, as a result village youth, farmers and farm women are taking interest in agriculture and subsidiary entreprises.

Recognition, Awards and Media Coverage

She has received many prestigious awards such as the Krishak Fellow Award of RVSUAT, Gwalior (2003), Krishak Fellow Award of JNAU, Jabalpur (2022), Sushma Swaraj Award (2023), IARI Innovative Farmer Award (2022) and IARI Fellow Farmer Award (2024) for her outstanding contribution in agriculture.

Future Vision, Suggestions and Way Forward

Her vision is to expand the innovation to many farmers, farm women and rural youth in the district with the help of scientists and extension experts for employment generation and livelihood security of the rural household.

Name : Smt. Mina Mahanta
Address : Village Khuntapingu;
Block Saharpada;
District Keonjhar, Odisha - 758045
Contact No. : +91-9777791929
Email : skmishra.icar@gmail.com

Personal Profile and Farming Background

Smt. Mina Mahanta is an experienced farmer from Keonjhar district, Odisha, possessing fifteen years of practical agricultural expertise. She manages 2.7 hectares of land. Her farming enterprise is highly diversified, encompassing field crops, vegetables, agroforestry plantations, dairy, poultry, pigeon farming, goat rearing, and fishery. She is also running a Mini Paddy Huller as a secondary occupation. Her farm is equipped with essential irrigation structures, sprinkler systems, pumps, a power thresher, and a paddy huller, enabling her to adopt scientific and resource-efficient farming practices.

Innovation Overview and Motivation

Her innovations include a modified polythene mulching technique, the use of neem leaves as an organic fertilizer–cum–pesticide, and a low-cost pigeon-farming system. These practices evolved through scientific demonstrations and trainings under the ICAR-IIWM Farmer FIRST Project. Improved yields, soil health, income, and early success in diversification strengthened her determination to refine and disseminate these innovations.

Technical Features, Novelty and Development Process

Her innovation in polythene mulching involves planting seedlings in furrows and placing mulch on ridges, which ensures direct irrigation to the planting line and efficient water distribution under sprinkler irrigation. She incorporates dried neem leaves from her own farm into the soil before field preparation, which supports soil health and suppresses pest and disease incidence. In pigeon farming, she has developed a unique management system using earthen pots and low-cost feed, enabling profitable production with minimal investment. These practices evolved through continuous refinement based on field performance and scientific guidance.

Institutional Linkages, Mentorship and Validation

Her innovations have been supported, validated, and strengthened through strong institutional linkages with ICAR-Indian Institute of Water Management Bhubaneswar, under the Farmer FIRST Project. Scientists from diverse disciplines provided technical backstopping, field guidance, demonstrations, and critical inputs. She has also been associated with Krishi Vigyan Kendra, Keonjhar for advisory support, and with the Department of Agriculture and Farmers' Empowerment, Government of Odisha, which provided subsidies for irrigation infrastructure and machinery. These partnerships played a pivotal role in validating her innovations and broadening their adoption.

Challenges Faced and Problem-Solving Approaches

Her major challenges included unavailability of mulching materials in market, balancing household responsibilities with farming activities, pest outbreaks in brinjal during 2018 to 2020, input procurement issues, inadeqaute market access during the COVID-19 pandemic and limited irrigation

access in earlier years. She addressed these challenges through enterprise diversification, adoption of non-chemical pest management, installation of a borewell with sprinkler irrigation, and timely engagement with scientific institutions. Her resilience and adaptive management enabled her to overcome these constraints effectively.

Utility, Applications and User Benefits

Her innovations enhanced water-use efficiency, reduced reliance on chemical fertilizers and pesticides, and lowered labour by eliminating manual weeding. Annual savings of about ₹20,000, 20–25% water savings, and reduced chemical inputs improved profitability. Better soil health and crop quality increased market value of products, while her low-cost pigeon farming system provides steady supplementary income.

Adoption, Outreach and Scaling Up

Her innovations have been adopted within her village and disseminated to neighbouring villages. Serving as a "barefoot trainer," she has guided more than one thousand farmers through training programmes, exposure visits, demonstrations, and Self Help Group interactions. After receiving national recognition, she expanded her advisory activities, trained more women farmers, and strengthened dissemination through social media, publications, and field interactions.

Impact Assessment (Economic, Social and Environmental)

Her net annual income rose from ₹1,65,000 in 2015–16 to about ₹5,00,000 in 2024–25, a threefold increase. Socially, she has become a role model for farm women, leading capacity-building efforts. Environmentally, her innovations reduced chemical use, enhanced water efficiency, promoted organic practices, strengthened climate resilience, and created seasonal local employment.

Recognition, Awards and Media Coverage

She has received several prestigious honours, including the IARI Innovative Farmer Award 2024, Excellent Farmer Award 2024, and Best Farmer Awards 2018 and 2019, along with recognition from ICAR-IIWM and ICAR-CRRI. Her success is featured in Indian Farming, ICAR publications, newspapers, and social media, with a documentary produced under ICAR-DKMA's *Meri Zubani, Meri Kahani*.

Future Vision, Suggestions and Way Forward

She intends to further strengthen farmer-to-farmer extension, particularly among women farmers, through structured training on scientific vegetable cultivation, nursery raising, water conservation, and organic pest management. She advocates wider dissemination of farmer-led innovations across the state, enhanced publication of success stories in regional languages and greater institutional recognition for grassroot innovators. She aims to continue contributing to sustainable and climate-resilient agriculture through training, demonstrations and community leadership.

Name : Smt. Manju Rani Kashyap
Address : Village Duhai, Meerut Road,
District Ghaziabad,
Uttar Pradesh -201001
Contact No. : +91-8937895867
Email : manju.kashyap8750@gmail.com

Personal Profile and Farming Background

Smt. Manju Kumari Kashyap, aged 35, with a B.Sc. degree and 6 years of farming experience. Her primary occupation is farming on 6.05 ha of leased land (fully irrigated) with loam-clay soil, using implements like power tiller, laser leveller, harvester, plough, spray pump, tractor trolley, and mist blower. She is a member of a dairy cooperative.

Innovation Overview and Motivation

Previously, artificial pellet/floating fish feed was used; the innovation mixed district religious waste offerings (murmura, kheel) with bel and amla leaves and poultry waste/husk as low-cost fish feed, rapidly increasing fish weight and reducing maturity by about one month. Inspiration came from Prime Minister interactions promoting new technologies, skill development trainings building modern farming, environmental conservation goals, and the aim to double farmers' income through low-cost, high-profit practices.

Technical Features, Novelty and Development Process

The innovation features the conversion of offerings/prasad and worship materials from religious places into valuable agricultural inputs through waste-to-wealth transformation, alongside recycling enterprise residues and integrating irrigation water with feed channels for liquid-based inputs. This multilayer farming module boosted crop productivity and farmers' income while promoting indigenous practices and local self-reliance.

Institutional Linkages, Mentorship and Validation

She received institutional support from Krishi Vigyan Kendra Farrukhabad, Sardar Vallabhbhai Patel University of Agriculture and Technology Meerut, and the Indian Agricultural Research Institute (IARI), Pusa, New Delhi, which provided guidance, testing, validation, and extension services for her innovations through workshops, farmer demonstrations, and research collaborations.

Challenges Faced and Problem-Solving Approaches

She faced significant challenges, including the lack of required infrastructure facilities and financial support for validation, standardization, testing and registration of her innovations, as well as the absence of value-chain or incubation centers essential for their promotion and dissemination. She addressed these through resourceful local waste utilization, institutional collaborations for guidance, and hands-on farmer demonstrations to build confidence and gradual scaling up despite limited formal support.

Utility, Applications and User Benefits

The innovation utilizes local agricultural enterprises and institutional resources through effective recycling, while enhancing product quality via climate- and environment-friendly inputs in integrated farming systems. It delivers a high benefit-cost ratio, maintains ecological balance, conserves soil, water, and the environment through sustainable natural resource use. Ultimately it boosts economic returns by enabling chemical-free produce.

Adoption, Outreach and Scaling Up

She upscaled her innovations other receiving IARI award through Viksit Krishi Sankalp Abhiyan discussions, model displays at farmers' fairs, exhibitions, seminars; farm exposure visits for university; students, farmers, extension workers; Doordarshan programs like "Kisan," success stories, live shows, Q&A, and Krishi Chaupal, plus social media promotion.

Impact Assessment (Economic, Social and Environmental)

Yields have improved by 30-40%, with enhanced product quality and marketability, effectively doubling farmers' income through substantial cost reductions. Resource use efficiency has increased significantly, saving water, inputs, and energy while reducing drudgery and generating approximately 300 man-days of employment per hectare annually. Socially, it has empowered 12,500 farmers, women, and rural youth through skill development; environmentally, waste utilization has reduced pollution and fostered climate-resilient, diversified farming systems.

Recognition, Awards and Media Coverage

Received National Progressive Farmer Award (ICAR 2025), Mahila Kisan Diwas (2025), Lochan Samman (2024), top dairy producer (2024), and university-level awards. Featured in print (Nawjivan Fasal), electronic media (DD Uttar Pradesh), documentaries, and publications like "Inspiration Sources" (SVPUAT).

Future Vision, Suggestions and Way Forward

She plans to expand her innovations through FPOs, SHGs, and KVK programs under the "Seeing is believing" principle, leveraging student involvement for wider outreach. She suggests standardizing research protocols, establishing university incubation centers, creating KVK demonstration farms, and providing subsidies to encourage adoption. Additionally, she seeks development of traceability apps for value-added products to sustain eco-friendly, high-income integrated farming systems.

Name : Smt. Neelam Tyagi
Address : House No130, Gali No. 05, Rawli Road, Jeetpur, Murad Nagar, Tehsil Modinagar, District Ghaziabad Uttar Pradesh-201206
Contact No. : +91- 8279388429
Email : Neelamtyagi94@gmail.com

Personal Profile and Farming Background

Smt. Neelam Tyagi, aged 50, a progressive farmer and social entrepreneur with 25 years of farming experience and a postgraduate degree of MA in Sociology. She cultivates 1.739 ha of irrigated, owned land (sugarcane, turmeric and agroforestry) and runs "Neelam Tyagi Agri Industries" (Nitara brand) with an annual turnover of about ₹50 lakh from value-added food products.

Innovation Overview and Motivation

Her core innovation is mixed crop farming of sugarcane and turmeric integrated with modular, solar-enabled agro-processing facility and a women-centric value-chain model. The motivation was to solve the problems behind low farm income, dependence on middlemen and rural unemployment among women and youth, while ensuring sustainability and social equity.

Technical Features, Novelty and Development Process

Technically, the system intercrops sugarcane and turmeric, producing about 350 quintals of sugarcane and 50 quintals of turmeric per acre, with an 82% reduction in pesticide use and a land productivity index of 1.86 compared to 1.0 under monocropping. Novelty lies in combining intercropping, high-yield pest-tolerant varieties, solar-powered 3 quintal/hour processing units, and direct marketing (Nitara, Sunehra Fresh) to double per-acre profits (₹2.85 lakh vs. ₹1.2–1.5 lakh regionally).

Institutional Linkages, Mentorship and Validation

Her work is mentored and guided by senior agricultural experts and opinion leaders including Dr. P.L. Gautam, Dr. J.P. Sharma, Dr. Rajveer Singh, Dr. R.N. Padaria and others. The model has been validated and supported by ICAR–IARI, KVKs, NABARD, MANAGE, NIPHM, IIPR, Kanpur; SVBPUAT, Meerut and several government departments and associations.

Challenges Faced and Problem-Solving Approaches

She faced high initial investment needs, lack of awareness, social resistance to new practices, weak market linkages and limited organizational structures for smallholders. These were addressed through SHGs and FPOs, training and demonstrations, phased investment in machinery, building brands and urban linkages, and intensive awareness campaigns among farmers and women.

Utility, Applications and User Benefits

The innovation increases yields and profitability, strengthens soil health, reduces soil erosion and pesticide load, and generates stable income through value-added turmeric, multigrain flour and other products. Farmers gain 20–35% higher profits from direct market linkages, better price realization, diversified nutrition and access to technical training and services.

Adoption, Outreach and Scaling Up

Intercropping and value-chain innovations have been adopted by about 40,000-40,497 smallholder farmers across at least 14-20 districts in Uttar Pradesh and neighbouring states. Scaling has occurred through KopusAgro FPO, Laxmi Jan Kalyan Seva Sansthan, 300 SHGs (4,500 women), NGO networks, retailer partnerships (e.g., Bharti Walmart) and structured training of more than 40,497 youth, women and farmers.

Impact Assessment (Economic, Social and Environmental)

Economically, farmers' per-acre profits increased to about ₹2.85 lakh, processing units generate around ₹1.37 crore annually, and thousands of women and youth have secured self-employment. Socially and environmentally, the model empowers disadvantaged households, enhances women's leadership, reduces rural migration, cuts pesticide use by 82%, saves 40% energy via solar processing and improves land productivity and soil health.

Recognition, Awards and Media Coverage

She has received numerous state, national and international honours including Regional Winners Award (Mahindra, 2019), multiple national innovation awards, NCR Ratan, Uttar Pradesh Ratan (2025) and the prestigious Dr. Norman E. Borlaug Innovative Farmer Award 2025 with ₹1,00,000 prize money. Her work is widely covered across print, television (DD Kisan, Pusa Samachar), YouTube, Facebook, Instagram and online portals, and she serves on several government and institutional committees and advisory bodies.

Future Vision, Suggestions and Way Forward

Her future vision is to further popularize the model across South Asia through modular processing units, stronger FPO networks, gender-inclusive training and supportive policies for intercropping and value addition. She recommends strengthening research–extension–industry convergence, dedicated innovation-support policies, and large-scale awareness and capacity-building so that smallholder, women- and youth-led enterprises can replicate and adapt this integrated model.

Name : Ms. Preeti Bhandari
Address : Manoj Vihar, Khatyari,
District Almora,
Uttarakhand – 263601
Contact No. : +91-8191891054
Email : preetibhandari650@gmail.com

Personal Profile and Farming Background

Ms. Preeti Bhandari, aged forty-two, is a postgraduate with ten years of experience in mushroom farming. She is also engaged in beekeeping with *Apis cerana indica*. She currently operates the Himgiri Natural Products Cooperative Society Limited, which is actively involved in local agricultural development.

Innovation Overview and Motivation

Her innovation centres around the development of mushroom-based value-added products designed to improve nutritional quality and enhance consumer acceptance. She began refining these products in 2020 with the objective of providing high-quality and nutritious food to the community. Her work has expanded the scope of mushroom use in regional diets while supporting livelihood opportunities.

Technical Features, Novelty and Development Process

Ms. Preeti Bhandari produces button, oyster and milky mushrooms in two rooms of 30 by 20 feet each. She has developed a unique method of preparing ragi-based mushroom momos that combine local finger millet with mushrooms. This product has become popular and is marketed through her outlet, Almora Mushrooms. The process enhances shelf life, nutritional content, and local value addition. She also produces mushroom soup, burger, pickle and biryani.

Institutional Linkages, Mentorship and Validation

Her innovation journey has been guided by Dr. Krishna Kant Mishra, Principal Scientist at ICAR-VPKAS, Almora. The same institution has validated and supported her work through continuous technical guidance. She has collaborated with several government organisations, training institutions, and cooperatives in the dissemination of mushroom cultivation technologies.

Challenges Faced and Problem-Solving Approaches

One of the major challenges in scaling up her innovation was the limited availability of consistent markets for value-added mushroom products. Through consistent quality, consumer engagement, and the establishment of a dedicated outlet, she gradually built a stable market presence. Her efforts strengthened local demand for mushroom-based foods.

Utility, Applications and User Benefits

Her innovations increase the shelf life of mushrooms and create sustainable income opportunities. The products are nutrient-rich and provide a healthy alternative to conventional

foods. The enterprise generates employment and promotes efficient use of agricultural waste, contributing to better utilisation of local resources and enhancing rural livelihoods.

Adoption, Outreach and Scaling Up

Since receiving the IARI Award, Mrs. Bhandari has expanded her outreach by supplying a wider range of value-added products through her Almora Mushrooms outlet. She has trained approximately two thousand farmers and has played a key role in spreading awareness about mushroom cultivation and processing. Her work has helped farmers adopt year-round production of button, oyster, and milky mushrooms.

Impact Assessment (Economic, Social and Environmental)

Her enterprise generates an annual turnover of about ₹4 lakhs through value-added mushroom products. The benefit cost ratio for button, oyster, and milky mushrooms remains favourable, ranging from 1.7 to 2.7, ensuring strong profitability for farmers adopting these varieties. She provides year-round employment to five to six individuals. Her work promotes sustainable waste recycling, supports environmental conservation, and contributes significantly to improved nutritional security for rural households through affordable, high-quality mushroom products.

Recognition, Awards and Media Coverage

She has received numerous honours, including the IARI innovative farmer award, Rajya Striya Shakti Tilu Rauteli Award for women empowerment, several certificates of appreciation from district authorities, and recognition from RUDSETI and ICAR-VPKAS for her work in mushroom cultivation. She has also been awarded under initiatives such as Beti Bachao Beti Padhao and the SDG Goalkeeper Award for Gender Equality. Her innovations have been widely reported in newspapers such as *Amar Ujala, Hindustan, Dainik Jagran, Uttara Ujala,* and various regional publications.

Future Vision, Suggestions and Way Forward

She aims to expand the reach of her value-added mushroom products and engage more farmers in mushroom cultivation. Her vision focuses on increasing awareness, promoting low-cost production technologies, and developing affordable, scalable models suitable for rural households. She encourages further research to strengthen local processing and value addition, ensuring higher farmer incomes. By building community-based producer groups, she hopes to create sustainable, decentralized mushroom enterprises across the region.

Name : Ms. Hema Dangwal
Address : Village Sunkia,
Post Bhatelia,
District Nainital, Uttarakhand-263001
Contact No. : +91-9719224451
Email : hemadangwal77@gmail.com

Personal Profile and Farming Background

Ms. Hema Dangwal, aged 48, is a dedicated woman entrepreneur with a postgraduate degree and around 10 years of experience in agriculture and allied activities. Along with her primary profession as a teacher, she has emerged as a skilled master trainer in incense (agarbatti) making, jam and jelly preparation, fruit processing, candle making, vegetable cultivation, fisheries and herbal plant production.

Innovation Overview and Motivation

Her innovation is rooted in natural, chemical-free farming that relies on local plants and native cattle resources such as cow dung and cow urine for preparing low-cost, eco-friendly pesticides and growth promoters. Inputs like Beejamrit, Jeevamrit, Ghan Jeevamrit, Kunap jal, Brahmastra, Neem Astra, buttermilk, neem oil, neem cake, neem-leaf compost, and wood ash are used to ensure crop protection and nutrition at almost zero cost. This approach not only reduces dependence on synthetic agro-chemicals but also motivates young men and women, who are otherwise migrating to cities, to look towards agriculture and cottage industries as dignified and profitable livelihoods.

Technical Features, Novelty and Development Process

Technically, her work integrates value addition, waste recycling, and environmental conservation. She promotes fruit processing for jams, jellies, and other products, and has developed entrepreneurship models for making incense sticks from cow dung, turning a waste product into a marketable commodity. She also uses Pusa Decomposer to break down crop residues and tree leaves, thereby addressing residue burning and improving soil health through *in-situ* decomposition. In addition, she has encouraged entrepreneurship in Kumaoni *Pichhauda* (traditional fabric), linking cultural heritage with income generation and rural employment.

Institutional Linkages, Mentorship and Validation

Her work benefits from strong institutional linkages with the Khadi and Village Industries Commission, Baroda RSETI, NRLM Self-Help Groups and Govind Ballabh Pant University of Agriculture & Technology, Pantnagar, providing guidance, testing, validation, refined innovations, standardized training, and expanded rural outreach. Healthy competition among women trainees has elevated production and product standards, enhancing the quality, scale and credibility of her initiatives.

Challenges Faced and Problem-Solving Approaches

She faced major challenges such as wild animal damage, erratic weather, and high packaging and transport costs, which reduced profitability. To overcome these issues, she

diversified her activities, adopted risk-spreading strategies, focused on local value addition, and promoted low-cost natural farming practices to reduce dependence on external inputs.

Adoption, Outreach and Scaling Up

For wider adoption, she has provided free training in making cow dung-based incense sticks to poor and destitute children and women, helping them build sustainable livelihoods. Women farmer groups and self-help groups (SHGs) have been formed so that members can access interest-free loans and government schemes to start or expand their enterprises. Through continuous training, handholding and demonstration, her model of integrating natural farming with value-added products is being replicated, leading to greater outreach and gradual scaling up in the region.

Impact Assessment (Economic, Social and Environmental)

Her initiatives have created strong economic, social, and environmental benefits. Machine-based incense and candle production has boosted family incomes, while tree plantation, trenches, and water bodies have improved forest ecosystems and supported wildlife. Cow-dung-based incense has promoted cattle rearing and reduced production costs, raising living standards. Rainwater harvesting ensures year-round vegetables, and solar installations have eliminated power bills and generated additional income through surplus energy sales.

Recognition, Awards and Media Coverage

Her work has earned multiple honours, including recognition as a Progressive Farmer by IVRI, awards from the Ministry of Rural Development, and the Women Empowerment & Sustainable Rural Development Award. She is also a certified Master Trainer by Khadi and Village Industries and has received accolades such as the Organic Agriculture Award and recognition as a "Bank Sakhi." Her initiatives have been widely showcased through social media and farmer-focused platforms, expanding her visibility and outreach.

Future Vision, Suggestions and Way Forward

Her future vision aims to build climate-resilient and self-reliant rural communities. She plans to expand polyhouses, install solar fencing, and promote solar rooftops for energy self-sufficiency. She seeks to boost income through wider production of Kumaoni*Pichhauda,* household-level mulching and incense-making, and increased use of natural formulations like Brahmastra. She also envisions large-scale awareness on natural farming, environmental conservation, and rainwater harvesting to secure sustainable livelihoods for Himalayan communities.

CHAPTER 5

Farm Mechanization for Enhancing Efficiency and Reducing Drudgery

Introduction

Agriculture has historically been the backbone of rural livelihood systems, yet it has remained vulnerable to the constraints of labour-intensive operations, low efficiency, climatic uncertainties and rising cost of production. Farm mechanization has emerged as one of the most powerful drivers for agricultural transformation, shifting farming from subsistence-oriented manual labour to a more productive, precise, cost-effective and youth-attractive enterprise. Mechanization not only enhances crop productivity by improving the timeliness of operations but also drastically reduces the drudgery involved for both men and women engaged in agriculture.

As rural labour availability continues to decline due to urban migration, demographic shift, and changing aspirations of the younger generation, mechanization offers a critical pathway to sustain agricultural productivity. The concept today goes beyond tractors and tillage equipment, it encompasses precision machinery for sowing, harvesting, grading, post-harvest handling, processing and value addition. The evolution from manual tools to semi-automatic machines and now towards smart mechanization systems integrated with ICT, automation and solar-powered devices reflects the modernization of Indian agriculture.

Importantly, farm mechanization is no longer confined to research laboratories or industrial manufacturing hubs. Farmers themselves are emerging as innovators, designing, modifying and adapting farm machines according to regional requirements, crop specificity, traditional knowledge and resource availability. These farmer-led innovations demonstrate ingenuity, frugality, and deep practical understanding of field situations. They not only solve local problems but often create scalable, replicable and livelihood-enhancing solutions for a wider community.

Farmer-Led Design and Innovation

Around the country, farmers have engineered innovative tools that reduce labor cost, improve quality of produce, ensure uniform operations and enhance market

competitiveness. The design of a low-cost gladiolus bulk grader developed by a farmer-machine designer is a striking example of how on-farm innovation bridges technology gaps in commercial floriculture. Gladiolus is a delicate cut flower; traditional sorting and grading methods are time-consuming and prone to quality inconsistency. The innovative bulk grader drastically cuts manual effort, reduces post-harvest losses and improves market presentation, ultimately enhancing the profitability of flower growers.

Similarly, mechanization in tuber and spice-based farming systems has witnessed noteworthy farmer inventions. A designer-gladiolus digger, developed to reduce the physical effort involved in lifting corms from the field, saves significant labor and time while reducing soil disturbance. The motorized pepper threshing machine reflects innovation in the spice sector, where removal of pepper berries from spikes is traditionally labor-intensive and seasonal, often resulting in high wage expenditure. Such machines not only ensure faster operation but also reduce breakage and maintain higher product quality needed for domestic and export markets.

Post-harvest mechanization innovations have also emerged in processing and value addition. The creation of a cycle-operated flour food mill shows how improvisation can lead to a low-cost, energy-independent device useful particularly in remote areas where electricity access is intermittent. Innovations such as the low-cost electric nutmeg/mace dryer and nutmeg desheller demonstrate how farmer-designed solutions have improved drying efficiency, minimized losses, ensured uniformity in dehydration, and reduced dependence on unpredictable sunlight, contributing to higher value realization in the spice value chain.

Smart Farming with Grassroots Innovations

Farmer led innovations in developing smart farms,reflects how farmers are reshaping agriculture by developing low-cost, locally adaptable, and context-specific tools and practices. These innovations emerge from farmers' firsthand understanding of their landscapes, crops, labour challenges, and resource limitations. From improvised sowing and weeding tools to solar-powered water pumps, simple grading machines, and residue recyclers, grassroots solutions are enabling precision, reducing drudgery, and improving productivity. Equipped with digital literacy, local materials, and indigenous knowledge, farmers are now blending traditional wisdom with modern science to create "smart" solutions that are sustainable, scalable, and economically viable. This farmer-driven innovation ecosystem not only strengthens resilience and profitability but also positions farmers as co-creators of technology in an evolving agri-tech landscape.

The growing use of smart and digital technologies is evident in innovations like a smart weighment and monitoring system, which supports transparency, efficiency and accuracy in farm operations and produce handling. Integration of sensors, IoT-based monitoring, mobile interfaces and automated alerts are making mechanization more intelligent and decision-oriented. The introduction of soil mapping tools and pneumatic planters for maize represents the transition towards precision mechanization, optimizing seed placement, fertilizer application and moisture use, thereby enhancing resource-use efficiency.

Innovations for drudgery reduction

Farmers, through their experiential knowledge and deep understanding of field operations, have been pioneers in developing tools and techniques that significantly reduce physical drudgery, especially in labour-intensive tasks. Innovations such as improvised seed dibblers, lightweight weeders, ergonomic harvesting tools, pedal-operated threshers, and low-cost transplanting aids have emerged from the pressing need to save time, minimize fatigue, and improve efficiency. Many of these grassroots inventions are crafted using locally available materials, making them affordable and easy to repair. Women farmers have played a critical role in designing tools suited to their ergonomics and work patterns, supporting inclusiveness in farm mechanization. These farmer-driven drudgery-reducing innovations not only enhance work efficiency but also contribute to a healthier, more dignified, and productive workforce in agriculture.

Manual operations cause repetitive strain, health issues and long hours of labor. The shift to semi-automatic and mechanized devices helps reduce physical stress while increasing operational output and safety. Moreover, small-scale and low-cost machines enable women and smallholder farmers to enter local processing and value addition enterprises, creating rural entrepreneurship and employment.

Conclusion

Farmer-led innovations in mechanization are contributing significantly to improved agricultural efficiency, reduced drudgery, value addition and productivity enhancement. They highlight the creativity, problem-solving ability and entrepreneurial spirit of farmers who are not only cultivators but also designers, engineers and change-makers in India's agricultural ecosystem.The future of mechanization will be shaped by the principles of cost-effectiveness, sustainability, energy efficiency and smallholder suitability. Innovations aligned with renewable energy, particularly solar-based irrigation, drying, and processingwill support climate-resilient agriculture.

Custom hiring centers, village-level machinery banks and aggregator-based service provision models are democratizing access to mechanization. Farmer Producer Organizations (FPOs) are emerging as collective platforms for procurement, leasing and maintenance of machinery, ensuring affordability and shared benefits.Farm mechanization, therefore, is not just about machinesit is about innovation, resilience, inclusivity and the evolution of farming as a modern enterprise. As challenges intensify and opportunities expand, empowering farmers to innovate, adapt and adopt mechanization will be the foundation for achieving sustainable, profitable and future-ready agriculture. The subsequent farmer success cases illustrate how grassroots mechanization innovations have translated into tangible improvements in efficiency, drudgery reduction, and livelihood enhancement.

Name : Shri Gopala Krishna Sharma. S.
Address : Saravu House, Padre Post (Via),
Perla, District Kasaragod,
Kerala – 671552
Contact No. : +91-9446655218
Email : gkshanmasaravu@gmail.com

Personal Profile and Farming Background

Shri Gopala Krishna Sharma, aged 63, is a progressive farmer from Kasaragod, Kerala, with a B.Sc. in Botany and extensive experience in arecanut, coconut, black pepper, and rubber cultivation. Farming has been his primary occupation, supported by allied activities. From childhood, he showed interest in machinery and reducing drudgery. Labour shortages and post-harvest challenges motivated him to develop efficient, farmer-friendly, cost-saving technological solutions for his 2-hectare farm.

Innovation Overview and Motivation

The major innovation developed by Shri Sharma is the Vinpept Motorised Pepper Thresher, an efficient power-operated machine for separating pepper berries from harvested spikes. Manual methods caused contamination, damage, drudgery and high labour costs. Seasonal harvest and limited labour motivated him, especially as existing machines were inefficient. Determined to create a cleaner, faster and affordable solution, he began work in 2008 and completed the innovation in 2011.

Technical Features, Novelty and Development Process

The Vinpept Pepper Thresher is a semi-continuous, power-operated machine weighing 43 kg, running on a ½ HP single-phase motor, and delivering 99.5% threshing efficiency with a capacity of over 250 kg per hour. Its friction-reducing mechanism enables clean separation without damage. Compact, low-power and suitable for all pepper varieties, it was developed through extensive experimentation, field testing and user-based refinement, with an overall development cost ₹1,50,000.

Institutional Linkages, Mentorship and Validation

The innovation has been scientifically validated by CPCRI, Kasaragod, confirming its technical efficiency and reliability. Shri Sharma also received developmental guidance from KVK Kasaragod during testing and refinement. Participation in national forums such as the National Farm Innovators Meet, Tech4Seva and major agricultural expos enhanced visibility. Recognition through IARI and state awards further strengthened credibility and facilitated wider adoption among pepper growers.

Challenges Faced and Problem-Solving Approaches

During the development of the machine, Shri Sharma faced multiple challenges including the lack of technical guidance, absence of proper financing support, high cost of components, and difficulty in refining the machine to achieve high efficiency. Another major challenge was the absence of formal advertising or marketing networks. He overcame these issues by relying on self-learning, rigorous trial-and-error experiments, and continuous engagement with farmers for

feedback. Despite no formal marketing, the machine became popular purely through farmer-to-farmer communication and demonstration of its high performance.

Utility, Applications and User Benefits

The innovation offers numerous advantages to pepper farmers. The Vinpept Pepper Thresher offers multiple advantages by eliminating contamination, ensuring zero berry damage and delivering premium-quality produce. While manual threshing yields about 100 kg/day at high labour cost, the machine processes 250 kg/hour at merely 20 paise/kg. It reduces drudgery, prevents losses, saves time, and is suitable for all pepper varieties. Its high energy efficiency and ease of operation make it extremely beneficial for pepper farmers.

Adoption, Outreach and Scaling up

Following the IARI Award, the innovation expanded rapidly with over 300 machines adopted across Kerala, Karnataka and Tamil Nadu. Dissemination occurred through user experience, demonstrations, exposure visits and word-of-mouth. Farmer groups, organizations and pepper growers widely embraced the technology. Its simplicity, affordability and high efficiency provide strong potential for further upscaling across pepper-growing regions.

Impact Assessment (Economic, Social and Environmental)

Economically, the machine reduces labour costs, enhances income and improves produce quality. Socially, it empowers farmers especially smallholders by lowering drudgery and improving post-harvest efficiency. It also creates opportunities for women and rural youth in fabrication, custom hiring and service provision. Environmentally, the machine consumes nominal power, has no negative impact and promotes clean, energy-efficient processing, contributing indirectly to climate resilience.

Recognition, Awards and Media Coverage

He has received major recognitions including the Jagjivan Ram Innovative Farmer Award (2020), ICAR-NAARM Innovative Farmer Award (2020–21), Kerala State Innovative Farmer Award (2022), Campco Silver Jubilee Innovative Farmer Award (2022–23), Kerala Bank Innovative Farmer Award (2022–23) and Vishwa Havyaka Krishiratna Award (2024). His work has been showcased at national forums and widely covered across print, electronic and social media.

Future Vision, Suggestions and Way Forward

He aims to refine the thresher by improving user comfort, portability and affordability. He plans to establish a local manufacturing unit to support large-scale production and generate rural employment. New attachments and models suited to diverse farm sizes are under consideration. He seeks greater institutional backing for marketing, incubation and finance, envisioning mechanized pepper threshing across all pepper-growing regions of India.

Name : Shri Gurpreet Singh Shergill
Address : Village Majal Khurd,
District Patiala,
Punjab – 147101
Contact No. : +91-9872624253
Email : shergill_farms@yahoo.com

Personal Profile and Farming Background

Shri Gurpreet Singh Shergill, aged 54, is a nationally recognised progressive farmer from Majal Khurd, Patiala, with twenty-nine years of experience in diversified agriculture. A Mechanical Engineer by training, he has developed his six-hectare irrigated farm into a technology-driven floriculture enterprise. He scientifically cultivates gladiolus, rose, chrysanthemum, marigold, statice and daisy for flowers and seed production, and his farm serves as a demonstration centre for improved crop management, mechanisation and value addition.

Innovation Overview and Motivation

His Gladiolus Bulb Grader, developed in 2012, addresses labor-intensive and inefficient manual grading in floriculture. Inspired by high-cost commercial machines in Holland, he designed an affordable, farmer-friendly alternative to reduce post-harvest losses, lower labor costs, and ensure uniform bulb grading meeting market standards at domestic and international level.

Technical Features, Novelty and Development Process

The Gladiolus Bulb Grader is a compact, low-cost device grading 7–8 quintals of bulbs per cycle into four sizes: large, medium, small, and cormels. Costing around ₹50,000, it ensures accuracy while maintaining bulb integrity. Its simple design, minimal power use, easy operation, and suitability for farms of up to 100 acres make it ideal for rural use. Developed through local fabrication, field testing, and continuous refinement, it balances affordability with precision and durability.

Institutional Linkages, Mentorship and Validation

His innovation was guided and validated by Punjab Agricultural University (PAU), Ludhiana, and the Punjab State Council for Science and Technology. National bodies like ICAR and the National Innovation Foundation have recognized his work for originality and practical value. As President of the PAU Flower Growers Club and the Dynamic Diversified Farmers Group, he actively promotes floriculture and farmer-led technology. International exposure, especially with Dutch experts, enhanced his knowledge of global mechanization and post-harvest management.

Challenges Faced and Problem-Solving Approaches

He initially faced constraints related to limited engineering resources, difficulty in locating artisans capable of producing components to exact specifications, and farmers' hesitancy to adopt mechanised grading. He addressed these challenges through design simplification, rigorous field demonstrations, hands-on training sessions and open sharing of fabrication guidelines. This participatory approach fostered trust and enabled gradual acceptance among growers.

Utility, Applications and User Benefits

The grader significantly enhances grading efficiency, minimises post-harvest losses, reduces labour requirements and ensures uniform bulb size for planting and marketing. Its affordability makes advanced post-harvest technology accessible to small and medium growers, improving market competitiveness and profitability. It also reduces physical drudgery, particularly benefiting women who are typically engaged in manual sorting.

Adoption, Outreach and Scaling Up

The innovation has gained substantial acceptance across gladiolus-growing regions of Punjab and beyond. Many farmers have replicated the machine locally, while others utilise it collectively through cooperatives and farmer groups. After receiving validation and recognition from IARI, he expanded outreach through Skill India programmes, Kisan Melas and agricultural colleges, training over a thousand agriculture students and numerous farmers in the grader's use and fabrication of the bulb-grader.

Impact Assessment (Economic, Social and Environmental)

Economically, the grader improves grading speed, reduces labour expenditure and enhances bulb quality, leading to higher productivity and better market prices. Socially, it generates employment in floriculture cultivation, harvesting and processing, while empowering rural women and youth. Environmentally, it reduces wastage, prevents spoilage from heat exposure and supports diversified, climate-resilient farming systems.

Recognition, Awards and Media Coverage

He has received several prestigious honours, including the N.G. Ranga Farmer Award, IARI Fellow Farmer Award, National Innovative Farmer Award, Jagjivan Ram Innovative Farmer Award and various state-level awards. His work has been widely featured in newspapers, magazines and digital media, positioning him as a leading figure in floriculture-based diversification.

Future Vision, Suggestions and Way Forward

He aims to broaden adoption of the Gladiolus Bulb Grader through farmer-group collaborations, local fabrication units and large-scale demonstrations. His long-term vision emphasises strengthening floriculture value chains, enhancing processing and branding, and promoting farmer-owned, resource-efficient technologies to improve incomes and build climate-resilient, diversified farming systems.

Name : Shri Gurvinder Singh Sohi
Address : Village NanowalKhurd,
PO Nanowal Kalan, Tehsil Khamano,
District Fatehgarh Sahib, Punjab - 141801
Contact No. : +91-9915310703
Email : sohi07@yahoo.co.in

Personal Profile and Farming Background

Shri Gurvinder Singh Sohi manages 8.8 hectares farm of sandy loamy soil in Nanowal Khurd, Fatehgarh Sahib, Punjab, with 3.2 hectares owned and 5.6 hectares leased, fully irrigated by canal water and borewells. With 27 years of floriculture experience, he cultivates extensive flower crops using tractors and specialized implements such as gladiolus planters and diggers, alongside limited wheat and paddy. As president of Friends Farmer Welfare Club and member of major FPOs, he addresses labour shortages in floriculture through large-scale mechanization.

Innovation Overview and Motivation

His innovations include a Gladiolus Planter (2021; ₹5 lakh), Gladiolus Digger (2017; ₹2.25 lakh) and a Tractor-Operated Vacuum prototype for seed collection (2024) - designed to address labour-intensive floriculture tasks. Manual gladiolus planting and harvesting require high labour and cause bulb damage, while seed collection suffers losses. His planter covers 1 acre in 4 hours, the digger harvests 2–3 acres daily with reduced injury, and the vacuum seed collection device enables undamaged seed recovery, lowering costs and drudgery for smallholders.

Technical Features, Novelty and Development Process

The semi-automatic Gladiolus Planter mounts on a three-point linkage, where four labourers feed corms while tractor's motion ensures uniform placement, completing 1 acre in 4 hours. The modified Digger, based on a potato digger with narrower bars and changes in pulley, uproots bulbs gently in one pass. The PTO-powered Vacuum prototype collects seeds without sweeping-like movement. These floriculture-specific implements, refined through PAU, Ludhiana trials (2017–2024) with a ₹12 lakh PABI grant, address field-prototype and soil-type challenges, unavailable in existing machinery.

Institutional Linkages, Mentorship and Validation

PAU, Ludhiana's floriculture and landscaping department validated the planter on its flower farm, mentoring alongside PUM Netherlands Senior Experts, while PABI skill incubation centre provided ₹12 lakhs grant for development without NIF or Atal innovation Mission sponsors; FPO memberships facilitated outreach, with machines leased at ₹3,000 per acre. These ties ensured structured support, confirming yield boosts by uniform planting and 70% labour savings due to the digger across trials, enabling Sh. Sohi to guide 1,300 farmers in North India through Farmers' club-level demonstrations.

Challenges Faced and Problem-Solving Approaches

Fabrication from scratch in absence of any model, calibrating spacing, depth, gentle handling mechanism; financial constraints, and adaptation to soil types challenged development. Those were resolved via PAU trials, modifications, and grants. Popularization was delayed due to low awareness, smallholder hesitation (under 8.8 ha plots), and service gaps, which were tackled by custom hiring, field demos, and welfare club activities. Unlike manual methods involving spending for 25-35 labourers per acre, these machines needed a frugal 4-8 worker engagement,

apart from overcoming climate-induced seed losses due to quicker operations.

Utility, Applications and User Benefits

Planter cuts labour requirement from 21 labourers/day to only 4 for 4 hours/acre, digger harvests 2-3 acres daily versus 7-10 acres conventionally, vacuum collector accelerates seed collection avoiding damage, optimizing sunlight, nutrients, moisture for taller stems, larger spikes/bulbs, ensuring higher germination, and market appeal; applications span gladiolus and other annuals on leased lands, reducing inputs due to uniformity, ensuring less use of fertilizer, irrigation or pesticides and fuel through short runs. Benefits include cost-effective scalability for 8.8 ha operations, timely rotations, and profitability and assured steady revenue flow similar to salaried employment.

Adoption, Outreach and Scaling Up

Adopted across North India, the tools reached 1,300 farmers through guidance, leasing and trials; welfare club and FPO networks carry out demos. After receiving IARI award marketing plans have been conceived to be carried out with intensive field shows, expanding from Sohi's 8.8 ha to marginal plots nationwide.

Impact Assessment (Economic, Social and Environmental)

Labor-related expenditure plummeted by 70% - from 21 labourers to 4 for planting and man-days saved from 25–26 down to 7–8 only for digging which were cost saving, leading to higher bulb recovery and price realisation and profits; uniform growth boosts yield, productivity and quality with cleaner produce. On social front, viable floriculture business empowered farmers, rural women and youth with small holdings; environmentally, precise inputs curbed wastage and GHG emissions, efficient tractor use saved diesel, promoting sustainable farming practice.

Recognition, Awards and Media Coverage

IARI-Innovative Farmer Award, headlines in national-level print media, developed contact with Punjab CM Bhagwant Mann through state science council/PAU, Sardarni Prakash Kaur Saran Memorial (PAU), honours from Chief Parliamentary Secretary P.C. Garg, Cabinet Minister Navjot Singh Sidhu, Janab Hazi Mohammad Ramzan (Jatt Expo), and 1st prize from Chancellor Ramesh Mittal (LPU Flower Show); extensive print, electronic, social media coverage exemplifies the reach of Sh. Sohi .

Future Vision, Suggestions and Way Forward

Intensive marketing and field trials aimed for hesitation-free adoption, with policy calls for subsidies and custom-hiring schemes, university-level multi-soil trials, training sessions atKisan Melas, FPO-mediated entrepreneur support and innovator grants/incubators to mass-produce and standardize the machinery, up-scaling floriculture via institutional collaborations for India's marginal farmers.

Name : Shri Ravichandran Vanchinathan
Address : 52, Agraharam Nallamangudi,
Nannilam, District Thiruvarur,
Tamil Nadu – 610105
Contact No. : +91-9443683724
Email : vkvravi@gmail.com

Personal Profile and Farming Background

Shri Ravichandran Vanchinathan, aged 67, is a progressive farmer with four decades of experience, cultivating 21 hectares of irrigated clay soils in Thiruvarur district. A B.Sc. graduate, he applies analytical decision-making to a diversified farming system that combines traditional knowledge with mechanization. Using power tillers, borewells, canal irrigation, drip and sprinkler systems, he focuses on precision, reduced labour dependence, efficient resource use, and long-term farm resilience.

Innovation Overview and Motivation

He has developed three significant innovations to address recurring farm-level challenges: Smart Weighment and Monitoring System (SWAMS) to ensure accurate, transparent crop weighment; Storage Pest Control Techniques using vacuum sealing for long-term grain protection; and an Improved Direct Seeded Rice (DSR) System integrated with seed fortification to improve germination and crop vigour. These ideas emerged from his need to reduce losses, improve seed quality, and enhance efficiency across the cultivation cycle.

Technical Features, Novelty and Development Process

SWAMS ensures precise digital weighment and monitoring, reducing disputes and ensuring farmer-friendly transparency during procurement. His storage innovation uses vacuum bags that extend grain shelf-life, prevent pest infestation, and maintain quality without chemicals. The improved DSR innovation integrates pneumatic seed drill–based deep placement of urea briquettes, micronutrients, and biofertilizers, improving early crop vigour and nutrient-use efficiency. Together, these innovations strengthen production, storage, and value realization.

Institutional Linkages, Mentorship and Validation

His innovations have benefited from institutional support and scientific validation provided by KVKs, ICAR–IARI, and TNAU, particularly in refining the fortified DSR system. Expert feedback played an important role in improving prototype efficiency, optimizing nutrient delivery mechanisms, refining pest-proof storage designs, and enhancing the operational accuracy of SWAMS. These institutional collaborations strengthened the scientific credibility of his innovations, facilitated field-level evaluation, and enabled wider dissemination among farming communities

Challenges Faced and Problem-Solving Approaches

He initially encountered several challenges, including high equipment and input costs, limited scientific guidance for prototype refinement, and financial constraints in obtaining coating materials and vacuum storage bags. To address these constraints, he adopted an iterative process of on-farm experimentation, consulted domain experts for technical guidance, and refined each innovation to make it cost-effective and user-friendly for farmers. This systematic

approach ensured that the technologies remained affordable, practical, and suitable for diverse farming conditions.

Utility, Applications and User Benefits

SWAMS provides accurate, transparent crop weighment and prevents exploitation during procurement. The vacuum storage system safeguards grains against pests, significantly reduces storage losses, and preserves quality for extended periods. The improved DSR method enhances germination, boosts nutrient uptake, reduces fertilizer wastage, and results in stronger plant establishment. Collectively, these innovations improve productivity, reduce input losses, and enhance farmers' income.

Adoption, Outreach and Scaling Up

Farmers in his region have adopted the vacuum storage method to safeguard grains effectively, and many have implemented the improved DSR method using pneumatic seed drills and fortified seeds. SWAMS, demonstrated at procurement centres and farmer meetings, has shown high potential for scaling, particularly through Farmer Producer Organizations (FPOs) and cooperatives seeking transparent and accurate weighment systems. His outreach activities include demonstrations, technical discussions, and capacity-building sessions.

Impact Assessment (Economic, Social and Environmental)

Economically, his innovations reduce fertilizer wastage, improve nitrogen-use efficiency, prevent storage losses, and enhance crop yields, contributing to higher net returns. Socially, they build farmer confidence, improve market transparency, and create opportunities for local employment in seed preparation and storage operations. Environmentally, reduced chemical use, better nutrient placement, and pest-free storage support sustainable and climate-resilient agriculture.

Recognition, Awards and Media Coverage

He has received several prestigious recognitions, including invitations to Rashtrapati Bhavan (2024) and an award from the Governor of Tamil Nadu (2025). Major honours include the Rotary Vocational Excellence Award, ASM Uday Ratan Award, IARI Fellow Farmer Award, Harit Kranti Award, and IRRI Essay Contest. His work is widely covered by BBC, national media, journals, newsletters, and All India Radio.

Future Vision, Suggestions and Way Forward

He aims for large-scale promotion of SWAMS to strengthen marketing transparency, widespread dissemination of vacuum storage technology for chemical-free grain preservation, and broader adoption of fortified DSR for efficient rice cultivation. He advocates stronger institutional support to commercialize these technologies and intends to continue developing practical, science-based innovations to empower farmers and enhance agricultural sustainability.

Name : Shri Ranjit Kumar R.
Address : 6 Theatr Road, Kottur,
District Coimbatore,
Tamil Nadu– 642114
Contact No. : +91-9486685100
Email : ranjitkct@gmail.com

Personal Profile and Farming Background

Shri Ranjit Kumar, aged 38, has 11 years of agricultural experience. He holds a B.E. in Mechanical Engineering and MPhil in Micro and Nanotechnology. He serves as Managing Director of Pollachi Nutmeg FPO and Director of Arulmigu Someshwara FPO.

Innovation Overview and Motivation

Shri Ranjit Kumar developed low-cost electrical solutions for nutmeg processing, including a Nutmeg/Mace Dryer and a Nutmeg Desheller. These innovations are self-motivated, aimed at reducing labour, improving efficiency, and adding value to nutmeg production.

Technical Features, Novelty, and Development Process

His solutions for nutmeg processing to improved efficiency and has made post-harvest operations affordable for small farmers. The dryer, fabricated for ₹15,000 compared to commercial units costing ₹50,000, handles up to 10,000 nuts and mace, dries 300 coconuts, prevents fungal growth during prolonged rains and enables copra extraction even from small nuts. The desheller, also costing ₹15,000 versus ₹1 lakh commercially, uses a single-phase motor, has a transparent, easily maintainable design and is portable. Both of the farmer-scale innovations emphasize affordability, simplicity and scalability, enhancing income and streamlining nutmeg processing for smallholders.

Institutional Linkages, Mentorship, and Validation

He has established technical and knowledge linkages with Tamil Nadu Agricultural University (TNAU), Coimbatore, which provided scientific guidance for validating and refining his low-cost nutmeg processing innovations. These institutional connections strengthened design improvements, ensured alignment with recommended post-harvest standards, and supported wider dissemination among small and marginal nutmeg growers.

Challenges Faced and Problem-Solving Approaches

He faced challenges such as prolonged rains causing fungal growth in nutmeg and mace, the high cost of commercial dryers and deshellers, and the vulnerability of coconut plantations to Root Wilt Disease and climate variability. To overcome these, he fabricated low-cost electric dryers and deshellers suitable for small farmers, implemented collective marketing through FPOs for better price realization, and installed mini meteorological stations to monitor climate in real time.

Utility, Application, and User Benefits

His innovation offer affordable, efficient, and farmer-friendly solutions. The dryer reduces fungal contamination, saving large quantities of mace during heavy rains, with first-class fungus-free Pollachi mace fetching ₹2,900/kg compared to ₹1,250/kg for damaged produce. The innovations improve quality, speed up post-harvest processing, reduce labor, and lower dependency on costly commercial machines. Combined with FPO-based collective marketing and climate monitoring, they enhance income, marketability, and crop resilience for smallholder farmers.

Adoption, Outreach, and Scaling Up

Adoption and outreach efforts in Anaimalai and Pollachi Taluks have covered approximately 300 acres, with 20 farmers directly guided and benefited through the innovations and field support.

Impact Assessment (Economic, Social, and Environmental)

The innovations have led to measurable economic gains for farmers by preventing fungal spoilage and improving product grade. While fungal mace sells at ₹1,250/kg, high-quality mace dried by using the electric dryer fetches ₹2,900/kg, significantly increasing farmer income. The low fabrication cost (₹15,000) makes the system accessible compared to market alternatives costing ₹50,0000-₹1,00,000. Socially, the innovation has strengthened farmer confidence, skill-based independence, and collective action through FPO involvement, benefiting 20 farmers across 300 acres. Environmentally, the innovation reduces wastage, prevents fungal contamination, promotes efficient resource use, and minimizes the carbon footprint associated with repeated long-distance sorties needed of drying and processing.

Recognition, Awards, and Media Coverage

Shri Ranjit Kumar R has been honored with major awards, including the VELAN SEMMAL Award (2024), Sugandhashree Innovative Farmer Award (2021), IARI Innovative Farmer Award (2025), and the Millionaire Farmer of India Award (2024). His work has been featured in leading media such as Spice India Magazine, Pasumai Vikatan, The Hindu, Indian Express, Times of India, and a Business Insider documentary with over 3.9 million views, bringing national and global visibility to Pollachi nutmeg farming and farmer-led innovation.

Future Vision, Suggestions, and Way Forward

Shri Ranjit Kumar aims to scale and commercialize his low-cost farm technologies, train more farmers, and expand adoption through FPOs. He suggests stronger farmer–scientist collaboration, policy support for land-based processing innovations, and financial schemes to encourage local value addition. Moving forward, recognizing farmers' contributions and enabling farmer-led climate resilience will help accelerate wider adoption and sustainability.

Name : Shri Ganga Ram Chauhan
Address : House No. 731A, Village Chaksa Husain, Pachpedwa, Ramanand Shiv Mandir Marg, Post Bashartpur, District Gorakhpur, Uttar Pradesh- 273004
Contact No. : +91-9454351680
Email : grchauhaninnovator@gmail.com

Personal Profile and Farming background

Shri Ganga Ram Chauhan, 56-year-old, holds a B. Com and has 25 years of farming experience. Primarily an agriculturist, he is also engaged in agricultural innovation, focusing on improving practices and productivity for the farming community.

Innovation Overview and Motivation

During the lockdown, Shri Ganga Ram Chauhan developed the cycle-operated flour food mill, driven by self-motivation and a desire to create a practical, efficient solution for farmers and households.

Technical features, Novelty and development Process

The Cycle-operated flour food mill developed is a manually operated, eco-friendly flour mill that runs entirely on human power without requiring electricity, diesel, or petrol. It grinds 1 kilogram of grain in 5 minutes, producing pure and hygienic flour. It's simple design allows anyone, including women and the elderly, to operate it easily without special training. The machine promotes physical fitness as pedalling provides exercise, helps prevent lifestyle related diseases, and ensures health benefits. It is especially useful in hilly areas, during power cuts, or emergencies, allowing households to grind grains independently.

Institutional Linkages, Mentorship and validation

He has established strong institutional linkages through collaboration with organizations such as the Atal Innovation Mission (AIM) Atal Community Innovation Centre (ACIC) and the Miet Meerut Foundation, Meerut.

Challenges faced and problem-solving approaches

Shri Ganga Ram Chauhan faced challenges in selecting durable, affordable materials, designing an efficient mechanism, and assembling the machine into a smooth, user-friendly, and reliable flour mill. Persistence and problem-solving were key to overcoming these hurdles.

Utility, application and user benefits

It offers multiple practical benefits. It allows households to grind grains efficiently without electricity or fuel, producing pure and hygienic flour. It's simple design makes it easy for anyone, including women and the elderly, to operate. Pedalling provides physical exercise,

promoting health and preventing lifestyle related diseases. The machine is especially useful in rural or hilly areas, during power cuts, and emergencies, supporting self-reliance, employment, and eco-friendly, sustainable practices.

Adoption, outreach and scaling up

Twenty farmers have been directly guided and benefited, and the innovation was developed and refined at an approximate cost of ₹15,000. Outreach and scaling are being done through YouTube, Facebook, newspaper coverage, and participation in exhibitions and fairs to promote adoption and wider awareness.

Impact Assessment (Economic, social and environmental)

The mill excels in power outages, remote hilly areas, natural disasters, enabling independent home grinding for self-reliance. Quiet, slow-running, and pollution-free, it maintains environmental cleanliness and sustainability, aligning with post-harvest technology in food processing. At a low cost of around ₹15,000, the affordable, easy-to-manufacture mill generates employment and supports rural programs like NRLM for self-reliance and livelihoods. Socially, it fosters health, community processing, and reduced drudgery; economically, it cuts milling fees and operational costs; environmentally, it lowers emissions, conserves energy, and aids eco-friendly rural development.

Recognition, Awards and Media Coverage

Sh. Chauhan Science Awards 2014-15; IARI Innovative Farmer Award 2020; Search of Rural Scientists by Lions Club Mulund, Mumbai; Dr. A.P.J. Abdul Kalam Innovation Award by Vigyan Ratna Lakshman Prasad, Aligarh; KVK Mahayogi Gorakhnath Gorakhpur recognition. Print, electronic, and social media amplified outreach for adoption.

Future Vision, suggestions and way forward

The farmers demand comprehensive support from innovation development through production to marketing and sales so the new innovation achieves successful market penetration and sales.

Name : Shri Dharampal Singh Duhoon
Address : 21/17, Patti Chaudharan, Baoli Road,
Paschim Baraut, District Baghpat,
Uttar Pradesh – 250611
Contact No. : +91-9917862313
Email : dpsinghduhoon@gmail.com

Personal Profile and Farming Background

Shri Dharampal Singh Duhoon, 56, is a postgraduate in Agricultural Economics and a nationally recognized grassroots innovator with over 30 years of farming experience. Growing up in a farming family in Baghpat, Uttar Pradesh, he became committed to reducing agricultural drudgery. On his 1.5 hectare irrigated farm, he cultivates sugarcane, wheat, rice, and fruits, and uses the farm as an innovation lab for designing and testing machines. He also manages a small dairy unit and operates a successful mechanization startup with an annual turnover of ₹30–35 lakh.

Innovation Overview and Motivation

He innovations developed over sixty indigenous agricultural machines addressing key field challenges. His innovations include battery operated weeders, solar intercultural devices, sugarcane bud chippers, ratoon management tools, lightweight tillers, seed drills, and processing machines for horticultural and medicinal crops. His journey began in 2007 with support from the Agri Business Incubation Centre at IIT (BHU), Varanasi. Motivated by labour shortages, rising input costs, and the lack of affordable machinery for small farmers, he focused on designing simple, durable, and cost-effective mechanization solutions for Indian agriculture.

Technical Features, Novelty and Development Process

The hallmark of his innovations is their low maintenance, and farmer-friendly design. Powered by battery and solar energy, his tools allow farmers to mechanize work at almost no running cost, making them ideal for small and marginal farmers. His machines are lightweight, ergonomic, compact, and adjustable for various soils and crops, unlike conventional large-farm equipment. Each tool is designed from scratch and improved through continuous prototyping and field testing. Incorporating farmer feedback, his machines replace labour-intensive tasks like weeding and sugarcane management, reducing drudgery and saving time.

Institutional Linkages, Mentorship and Validation

Over the years, he has collaborated with several national institutions, including IIT (BHU), Atal Innovation Centre (IIMT University), SVPUA&T Meerut, and KVK Baghpat, which supported validation and dissemination of his innovations. These institutions facilitated demonstrations, technical feedback, and linkages with wider farmer and industry networks. His work has been regularly featured on platforms such as DD Kisan, Kisan Tak, and Farmers of India, greatly expanding the reach of his machines across multiple states.

Challenges Faced and Problem-Solving Approaches

Uniquely, he reports facing relatively few constraints during innovation and adoption. His machines filled critical mechanization gaps, especially in sugarcane and field crop management, and thus were quickly embraced by farmers. His strong understanding of grassroot challenges and

practical design thinking ensured immediate relevance and affordability. This alignment between need and solution minimized resistance and accelerated acceptance across multiple states.

Utility, Applications and User Benefits

His machines greatly reduce labour costs, drudgery, and the time required for sugarcane interculture, weeding, harvesting assistance, and other field tasks. For smallholder farmers struggling with rising fuel prices and labour shortages, his battery and solar powered tools provide a sustainable, low-cost alternative. His underground PVC-based irrigation system lowers water use by 30–40% and needs minimal supervision, saving farmers long hours.

Adoption, Outreach and Scaling Up

Today, thousands of farmers across Uttar Pradesh, Haryana, Bihar, Rajasthan, Maharashtra, Tamil Nadu, Uttarakhand, Assam, and other states benefit from his machines. Moreover, major sugar mills such as Avadh Sugar & Energy, DCM Shriram Sugar Factory, and several units of Magadh Sugar & Energy Ltd. use his innovations extensively for sugarcane operations. His national reach expanded rapidly after receiving the prestigious IARI Award, motivating him to develop more than thirty additional machines in 2024 alone and to strengthen his distribution network.

Impact Assessment (Economic, Social and Environmental)

His innovations have improved farm economics, with farmers reporting up to 35% higher yields and a 60–70% reduction in cultivation costs due to lower fuel and labour needs. His machines empower women, elderly farmers, and youth by making tasks easier and less strenuous. Environmentally, his battery and solar-powered technologies reduce emissions and conserve water. His workshop also employs eight skilled and semi-skilled workers, supporting local livelihoods.

Recognition, Awards and Media Coverage

He has received prestigious awards from the Technology Development Board (Government of India), IARI, SVPUA&T Meerut, KVK Baghpat, and the National Medicinal Plants Board. His work has been extensively featured in print, television, and digital media, highlighting his role as a leading grassroots mechanization innovator.

Future Vision, Suggestions and Way Forward

Looking ahead, he envisions expanding his innovations to neighbouring countries with similar smallholder farming systems. He advocates for farmer-centric mechanization policies that promote affordability, eco-friendly designs, simple maintenance, and continuous technical refinement. He believes that meaningful innovations naturally spread through farmer networks when they deliver real results, making them sustainable and scalable in the long run.

CHAPTER 7

Scaling Farmer-Led Innovations in Secondary Agriculture: Evidence, Models and Policy Directions

Secondary agriculture constitutes a critical interface between primary agricultural production and value-added rural enterprises, encompassing dairy, fisheries, poultry, beekeeping, goat rearing, vermicomposting, mushroom cultivation, sericulture, and other allied subsystems. In India, these sectors employ more than 45 percent of the rural workforce and contribute approximately 18 to 20 percent to the national GDP (FAO, 2023). National production in 2024-25 reached 230 million tonnes of milk, 18 million tonnes of fish (including 14.4 million tonnes from aquaculture), and 12 billion eggs, reflecting strong structural growth. Small and marginal farmers, who represent 86 percent of operational holdings, increasingly rely on secondary agriculture, which provides 3–5 times higher returns than cereals and other staple crops and has demonstrated annual growth rates of 8-12 percent in major subsectors (World Bank, 2024). Rising protein demand, currently estimated at 80 grams per capita per day, further accelerates diversification toward livestock and aquaculture. The scientific and policy literature consistently positions secondary agriculture as a cornerstone for rural income stability and climate resilience. As emphasized in ICAR's strategic reviews (ICAR, 2024), innovations in secondary agriculture bridge technological, ecological, and entrepreneurial domains, making them central to rural transformation agendas. This chapter therefore synthesizes empirical performance metrics, technology trends, practitioner evidence from field studies, institutional insights, and policy frameworks shaping secondary agriculture in contemporary India.

Significance of Secondary Agriculture in Rural Economies

Secondary agriculture addresses longstanding structural problems in Indian farming systems, including land fragmentation where average holdings have declined to 1.08 hectares and growing monsoon variability. Chronic green fodder deficits of 35.6 percent severely constrain livestock productivity, while aquaculture potential remains underutilized despite high projected demand (FAO, 2023). Dairy continues to support approximately 80 million rural households, making India the world's largest milk producer; inland fisheries and aquaculture are projected to reach 28.8 million tonnes by 2033; and poultry development increasingly leverages nineteen ICAR-registered indigenous breeds to enhance climate resilience (ICAR, 2025). Such evidence reinforces the broader argument advanced by global

research networks such as GFRAS and GFAR that farmer-led innovation and secondary agriculture are mutually reinforcing drivers of agrarian modernization (Waters Bayer & Van Veldhuizen, 2012; GFAR, 2023). Secondary agriculture not only diversifies income but also ensures year-round cash flows, strengthens women's participation estimated at 60–80 percent of labor in dairy and poultry systems and deepens linkages with Farmer Producer Organizations (FPOs) functioning as market-oriented rural enterprises (NABARD, 2021; SFAC, 2022).

Innovations in Dairy: Technology, Productivity, and Practitioner Evidence

Dairy innovations in India draw on advancements in precision nutrition, reproductive biotechnology, and digital animal health systems. Hydroponic green fodder units, producing 30 to 40 kilograms of fresh fodder per square meter per day while using 90 percent less water, have been demonstrated to increase milk yield by 1.5-2 liters per cow per day, approximately a 20 percent gain, while reducing feeding costs by 15–20 percent (ICAR, 2024). Controlled supplementation with azolla has been shown to enhance milk fat by 15–20 percent, and the increasing adoption of sex-sorted semen achieving up to 90 percent female calves has resolved herd composition imbalances. IoT-enabled rumen sensors, automated estrus detection systems, and digital mastitis monitoring reduced clinical episodes by nearly thirty percent in field trials These qualitative insights reinforce scientific evaluations and align with review-based assessments published by ICAR and global innovation platforms (GFAR, 2023).

Innovations in Fisheries: Sustainable Intensification and Technological Transitions

Fisheries and aquaculture have become major pillars of secondary agriculture, driven by technologies such as biofloc, recirculating aquaculture systems (RAS), cage culture, and integrated multi-trophic aquaculture (IMTA). Biofloc Technology (BFT) converts organic residues and pond metabolites into microbial protein, enabling annual productivity of 10–20 tonnes per hectare for tilapia and shrimp with feed conversion ratios approaching 1:1 and water reuse rates above eighty percent. More than 4,205 biofloc units have been documented across India, demonstrating scalability (Ministry of Agriculture & Farmers Welfare, 2025). Qualitative accounts confirm performance outcomes. An Assam aquaculture cluster farmer stated in a key informant interview that "biofloc tripled profits and required minimal water, making it ideal for small ponds" (Aquaculture Interview, 2024). Documentation from Andhra Pradesh's shrimp export hub similarly notes that "RAS ensures disease free production and stable export premiums," validating scientific evaluations (NABARD, 2022). Cage culture systems produce 5–10 tonnes per unit and achieve thirty percent higher yields when integrated with seaweed or mollusks for nutrient capture, aligning with empirical studies reviewed in FAO (2023).

Poultry Innovations: Indigenous Genetics, Nutritional Strategies, and Efficiency Gains

Poultry innovations are anchored in genetic enhancement, cost-efficient feeding systems, and disease-control measures. ICAR has strengthened nineteen registered

indigenous strains, including Kadaknath, Vanaraja, and Gramapriya, each offering adaptive resilience and market premiums. These breeds achieve 1.5–2.5 kilograms live weight in 35–180 days, with feed conversion ratios between 3:1 and 3.9 and price realization ranging from ₹500 to ₹800 per kilogram for specialty meat. Nutrient innovations, such as nano-calcium supplementation, have increased layer performance to 300 eggs per bird annually, while substitution of soybean meal with black soldier fly larvae has reduced feed costs by forty percent and decreased antibiotic dependence.

Beekeeping, Goatary, and Integrated Farming Systems

Beekeeping contributes both direct income and ecological services. Migratory beekeeping yields 40–60 kilograms of honey per hive annually, while stingless bees produce 1–2 liters of high-value medicinal honey priced at ₹1,500 per kilogram. Pollination services raise yields of fruits, oilseeds, and vegetables by 20–40 percent. A documented success case from Haryana reported an "eco-model generating two crore rupees with zero recurring costs," highlighting the enterprise's viability. Goatary has emerged as a preferred enterprise for marginal farmers due to its low capital requirements and rapid turnover. Boer and Sirohi crosses achieve 2–3 liters of milk per doe per day and reach 30 kilograms body weight within six months under stall-fed conditions. Total mixed ration (TMR) feeding reduces input costs by twenty-five percent, and FPO-led goat clusters in Bihar have reported high demand for chevon, enabling rapid enterprise scaling. Integrated farming systems combining dairy, fishery, poultry, and vermicomposting yield net returns of ₹3–5 lakh per hectare annually, with nutrient recycling providing ecological and economic synergies. This aligns with broader evaluations by IFAD (2023), emphasizing that integrated systems improve resilience and reduce input dependence.

Barriers, Enablers, and Scaling Pathways

Despite strong performance indicators, multiple structural and institutional barriers hinder widespread adoption. High capital requirements estimated at ₹10–15 lakh for a standard RAS unit limit entry for smallholders. Skills deficits remain prominent, particularly in diagnosing aquaculture diseases and managing precision dairy or poultry systems. A biofloc practitioner cautioned during a validation workshop that reinforcing findings from ICAR-NAARM and NABARD reviews (Nayak, 2022; NABARD, 2021). Key enablers include policies under the National Livestock Mission, which supports livestock-based FPOs with financial allocations exceeding ₹50 crore, and the RKVY-RAFTAAR program, which promotes agri-startup innovation ecosystems. Institutional linkages through SFAC, NABARD, ICAR institutions, and state agricultural universities provide essential extension, market intelligence, and entrepreneurial incubation. The literature indicates that FPOs act as aggregators, negotiators, and value-chain integrators, enhancing the viability of diversified enterprises (Singh & Singh, 2025; Marico Innovation Foundation, 2025). Policy recommendations emphasize the need for 50–75 percent capital subsidies for biofloc and RAS units, nationwide skill hubs for training one million rural youth and women, a ₹10,000

crore cold-chain infrastructure fund, and expanded access to e-NAM and GI-based market platforms (PIB, 2025).

Conclusion

The empirical evidence synthesized in this chapter demonstrates that secondary agriculture driven by innovations in dairy, fisheries, poultry, beekeeping, goatary, and integrated systems offers transformative potential for rural livelihoods. Productivity enhancements such as hydroponics increasing milk yield by twenty percent, biofloc achieving tenfold gains in aquaculture, and indigenous poultry yielding high-value products are validated by scientific research and supported by practitioner testimonies. These innovations reduce input costs, diversify income, enhance climate resilience, and strengthen ecological sustainability. The alignment of technology, farmer-led innovation, institutional support, and policy incentives can significantly accelerate India's progress toward inclusive agricultural development and rural prosperity. Strengthening farmer entrepreneurship within these sectors will be essential for scaling sustainable models and achieving long-term agrarian transformation.

Name : Smt. Anita Kumari
Address : Village Anantpur,
Post Madhopur, P.S – Chandi,
District Nalanda, Bihar - 803108
Contact No. : +91-8521421643, +91-479993755
Email : mfpclanantpur@gmail.com

Personal Profile and Farming Background

Smt. Anita Kumari, aged 53, from Anantpur village, Nalanda, Bihar, is a progressive woman farmer with a B.A. (Hons.) in Home Science and over 16 years of agricultural experience. She specializes in mushroom cultivation and horticulture and serves as a Director of Madhopur Farmers Producer Company Limited, contributing to farmer empowerment, collective marketing and capacity building. Her leadership and enterprise make her an influential figure in rural agricultural transformation.

Innovation Overview and Motivation

Known as the 'Mushroom Lady of Bihar,' she developed an integrated, low-cost and scalable model for mushroom cultivation, spawn production and value-added processing. Motivated to create profitable, land-light enterprises for small farmers, especially women, she drew inspiration from agricultural trainings and institutional support from ICAR, KVKs and universities. Her innovation converts agricultural waste into income, strengthens women's self-employment and advances sustainable livelihoods aligned with the vision of Atmanirbhar Bharat.

Technical Features, Novelty and Development Process

Smt. Anita Kumari developed a system that covers the entire process from spawn production to mushroom cultivation and value-addition. She produces high-quality mushroom spawn using sterilized wheat grains inoculated with pure culture and incubated under controlled conditions. Her low-cost mushroom growing chamber, built using an iron frame and foggers for humidity regulation, enables successful cultivation of oyster and milky mushrooms, achieving year-round production without expensive machinery. This model's novelty lies in its simplicity, affordability, low waste, and suitability for women and marginal farmers.

Institutional Linkages, Mentorship and Validation

Her journey has been strengthened through guidance from ATMA Nalanda, Krishi Vigyan Kendra Nalanda, Dr. Rajendra Prasad Central Agricultural University Pusa, Bihar Agricultural University Sabour, Birsa Agricultural University Ranchi, Directorate of Mushroom Research Solan, and Govind Ballabh Pant University Pantnagar. Scientists, officers, and experienced agripreneurs provided technical mentorship while rural women and youth who trained under her contributed to the model's refinement and validation through field adoption and feedback.

Challenges Faced and Problem-Solving Approaches

In the initial stages, she faced social stigma, lack of technical knowledge, contamination challenges, difficulty accessing good-quality spawn, and limited financial support. Through continuous learning, experimentation, and institutional training, she refined her methods and eventually established her own spawn production lab. She organized training programs,

promoted Self-Help Groups, and strengthened collective marketing through the Madhopur FPO. Value-added products such as mushroom powder and pickle helped enhance marketability and year-round income.

Utility, Applications and User Benefits

Her innovation offers multiple benefits including high profitability with low space and investment requirements, making it ideal for smallholders. Mushrooms contribute significantly to nutrition as a rich source of protein, vitamins, and minerals. Socially, her work empowers rural women, creates employment, and reduces migration. Environmentally, the model supports waste recycling, requires no chemicals, uses less water and land, and promotes sustainable, eco-friendly farming practices.

Adoption, Outreach and Scaling Up

After receiving the IARI Award, Anita expanded her work through intensive training programs, increased production capacity, and strengthened market linkages. Her model is now adopted across villages in Bihar and neighbouring states, supported by awareness programs, FPO networks, and demonstration units.

Impact Assessment (economic, social and environmental)

Her innovation has improved livelihoods, increased farmer incomes, created women-led enterprises, strengthened community confidence, and reduced agricultural waste. On 8 March 2025, she received appreciation from the Hon'ble Prime Minister for her contribution to women empowerment and rural development.

Recognition, awards and media coverage

Smt. Anita Kumari has earned major national recognition for her leadership in mushroom cultivation and women-led rural enterprises. Beginning with local appreciation in 2009, she later received the Jagjivanram Abhinav Kisan Puraskar (2014), Mahindra Samriddhi Award (2018), IARI Innovative Farmer Award (2021), Women Transforming India Award (2022) and Vijayalakshmi Das Award (2023), alongside institutional acknowledgements and public appreciation from the Prime Minister in 2025.

Future Vision, suggestions and way forward

To scale mushroom cultivation and empower women farmers, easy loans, subsidies and village-level training are essential. Strengthening research for quality spawn, low-cost techniques and better storage will enable year-round production. Enhanced support from KVKs, FPOs and extension systems for training, exposure visits and market linkages will create a sustainable mushroom ecosystem, boosting rural income and women-led entrepreneurship.

Name : Shri Mahadev Sahni
Address : Ward-0008, Village Satlakha,
Mithila Area, Rahika,
District Madhubani, Bihar-847238
Contact No. : +91-9431835351, +91-9471678007
Email : murli7200@gmail.com

Personal Profile and Farming Background

Shri Mahadev Saini, aged 76, is a graduate farmer with 50 years of experience in Bihar's chaur-based water landscapes. He manages 2.5 acres of land with irrigated rice, wheat, pulses, mango and mahogany, alongside cattle and extensive makhana processing valued at ₹4–5 lakh annually. He is locally regarded as an indigenous knowledge-holder of aquatic food systems, drawing from long-standing engagement with rivers, ponds, chaurs and fish–makhana livelihoods.

Innovation Overview and Motivation

His 2019 innovation introduces organic pest and disease management in mango and horticultural crops using neem oil, turmeric, ginger, jaggery and salt. Motivated by concerns over chemical residues and environmental risks, he adopted low-cost, traditional inputs to protect family orchards. His broader motivation is rooted in sustaining water-based cropping systems, especially makhana, where ecological balance and chemical-free practices directly affect quality and market acceptance.

Technical Features, Novelty and Development Process

The technique combines neem mineral oil coatings, turmeric- ginger salt pastes, jaggery-based fruit fly management and fermented organic preparations. These provide comprehensive, residue-free disease and pest control. The approach evolved from traditional formulations, field observation and iterative application. Novelty lies in using local materials suitable for smallholders, aligning with chemical-free deep-water systems such as makhana cultivation, where water purity and ecological stability are essential for productivity and market quality.

Institutional Linkages, Mentorship and Validation

His innovation was validated as a farmer-led organic intervention and documented by ASAR Social Impact Advisors, state agricultural departments engaged in extension activities. His perspectives on makhana, aquatic ecology and climate stresses are cited in working reports and regional studies, recognising him as an indigenous scientist of water-based systems. These institutional linkages strengthened dissemination of both horticultural innovations and makhana-related ecological knowledge.

Challenges Faced and Problem-Solving Approaches

Major challenges included poor market linkages, limited extension services, inadequate makhana storage, climate variability and hydrological disruptions from siltation and embankments. Declining fish and makhana yields due to blocked river flow and erratic rainfall further constrained livelihoods. He addressed these by community mobilisation, field demonstrations, NGO and government engagement, advocating river restoration and adopting low-cost organic inputs suited to fragile water ecosystems.

Utility, Applications and User Benefits

The innovation enables organic disease control in orchard crops, reducing chemical dependency and improving produce quality. It indirectly supports makhana systems by preventing chemical drift into ponds and chaurs, protecting water quality essential for nut formation and fish productivity. Benefits include reduced input costs, improved environmental safety, suitability for organic certification and reduced labour drudgery. The method strengthens diversified livelihoods integrating horticulture, makhana and fisheries.

Adoption, Outreach and Scaling Up

The practice is adopted across hundreds of acres and disseminated to thousands of farmers in multiple states. Outreach includes radio and TV broadcasts, Kisan Chaupals, ATMA programs, newspapers and departmental extension. IARI recognition accelerated scaling. His makhana-related insights, climate indicators and ecological critiques were disseminated through reports, farmer networks, and community meetings, strengthening regional awareness of sustainable water-based cropping systems.

Impact Assessment (Economic, Social and Environmental)

Economically, reduced pesticide expenditure, higher fruit quality and ₹4–5 lakh annual makhana income enhance livelihood stability. Socially, his knowledge empowers communities, supports women's roles in processing, and engages youth in aquatic and horticultural value chains. Environmentally, the approach protects water bodies from chemical contamination, maintains biodiversity in ponds and chaurs, and supports climate resilience through traditional ecological practices and low-input systems.

Recognition, Awards and Media Coverage

He received IARI Innovative Farmer Award (2024) and ASAR certification. His expertise is cited in ASAR's report and regional media describing impacts of siltation, sand deposition and hydrological decline on makhana and fisheries. Agricultural events, policy briefs and research case studies document his role as a leading farmer-scientist voice on aquatic food systems, climate risks and traditional ecological knowledge.

Future Vision, Suggestions and Way Forward

He advocates scaling organic inputs, strengthening makhana–fish–water chestnut integration, and establishing quality certification and export infrastructure for makhana. Recommendations include long-term pond leases, support for landless Mallah farmers, desilting and river restoration, FPO formation, storage and processing facilities, and inclusion of traditional farmers, especially women in policymaking. He emphasizes climate resilience through revived water systems, diversified aquatic cropping and institutional support for indigenous knowledge.

Name : Shri Chinmay Purshottam Tanshikar
Address : H. No. – 118, Taliwada,
Netravali, Sanguem
Goa - 403704
Contact No. : +91+9421184114
Email : tanshikarspicefarm@gmail.com

Personal Profile and Farming Background

Shri Chinmay Purshottam Tanshikar, 49-year-old graduate (B.Com.) farmer from Goa has more than 29 years of experience in spices farming and Agri-Eco Tourism. This innovative farmer of Goa has developed 'Agro-Eco Tourism' integrating agriculture, horticulture, spices, agroforestry and apiary with value addition of farm product. The yearly turnover from Agro Eco Tourism and value addition in his farm is about Rs.30-40 lakhs. He is practicing 100 % organic/ natural farming, mixed cropping in Agro Eco Tourism and developed many value added products.

Innovation Overview and Motivation

Shri Chinmay Purshottam Tanshikar is an innovative farmer recognizing for the integrated farming incorporating agriculture, agroforestry, agri eco-tourism, apiary and value addition. He has started agri eco-tourism from 2006 to make farming more profitable and sustainable with minimum dependency on outside support.

Technical Features, Novelty and Development Process

Shri Chinmay Tanshikar has developed his 10 hectares of land under agri eco-tourism in 2006 integrating agriculture, horticulture, spices, agroforestry and apiary with value addition of farm product. Around 80-100 farmers, tourists and students from schools and colleges visit his agri eco-tourism farm. He is practicing 100 % organic/ natural farming, mixed cropping in Agro Eco Tourism and developed many value added products. The value added products are being sold to visiting tourist from his farm sale counter. The yearly turnover from Agro Eco Tourism and value addition in his farm is about Rs.30-40 lakhs.

Institutional Linkages, Mentorship and Validation

He has developed linkages with Government colleges in Goa for training, visit and learn new innovations from agri eco-tourism farm. Shri Chinmay Tanshikar has also developed linkages with Adyyan Foundation (NGO) through which many school and college students get training from his farm. So far more than 400 farmers have been trained in apiary. His parents are the mentor of his innovation.

Challenges Faced and Problem-Solving Approaches

Shri Chinmay Tanshikar has faced many challenges like climate change, and this innovation is not reaching to the other farmers so the adoption is low because of high initial investment. The Govt. state department of agriculture may promote this innovation to the

other farmers for wider dissemination of this innovative concept. This innovative model is more sustainable but climate change is a big challenge.

Utility, Applications and User Benefits

With this agri eco-tourism innovation, Mr. Chinmay Tanshikar has made farm income almost double and he is providing employment to 30 persons in his village. Mr. Tanshikar has done value addition of different commodities like Nutmeg, Pineapple, Jackfruit, coconut oil, honey, different types of spices and able to sale from his agri eco-tourism sale counter to the tourists.

Adoption, Outreach and Scaling Up

Shri Chinmay Tanshikar has developed his 10 hectares of land under agri eco-tourism in 2006. He is providing employment in his agri eco-tourism to 30 local persons. Shri Chinmay Tanshikar has also developed outreach model with Adyyan Foundation (NGO) through which many school & college students get training from his farm. A majority of farmers and students are getting benefitted of this innovation.

Impact Assessment (Economic, Social and Environmental)

The yearly turnover from Agro Eco Tourism and value addition is about Rs.30-40 lakhs with employment generation to 30 local people. Shri Chinmay Tanshikar has developed association with Adyyan Foundation (NGO) through which many school & college students get training about agriculture, horticulture and environmental issues in his agri eco-tourism farm. So far more than 400 farmers have been trained in apiary.

Recognition, Awards and Media Coverage

He has received many prestigious awards such as Best Horticulturist from Goa Govt. (2006), Krishi Bhushan Award of Govt. of Goa (2012), Krishi Ratna Award (2016), IARI Innovative Farmer Award (2018) and Visionary Farmer Award of MIT, Pune (2024) for his outstanding contribution in agriculture.

Future Vision, Suggestions and Way Forward

NGO has invited Shri Chinmay Tanshikar to deliver lectures in school and college students about his innovation of agri eco-tourism, value addition, apiary and spices cultivation. There should be compulsory exposure visit of farmers and study visit of school and college students to visit agri eco-tourism to learn first-hand information and knowledge.

Name : Shri Jagpal Singh
Address : Village Malikpur, Post Office Achhej,
District Jhajjar,
Haryana-124106
Contact No. : +91-9416661961
Email : jagpal_phogat@yahoo.com

Personal Profile and Farming Background

Shri Jagpal Singh, aged 57, is an apiculture entrepreneur with 25 years of experience. He holds BA and B.PEd degrees and manages 2.5 acres of owned, irrigated land supported by canal and borewell systems. His primary enterprise is beekeeping, operating 1500 colonies of *Apis mellifera*. His long experience and large colony base form the foundation of his diversified bee-based entrepreneurial activities.

Innovation Overview and Motivation

He diversified beyond honey by developing value-added products such as bee pollen capsules, royal jelly, bee wax skin moisturizer, and bee wax foot cream. His motivation was to utilize all hive products efficiently, reduce dependence on honey alone, and create additional income opportunities for beekeepers. This approach sought to enhance profitability through comprehensive utilization of bee-derived resources.

Technical Features, Novelty and Development Process

He introduced scientific processing of bee pollen using pollen traps, controlled drying, and capsule filling. Royal jelly is extracted within 72 hours from queen cells and preserved under low temperature to maintain quality. The skincare products use purified bee wax blended with natural ingredients. These innovations, initiated in 2021, enabled systematic processing and diversification of hive products into value-added items.

Institutional Linkages, Mentorship and Validation

Validation occurred through extensive field-scale adoption and consistent market acceptance across various states. The rising demand for pollen capsules, royal jelly, and bee wax products demonstrated their reliability, consumer preference, and functional effectiveness. This widespread uptake provided practical evidence of product quality, strengthening confidence among beekeepers and confirming the commercial viability of his diversified apiculture innovations.

Challenges Faced and Problem-Solving Approaches:

He initially faced challenges in obtaining technical knowledge, maintaining product quality, establishing processing facilities, and creating awareness about non-honey hive products. These barriers were addressed through improvements in storage and processing methods, use of appropriate equipment, and conducting training programmes for beekeepers. Systematic demonstrations and experience-sharing helped build confidence

among producers and consumers.

Utility, Applications and User Benefits:

The innovations enable complete utilization of hive products, increasing income for beekeepers and offering consumers natural, chemical-free supplements and skincare items. Bee pollen and royal jelly support immunity and nutrition, while bee wax moisturizers provide natural skincare benefits. By diversifying product lines, beekeepers reduce dependence on honey alone and gain more stable, value-added revenue streams.

Adoption, Outreach and Scaling Up:

His innovations have been adopted across Rajasthan, Haryana, Uttar Pradesh, Jammu & Kashmir, and Punjab. He has trained ~1600 farmers, enabling them to diversify into pollen collection, royal jelly extraction, and wax-based product development. Through structured training, demonstrations, and farmer engagement, he has facilitated significant scaling of diversified apiculture-based entrepreneurship.

Impact Assessment (Economic, Social and Environmental):

Processing innovations increased product yield and quality, particularly in royal jelly extraction. His enterprise achieved a turnover of ₹1.89 crore in 2023–24 and ₹2.1 crore in 2024–25. The diversification supports biodiversity, sustainable beekeeping, and chemical-free product lines. Employment has been generated for 14 persons, strengthening local livelihoods and enhancing rural enterprise development.

Recognition, Awards and Media Coverage:

He has received several recognitions including IARI Fellow Farmer Award (2022), National Health Award (2019), Haryana Krishi Ratan (2019), Agri-Leadership Award (2017), and Swarna Jayanti Award (2016). His work has been widely covered across print and electronic media, reflecting increasing public and institutional interest in diversified apiculture practices.

Future Vision, Suggestions and Way Forward:

He plans to expand processing capacity, train more farmers, and promote diversified bee-based enterprises across India. He suggests policy support for product diversification, research on advanced processing of hive products, and improved market awareness. Strengthening training and extension mechanisms will, in his view, advance large-scale adoption of value-added apiculture-based entrepreneurship.

Name : Shri Gowhar Ali Lone
Address : Village Khonchipora, Tehsil Kunzer, Block Tangmarg, District Baramulla, Jammu & Kashmir- 193402
Contact No. : +91-9797131268
Email : lonegowhar58@gmail.com

Personal Profile and Farming Background

Shri Gowhar Ali Lone, aged 33, is a Middle educated farmer from Khonchipora, Kunzer, Tangmarg, Baramulla (J&K), with 18 years of farming experience. His primary occupation is farming, complemented by Integrated Farming System (IFS) and intensive mushroom cultivation. He is an active member of Shujaat Fed Farmer Producer Company Ltd., under NAFED, reflecting his engagement in organized agriculture and rural entrepreneurship.

Innovation Overview and Motivation

In 2020–21, Shri Lone introduced landless farming using vertical spaces to overcome limited land availability and seasonal constraints in Kashmir. By employing controlled vertical systems, he enabled year-round cultivation of mushrooms and high-value crops without depending on farmland. His innovation was motivated by unemployment, small landholdings, a short growing season, and the need to modernize traditional farming practices. The model has proven sustainable, scalable, and suitable for youth, small farmers, and landless households.

Technical Features, Novelty, and Development Process

He established a commercial integrated farming system inside an old building, utilizing the ground floor for mushrooms and the first floor for poultry. The poultry-generated heat naturally maintained optimal conditions for mushroom growth, particularly suited for Kashmir's cold climate. The system emphasizes resource recycling, with spent mushroom compost used for terrace vegetable cultivation. Developed through experimentation during 2020–21, it reduces production costs, ensures year-round income, and serves as a practical landless farming model. The success of the system has drawn attention from administration, scientists, farmers, and youth, making it replicable and scalable.

Institutional Linkages, Mentorship, and Validation

The innovation has been formally recognized by the District Administration, Baramulla, under the Aspirational District Programme (NITI Aayog). Technical training and support were received from KVK (ICAR) Kunzer, SKUAST-K, ICAR-CITH Srinagar, and CSIR-IIIM Srinagar, along with handholding support from the Agricultural Production & Farmers Welfare Department, J&K. JKEDI provided financial assistance, while experts including Sh. Yadvinder Singh, Sh. Daljit Singh, and Sh. Sheikh Khurshid Ahmed continue to mentor him for refinement and scaling.

Challenges Faced and Problem-Solving Approaches

The innovation faced challenges such as harsh winters affecting year-round production, scarcity of wheat bhusa for compost, and limited government subsidies restricting adoption.

The absence of standardized technology for landless vertical farming required continuous experimentation and adjustments to refine the system.

Utility, Application, and User Benefits

The landless farming model offers significant advantages, particularly for small farmers and women, enabling home-based cultivation without the need for land. It maximizes productivity using vertical spaces, generates high returns, and integrates crop-livestock systems sustainably.

Adoption, Outreach, and Scaling Up

The innovation has been adopted across all districts of Kashmir Valley and parts of the Pir Panjal and Chenab regions, benefiting over 450 farmers. Its market-driven design makes it ideal for urban and pei-urban areas, with potential to evolve into scalable agri-startups for wider replication.

Impact Assessment (Economic, Social, and Environmental)

The model generates an estimated ₹12.4 lakh annually, with cost savings through resource recycling and efficient use of vertical space. It provides year-round employment for family members and seasonal labor, especially benefiting women and landless youth. Socially, it promotes dignity, self-employment, and inclusion, while environmentally, the reuse of mushroom compost and poultry litter reduces chemical fertilizer use and supports climate-resilient indoor farming.

Recognition, Awards, and Media Coverage

Shri Lone has received multiple awards, including the IARI Innovative Farmer Award (2021), the Mushroom Progressive Farmer Award (2023) from ICAR-DMR, and the CSIR–IIIM Award (2024), along with several UT and district-level recognitions, acknowledging his contribution to innovative landless farming.

Future Vision, Suggestions, and Way Forward

He aims to expand landless and integrated farming by engaging women and rural youth, promoting off-season mushroom exports, generating marketable surplus, and providing spawned compost with awareness through Self-Help Groups. He recommends that ICAR, SAUs, and KVKs promote integrated landless farming with mushrooms, poultry, dairying, apiculture, sheep, and polyhouses, including it under KCC and crop insurance schemes. He advocates a national-level program with financial and technical support to scale up and mainstream this high-income, sustainable model.

Name : Shri Ravindra Manikrao Metkar
Address : Matoshri Krushi Farm,
Mahasla, Anjangaon Bari Road,
Badnera Road, Amravati Maharashtra – 444701
Contact No. : +91-9881303702
Email : smmetkar68@gmail.com

Personal Profile and Farming Background

Shri Ravindra ManikraoMetkar, aged 57, is an M.Com graduate with 41 years of farming experience. He owns 22 hectares of fully irrigated black soil land in Amravati and grows arhar, soybean, and multiple horticultural crops including mosambi, coconut, chikoo, orange, banana, and mango, along with teak and bamboo in agroforestry. He also manages a poultry enterprise of 1.8 lakh layer birds, maintains cattle, and runs a large allied business with an annual turnover of ₹15 crore.

Innovation Overview and Motivation

His innovation, developed in 2022, is a Jaivik Spray, also referred to as Panchamrit or Organic Spray Solution. The innovation originated from his motivation to reduce plant protection expenses and transition toward a natural, low-cost method of crop protection. Drawing on his practical field experience, he aimed to develop an alternative to synthetic agrochemicals that would be affordable for farmers, environmentally friendly, and suitable for large-scale application. Reducing the financial burden associated with chemical pesticides and minimizing dependence on external inputs served as key motivating factors.

Technical Features, Novelty and Development Process

The organic spray is made using five locally available ingredients—eggs, buttermilk, jaggery, lime, and allium to create an effective bio-solution for plant protection and growth. The preparation cost is only ₹120 per acre, making it affordable and scalable. Its biodegradability and natural composition make it safe and eco-friendly.

Institutional Linkages, Mentorship and Validation

Various Krishi Vigyan Kendras and NGOs have recognized, appreciated, and felicitated his innovation for its utility and farmer-oriented design. However, there has been no formal technical validation, laboratory testing, or research collaboration with agricultural universities or research institutes. Likewise, no sponsorship or financial assistance from external agencies has been involved in the development or dissemination of the spray. The acknowledgements by KVKs and NGOs reflects grassroots-level validation, while the absence of formal institutional testing indicates that the innovation has so far been evaluated primarily through field-level feedback and adoption.

Challenges Faced and Problem-Solving Approaches

He reported no major challenges, except that the innovation needs rationalization and consistent field-level explanation to farmers. He addressed this through demonstrations,

farmer-to-farmer discussions, and large-scale awareness efforts.

Utility, Applications and User Benefits

The Jaivik Spray enhances plant protection, improves vegetative and reproductive growth, and increases yield quality. Farmers report about a 30% improvement in quality and reduced plant protection costs. Its natural, chemical-free formulation minimizes health risks and supports safe application. Low cost, easy preparation, and suitability across crops make it a practical, eco-friendly farming solution.

Adoption, Outreach and Scaling Up

More than 1,000 farmers currently use the spray, and over 10,000 have been trained or benefitted through his guidance. After receiving the IARI award, the innovation gained wide visibility through print, social, and electronic media, accelerating its spread. Demonstrations and peer learning enabled large-scale adoption without formal institutional support, with farmer interest continuing to expand.

Impact Assessment (Economic, Social and Environmental)

Economically, the spray results in income enhancement and cost saving of 30% (₹50,000 per hectare), while reducing chemical input costs. Socially, the innovation supports organic/natural farming and provides employment to 50 workers and 4 family members, with spray production enterprises. Environmentally, the solution is biodegradable, eco-friendly, and contributes to climate resilience.

Recognition, Awards and Media Coverage

He has received numerous significant awards, including the Vasantrao Naik Shetinishtha Shetkari Puraskar (2014), Dr.Punjabrao Deshmukh Prerna Puraskar (2020), Jagjivan Ram Abhinav Kisan Puraskar (2022), Devbhumi Bagwani Puraskar (2023), Sustainable Agriculture Award (2024), National Icon Award (2025), Best Agriculture Award (2025), Poultry Industry Excellence Award (2024), and The Sustainable Award (2025). His innovation has received extensive coverage in print, electronic, and social media.

Future Vision, Suggestions and Way Forward

Widespread farmer interest and large-scale adoption indicate strong potential for future scaling. He believes the Jaivik Spray is highly suitable for organic and natural farming systems, offering a low-cost, accessible option that can also promote youth-led entrepreneurship through localized production, distribution, and service-based agricultural enterprises.

Name : Shri Ashok Manwani
Address : Room No. 10, CN Plot, Section 30,
Ulhasnagar, Thane,
Maharashtra-421004
Contact No. : +91-9271282561
Email : indianpearlculture@yahoo.com

Personal Profile and Farming Background

Shri Ashok Manwani, aged 52, is a full-time progressive farmer-entrepreneur practising fresh-water pearl farming for 28 years. He is widely recognised as the pioneer who revived and modernised India's forgotten fresh-water pearl culture. Since beginning his research in 2001, he has converted village ponds, rivers, canals and cement tanks into pearl-production units. He operates pearl farms on owned and leased ponds across Maharashtra and manages research, training, tool-making and pearl-jewellery activities from Ulhasnagar, Thane district.

Innovation Overview and Motivation

Shri Manwani pioneered modern fresh-water designer pearl culture in India in a field with no literature, mentors or practitioners. He became the first farmer to secure DIPP registration, developed India's first two design-patented pearl-culture tools, and enabled pearl production even in small tanks and village ponds. Realising that mussels were abundant yet unused, he promoted pearl farming as a high-value, low-space, zero-pollution enterprise to enhance farmer income.

Technical Features, Novelty and Development Process

Shri Ashok Manwani developed an indigenous, low-cost technology package for fresh-water designer pearl culture. He design-patented mussel openers, stands, operation kits, care systems and a surgery method enabling one mussel to produce up to six pearls of varied shapes. He perfected cement-tank culture for wider adoption. The entire process from mussel collection to harvest was refined through self-experimentation since 2001 across more than 25 states.

Institutional Linkages, Mentorship and Validation

He received research funding, support and incubation from IIT-BHU, RKVY-RAFTAAR, NITI Aayog and a dedicated BHU research pond. His work is recognised by ICAR-CIFE, ICAR centres, fisheries departments, KVKs and universities. He mentors hundreds of farmers and students through regular trainings.

Challenges Faced and Problem-Solving Approaches

Initially, there was no literature, no mentors and very high mussel mortality. He addressed this by developing his own pre and post operative care systems and cement-tank protocols. The absence of proper tools led him to design and patent his own instruments. Public disbelief was overcome through live demonstrations, while initial funding gaps were managed through personal savings until grants became available.

Utility, Applications and User Benefits

Fresh-water pearl farming gives ₹2–4 lakh additional annual income from a single small cement tank or village pond with almost no recurring cost. It is ideal for landless farmers, women SHGs, tribal families and educated unemployed youth. Mussel meat provides extra income, designer pearls fetch premium prices, and the enterprise is fully eco-friendly with zero chemical use and can be integrated with existing fish farming.

Adoption, Outreach and Scaling Up

He has trained over 1,200 farmers and students from Maharashtra, Gujarat, Karnataka, Rajasthan, Madhya Pradesh, Uttar Pradesh, Bihar, Jharkhand, Chhattisgarh, Odisha, West Bengal, the North-East and other states. He supplies complete tool kits and nucleus material and conducts hands-on trainings through KVKs and universities. After national recognitions, demand increased, leading to the launch of the countrywide "Pearl Yatra" campaign.

Impact Assessment (Economic, Social and Environmental)

Economically, trained farmers are earning ₹2–4 lakh extra per year with very low investment. Socially, the technology has empowered women, tribal communities and rural youth by creating dignified self-employment in villages. Environmentally, pearl farming utilises unused village water bodies, needs no chemicals or electricity, and mussels naturally purify water, making it a completely sustainable and climate-resilient enterprise.

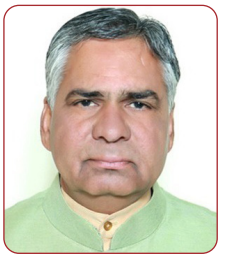
Recognition, Awards and Media Coverage

He has received numerous honours, including India's First Progressive Farmer Award (2017), IARI Innovative Farmer Award (2018), Krishi Jagran Innovative Pearl Farmer Award (2024), Entrepreneurship Award (2024), CIFE Award (2011), ICAR-Bhopal Pearl School Award (2018), Aamhi Maanasa Award, IIIM J&K Award (2014) and others. His work is widely featured on DD Kisan, print media and digital platforms.

Future Vision, Suggestions and Way Forward

His vision is to make India the leading fresh-water pearl producing nation and establish pearl farming in every state. He plans to expand "Pearl Yatra," train thousands of SHGs, FPOs, students and tribal women, and develop more designer pearls for export. He recommends subsidies, PMMSY inclusion, easier tool availability and recognising pearl culture as an agriculture-allied activity for loans and insurance.

Name : Shri Surendra Awana
Address : Village Bhairana, Post Bichoon,
Tahsil Maujamabad, District Jaipur
Rajasthan-303002
Contact No. : +91-9462229999
Email : surendrawana@gmail.com



Personal Profile and Farming Background

Shri Surendra Awana, 63 years old graduate innovative farmer of Jaipur district of Rajasthan is known for integrated farming model in 21 ha area with crop diversification in dryland farming, dairy, goatery, fishery, sorted semen technology in Gir cow, round the year fodder production, agroforestry and waste management. He has 21-hectares land holding with 40 years of farming experience. He is cultivating field crops (4 ha), horticultural crops (5 ha), agroforestry (8 ha), dairy unit (350 Gir cow), goetry (100 No.), duckey (50), fishery (5000).

Innovation Overview and Motivation

He is an innovative farmer practicing diversified agriculture by integrating goatery, dairy, fishery, sorted semen technology in Gir cows, round-the-year fodder production, agroforestry, and waste management. Inspired initially by his grandfather, he adopted diversified farming to enhance income. After receiving the IARI Innovative Farmer Award in 2021, he promoted integrated farming locally. Motivated by the Prime Minister and ICAR-IGFRI, he established sorted semen and year-round fodder systems.

Technical Features, Novelty and Development Process

Shri Surendra Awana, an innovative farmer started his agriculture journey 40 years back. He has initiated several innovations in his farm for enhancing farm income and profitability. The major initiatives include crop diversification in dryland farming, integrated farming, dairy, goatery, fishery, duckery, sorted semen technology in Gir cow, round the year fodder production, agroforestry and farm residue & waste management.

Institutional Linkages, Mentorship and Validation

Shri Surendra Awana has developed linkages with *Krishi Vigyan Kendra,* National Dairy Development Board, Sri Karn Narendra Agricultural University, Jobner, Animal Husbandary & Agricultural Department, Govt. of Rajasthan. However, he got mentorship for various innovations from his grandfather. He got financial support from *Kamdhenu Yojana, Rashtriya Gokul* Mission, Agri. Incubation Centre, Jobner, Agriculture & Animal Husbandry Department, Govt. of Rajasthan and National Natural Farming Mission.

Challenges Faced and Problem-Solving Approaches

Shri Surendra Awana has faced many challenges in his agriculture journey which includes no-cooperation from local people and neighbouring farmers, late arrival of benefit from govt. schemes, plantation drive in scarcity of water, and vagaries of monsoon.

Utility, Applications and User Benefits

Shri Surendra Awana has adopted micro-irrigation especially drip and sprinkler in his farm and developed two farm pond with 50KV solar pumping system for irrigating in 17 hectare area promote micro irrigation. He is promoting *Pradhan Mantri Fasal Beema Yojana, Kamdhenu Yojana*, Agri Start-up for waste management, *Rashtriya Gokul Mission*, National Livestock Mission to other farmers and imparting training to the neighboring farmers. Majority of the farmers are getting benefit from his sorted semen technology for Gir cow. Daily about 30-40 farmers visiting his farm for exposure visit.

Adoption, Outreach and Scaling Up

After receiving the IARI award, he began applying for government schemes and secured their benefits. He availed *Pradhan Mantri Krishi Sinchai Yojana* to develop two farm ponds with a 50 kV solar pumping system over 17 hectares for drip and sprinkler irrigation. He also benefited from PMFBY, *Kamdhenu Yojana*, Agri Start-up support, *Rashtriya Gokul Mission*, and NLM, trained farmers under NNF Mission, and recently initiated agritourism to showcase his innovations.

Impact Assessment (Economic, Social and Environmental)

Shri Surendra Awana has generated employment for about 500 people through activities such as semen collection, artificial insemination, fodder seed sales, plant sales, dairy, duckery, and fishery management. Around 30–40 farmers visit his farm daily for exposure to innovations. He produces and sells value added products from animal wastes and provides fodder seeds free of cost. He has guided nearly 500 farmers to enhance their farm income through his innovations.

Recognition, Awards and Media Coverage

Shri Surendra Awana has received many prestigious state and national awards such as the Jagjeevam Ram Innovative Farmer Award (2021), National Gopal Ratna Award of Govt. of India (2021), Best Conservation Award of ICAR-NBAGR, Karnal (2024), IARI Innovative Farmer Award (2021), IARI Fellow Farmer Award (2023) and Organic Farmer Award (2021) of Rajasthan Govt. for his outstanding contribution in agriculture.

Future Vision, Suggestions and Way Forward

He aims is to expand this innovation to many farmers in his district with the help of scientist and extension experts of *Krishi Vigyan Kendra* and State department of Animal Husbandary and Dairy to promote crop diversification in dryland farming, dairy, goatery, fishery, sorted semen technology in Gir cow, round the year fodder production, agroforestry and waste management for enhancing farm income.

Suggested Readings / References

- Abrol, D., and Gupta, A. (2014). Understanding the diffusion modes of grassroots innovations in India: A study of Honey Bee Network supported innovators. *African Journal of Science, Technology, Innovation and Development, 6*(6), 541–552.
- Gupta, A. K. (2024). Indigenous knowledge: Ways of knowing, feeling and doing. SRISTI. Retrieved from https://anilg.sristi.org
- Ashby, J. A. (2009). The impact of participatory plant breeding. In S. Ceccarelli, E. P. Guimarães, and E. Weltzien (Eds.), *Plant breeding and farmer participation* (pp. 649–671). FAO.
- Baliwada, H. (2016). *Farmer-led innovations and their techno-economic feasibility for scaling up* (Doctoral dissertation). Division of Agricultural Extension, Indian Agricultural Research Institute, New Delhi.
- Baliwada, H., Sharma, J. P., Burman, R. R., Nain, M. S., Kumar, A., and Venkatesh, P. (2017). A study on institutionalization of farmer-led innovations for their scaling up. *Indian Journal of Agricultural Sciences, 87*(12), 1725–1729.
- Baliwada, H., Sharma, J. P., Burman, R. R., Nain, M. S., Kumar, A., and Venkatesh, P. (2017). Constraints and strategies in scaling up of farmer led innovations. *Journal of Community Mobilization and Sustainable Development, 12*(1), 72–78.
- Baliwada, H., Sharma, J. P., Burman, R. R., Nain, M. S., Venkatesh, P., and Kumar, A. (2017). Economic impact assessment of farmer-led innovations. *International Journal of Agriculture Innovations and Research, 6*(1), 14–20.
- Baliwada, H., Sharma, J. P., Burman, R. R., Nain, M. S., Venkatesh, P., and Kumar, A. (2018). A study on instigation of farmer-led innovations and its spread. *Journal of Community Mobilization and Sustainable Development, 13*(1), 17–26.
- Blake, A., and Garzon, M. Q. (2012). Boundary objects to guide sustainable technology supported participatory development for poverty alleviation in the context of digital divides. *Electronic Journal of Information Systems in Developing Countries, 51*(1), 1–25.
- Boyer, R. (2014). Sociotechnical transitions and urban planning: A case study of ecocohousing in Tompkins County, New York. *Journal of Planning Education and Research, 34*(4), 451–464.
- Cabannes, Y. (2012). Financing urban agriculture. *Environment and Urbanization, 24*(2), 665–683.
- Ceccarelli, S. (2020). Participatory plant breeding: Who did it, who does it and where. *Experimental Agriculture, 56*(1), 1–11. https://doi.org/10.1017/S0014479720000159

- Chambers, R. (1989). *Farmer first: Farmer innovation and agricultural research*. Intermediate Technology Publications.
- Creech, H., Paas, L., Gabriel, G. H., Voora, V., Hybsier, C., and Marquard, H. (2014). Small-scale social environmental enterprises in the green economy: Supporting grassroots innovation. *Development in Practice, 24*(3), 366–378.
- De Vries, G. W., Boon, W. P., and Peine, A. (2016). User-led innovation in civic energy communities. *Environmental Innovation and Societal Transitions, 19*, 51–65.
- Douthwaite, B., Beaulieu, N., Lundy, M., and Peters, D. (2009). Understanding how participatory approaches foster innovation. *International Journal of Agricultural Sustainability, 7*(1), 42–60.
- Drishti IAS. (2025). *Farmers producer organisation: Concept and challenges*. Drishti Publications. https://www.drishtiias.com/daily-updates/daily-news-analysis/farmers-producer-organisation-1
- Earth5R. (2024). *Women-led agroecological innovations in India: Impact assessment*. Earth5R. https://earth5r.org/
- Ely, A., Smith, A., Stirling, A., Leach, M., and Scoones, I. (2013). Innovation politics post-Rio+20: Hybrid pathways to sustainability? *Environment and Planning C: Government and Policy, 31*(6), 1063–1081.
- Ensor, J., and de Bruin, A. (2022). The role of learning in farmer-led innovation. *Agricultural Systems, 197*, 103356.
- Feola, G., and Nunes, R. (2014). Success and failure of grassroots innovations for addressing climate change: The case of the Transition Movement. *Global Environmental Change, 24*, 232–250.
- Food and Agriculture Organization of the United Nations. (2023). *The state of food and agriculture 2023*. FAO. https://openknowledge.fao.org/items/1516eb79-8b43-400e-b3cb-130fd70853b0
- Global Forum on Agricultural Research and Innovation. (2023). *Global forum on agricultural research report on farmer innovations*. GFAR/FAO. https://www.gfar.net/
- Grabs, J., Langen, N., Maschkowski, G., and Schäpke, N. (2016). Understanding role models for change: A multilevel analysis of success factors of grassroots initiatives for sustainable consumption. *Journal of Cleaner Production, 134*(Part A), 98–111.
- Gupta, A. K. (2006). From sink to source: The Honey Bee Network documents indigenous knowledge and innovations in India. *Innovations: Technology, Governance, Globalization, 1*(3), 49–66. https://doi.org/10.1162/itgg.2006.1.3.49
- Gupta, A. K. (2012). Innovations for the poor by the poor. *International Journal of Technology Learning and Innovation Development, 5*(1–2), 28–39.

- Gupta, A. K., Shinde, C., Dey, A., and Saha, A. (2019). Honey Bee Network in Africa: Co-creating a grassroots innovation ecosystem in Africa. *ZEF Working Paper Series, 178*. University of Bonn.
- Gupta, A. K., Sinha, R., Koradia, D., Patel, R., Parmar, M., Rohit, P., and Chandan, A. (2003). Mobilizing grassroots technological innovations and traditional knowledge, values and institutions: Articulating social and ethical capital. *Futures, 35*(9), 975–987.
- Gupta, S. (2020). Understanding the feasibility and value of grassroots innovation. *Journal of the Academy of Marketing Science, 48*(5), 941–965.
- Hargreaves, T., Hielscher, S., Seyfang, G., and Smith, A. (2013). Grassroots innovations in community energy: The role of intermediaries in niche development. *Global Environmental Change, 23*(5), 868–880.
- Hoppe, T., Graf, A., Warbroek, B., Lammers, I., and Lepping, I. (2015). Local governments supporting local energy initiatives: Lessons from best practices of Saerbeck (Germany) and Lochem (The Netherlands). *Sustainability, 7*(2), 1900–1931.
- ICAR-Central Institute for Women in Agriculture. (2022). *Success stories of progressive farm women*. ICAR-CIWA. https://icar-ciwa.org.in/
- Indian Council of Agricultural Research. (2004). Cross-sectoral validation of Indigenous Technical Knowledge in agriculture. ICAR
- Indian Council of Agricultural Research. (2024). *Compendium of farmer-led innovations in Indian agriculture*. ICAR-IARI. https://www.iari.res.in/
- Indian Council of Agricultural Research. (2025). *Gender strategy for national agricultural research*. ICAR. https://icar.org.in/sites/default/files/2025-10/ICAR%20Gender%20Strategy_2025.pdf
- International Fund for Agricultural Development. (2023). *Gender-differentiated impacts of agricultural innovations: Evidence from South Asia*. IFAD. https://www.ifad.org/
- Kannan, K. P. (1990). Secularism and people's science movement in India. *Economic and Political Weekly, 25*(6), 311–313.
- Kar, P., Sharma, R., Jat, S. L., Nigam, S., Dar, Z. A., Sravani, D., and Rakhsit, S. (2025). Tracking the emergence and usage of farmer led innovations (FLIs) in maize ecosystem: A pan India exploration. *Indian Journal of Traditional Knowledge, 24*(2), 177–184.
- Kirwan, J., Ilbery, B., Maye, D., and Carey, J. (2013). Grassroots social innovations and food localisation: An investigation of the Local Food programme in England. *Global Environmental Change, 23*(5), 830–837.
- Kumar, H., and Namrata. (2024). Socio-economic environment and motivation to innovate: Exploring grassroots innovations process in India. *Technology Analysis and Strategic Management, 36*(6), 1234–1247.

- Manjeet Singh Nain, Rashmi Singh, Jyoti Ranjan Mishra, Anil Kumar Singh (2024), Scaling Farmers' Innovation for Sustainable Development : Evidence from Empirical Learning's, Policy Brief – 2024. Division of Agricultural Extension, ICAR-Indian Agricultural Research Institute, New Delhi 110012.
- Marico Innovation Foundation. (2025). *How FPOs and agri-startups can transform Indian agriculture*. https://www.maricoinnovationfoundation.org/
- Martin, C. J., Upham, P., and Budd, L. (2015). Commercial orientation in grassroots social innovation: Insights from the sharing economy. *Ecological Economics, 118*, 240–251.
- Ministry of Agriculture and Farmers Welfare. (2025). *Factsheet on farmer producer organisations (FPOs)*. Press Information Bureau, Government of India. https://pib.gov.in/
- Nain, M. S., Singh, R., Mishra, J. R., and Sharma, J. P. (2018). Scalability of farmer led innovations (FLIs): A study of perceived determinants and required capacities. *Indian Journal of Agricultural Sciences, 88*(8), 1312–1315.
- National Bank for Agriculture and Rural Development. (2015). *Farmer producer organisations: Frequently asked questions*. NABARD. https://www.nabard.org/
- National Bank for Agriculture and Rural Development. (2021). *Collectivization of agricultural produce for enhancing farmers' income*. NABARD. https://www.nabard.org/
- National Bank for Agriculture and Rural Development. (2022). *Case studies of FPOs in India, 2019–2021*. NABARD. https://www.nabard.org/
- National Institute of Agricultural Extension Management. (2024). *Documentation of women leaders in agriculture*. MANAGE. https://www.manage.gov.in/
- Nayak, A. K. J. R. (2022). *FPOs in India: Creating an enabling ecosystem for their sustainability* (Policy paper). ICAR-NAARM. https://naarm.org.in/
- NITI Aayog. (2023). *Compendium of 75 agri entrepreneurs and innovators*. NITI Aayog. https://www.niti.gov.in/
- Ornetzeder, M., and Rohracher, H. (2013). Of solar collectors, wind power, and car sharing: Comparing and understanding successful cases of grassroots innovations. *Global Environmental Change, 23*(5), 856–867.
- Pansera, M. (2013). Frugality, grassroots and inclusiveness: New challenges for mainstream innovation theories. *African Journal of Science, Technology, Innovation and Development, 5*(6), 469–478.
- Parwez, S. (2022). Institutionalisation and processes of grassroots innovations: Evidence from the literature. *Journal of Entrepreneurship and Innovation in Emerging Economies, 8*(2), 258–269.
- Parwez, S., and Chandra Shekar, K. (2019). Understanding of grassroots innovations in India: Evidence from the countryside. *Society and Business Review, 14*(4), 273–299.

- Pawera, L., Manickam, R., Wangungu, C., Bonnarith, U., Schreinemachers, P., and Ramasamy, S. (2024). Guidance on farmer participation in the design, testing and scaling of agricultural innovations. *Agricultural Systems, 218*, 104006.
- Phalswal, S. (2023). Mapping the grassroots innovation research: A bibliometric analysis and future agenda. *Journal of Scientometric Research, 12*(3), 727–738.
- Professional Assistance for Development Action. (2023). *SRI adoption and women farmers in Bihar: Documentation report (Gaya, Bihar)*. PRADAN. https://www.pradan.net/
- Regenerative Bihar Initiative. (2024). *MannonatiMahila Kisan Producer Company: Case study report*. Regenerative Bihar Initiative. https://regenerativebihar.org/
- Salazar, R., Louwaars, N. P., and Visser, B. (2007). Protecting farmers' new varieties: New approaches to rights on collective innovations in plant genetic resources. *World Development, 35*(9), 1515–1528.
- Salembier, C., Segrestin, B., Weil, B., Jeuffroy, M. H., Cadoux, S., Cros, C., and Meynard, J. M. (2021). A theoretical framework for tracking farmers' innovations to support farming system design. *Agronomy for Sustainable Development, 41*(5), 61.
- Seyfang, G., and Longhurst, N. (2013). Desperately seeking niches: Grassroots innovations and niche development in the community currency field. *Global Environmental Change, 23*(5), 881–891.
- Seyfang, G., and Smith, A. (2007). Grassroots innovations for sustainable development: Towards a new research and policy agenda. *Environmental Politics, 16*(4), 584–603.
- Singh, S., and Singh, T. (2025). Farmer producer organizations: An ecosystem for building socio-economic resilience of smallholders in India. *Agriculture, 13*(1). https://www.agriculturejournal.org/
- Singh, S. H., Bhowmick, B., Sindhav, B., and Eesley, D. (2020). Determinants of grassroots innovation: An empirical study in the Indian context. *Innovation, 22*(3), 270–289.
- Singh, S., Sindhav, B., Eesley, D., and Bhowmick, B. (2018). Investigating the role of ICT intervention in grassroots innovation using structural equation modelling approach. *Sādhanā, 43*(7), 104.
- Singh, Y. P., Nayak, A. K., Sharma, D. K., Gautam, R. K., Singh, R. K., Singh, R., and Ismail, A. M. (2014). Farmers' participatory varietal selection: A sustainable crop improvement approach for the 21st century. *Agroecology and Sustainable Food Systems, 38*(4), 427–444.
- Small Farmers' Agribusiness Consortium. (2022). *Operational guidelines for formation and promotion of 10,000 farmer producer organizations*. SFAC. https://sfacindia.com/FPOS.aspx

- Smith, A., Fressoli, M., and Thomas, H. (2014). Grassroots innovation movements: Challenges and contributions. *Journal of Cleaner Production, 63*, 114–124.
- Sthapit, B. R., and Rao, V. R. (2008). Consolidating community's role in local crop development by promoting farmer innovation to maximise the use of local crop diversity for the well-being of people. In *International Symposium on Underutilized Plants for Food Security, Nutrition, Income and Sustainable Development* (Vol. 806, pp. 669–676).
- Swayam Shikshan Prayog. (2024). *Women-led climate-resilient farming: Case studies from Maharashtra*. https://www.swayamshikshanprayog.org/
- Tambo, J. A., and Wünscher, T. (2015). Identification and prioritization of farmers' innovations in northern Ghana. *Renewable Agriculture and Food Systems, 30*(6), 537–549.
- Tambo, J. A., and Wünscher, T. (2017). Farmer-led innovations and rural household welfare: Evidence from Ghana. *Journal of Rural Studies, 55*, 263–274.
- TechnoServe. (2020). *Women's advancement in rural development and agriculture (WARDA) program report: Bihar, India*. TechnoServe. https://www.technoserve.org/
- Walker, T. S. (2006). Participatory varietal selection, participatory plant breeding, and participatory research in plant breeding: A synthesis of the literature. *World Bank Working Paper Series on Agricultural Innovation Systems*.
- Waters-Bayer, A., and van Veldhuizen, L. (2012). Farmer innovation: Why it is important and how to support it. *GFRAS Regional Learning Alliance*. https://www.g-fras.org/en/
- World Bank. (2024a). *Mahila Pragati Farmer Producer Company: Women farmer organization in tribal context (Odisha)*. World Bank. https://www.worldbank.org/
- World Bank. (2024b). *Women in agriculture: Evidence and priorities for development*. World Bank Group. https://www.worldbank.org/
- Wu, B., and Zhang, L. (2013). Farmer innovation diffusion via network building: A case of winter greenhouse diffusion in China. *Agriculture and Human Values, 30*(4), 641–651.


प्रो. एम एस स्वामीनाथन पुस्तकालय
Prof. M S SWAMINATHAN LIBRARY