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Progress Through Science

Saguna Regenerative Technique and Agro-tourism

A Success Story

Chandrashekhar Hari Bhadsavle

Trust for Advancement of Agricultural Sciences (TAAS)

GOAL

Harnessing the potential of agricultural sciences for the welfare of the people.

MISSION

Promoting growth and advancement of agriculture through scientific partnerships, policy advocacy and public awareness.

OBJECTIVES

- To act as a 'Think Tank' to deliberate on key issues relating to agricultural research and innovation for development (ARI4D) and influence policy decisions
- To organize workshops, conferences, brainstorming sessions, policy dialogues seminars and special lectures on emerging issues and new developments in agricultural sciences
- To disseminate knowledge among stakeholders through publication of proceedings, strategy papers and policy briefs
- To recognize and award the scientists of Indian and foreign origin for their outstanding contributions towards Indian agriculture
- To facilitate scientific interactions and partnership building of non-resident Indian agricultural scientists with Indian scientists

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Foreword

Agriculture, mainly being rainfed in India, is vulnerable due to the vagaries of climate change. Growing paddy, a water-intensive crop, involves deep ploughing and puddling of soil followed by transplanting of seedlings. Farmers over generations have lived under the impression that rice crop would be weed-free and good only when puddling is done. On the contrary, no puddling, transplanting and hand-hoeing is required under direct seeding of rice when *Saguna* Regenerative Technique (SRT) is used. Thus, one can save 50 per cent water and almost 40 per cent on cost of cultivation needing no labour for transplanting. In view of these benefits, the farmers in Maharashtra are increasingly adopting SRT to grow rice and other crops with better production.

Thanks to the sincere efforts of Mr Chandrashekhar Hari Bhadsavle, a food scientist-turned-farmer, who introduced SRT to a handful of farmers in village Neral (Karjat), Maharashtra in 2013. This is located 75 km from Mumbai. Once a degraded land, the '*Saguna Baug*' is now a success story of tapping the natural resources to grow food crops, bamboo, also to rear livestock and fish, and promote biodiversity in and around his farm. On the farm, he eventually dug six watershed ponds to grow fish, worked hard to have good crops, green cover on entire area and trees that have made it an attractive place for agro-tourism.

Today, SRT is practised by a number of farmers in different parts of Maharashtra. I personally visited a number of tribal farmers' fields and got impressed the way they are happy to have adopted SRT to raise different crops and save on labour, fertilisers, water, fuel etc., while increasing the income and improving their soil health.

I congratulate **Shri Chandrashekhar Hari Bhadsavle** to have taken the pains to compile all relevant information on SRT and its scaling on other farmers' fields which TAAS has published in the form of a book entitled ***"Saguna Regenerative Technique and Agri-tourism - A Success Story"***. This unfolds the story of how

innovative regenerative agriculture can be of great benefit to smallholder farmers, while conserving natural resources. I am sure such sustainable practices will encourage youth to adopt agriculture as a profession. It is also our expectation that this publication will be useful to policy planners, scientists, extension personnel and smallholder farmers.

RS Paroda
Chairman, TAAS

Preface

In the face of the prevailing challenges in agriculture, particularly the distressing issue of farmers' suicides, my story becomes a beacon of hope. By introducing sustainable and economically viable farming practices based on scientific methods, I provided a lifeline for farmers facing hardships. The book delves into the scientific innovations on the farm and transformative power of these initiatives in addressing the mental and emotional well-being of farmers, a dimension often neglected in discussions about agriculture. Furthermore, the narrative explores my efforts in attracting the youth towards agriculture. At this critical time when the younger generation is increasingly turning away from conventional farming methods, my dedication to farming can become a source of inspiration.

The 'Success Story" unfolds the story of how our innovative techniques and commitment to sustainable practices became a compelling force in enticing the youth back to the agricultural landscape. My long journey has been a testament to the idea that agriculture can be modern, dynamic, and attractive to the younger generation when approached with innovation and a sense of purpose.

In essence, this publication captures our agricultural innovation and environmental consciousness, and also delves into the profound impact on the happiness, confidence, and emotional well-being of farmers. It portrays my journey as a catalyst for change, not only in the fields but also in the hearts and minds of those connected to the soil and farming with a mission-mode approach for the happiness of farmers.

Chandrashekhar Hari Bhadsavle

Acronyms and Abbreviations

AUs	Agricultural Universities
BKS	*Bharat Krushak Samaj*
BSSKKV	Dr Balasaheb Sawant *Kokan Krushi Vidyapeeth*
CA	Conservation Agriculture
CECs	Carbon Evaluation Centres
CIFE	Central Institute of Fisheries Education
CoE	Centre of Excellence
CRA	Climate Resilient Agriculture
CRT	Climate Resilient Technology
CSIR	Council of Scientific & Industrial Research
DAP	Di-ammonium Phosphate
DG	Director General
DSR	Direct-seeded Rice
FAO	Food and Agriculture Organization of the United Nations
FFF	Finding a Farmer Friend
FFS	Farmers' Field Schools
FHI	Farmers Happiness Index
GHG	Greenhouse Gas
GoI	Government of India
HHH	Helping Hands for Humanity- an NGO
ICAR	Indian Council of Agricultural Research
ICID	International Commission on Irrigation and Drainage

IIRR	Indian Institute of Rice Research
INR	Indian Rupees
IPM	Integrated Pest Management
ISEE	Indian Society of Extension Education
JSW	Jindal South West
LCB	Live Contour Bunds
LOC	Low Organic Carbon
MSSRF	MS Swaminathan Research Foundation
NGO	Non-Government Organization
OC	Organic Carbon
PoCRA	Project on Climate Resilient Agriculture
PPP	Public Private Partnership
PPP-IAD	Public-Private Partnership-Integrated Agriculture Development
QR	Quick-response Code
RA	Regenerative Agriculture
RCF	*Rashtriya* Chemicals and Fertilizers
SAARC	South Asian Association for Regional Cooperation
SRT	Saguna Rice Technique; Saguna Regenerative Technique
SAUs	State Agriculture Universities
SDGs	Sustainable Development Goals
SRF	Saguna Rural Foundation
SVT	*Saguna Vansamvardhan Tantra*
TAAS	Trust for Advancement of Agricultural Sciences
UC-D	University of California, Davis
USA	United States of America
WB	Water Buffalo

Chapter 1

A Call to the Soil

'Why is it that you Indians come to America for higher education and don't go back to settle in your life?' Is your country so bad that you would not want to live in your own country? – an American room-mate asked these questions to the young 25-year-old Chandrashekhar.

These questions struck him like a thunderbolt. And that very moment, Shri Chandrashekhar decided that he would create '*His own America*' at *Saguna Baug*, Karjat (Maharashtra), India.

The story began 45 years ago, when a promising young man quits a lucrative career in the United States after completing a Masters in Food Science and Technology in California. Armed with a promising job and the allure of a comfortable life, Shri Chandrashekhar made a decision that would resonate through the annals of time (Fig. 1). This was much more than a mere change of profession; it was a fulfilment of a promise he made to his father, a veteran freedom fighter who had instilled in him a deep reverence for his land, the people and its traditions (Fig. 2).

Fig. 1. *Shri Chandrashekhar Bhadsavle with his guide Professor Edwin Collins, UC Davis (1972)*

At the foothills of Matheran in the state of Maharashtra, nestled amidst the vibrant landscapes of India, is *Saguna Baug*. At this place, a story of extraordinary

Fig. 2. *The day of return to Saguna Baug blessed by mother and grandmother, Jan 1976*

dedication and commitment unfolded. Shri Chandrashekhar, son of a freedom fighter, a young Indian visionary, embarked on a journey that would re-define the contours of agriculture and leave an indelible mark on the nation.

His early childhood years on the farm were a blend of academic learning and hands-on agricultural experience. Attending school and helping with farm chores were integral parts of his daily life. These formative years were not just about acquiring knowledge; they were about developing a bond with the land and understanding the rhythm of nature. The farm was more than a piece of land; it was a lively and vibrant entity that nurtured and taught him the values of hard work, patience, and respect for the environment.

Recalling one of his most vivid memories from those days, he remembers the sight of the *Ulhas* River flowing alongside his farm. In the year 1970s, the river was a symbol of pristine beauty and purity. He distinctly remembers being fascinated by the clarity of its water, so clear that a small coin could be seen glittering on the sandy riverbed. This image stayed with him, a reminder of the natural beauty that surrounded them.

Shri Chandrashekhar embraced agriculture as more than a profession—it became a calling. His decision to forgo the secured job in the United States was a testament to his deep-rooted love for rural India and a burning desire to contribute to its prosperity. People thought that he could not make it in the US and hence returned. When they further got to know that he had decided to take up farming, he was labelled as a lost cause. People considered him crazy. At that time, nobody would have imagined that this crazy young man would become a **Global Farmer** and be the ***Krishi Ratna*** and receive other recognitions (see Annexure I) in the field chosen by him.

On his return from the US, what awaited him, was the vast expanse of degraded land. The river that flowed clear, after the rainy season began to lose its lustre from the month of December. By the late 1980s, he found out that this was because of

the impact of ploughing and puddling for summer paddy cultivation agricultural practices upstream. The traditional method of rice cultivation was causing silt and mud washed into the river, muddying its waters. This sight was not only a visual disturbance but a signal that our practices were harming the very ecosystem we are dependent upon.

As he stepped onto the barren and degraded land, Shri Chandrashekhar sowed the seeds of a success story that would blossom into the legend of the 'Global Farmer.' His journey was not one of comfort or convenience but a relentless pursuit of excellence in the field of agriculture. With a keen eye for innovation, he dedicated himself to the upliftment of farmers and the enhancement of farming techniques. His efforts rippled through the agricultural landscape, bringing about a revolution that touched the lives of countless farmers across the country.

The journey was not without challenges—adventures that tested the limits of determination, and rewards that blossomed from the sweat and toil in the fields. Shri Chandrashekhar's story is a story of resilience, a narrative that underscores the transformative power of one man's unwavering commitment to the soil.

In the next chapters, we delve deeper into the trials and triumphs of the man who turned his back on comfort to plough the fields of change. It was not just cultivating crops but a legacy that would endure for generations to come.

Chapter 2

Seed of Innovation - The *Saguna Baug*

In the backdrop of India's struggle for independence, the narrative weaves the remarkable tale of Late Shri Hari Kaka, an active participant in the freedom movement. His journey, entwined with the ideals of the *Bhoodan* Movement led by the late Shri Vinoba Bhave ji, laid the foundation for a legacy of selfless service. After being released from incarceration, Hari Kaka generously handed over the ancestral land to the peasants, embodying the spirit of the *Bhoodan* Movement.

In the post-independence era, Shri Chandrashekhar's father, late Shri Haribhau (Fig. 3), established the *Hutatma Kotwal Wadi* Trust, the NGO in 1947, with the mission for Robust Rural India. The family stayed in the land owned by the trust. However, late Shri Haribhau's Guru, late Shri Anna Saheb Sahastrabuddhe insisted that the family should own/ buy some piece of land of their own. Guided by the teachings of his late Guru, Shri Haribhau, acquired his initial piece of land in the early 1950s. He affectionately named this land '*Saguna*' in the honour of his beloved mother. The process of acquiring the land evolved into a collaborative venture, as Shri Chandrashekhar utilized his savings from employment in the United States to effectively double the property's size to 55 acres.

Fig. 3. *The early days with parents, Kaka and Vahini, April 1976*

Against the degraded backdrop of Malegaon from Karjat *Taluka*, the seeds of *Saguna Baug* were sown. The initial focus on rice cultivation stemmed from the abundant rainfall in the area. The years from 1977 to 1995 were marked by

conventional rice cultivation methods, demanding labour-intensive processes. The reliance on rainfall, tractors, and skilled labour soon proved precarious, leading to a pivotal moment of seeking alternative methods.

Returning to his farm, he set out to transform a modest piece of land into the crown jewel of 'agro-tourism' in the nation—*Saguna Baug*. This endeavour was not just about cultivation; it was about creating an ecosystem where agriculture and tourism harmoniously coexisted. '*Saguna Baug*' became a symbol of sustainable farming practices. It was a beacon for those seeking to explore the inter-connectedness of rural life and modernity.

Working at the ground level, he understood the hardships faced by the fellow farmers because of very low agricultural production. Their plight made him very restless, and in the year 1995, he embarked on a quest to find simplicity yet high yielding solutions in farming.

His approach was experimental – blending traditional knowledge with innovative techniques. The first step was introducing groundnut cultivation on raised beds, using poly-mulch film and drip-irrigation. This method was a departure from the conventional, but it yielded promising results. It was during a season when groundnut seeds were scarce that he stumbled upon a significant discovery. In the year 1995, in an improvisational move, he planted rice seeds on the raised beds and used Goal (Oxyfluorfen) as a pre-emergence selective herbicide. The success of this rice crop was a revelation, when harvested in May 1996. It proved that direct seeded rice (DSR) cultivation was possible without puddling. Use of general purpose non selective herbicide (important tool) after harvesting the main crop, i.e., before sowing the seed of the next crop, could eliminate the need for ploughing after each crop.

This success journey was not just about agricultural innovation; it was also about validation and acceptance. The real test of the *Saguna* Rice Technique (SRT) came with its exposure to the scientific community. Esteemed visitors to *Saguna Baug*, including Dr Arun Pande from Tata Consulting Services, Dr S Ayyappan, the then Secretary DARE & Director General, ICAR (Fig. 4); and Dr DG

Fig. 4. *Visit of Dr S Ayyappan to see our early attempts of taking SRT to the farmers, 2013*

Bhapkar, Former Rice Specialist, provided invaluable insights. The most memorable visit was in 1998 when Dr Sant Virmani, IRRI Senior Scientist and Dr Partha Dasgupta of Syngenta Foundation witnessed the no-till cultivation of rice on raised beds with drip irrigation (Fig. 5). The appreciation and constructive feedback were pivotal in bolstering his confidence in SRT (see chapter 4 for details). The technique also garnered the blessings of visionary Indian scientists, like the late Dr Jayantrao Patil and late Prof MS Swaminathan, the Father of the Green Revolution, in India. Their encouragement was a morale booster and affirmation of the significance of his work. Dr Patil, like an elder brother, urged him to go to the needy, marginal and poor rice farmers for acceptance and widespread use of the technique. He also advised him to document his journey. This suggestion resonated deeply with his belief in the power of knowledge sharing.

Fig. 5. *Visit of 'No-till' cultivation of rice by Dr Sant Virmani, IRRI and Dr Partha Dasgupta, Syngenta Foundation 1998*

These early experiments laid the foundation for what would become the *Saguna* Rice Technique (SRT). The results of experiments were encouraging – crops grew robustly and uniformly, instilling a newfound confidence in his innovative ideas among his team. It was reinforced by the support of innovative farmers like Mr Jaykumar Gunde and Mr Pratap Chiplunkar, who contributed significantly to refining the technique.

Fig. 6. *Dr RS Paroda visited tribal SRT farmer at Karjat, Dist. Raigad, Maharashtra*

Dr RS Paroda, Former Secretary, DARE and Director General, ICAR, and Chairman, Trust for Advancement of Agricultural Sciences (TAAS) during his recent visit to *Saguna Baug* (Fig. 6) expressed deep admiration of the work carried out by Shri Chandrashekhar. He gave valuable insights with his expertise in the field. He was

particularly impressed with the increase in the happiness index and income of the farmers. He also applauded the women empowerment due to SRT making them self-reliant and engaged in farming activities.

Prof KV Raman, Adjunct Professor, School of Integrative Plant Science Plant Breeding and Genetics Section, College of Agriculture & Life Sciences, Cornell University, United States of America visited '*Saguna Baug*' in December 2023 (Fig. 7), and was greatly impressed by the SRT. He was introduced to SRT by Shri Chandrashekar in one of the webinars on agricultural development. He was very keen to experience SRT and meet Shri Chandrashekhar in person. He travelled all the way from the US to India. He was highly impressed with the farm visits where he could speak to the SRT farmers and understand the benefits. In his remarks about his visit, he said, "*After having seen so many development projects worldwide, I have to say that the work being done by Shri Chandrashekhar and his team on adoption of SRT by small adivasi tribal farmers plus several others in Pune and Neral regions, is changing the lives by providing high yield, improving soil health, and promoting sustainability and environmental health. Thousands of small farmers reaping benefits of SRT. I encourage students and faculty in State Agricultural Universities (SAUs) for 'Seeing-is-Believing' to get first-hand information about SRT and engage in further work of research.*"

Fig. 7. *SRT team with Dr KV Raman (extreme right in middle row)*

Fig. 8. *Dr MS Swaminathan appreciating the work of Shri Chandrashekhar Bhadsavle*

Dr MS Swaminathan, Founder Chairman, MSSRF Chennai also praised his work a great deal (Fig. 8). As SRT evolved, so did its impact. By June 2013, it was ready to be shared with other farmers. Handing over SRT to the farming community was not just about transferring a technique (Figs. 9-10); it was about sharing a vision for sustainable and environment-friendly agriculture.

Fig. 9. *Shri Chandrashekhar demonstrating the use of frames for making holes for seed placement*

Fig. 10. *The first plot of rice with raised beds and 'No till' cultivation*

Initially not a single farmer believed him and nobody came forward to try SRT in their field. Only after an assurance of reimbursing double the loss, thirty farmers were ready to try. The results of SRT with all those first farmers in 2013 were overwhelming. After witnessing SRT's benefits first-hand they became the advocates of this technology.

The quest for a solution in 'no-till' rice cultivation began in 1996, spurred by challenges in transplantation (Fig. 11). Despite facing uncertainty and setbacks, the unwavering spirit of experimentation took roots. A crucial turning point emerged with the idea of direct-seeded no-till rice—an innovative approach that defied traditional practices. Some of the financial supporters for the innovation efforts included Shri Rama Purushottam Foundation, Pune; JSW Foundation, Mumbai; *Kisan* Forum, Pune; Dr NH Atthreya, Mumbai; Sanket Baralay, Pune; Pradeep H Bhadsavle and Nipun Bhadsavle, USA; Ms Padma Gresham, Switzerland; Anuradha C Bhadsavle, *Saguna Baug*; and Dr Kalkar family, Pune.

Fig. 11. *The tough days which triggered Shri Chandrashekhar to look for options of direct seeded rice*

Chapter 3

Innovation-led Infrastructure

Shri Chandrashekhar's journey in agriculture unfolded as a dynamic exploration of resilience inspired by nature's diversity. Recognizing that a diverse range of activities leads to a more feasible and financially sustainable future, he expanded the scope of his farm, intertwining various ventures into an inter-connected ecosystem. This chapter delves into the gradual evolution of '*Saguna Baug*' (Fig. 12), where each addition played a pivotal role in shaping a comprehensive and sustainable agricultural landscape.

Fig. 12. *Impressive additions to infrastructure of Saguna Baug in 1986*

Rice Cultivation: A Shift Towards Efficiency and Sustainability

Shri Chandrashekhar's venture into transforming rice cultivation marked a fundamental change in his farming philosophy. Redesigning the field layout with raised beds optimized for direct-seeded rice (DSR) cultivation reflected a commitment to efficiency. The introduction of drip-irrigation allowed precise water management, showcasing a dedication to sustainable water usage. The application of poly-mulch film emerged as a significant innovation, conserving soil moisture and enhancing crop health. These initiatives transformed rice cultivation,

aligning it with the principles of the natural environment. A significant experiment involved DSR on raised beds with black and transparent poly films, coupled with drip-irrigation (Fig. 13).

Fig. 13. *Experiments of growing rice by DSR, poly film and drip irrigation on raised beds*

Freshwater Aquaculture: Creating a Thriving Aquatic Environment

Recognizing the importance of a thriving environment for aquatic life, Shri Chandrashekhar established freshwater aquaculture. Harvesting rainwater in large ponds, meticulous construction of earthen ponds (Fig. 14), and aeration systems became essential components. Unique to '*Saguna Baug*' was the transportation of live large 'saleable fish' and 'freshwater giant prawns' to Mumbai for sale, achieved through a technique developed for transporting prawn seedlings from perennial rivers.

Fig. 14. *Construction of earthen ponds for rainwater harvesting and polyculture.*

Aqua-tourism

Integrating aquaculture with tourism known as 'Aqua-tourism' at *Saguna Baug* featured the 'Pond House' and 'Cottages' (Fig. 15) as unique stay arrangements, becoming major attractions for agro-tourism guests. Aqua-tourism is suitable and has great scope for smallholder farmers to earn high income and great respect.

Fig. 15. *Pond house and cottages built in 2004*

Dairy Farming

The dairy farming at '*Saguna Baug*', initiated with ten animals, now comprises 30 animals. A dedicated cattle barn with proper ventilation and sanitation (Fig. 16), coupled with a *Gobar* gas plant (Fig. 17), showcased a holistic approach. This dairy activity harmonized with other farm activities enhanced the overall productivity.

Fig. 16. *Dairy to integrate cropping pattern and agro-tourism*

Fig. 17. *Gobar gas plant; one of the first successful projects, 1982.*

Advanced Irrigation and Fruit Orchards

An electric water pump house on the riverbank facilitated advanced irrigation for fruit orchards. The orchard design, focusing on spacing, variety selection, and integrated pest management, resulted in healthy and bumper harvest in fruit crops. Farmers could get income through 'agro-tourism' just by allowing photography of a fruit laden tree; the fruit is yet to be harvested for sale in the market (Fig. 18).

Fig. 18. *Income through 'agro-tourism' allowing photography of a fruit laden tree*

Housing Facility for Farm Workers

Recognizing the importance of a dedicated workforce, Shri Chandrashekhar built housing units for farm workers (Fig. 19), ensuring their basic needs, and their health and education were taken care of, contributing to uninterrupted farm operations.

Fig. 19. *Construction of housing units by utilizing self-grown raw materials at the farm*

Agroforestry

For integrating agriculture with forestry, Shri Chandrashekhar planted tree species strategically for infrastructure development. Agroforestry efforts emphasized sustainability and productivity, showcasing the use of home-grown timber trees for construction of housing units and other infrastructure at the farm.

Integrated Pest Management

Emphasizing environmental balance, integrated pest management (IPM) was combined with biological, cultural, and mechanical methods (Fig. 20). The approach protected crops and preserved the natural biodiversity of the farm.

Fig. 20. *Light trap to monitor insect attack (left); Gliricidia to deter rodents in the fields (right).*

Building a Strong Foundation

The infrastructure at '*Saguna Baug*' was meticulously designed to support diverse agricultural practices. Storage and processing units handled everything from rice to fruits. Collaboration with the University of Auckland, New Zealand led to the setup of a weather monitoring system (Fig. 21), showcasing the farm's commitment to staying updated with technology for informed decision-making.

Fig. 21. *Setting-up of a weather monitoring system by Prof Akbar Ghobakhlou from Auckland University, New Zealand, 2013*

Environmental Sustainability and Waste Management

Efficient waste management systems transformed potential pollutants into useful resources. Well chalked-out roads ensured easy and faster access to different areas of the farm, contributing to overall efficiency.

A Productive, Sustainable, and Harmonious Farm

Each component, from worker comfort to technological efficiency, was thoughtfully integrated, contributing to the transformation of '*Saguna Baug*' into a productive, sustainable, and harmonious agricultural heaven. The gradual additions and innovations showcased a journey marked by resilience, adaptability, and a deep understanding of the interconnectedness of nature's diverse elements.

This phenomenal work in nature conservation carried out by Shri Chandrashekhar opened his way to the 'Gift of Nature'. This gift was SRT-the *Saguna* Regenerative Technique (SRT).

Chapter 4

Saguna Regenerative Technique (SRT): A Win-Win Breakthrough in Agriculture

Background

Agriculture in Maharashtra state has been facing serious challenges due to climate change since the last two decades. The farmers are fighting against the rising temperature, uncertain rainfall and deteriorating soil health. The constraints faced by the farmers are causing frustration among the largest community in the society. *Saguna* Rural Foundation (SRF) studied the issue from various aspects, and started searching for affordable solutions with environment-friendly practices. The Foundation's initial work in rice crop resulted in development of conservation agriculture (CA) protocol involving 'Zero Tillage practice' of rice cultivation. The protocol was named as '*Saguna* Rice Technique (SRT)' and was tested on rice farms in Raigad district initially. After successful trials by the Foundation on the fields of over hundreds of farmers, the SRT method was showcased to the officials of the Department of Agriculture and the then Dr Sudhir Kumar Goel, Additional Chief Secretary (Agriculture), Maharashtra Government, incorporated the technology in the project on 'Public-Private Partnership for Integrated Agriculture Development (PPP-IAD)' for rice during 2014-15.

The technology now is being piloted in other major crops such as cotton, soybean and maize under the 'Project on Climate Resilient Agriculture (PoCRA)' since the last four years through farmers' field schools (FFS). Both these initiatives showed positive impact on the farming resulting in increase in yield, increase in soil organic carbon, reduction in production cost and enhancing happiness among the farmers. Based on the successful implementation of the technology by farmers in all agro-climatic zones in the state, the technique was renamed as '*Saguna* Regenerative Technique (SRT)'. Still this regenerative agriculture (RA) practice is limited to a few projects while there is a great need to scale this technology among the lakhs of farmers in the state. Also, there is an urgent need to put SRT on the research agenda of the State Agricultural Universities (SAUs).

Importance of No-Tillage

Saguna Regenerative Technique (SRT) is defined as a conservation agriculture (CA), 'no-till' method (Fig. 22), essentially a regenerative method of farming that does not involve the disruption of soil structure through tillage. This approach effectively reduces soil erosion, promotes the natural proliferation of earthworms, enhances the organic carbon content of the soil, and significantly boosts land productivity. An additional benefit of this method is the increased happiness and confidence of the farmers, a testament to the transformative power of sustainable farming practices (Fig. 23).

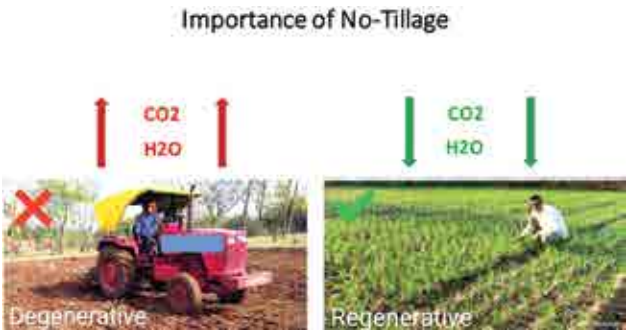

Fig. 22. *Tillage leads to degradation of soil (confirmed in 2013)*

Fig. 23. *Healthy soil, happy farmers and healthy environment; the mission of SRT*

The most significant benefits of SRT is its ability to reduce water requirement by 40 per cent, which is a crucial factor in regions where water scarcity is a pressing issue. Additionally, SRT reduces the cost of production by 40 per cent and number of required workers by 50 per cent, making it economically viable and beneficial for farmers. SRT addresses the global challenge of climate change by halting greenhouse gas (GHG) emissions from agricultural practices. It eliminates the need for fossil fuels in tillage completely. It sequesters carbon effectively, improves soil fertility and contributes significantly to the mitigation of global warming.

The SRT has potential for sustainable agricultural practices in the context of global challenges such as growing population demand, food security, and environmental degradation. This technique is a scientific approach to agriculture that has shown remarkable results in terms of productivity, sustainability, and farmers' satisfaction.

Constraints/ Limitations of the SRT

Although SRT has a good potential for enhancing crop production, there are some constraints that could be associated with the implementation of SRT or similar sustainable farming techniques:

1. **Change in traditional practices:** The SRT involves a significant change from traditional farming practices (Fig. 24). Some farmers may resist in accepting the change or find it difficult to adapt to the new techniques.
2. **Training and knowledge enhancement:** SRT is a precision farming technique, hence, farmers need special training and education to effectively implement it. This could be a constraint in areas where access to training or information is lacking or limited.

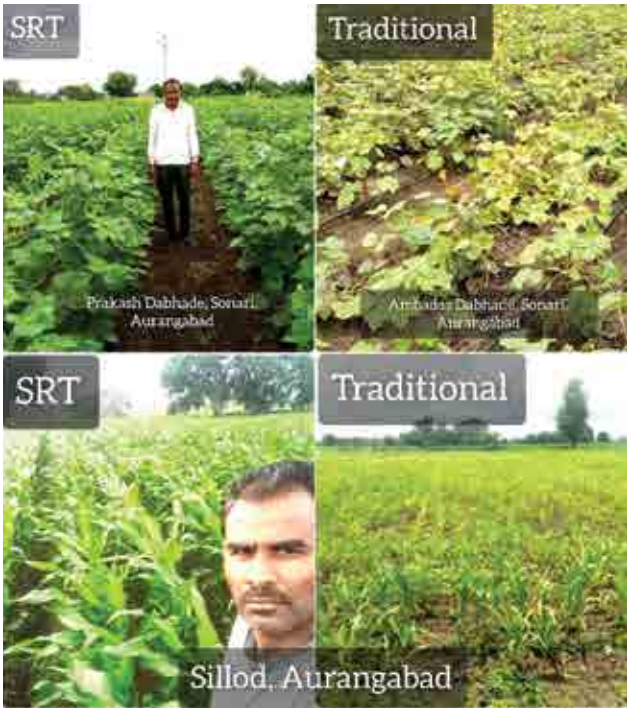

Fig. 24. *Climate resilience due to SRT in various crops*

3. **Initial investment:** The transition to SRT may require some initial investment in terms of time and resources. For example, farmers may need to invest in new equipment or materials to prepare the permanent raised beds.
4. **Time for results:** While SRT can improve soil health and increase crop yields, these benefits may not be immediate. It may take 2-3 years' time for the soil to regenerate and realize the full benefits.

Stubble Burning Issues and Solutions

The SRT also has a potential to completely tackle the problem of stubble burning which is common practice in North India (Fig. 25). Not to burn away the stubble will become the fringe benefit of SRT. Additionally, rice-wheat cropping patterns by SRT will prove to be one of the best methods of carbon sequestration.

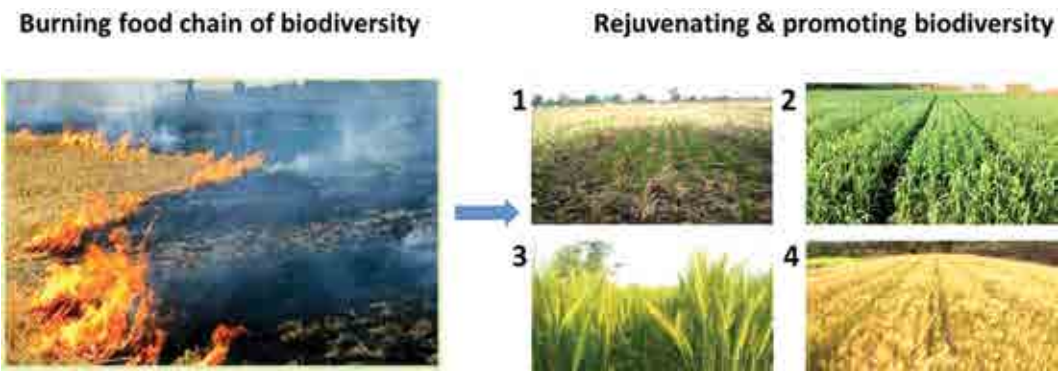

Fig. 25. *Wheat cultivation after rice without burning rice stubble and without tillage ('win-win' situation demonstrated in 2015)*

The technique has demonstrated a remarkable ability for rural empowerment. Even among tribal families, annual income has increased 4-fold after adopting SRT. This economic upliftment has brought joy and confidence to farmers. It has also led to a reverse trend of young people returning to the farming profession. SRT is favourably addressing 6 of the 17 Sustainable Development Goals (SDGs) set by the United Nations, which include (i) Goal 1-No Poverty; (ii) Goal 2- Zero Hunger; (iii) Goal 3- Good Health and Well-Being; (iv) Goal 6- Clean Water and Sanitation; (v) Goal 8-Decent Work and Economic Growth; and (vi) Goal 13-Climate Action. The technique has been validated as below by the Food and Agriculture Organization of the United Nations (FAO), further attesting to its global relevance.

Food and Agriculture Organization of the United Nations

TECA - Technologies and Practices for Small Agricultural Producers

Date: 8/18/2022 - Path: https://www.fao.org/teca/en/technologies/10108

Title: Saguna Regenerative Technique (SRT), a no-till, conservation agriculture method of rice-based farming

Id number:	10108
Source:	Saguna Rural Foundation
Language:	English
Date of Publication:	April 2021
Date of Revision:	April 2021
Keywords:	No tillage, Regenerative agriculture, Conservation agriculture, Small scale farming, Climate change, Climate smart agriculture, Zero emission, Good drainage, Water infiltration, Biodiversity conservation
Categories:	Climate Change Adaptation and Disaster Risk Reduction
Country:	India
Region:	Southern Asia
Related SDGs:	

Due to the above empirical observations getting proved in the state of Maharashtra, the Hon'ble Chief Minister Shri Eknath Ji Shinde in a program addressing farmers (Fig. 26) appreciated the Marathi slogan created by farmers – "SRT चे गुणगान, माती बलवान, पीक पैलवान आणि शेतकरी धनवान

Fig. 26. *Shri Eknath Ji Shinde, Chief Minister of Maharashtra addressing the SRT farmers at Saguna Baug on 22nd May 2023.*

Fig. 27. *A Workshop on Regenerative Agriculture, organized by Saguna Rural Foundation*

(Kudos to SRT for enriching the soil, yielding bountiful crops and making the farmers prosperous)". Also, a workshop on Regenerative Agriculture (RA) was organized (Fig. 27) by *Saguna* Rural Foundation (SRF), wherein Dr RS Paroda participated as Chief Guest and appreciated the usefulness of this technique (Fig. 28).

SRT humming……."Soil enriching, Crops booming and Empowering Farmers"

Scan this code to enjoy a Marathi song (चिंता रोग गेला *meaning vanishing of farmers' tensions*) *written and performed by an SRT farmer.*

Fig. 28. *Workshop on SRT regenerative agriculture at Saguna Baug, with Dr RS Paroda (Chief Guest) (September, 2023)*

Philosophy and Protocol of SRT

We believe that the holistic plan of mother nature towards human beings, animal world and vegetation is, "the grain and the fruit are for human beings, the leaves and branches are for the animals and the roots are for the mother land." In protocol of SRT (Fig. 29), the process involves following steps:

Fig. 29. *Various steps for using the SRT*

1. **Preparation of permanent raised beds:** The first step in the SRT is to prepare permanent raised beds in the field. These beds are typically 1m wide and can be of any length. The beds are separated by furrows that are 36 cm wide.
2. **Sowing:** Seeds are sown directly into the raised beds. There is no need for ploughing or puddling, which makes the technique less labour-intensive and more sustainable. The iron frame is designed to make holes at 25 cm × 25 cm but can be changed to multiples of 25 cm as per the crop requirement.
3. **Pre-emergence selective weedicide application:** This is important to prevent weed growth in the first month of plantation. The selective pre-emergence weedicide is to be applied within 24 hours after seed sowing and irrigating the land, walking backwards. See link below:

   Links : https://youtu.be/pbt_JtTo0_M;https://youtu.be/cxai8cKPkl0; https://youtu.be/TfyoFOMiMUA; https://teca.apps.fao.org/teca/en/technologies/10108

4. **Post-emergence selective weedicide application:** If for some reason an aggressive weed is noticed after crop emergence, a set of recommended selective weedicides can be sprayed.
5. **Gap filling:** This is to be performed between 15 to 25 days after the emergence of the crop.
6. **Irrigation:** Irrigation is given as needed. The design of the beds helps to maintain optimum moisture.
7. **Fertilizer application:** Only one dose of fertilizer application is recommended in the SRT method. Between 20-25 days after germination, one briquette/tablet of DAP urea is pushed into soil between 4 rice plants.

   Scan this code and watch a 5-minute SRT English video documentary.

Key Features of SRT

1. **'No-till' farming:** This technique emphasizes no ploughing, no puddling, no harrowing, no removal of weeds and such other tillage operations which are responsible for soil degradation.
2. **Permanent raised beds:** Crops are grown on permanent raised beds, which help maintain optimum moisture and oxygen conditions in the root-zone area promoting good microbial count resulting in resilient crops.
3. **Crop residue:** The root mass of the previous crop and the weeds are kept undisturbed in the bed, which helps conserve moisture, improve soil health, and suppress weeds with the help of weedicides.
4. **Crop rotation:** SRT insists for rotation of crops; two different crops from the same family such as wheat after rice or chickpea after soybean is recommended but must be avoided rice after rice or maize after maize.

Area under SRT in *kharif* 2023

The total area planted under SRT was about 5,000-7,000 ha in Maharashtra state and the area is continuously increasing year after year.

Major Crops Grown under SRT

Rice, wheat, cotton, soybean, maize, groundnut, pigeonpea and vegetables are the major crops grown using this technique (Figs. 30, 31).

Fig. 30. *Rice, wheat and cotton crops grown using SRT*

Fig. 31. *Soybean, horse gram and groundnut crops grown using SRT*

Benefits of SRT

1. **Reduces Cost of Production:** It saves 30-40 per cent cost of production compared to conventional method of rice cultivation as farmers do not have to do ploughing, puddling, transplanting and hand hoeing. Also, it saves 50 per cent of treacherous labour, especially for farm women.
2. **Soil Health:** SRT's 'zero-till' and cover-crop practices enhance soil structure, fertility, and organic matter content, leading to healthier soil ecosystems. Loss of valuable silt (about 20% of puddle water going out of field) during puddling can be prevented. Also keeping the roots of previous crops at the same spot to decay slowly, quickly enhances the per cent organic carbon in the soil. Thus, more fertile land can be handed over to the next generation.
3. **Water Efficiency:** The water-conserving technique helps in tackling water scarcity, and making it ideal for Maharashtra's climate.
4. **Climate Resilience:** SRT's carbon sequestration capabilities contribute to climate change mitigation and adaptation, which is crucial in the face of changing weather patterns. Avoiding puddling in vast paddy cultivation areas will drastically reduce diesel consumption and thus reduce emission of CO_2. SRT being an aerobic method will prevent methane generation. Thus,

drastically making it a 'Climate Resilient Agriculture' practice by bringing down greenhouse gas (GHG) emission from paddy cultivation.

5. **Increased Yield:** By improving soil health and following the crop rotation practice, the SRT has the potential to increase crop yields sustainably.

A workshop on decarbonization of paddy was also organized at '*Saguna Baug*'. Dr Ranjan Samantaray of World Bank and Shri Parimal Singh, IAS of Government of Maharashtra were present (Fig. 32).

Fig. 32. *Workshop on decarbonization of paddy organised at 'Saguna Baug' in April 2023*

Impacts of SRT

The average loss from cultivated land of India is 16.5 tons per hectare per year. There is urgent need to stop this as soon as possible which is demonstrated to be possible by SRT method as against tillage by various equipments and machines used in traditional method of farming (Fig. 33). Preliminary analysis of the soil revealed replenishment of 0.5 per cent organic carbon per year when SRT is practiced. Average

Fig. 33. *Farmland soil erosion in SRT*

agricultural land of India is having 0.4 to 0.5 per cent organic carbon (OC), while ideal is anything beyond 0.75 per cent OC. The SRT enables quick recovery of the degraded land to 1 per cent and more OC level of the soil.

Perfect uniformity: The aerobic condition at the rhizosphere triggers positive chain-reaction for healthy root and plant growth resulting in perfect uniformity in crop growth. This also reduces risk and drudgery to farmers.

Impact on soil structure and water infiltration: With increase in organic carbon, *in situ* decomposition of organic matter, capillary formation by drying roots and earthworms, and enhanced aerobic condition in the deeper layer of soil quickly build a healthy soil. Improved water drainage makes the crop climate smart and climate resilient (Fig. 34). Increased organic carbon enhanced earthworm activity and higher microflora. This improved soil aggregation and water drainage. All the SRT farmers observed the same resilience in crops even during floods in the past two years. The same resilience was also noticed under the drought conditions. Improvement of the physical properties of soil was observed at surprisingly high speed and superior quality in a span of 10 years by SRT method (Fig. 35).

Fig. 34. *Climate resilience due to SRT in flooded condition*

Fig. 35. *Regeneration/transformation of dirt into healthy soil*

Presence of earthworms : With the traditional method where ploughing and puddling are performed, the survival and performance of earthworms was impossible. But with the 'No-till' SRT method, all the 5,000 farmers in all six agro-climatic zones are very happy after noticing the natural presence of earthworms in the paddy field in many types of soils (Fig. 36). Attracting presence of earthworms in paddy field has been the dream of scientists world over; this is profoundly demonstrated by thousands of SRT farmers in all types of soils under all the agro-climatic zones of Maharashtra.

Fig. 36. *Natural occurrence of abundant earthworms in different types of paddy fields.*

Problem of residue burning on farm lands: Organic residue burning on farms is practiced to get rid of the bulk of residue. This makes it convenient for next crop sowing or to sterilize the land for seed. In SRT method, the burning of crop residues is avoided, which takes care of both these problems.

Enhanced Biodiversity: As a result of SRT 'No-till' farming over 12 years, the amazing enhanced biodiversity of spiders (57 species), butterflies (70 species), birds (120 species), and reptiles, mammals and amphibians was located and identified at *Saguna Baug* (Fig. 37).

57 species of "Spiders"

70 species of "Butterflies"

120 species of "Birds"

Amphibians, Reptiles and Mammals

Fig. 37. *Improved biodiversity at Saguna Baug due to SRT 'No-till' farming*

Saguna Regenerative Technique (SRT) and its application in paddy

The impact of Saguna Regerearive Technique (SRT) and its application in paddy is given in Table 1.

TABLE 1. Impact of SRT on water, soil and climate.

S. No.	Conventional farming	SRT farming
	Water conservation	
1.	Large quantity (40% of the total quantity i.e. 3,000 litre per kg of rice) of water requirement for puddling activity before transplantation	No puddling activity required in SRT due to direct seeding, thus saving on large quantity of water.
2.	'Hard clay pan formation' takes place in subsoil due to puddling activity resulting in reduced percolation	There is no such clay pan formation, rather fibrous remnant roots of earlier harvests lead to more void spaces (porosity) for locomotion of earthworms, etc., therefore more infiltration and percolation of water takes place.
3.	Low organic carbon (LOC) content in soil leads to low water retaining/holding capacity of soil	SRT leads to enhancement of organic carbon in soil. With passage of time, increased humus and biomass in soil leads to more water holding capacity. It also decreases irrigation frequency and saves water in turn.
4.	The irrigated farmlands become source of excessive utilization and wastage of rainwater as well	The irrigated farmlands (area of land) in turn acts as rainwater harvesting structures. In India, large areas of farms are under paddy cultivation in monsoon, *rabi* and boro/dry weather. Thus, the annual saving of water is enormous.
	Soil conservation	
5.	There is tremendous loss of top soil from conventional paddy fields due to ploughing and puddling activities	Soil erosion is reduced to minimum as there are no ploughing and puddling activities required and thus precious soil is conserved.
	Climate conservation	
6.	Conventional paddy fields are sources of methane generation due to anaerobic conditions produced by puddling and stagnant water. This causes global warming and climate change	SRT do not need puddling and water stagnation in the fields, being primarily an aerobic method of farming. Hence methane generation is prevented making it a climate resilient method

Chapter 5

With SRT - Onward and Upward...

Current Production Scenario

An insight into the present scenario of SRT and how it progressed from Konkan and Pune region to Marathwada and Vidarbha region of Maharashtra is a long story. There was a tough fight of nine years to convince people to adopt SRT and change the traditional way of farming. In the present time, '*Saguna Baug*' stands as a testament to the transformative power of sustainable agricultural practices in India. The farm is not only achieving remarkable success but also continuing to evolve as a beacon of innovation in agricultural practices. With the explicit blend of nature related activities, the farm has become a hub for providing employment and livelihood to the rural people. *Saguna Baug's* success extends beyond the fields; for those seeking to adopt eco-friendly and regenerative farming practices. The legacy of '*Saguna Baug*' is not just a story of farming; it is a narrative of sustainable growth, community empowerment, and environmental guardianship.

Emphasis on public-private partnership (PPP) to take this technique to the farmers for their benefits was recommended by Dr Sudhir Kumar Goyal, Former Principal Secretary (Agriculture) and Dr Umakant Dangat, Former Agriculture Commissioner, Maharashtra. Various State Agricultural Universities (SAUs) were approached for the spread of SRT. Hearing a positive response from them is still awaited.

The four guiding principles of SRT are – no ploughing of the soil and judicious use of weedicides, permanent raised beds, not uprooting the previous crop remains and crop rotation. This led to an increase in organic carbon of the soil with an increased production.

Following are the important components to be given emphasis to move forward:

- Development of baseline farming practices in agriculture with the Department of Agriculture and the Universities
- Linkage of farmers and consumers through market integration
- More women are becoming a part of the movement
- Protocol for market integration to be developed
- Formation of policy by the State and the Central Government to align national level carbon emission
- Incentivising the farmers for carbon credit
- SRT to get into carbon credit system

Some Examples of Success of Adoption of SRT

Following are a few examples of success of use of SRT as compared to traditional methods as evidenced by a few farmers:

Example 1: The components of the cost and profit in SRT and traditional methods used by a farmer in village Neral. Raigad, Maharashtra in rice crop in 2016 are given in Fig. 38 and Table 2.

TABLE 2. Components of the cost and profit in SRT and traditional methods.

Components	SRT method	Traditional method
Labor cost (INR)	22,830	28,750
Input cost (INR)	11,350	6,717
Tillage cost (INR)	0	6,000
Yield (kg)	5,500	3,250
Income (INR)	77,000	45,500
Profit (INR)	44,320	5,533

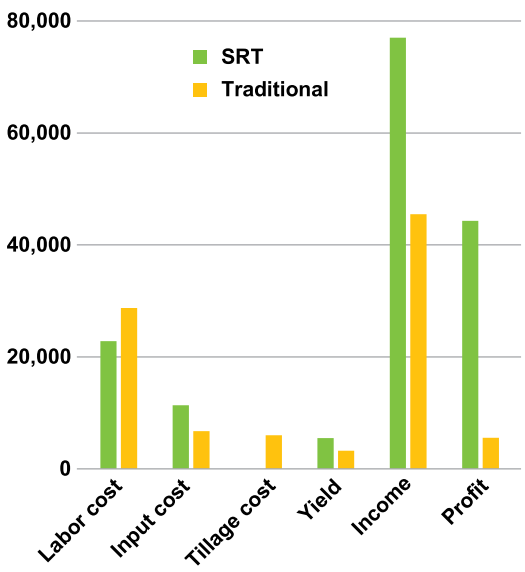

Fig. 38. *Components of the cost and profit in SRT and traditional methods of rice cultivation*

Example 2: The comparative data of plant growth in SRT and traditional methods of rice farming by 75 farmers in each of the five districts in 2019 are given in Fig. 39 and Table 3.

TABLE 3. Comparison of plant growth in SRT vs traditional farming of rice.

Components	SRT method	Traditional method
Average height (cm)	106	95
Effective tiller number	20	11
Number of filled grains per panicle	194	169
Weight of 1,000 grains (g)	21	19
Yield per acre (kg)	2,297	1,525

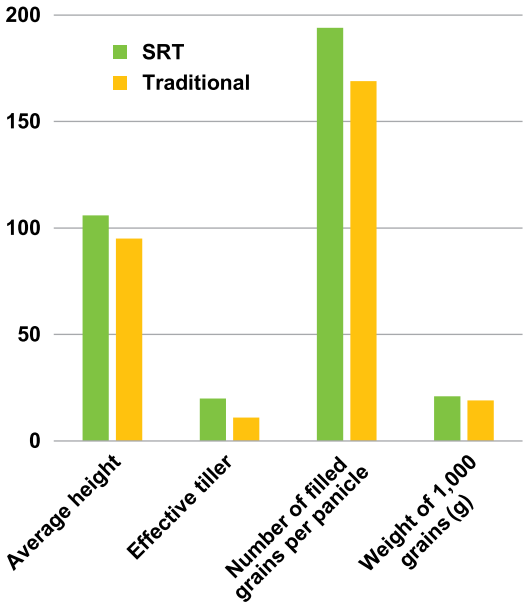

Fig. 39. *Comparison of plant growth in SRT vs traditional farming of rice cultivation*

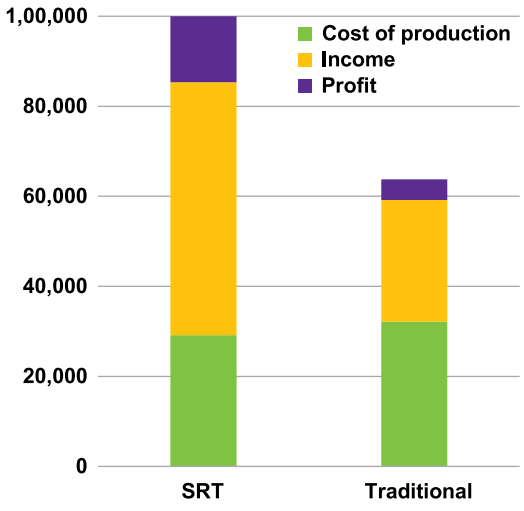

Fig. 40. *Comparison of cost of production, income and profit of cotton in SRT and traditional methods*

Example 3: The comparison of cost of production, income and profit in SRT and traditional methods of cotton cultivation by Shri Raosaheb Mohite, a farmer from Tapargaon, Sambhaji Nagar (Maharashtra) in 2020 is given in Fig. 40 and Table 4.

TABLE 4. Comparison of cost of production, income and profit of cotton in SRT and traditional methods.

Components (INR)	SRT method	Traditional method
Cost of production	29,149	32,150
Income	56,180	27,560
Profit	27,031	4,590

Chapter 6

Widening Horizons, Spreading Wings

With an aim to add more attractions to the 'Agro-tourism Centre', various activities like guided tours of the farm (Figs. 41, 42), 'Water Buffalo (WB) rides (Fig. 43)', awareness sessions on the intricacies and wonders of nature were added. The habitat of bees and wasps, snakes (Fig. 44) and reptiles, birds and butterflies, and different types of fishes (Fig. 45) shown by netting became quite popular with the visitors (Figs. 41, 42). Local tribes were provided a platform to showcase their culture through dances and various art forms. Rural

Fig. 41. *Tribal dance, attraction of agro-tourism*

Fig. 42. *Guided farm tour providing opportunity to rural youth for sharing knowledge*

Fig. 43. *Water buffalo (WB) ride - only of its kind in the whole world*

Fig. 44. *Live demonstration of snake to Mr Madhukarrao Chaudhari, Education Minister, Government of Maharashtra*

Fig. 45. *Live fish show at the farm pond for the guests*

Fig. 46. *Mallakhamb show to visiting students as part of 'agro-tourism' activity*

youth felt recognised when they were applauded for their demonstration of *Malkhamb* (Fig. 46) at the specially made *Malkhamb* Centre.

Through the guided tours of the farm, the visitors are apprised with the importance of rural India while the rural youth get dignity as he/she shares the self-earned local wisdom. They are enlightened on the science of 'no-till' farming and food production. Skill development of the local youth by providing various platforms for their skills gives them a sense of dignity and honour.

The legacy of serving your country leaving the glamor of developed countries was so deeply ingrained in the family that all the three children of Shri Chandrashekhar and Anuradha have carried on the legacy of serving the nation. In spite of studying, from the best universities in the world, they came back to contribute to rural Indian life. They observed that the potential rural India has for growth and development like their father. This was a big factor in leading by example. Mr Chandan Bhadsavle, the youngest son of Shri Chandrashekhar after completing his education from the University of Luzon, Philippines took charge of the day-to-day running of the 'agro-tourism' activity. He added another dimension

to the already evolving 'agro-tourism' set- up. In the year 2020, '*Saguna* Agro-tourism Centre' was recognized as the best Agro-tourism Centre in the country and was awarded for this distinction (Fig. 47). The award was conferred by Hon'ble Minister of Tourism, Shri Mangal Prabhat Lodha. The Tripadvisor Traveller's Choice 2023 proclaimed '*Saguna Baug*' to be the best destination among the top 10 per cent tourist destinations of the world.

Fig. 47. *Mr Chandan Bhadsavle receiving the National Award for Agro-tourism from Shri Mangal Prabhat Lodha, Union Minister of Tourism*

Besides taking firm roots in the state of Maharashtra, 'agro-tourism' spread its wings to various other states of India. The idea of 'agro-tourism' is replicated and stretched from Himachal Pradesh to Andaman and Nicobar group of Islands. It received a status of successful model from the Government of Maharashtra. This was evident in the reflection of the model in the agro-tourism policy of Maharashtra. Also, the Ministry of Tourism, Government of India recognised '*Saguna Baug*' as the pioneering and the best 'Agro-tourism Centre' of India.

With major responsibility of the 'Agro-tourism Centre' taken by Mr Chandan, Shri Chandrashekhar had more time to spare for the growth and spread of SRT. SRT started with 30 farmers in 2 districts of Maharashtra for rice crop in the year 2013, and was taken forward with extensive travel by Shri Chandrashekhar and his team. In *kharif* 2023, more than 5,000 farmers in 26 districts of Maharashtra adopted SRT happily and confidently for multiple crops such as cotton, pulses, soybean, maize, vegetables, etc. along with rice and wheat. A small experiment at Chandrashekhar's farm to eliminate the drawbacks became a movement of change for thousands of farmers.

Shri Chandrashekhar's approach to healthy and happy soil led to the happiness of the farmers. Unfortunately, the priority of the state agricultural universities and agriculture departments or agri-companies has always been productivity and not the happiness and confidence of farmers. Their objective was either

publishing papers or per cent profit. This approach has to undergo a paradigm shift to include the soil, the biodiversity, and the happy farmers to be holistic. When a new farmer adopts SRT, all in the farmer's family become happy within 45 days after seeing the vigorously uniform crop stand. This has led his team to carry out an extensive survey of farmers' happiness index (FHI). It is proved beyond doubt that as soon as the soil becomes healthy, the farmers become happy, which is demonstrated by SRT adoption (Figs. 48, 49).

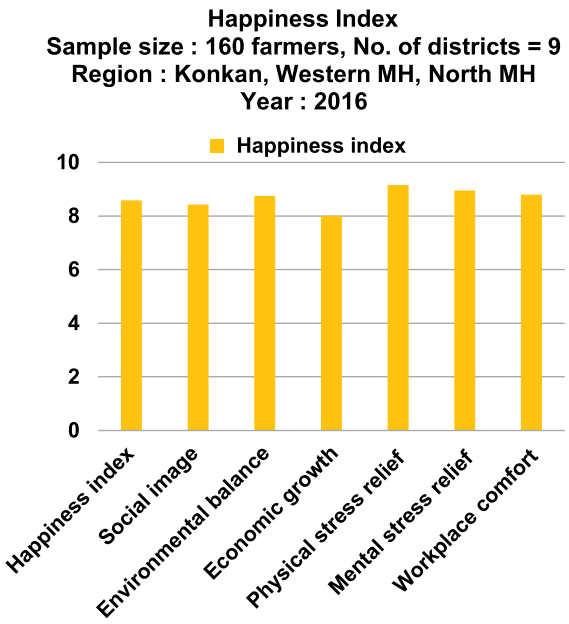

Fig. 48. *The increase in the overall wellbeing of the farmers*

Extraordinary Values of SRT

SRT has demonstrated extraordinary values and importance as is evident from the following:

- SRT is a 100 per cent *Bharat* originated technology which has a potential to make big revolution worldwide.
- Farmers' happiness, soil erosion, sub-soil water infiltration, less cost of production, wildfires and degraded forest, are not the top priority of the commercial media; but have to get them involved in these most important aspects which touch the lives of each and every one of us and our future generations.

Fig. 49. *Happy family of Mr Dattu Agivale, a SRT farmer*

- The happiness index using a sample size of 160 farmers of 9 districts of the Konkan region, Maharashtra in 2016 is given in Table 5 and Figs. 48, 49, 50.

TABLE 5. Happiness index scale under different components.

Labels	Happiness index scale (0-10)
Happiness index	8.58
Social image	8.43
Environmental balance	8.75
Economic growth	8.01
Physical stress relief	9.15
Mental stress relief	8.95
Workplace comfort	8.8

Demonstrated the following for the first time in the world in the history of rice production

- Presence of earthworms
- SRT being aerobic, no methane generation and other GHGs
- 'No-till' and direct seeded making it zero burning of fossil fuel for tillage
- No puddling and less days for maturity saves 50 per cent water
- SRT has the potential to fix 9 tons of CO_2 per acre per year.
- The easiest way to reach the goal of gender equality to farm women can be a combination of 'agro-tourism' and SRT, the latter makes the farming job very easy leaving ample time for other activities and 'agro-tourism' provides dignity along with additional substantial income.

Fig. 50. *Happy SRT farmers from Chhatrapati Sambhaji Nagar with the high corn yield and improvement in soil texture*

- SRT has brought even a marginal farmer on the same platform to solve the global problem of food shortage and global warming. Once the weakest link such as marginal farmers will start working on the global issue the problem will get solved quickly and effectively.

To reach the benefits of SRT to the larger farmer community, integration of technology was done through social media pages like Facebook, Youtube Channel, a dedicated page of SRT and books were also published. SRT led to further invention of farming tools and equipment known as the SRT Sacha (frame).

(Please scan the following QR code to listen to his video story)

Public-Private-Partnership, Integrated Agriculture Development (PPP-IAD) and Project on Climate Resilient Agriculture (PoCRA) by the Government of Maharashtra and World Bank gave momentum to SRT. The number of farmers increased from 2,000 in the year 2019 to 5,000 in the year 2023.

It is noteworthy that Shri Chandrashekar Bhadsavale represented India in the "Round Table Conference of Global Farmer Network (GFN) at CIMMYT, Mexico City in the year 2020. This is indeed a great recognition of his work on SRT and its scaling (Fig. 51).

Fig. 51. *India participated in roundtable conference of Global Farmer Network at CIMMYT Mexico City (2020)*

Public Awareness

Awareness about adoption/scaling of SRT is extremely important. Shri Chandrashekhar Bhadsavle has made tremendous efforts by publishing articles on success of SRT in a number of newspapers and also through other media. For details, please see Annexure II.

Chapter 7

Reaping the Fruits: Economics of Returns over Investments

Since its inception in the year 1985, '*Saguna Baug* Agro-Tourism Centre' and SRT have grown exponentially, succeeding and thriving. The self-sustaining model has created ample job opportunities for the local people too. The various projects and initiatives started by '*Saguna Baug*' such as Fish Pond, Pond House, Animal Rearing, and general accommodation for the guests have given measurable results in terms of 'Return over Investments'.

- The fish pond started in the year 1987 with a single pond and the yield of 500 kg has grown to 6 ponds with a yield of 10 tons per year.
- The first Pond House started in 2004 with 2 rooms and has increased to 8 rooms with a rent of ₹300 to ₹ 4,750 per adult per day.
- The cattle stock in the year 1988 was limited to 10 numbers and now has reached to 30.
- Each cattle stock that was priced at ₹ 5,000 per cattle is now priced at ₹ 25,000 in the Year 2024.

The general accommodation built for the guests has grown from 5 to 12, with a growth in the minimum rate of day picnic per adult from ₹35 to ₹1,700. All these have created employment opportunities for the local people with almost one family member from the local area employed with '*Saguna Baug*'. The number of employees rose from 15 to 180 in 2024.

The details of sale proceeds of *Saguna Baug* Agro-Tourism Private Limited are given in Table 6. The growth of assets including livestock during 1985-2024 are given in Fig. 52 and Table 7; while the details of employment generation during 1924-2024 are given in Figs. 52, 53 and Table 8.

TABLE 6. Sale proceeds of *Saguna Baug* Agro-Tourism Private Limited.

Sale proceeds (2021-2022)		*Sale proceeds (2022-2023)*	
Particulars	**Amount (INR)**	**Particulars**	**Amount (INR)**
Saguna Baug Agro-tourism Sales	32,602,487.00	*Saguna Baug* Agro-tourism Sales	47,622,939.43
Saguna Shop Sales	4,487,584.00	*Saguna* Shop Sales	8,665,421.00
Sales on Amazon	1,043,745.00	Sales on Amazon	1,520,083.70
Agriculture Sales	628,100.00	Agriculture Sales	3,859,484.01
Total Net Sales	38,761,916.00	Total Net Sales	61,667,928.14

TABLE 7. Growth of assets including livestock (1985-2024).

Period	Fish pond	Pond house	Cattle stock	General accommodation
1985-90	1	1	10	5
1991-95				7
1996-2000	2		15	
2001-05				9
2006-10			20	
2011-15				11
2016-20	4	5	25	
2021-24	6	7	30	12

TABLE 8. Details of employment generation during 1985-2024.

Period	Employment generation (No.)
1985-90	15
1991-95	20
1996-2000	27
2001-05	39
2006-10	76
2011-15	95
2016-20	110
2021-24	150

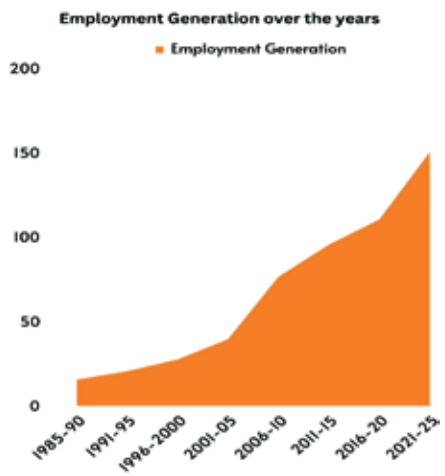

Fig. 52. *Details of employment generation during 1985-2024*

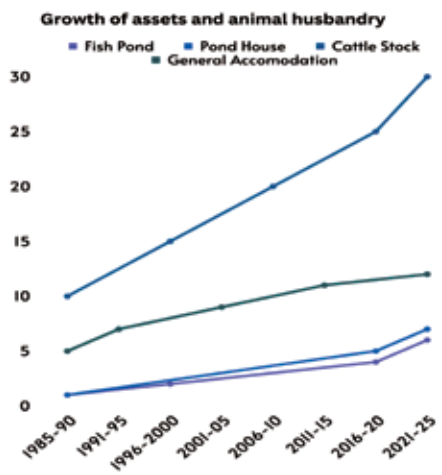

Fig. 53. *Growth of assets including livestock (1985-2024)*

Comparative Item-wise Cost of Production under SRT and Conventional Methods

Efforts have been made to calculate the cost of production of rice both under conventional puddling method and also under *Saguna* Rice Technique (SRT) taking all components into account from ploughing till harvesting (Table 9). Labour items in SRT method have proved to be simple and enjoyable that whole family enjoys the operations, rather than depending on outside labour. SRT follows the use of precision methods especially for fertilizers and insecticides.

TABLE 9. Comparative information of cost of production of rice by SRT and conventional puddling method.

Updated - 1/04/2023

Cost items for SRT	Amount per ha per crop (₹)
Fixed costs for 20 yrs Ploughing and pulverising of soil by tractor, 5 hr @ ₹ 600/hr = 3000/-	330/-
Making of beds by tractor, 3.5 hr @ ₹ 600/hr = 2100/-	
SRT frames @ 1500/-	
General weedicide Glyphosate, 5 lt @ ₹ 440/- per litre	2,200/-
Improved variety rice seed, 20 kg @ ₹ 70/kg	1,400/-
Pre-dibbling mixed fertilizer (50 kg Suphala @ ₹ 850/-) + Phorate (insecticide) 8 kg @ ₹ 80/-	1,490/-
Seed dibbling 25 workers @ ₹ 250/-	6,250/-
Selective weedicide Goal (Oxyflorfen), 600 ml @ ₹ 243/- per 100 ml	1,460/-
Gap filling 10 workers @ ₹ 250/-	2500/-
Weeding 10 workers @ ₹ 250/-	2500/-
Urea briquette fertilizer 150 kg @ ₹ 22/-kg	3300/-
Application of urea briquette 15 workers @ ₹ 250/-	3750/-
Harvesting 30 workers @ ₹ 250/-	7500/-
Total cost	**32,680/-**
Expected production: 5,000 kg **Expected price: @ ₹ 14/kg**	**70,000/-** **Profit = 37,320/-**

Updated - 1/04/2023

Cost items for conventional/puddling method	Amount per ha per crop (₹)
Chopping of forest growth 10 workers @ ₹ 250	2500/-
Bare minimum cost of forest/own material for burning of "Rab".	1500/-
Stacking material & controlled burning of "Rab" : 2 workers @ ₹ 250	500/-
Ploughing of soil by tractor 5 hr @ ₹ 600/- per hr	3000/-
Improved variety rice seed, 38 kg @ ₹ 70/kg	2660/-
Phorate (insecticide) for Rab 5 kg @ 80/-	400/-
Sowing seeds on nursery	500/-
Urea fertilizer for Rab, 2 applications, 76 kg @ ₹ 7/kg	532/-
Puddling by tractor @ ₹ 600/- per hr	1500/-
Transplanting 38 workers @ ₹ 250	9500/-
Small jobs in transplanting @ ₹ 250	500/-
Mixed fertilizer (18:18:10), 125 kg @ 18/-	2250/-
Boot stage urea application, 125 kg @ 7/kg	875/-
Lump sum labour for all fertilizer applications, 2 workers @ ₹ 250/-	500/-
Weeding 15 workers @ ₹ 250	3750/-
Harvesting 38 workers @ ₹ 250	9500/-
Total cost	**39,967/-**
Expected production: 3,250 kg **Expected price: @ ₹ 14/kg**	**45,500/-** **Profit = 5,533/-**

All labour costs are considered @ ₹ 250/- per day regardless of gender and region

Chapter 8

The Journey of Learning and Evolving

Lessons Learnt

The saying–*Rome was not built in a day*–is also true for '*Saguna Baug*'. The whole self-sustaining and well-developed farm with diverse activities that visitors witness today in all its splendour had its own shares of ups and downs in its journey of more than four decades. Initially when Shri Chandrashekhar Bhadsavle landed on his ancestral land, it was completely barren and degraded. Wild thorny bushes and plants covered the land with its scattered growth. The first step was to clear the land. It was done by cleaning up the land, removing thorny bushes and weeds and planting trees in a structured manner (Fig. 54). The trees were carefully chosen for their higher survival rate and suitable to the soil and weather conditions. Trees like *Gliricidia,* bamboo, subabul, *Eucalyptus*, *Casuarina* and Cactus for fence were selected and planted for their sturdy nature of survival. This helped in gradual upgradation of the land.

Fig. 54. *Cleaning the land; removing thorny bushes*

Obviously, the efforts required a dedicated team of people which was another major challenge in restoring the land. Employing the people and building a strong team was done through persistent and continuous efforts using our connections all over Maharashtra. Success was finally achieved by getting a work force from

Marathwada. Another major issue was no electricity, no roads, no water supply and no telephone connectivity. It took five to six years to resolve these issues gradually. This required connecting with government officials, several follow-ups and concerted efforts and plenty of time to get things done.

Simultaneously, the battle was being fought on the front with opposition from people with malicious intentions/negativity. They posed various threats in the form of stealing the fishes, fruits, setting things on fire and destroying the whole cultivation. At times, it went on to the verge of physical fight. Reporting matters to the police and taking legal recourse was another resort. However, drawing the learnings from the letter from his late father which he practiced himself acted as the most effective solution to tackle their destructive activities. Some of those people and family members are now employed with '*Saguna Baug*' and are positive contributors to its growth.

Fig. 55. *The destruction caused by floods in 1977*

The nature tested the commitment and will power of the '*Saguna* Team' in its own way. In July 2005, '*Saguna Baug*' was devastated due to floods (Fig. 55). More than 50 per cent of its property was washed away in the unimaginable devastating flood. The *Saguna* team was almost shattered. It took them three days to accept the destruction caused by the floods. On the fourth day, Shri Chandrashekhar, during the morning prayer with his team, which is a regular practice at the farm, inspired the team with his words. Addressing the team, he assured that everything we lost in the flood can be created with our imagination and efforts. Thankfully, we are still left with our creative minds and hard-working hands and we can recreate all that we have lost. This hope was rekindled when on the fourth day, a family of guests who have been frequent visitors to the farm came to stay on the farm in those very dilapidated conditions. The team spirit was renewed. In another such accident, there was a fire in the pond house on 26th June 2011 (Fig. 56). However, the learning from that incident was the use of wood as material for building was literally ruined.

On the SRT front, the lack of faith in the new technology among the common farmers practicing traditional ways of farming was a major challenge. In spite of

the proven results and benefits of SRT, the farmers refused to change from the comfort zones of traditional farming practices. They feared the risk of loss. It is after persistent persuasion, demonstration, and creating awareness, the SRT team could convince the first 30 farmers to give it a try on at least 10 per cent of their farmland in 2013, and thus the journey began.

Fig. 56. *Severe trauma and state of shock! The crown of Saguna Baug, the pond house was on fire*

The State Agricultural Universities (SAUs) that were approached still did not see any value in changing from traditional methods of farming and adopting the new technique. They did not accept, validate the solutions provided by SRT. However, when the intentions are backed by consistent actions, the recognition and support comes in from unexpected sources. In the year 2021, Food and Agriculture Organisation of the United Nations (FAO), recognised the benefits of SRT and kept it on their official website. The SRT is still awaiting the support from the Indian agricultural research and educational institutions. There are still challenges as almost everyone is negatively charged about the use of Glyphosate (an important tool). Many are not interested in validation and publication of our results. Most of the time, the government institutions are against giving full freedom of technology to farmers. Despite these challenges, the SRT team is committed to move forward.

Chapter 9

Innovation, Change and Progress-led Success

Key Factors of Success

Based on the strong foundation of '*Prayog, Parivartan, Pragati*' (प्रयोग, परिवर्तन, प्रगति) 'Experiment, Change and Progress' proved to be the major ideology that gave us the keys to success. Right from identifying problems, carrying out experiments for the same, looking for suitable alternate options, their implementation and achieving progress have been the process of constant learning and improvisation on the farm.

Late Shri Harikaka who worked with the tribal children gave Shri Chandrashekhar an opportunity to spend time with them. Growing with those *adivasis* helped him develop his ability to understand behavioural science of animals and plants. He immensely benefited from the indigenous knowledge they shared. He developed a bond with them. His affinity for agriculture and forest greatly influenced him to work for the cause in the later years like his father.

Shri Chandrashekhar shares the emotional moment when his long-held dreams come true, tears of joy filling his eyes. This vision inspired by his freedom fighter father (Fig. 57), is a culmination of 45 years of dedicated pursuit for the wellbeing of farmers of the country.

The first dream was to make degraded non-productive and negatively charged '*Saguna Baug*' into a highly productive and positively charged heavenly '*Saguna Baug*'. Second dream is dignity to enable youth through 'Agro-tourism' which is an activity organized by a farmer himself on his/her active farm where leisure learning and fun is combined together. The third dream steers away from traditional agricultural practices. In Shri Chandrashekhar's vision, no farmland should be subjected to ploughing (Fig. 57). Any form of atrocity to the soil related to this practice should

Fig. 57. *"The dream came true" 45 years of persistent sweating to pursue the dream of freedom fighter father*

be discarded. Instead, he envisions all farmland to be spongy, moist and fragrant. The fourth dream is to see the farmers happy and confident.

Shri Chandrashekhar, emphasized on the firm determination and dedication, an inspiration he drew from his late father's letter. Investment in continuous experimenting and learning from the results is an essential process to achieve success in your chosen field. To start Aquaculture in '*Saguna Baug*', Shri Chandrashekhar attended training in Andhra Pradesh and Israel. Working on the raised bed and 'no till' for SRT, extensive travel was carried out even in various remote districts of Maharashtra such as Gadchiroli, Chandrapur, etc. Relentless and untiring efforts were made in traveling different places, attending conferences, seminars, workshops, exhibitions and lectures.

The Legacy of Chandrashekhar Bhadsavle: A Family's Journey in Agro-tourism and Beyond

The Bhadsavle family's journey, spearheaded by Shri Chandrashekhar and his wife Ms Anuradha Bhadsavle (Fig. 58), is a testament to the power of innovation, dedication, and family support in achieving success. Their story unfolds from the humble beginnings at *Saguna Baug*, a beacon of agri-tourism inspired by

Fig. 58. *Ms Anuradha Bhadsavle*

tourism. *Chandan, Aarati, Abha and Rama Bhadsavle took forward the agro- tourism ship to a level that is marked as the best in Bharat* (Fig. 59)

Ms Ketki Bhadsavle (Fig. 60) inspired by her parents, ventured into agro-tourism with the establishment of 'Vrundawan', a testament to the family's commitment to nature and sustainable living. Her story reflects a deep-seated love for the environment, instilled by her father from a young age, guiding her and her siblings towards careers that harmonize with their upbringing.

the principle of '*Atithi Devo Bhava*' (the guest is God).

Ms Anuradha Bhadsavle's transition from city life to the rustic charm of *Saguna Baug* was marked by her unwavering support for Shri Chandrashekhar's vision. Together, they embarked on a mission to rejuvenate the land through *Saguna* Regenerative Technique (SRT), snake conservation, and public education. Ms Anuradha's journey alongside Shri Chandrashekhar was filled with challenges, yet her faith in their collective dream never wavered, culminating in the nationwide demand for SRT and the flourishing of agro-

Fig. 59. *Chandan, Aarati, Abha and Rama Bhadsavle taking forward the agro-tourism venture*

Dr Kasturi Bhadsavle's narrative is one of passion and innovation. Growing-up in an environment rich in wildlife and nature, she was drawn to specializing in veterinary ophthalmology—a field relatively new in India. Her return to India after spending years abroad was driven by a desire to contribute to her homeland, leading to the creation of a Centre of Excellence in Veterinary Ophthalmology (Fig 61). Her journey underscores the influence of parental support and the importance of thinking differently, principles that have guided her to success.

Fig. 60. *Ms Ketaki Bhadsavle Mhaskar with family at Vrundavan Agro-tourism, Karjat, Raigad (Maharashtra)*

Fig. 61. *Dr (Ms) Kasturi Bhadsavle at the Eye Vet Clinic, Pune, Maharashtra*

The Bhadsavle family's story is a powerful illustration of how family values, support, and a connection to nature can drive innovation and success. From the establishment of *Saguna Baug* to the pioneering efforts in veterinary ophthalmology, each family member's path reflects a shared legacy of dedication, innovation, and a deep love for the land. Their collective efforts have not only transformed agricultural practices but have also laid the groundwork for future generations to thrive in harmony with nature.

QR code of a letter of Chandrashekhar can be scanned

Chapter 10

Agro-tourism and SRT

The impact of 'agro-tourism' has been profound. A successful 'agro-tourism' model is standing tall for other young farmers to learn from. As a result, educated able youth have started returning to rural India. Many young people started taking inspiration and started 'agro-tourism' projects in rural India. They were able to integrate rural India with city people through their agro-projects. The successful examples are "Farm of Happiness" by Shri Rahul and Ms Sampada Kulkarni at Sangameshwar, Ratnagiri; *Amrute Nisarga Sahavas* अमृत निसर्ग सहवास" by Mr Ashish Amrute at Dapoli, Ratnagiri; '*Vrundawan* वृन्दावन' an 'agro-tourism farm' by Ms Ketaki Mhaskar at Warai; *Jai Malhar* 'Agro-tourism Resort' at Bhor, Pune by Mr Suraj Yadav Deshmukh, etc.

Shri Rahul and Ms Sampada Kulkarni

We were in our mid-thirties and working as creative professionals in the city when we decided to look for a change in 2005. That was the year, Shri Rahul and Ms Sampada Kulkarni) met Shekhar Dada at '*Saguna Baug*', a place that changed our lives. We were impressed by the 'agro-tourism' model at '*Saguna Baug*', which made us curious about agriculture. We had a unique and enjoyable experience (Fig. 62) of 'agro-

Fig. 62. *Shri Rahul and Ms Sampada Kulkarni enjoying at the Farm of Happiness 'Agro-tourism', Ratnagiri (Maharashtra), India*

tourism', and Shekhar Dada himself showed us the joy and pride of growing food. He was a confident and happy farmer; unlike the ones we saw in the media. Shekhar Dada not only inspired us on our first visit, but also guided us through our initial steps in agriculture and our own 'agro-tourism' project. We have been following his example and advice for almost twenty years now, with our own version of 'agro-tourism'.

Chandrashekhar Dada and Anuradha Vahini (वहिनी) visited our farm on January 19, 2021 for a specific purpose to check out our progress of adoption of SRT, which we had started in 2019. They both expressed high satisfaction with our farming set- up but were exhilarated as they saw the three families of us three brothers living happily together. They immediately strongly suggested that our family is an ideal example for integrating our innovative SRT farming with 'agro-tourism'. We immediately realised the importance of integrating our agricultural practices with *Krishi Paryatan* कृषि पर्यटन (agro-tourism) which we now confirm is the best win-win model for any farming family to adopt. This approach, he believed, could support agriculture without the need for subsidies or loan waivers.

Following Dada's guidance, we established the '*Jai Malhar* Agro-tourism Centre' in Bhor, combining historical, natural, and religious significance. This venture, along with our farming business, has thrived thanks to Dada's mentorship. He continues to be a source of learning and inspiration, always welcoming us to *Saguna Baug* for further education and growth in 'agro-tourism'. Shri Suraj Yadav and his family were very much enthused after visiting Jay Malhar Agro-tourism, Pune, Maharashtra (Fig. 63).

Fig. 63. *Shri Suraj Yadav and his family visited Jay Malhar Agro-tourism, Pune, Maharashtra*

Anamika Sharma

Ms Anamika Sharma, IBDP, TOK Faculty; Hon. Secretary, Helping Hands for Humanity (HHH NGO) was associated with Shri Chandrashekhar ji for the

last five years. She met him during a webinar on Wetland Conservation. With deep interest in nature conservation, regeneration of soil and preservation of biodiversity, She was instantly attracted towards his work. His passion and energy towards his work is contagious. Since then, she had been working closely with Shri Chandrashekhar ji and became a strong advocate of '*Saguna* Regenerative Technique – SRT' (Fig. 64).

As an educator for the past 25 years, she strongly recommended that SRT should become part of the school curriculum. Every child should understand the principles of soil conservation which is the need of the hour. The scientific approach and the enquiry- based methods used by Shri Chandrashekhar is another reason which makes it so relevant in today's world.

Fig. 64. *Ms Anamika Sharma - a strong advocate of SRT and admirer of Chandrashekhar's work*

She considers herself very fortunate and blessed to work with Shri Chandrashekhar ji in *Saguna Baug* events and projects. It has added a lot to her learning curve as an educator. He is an institution in himself. Greatly inspired by his work, she was on her way to shift from urban to rural set- up and contribute wholeheartedly to the noble cause of building rural India under the mentorship of Shri Chandrashekhar ji.

Anil Nivalkar

Mr Anil Nivalkar (Fig. 65), a young graduate from Dapoli Agriculture College, plunged into agriculture and attended one of Shri Chandrashekhar's lectures. Greatly influenced by his knowledge and work, he joined his team in 2013. He has become an integral part of the SRT team with his experience and expertise gained after years of association with Shri Chandrashekhar ji. He is one of the three top brains for the *Saguna* Rural Foundation (SRF) projects along with Parshuram Agiwale from Karjat, District Raigad. Training under the guidance of Shri Chandrashekhar,

he got well-versed with the scientific approach adopted by him in agricultural practices. He is also leading a project to study the benefits and impact of vetiver grass on soil erosion on the hilly slopes.

Fig. 65. *Shr Anil Nivalkar with his experiment on vetiver grass for preventing soil erosion*

Initiatives for SRT Regenerative Agriculture (RA) under the 'Project on Climate Resilient Agriculture (PoCRA)'

Looking at the success of SRT, the Government of Maharshtra and the World Bank in their Project on Climate Resilient Agriculture (PoCRA) started SRT training programs for the drought-prone areas of Maharashtra (Fig. 66). They promoted it as an effective alternative of the agricultural practices involving the agriculture officers from the government and the farmers. The wonder effect of the SRT adoption reflected in the benefits of increase in the happiness due to dignity and confidence building within them, thereby side-tracking farmers' suicide, a national catastrophe. Some good initiatives with success of SRT are as follows:

Fig. 66. *Dr Vijay Koleker (PoCRA) interacting with SRT farmers in drought- prone district of Chhatrapati Sambhaji Nagar at their transformed (regenerated) fields*

- Aligning to the mandate of the project to enhance climate resilience and profitability of the small holders in the state of Maharashtra, the PoCRA has listed 'zero-till' practice as the most climate- resilient technology.

- The *Saguna* Regenerative Technique (SRT) developed by Shri Chandrashekhar Bhadsawale, *Krishi Ratna* awardee farmer was studied by the project and this was successfully demonstrated for the crops other than rice.
- The customized 'zero-till' practice was successfully demonstrated in cotton, maize, soybean, and pearl millet crops through Farmers' Field Schools (FFS) in the project villages.
- The first demonstration of 'zero-tillage' for cotton under FFS in Tapargaon (Kannad, Aurangabad) was held in *kharif* 2019 by a farmer, Mr Atul Mohite. He harvested 9 crops in a sequence without tilling.
- The technology dissemination was promoted through 2,000 farmers in 40 villages in drought-prone Marathwada and Vidarbha regions. These farmers are getting benefits of the regenerative practices.
- The cotton growers are able to reduce the cost of cultivation by more than 40 per cent, and there is decrease in use of diesel as well as mechanized farm power.
- Also, the 'zero-tillage' helped farmers in the project area to enhance soil health and crop productivity.

The regenerative 'zero-tillage' being followed at '*Saguna Baug*' has inspired the extension agents and the farmers in the state of Maharashtra. The PoCRA project officials and Technology Coordinators were trained at '*Saguna Baug*' and they are spreading the technologies at a great speed in the entire state.

Farmers practicing SRT started getting awards and recognitions from government, NGOs and various organizations. This further strengthened their faith in SRT and motivated them to spread it to their peers. Parshuram Agiwale- a farmer (Fig. 67) who has been associated with Shri Chandrashekhar has become one of the master trainers to train farmers on SRT farming.

Fig. 67. *Mr Parshuram Agiwale, a farmer since 2014 in his flourishing SRT field*

The major impact of the work is seen in empowering women (Figs. 68, 69) in the agricultural practices as SRT demands less hard work and labour. In some cases, women have become confident earning members of the

family raising their confidence and dignity.

Ms Rasika Phatak, the youngest woman farmer from Sudhagad Pali, Raigad was able to free her family from the never-ending debts and achieved tremendous success by becoming a sustainable farmer. She has become an ardent follower of SRT as she promotes it to the fellow farmers of her area. She has received many awards and recognitions for the same.

Fig. 68. *Empowering rural women through providing frequent trainings by Shri Chandrashekhar and Ms Anuradha*

Fig. 69. *Shri Chandrashekhar and Ms Anuradha empowered rural women trough frequent trainings*

Saguna Baug's adoption of SRT and 'agro-tourism' activities have opened new economic avenues for the community. The allure of farm stays and eco-tourism has attracted visitors, creating additional business opportunities for local entrepreneurs in hospitality and service sectors. This influx of tourism has diversified the community's income sources and brought about a greater appreciation for rural life and sustainable agriculture. It has improved the standard of living, economic conditions and quality of life of the host farmers. Consequently, this has led to the development of a vibrant local economy, where each member benefits from the collective growth brought about by SRT and 'agro-tourism' practices.

Chapter 11

SRT Farmers – Straight from their Hearts

A large number of farmers have adopted *Saguna* Regenerative Technique (SRT) and have been immensely benefited. The success of SRT has been experienced in a number of crops such as rice, wheat, cotton, groundnut, soybean, horsegram and many other crops. A few successful examples of SRT farmers and their experience straight from their hearts are enumerated as below:

Shri Ganesh Gavhane

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Sillod, Dist. Chatrapati Sambhaji Nagar (Maharashtra)

I am a farmer from Marathwada, and since 2019, I have been practicing zero tillage farming under the SRT method, as part of the PoCRA scheme. In 2023, despite facing challenges like low rainfall and unseasonal rains, I witnessed a remarkable increase in the water level of my well along with bumper crops of cotton (about 12 q/acre) and maize (about 42 q/ acre) (Fig. 70). This positive change can be attributed solely to the SRT farming technique that I have adopted. The method has not only helped in conserving water but also in ensuring the sustainability of my farming practices even in adverse weather conditions.

Fig. 70. *Shri Ganesh Gavhane of Sillod, Ch Sambhaji Nagar persistently following SRT*

Shri Sujay Kumar

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Sitamarhi (Bihar)

Coming from a background of traditional rice farming in Sitamarhi, Bihar, I faced numerous challenges that seemed insurmountable. In my quest for solutions, I turned to YouTube, where I stumbled upon videos about SRT farming. These videos were a treasure trove of valuable information, leading me to take a significant step forward. Motivated by what I learned, I travelled to '*Saguna Baug*' for a comprehensive two-day training in SRT farming. My initial attempt was with wheat, and although it did not result in the success that I hoped for, it was a good learning experience. I identified and rectified my mistakes, and determined to improve. In my next attempt, I applied the SRT method to paddy cultivation during the *kharif*, and the results were astounding. I harvested an impressive 2,000 kg of rice per acre, a yield that far exceeded my expectations. This success not only brought me immense satisfaction but also sparked curiosity among the fellow farmers in my area. They are now approaching me, eager to learn about this innovative farming technique that transformed my agricultural practices. At Yerwada Jail farm, I have taken SRT training in rice field (Fig. 71).

Fig. 71. *Shri Sujay Kumar undergoing training at Yerwada Jail farm (rice field)*

Mrs Lalita Medage

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Karjat, Raigad
(Maharashtra)

Managing a farm while juggling family responsibilities, running a shop, and overseeing a poultry farm is no small feat. In the past, these diverse obligations often meant that our traditional rice farming received less attention than it needed. However, the adoption of the SRT method has brought a significant change to our farming practices and overall life style. The most notable benefit of SRT farming for us has been the freedom from painful dependence on labour requirements. Ms Lalita ji said, "This method not only demands less physical labour but also enhances production efficiency (Fig. 72). As a result, we have been able to manage our farm more effectively without compromising on the other aspects of our busy lives."

Fig. 72. *SRT Farmer, Mrs Lalita Medage, Karjat, Raigad*

"This shift to SRT agriculture has been a true boon for us. It allows us to fulfil our family and business responsibilities while still maintaining a productive and prosperous farm. We are truly lucky to have the positive impact that SRT farming has had on our lives, bringing both professional satisfaction and personal happiness."

Shri Pandurang Raghunath Patil

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Buldhana (Maharashtra)

In the village of Buldhana, Maharashtra, a daring 55-year-old farmer, Shri Pandurang Raghunath Patil, has earned the name "moniker" a crazy farmer for adopting SRT technology in cotton cultivation, reshaping traditional farming practices. To his surprise, the adoption of SRT brought unprecedented water abundance to the farm well, challenging a history of water scarcity. He says, "in my whole life of 55 years it is for the first time I have seen the well in our family farm overflowing with water, that too in the year of drought, by precisely following of SRT protocol and scientific weed management saved labour-intensive weeding." Initially he started SRT on 7 acres; undeterred by scepticism, the farmer plans to expand SRT across his 20-acre farm. Like-minded nearby farmers also have inspired those who are also going to adopt SRT in their farms. Guided by agricultural visionaries Shri Chiplunkar Kaka and Chandrashekhar Dada's team, this success hints at a broader shift towards sustainable practices, offering hope in a world grappling with climate change and resource scarcity (Fig. 73).

Fig. 73. *The 'Crazy Farmer' of Buldhana turns the tide of drought with SRT breakthrough*

Ms Rasika Phatak

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Sudhagad, Raigad (Maharashtra)

Beginning my agricultural journey with organic farming, I quickly realized the challenges it posed. High costs, intensive labour, and comparatively lower yields were the constant hurdles. However, my perspective on farming underwent a significant shift when I learned about SRT farming from Chandrasekhar Dada. My farm, located along the banks of the Amba River, was perennially plagued by floods, which made rice farming particularly challenging. Adopting SRT farming methods brought a transformative change. The techniques of direct seeding and permanent raised beds have been the game-changers, ensuring that my crops withstand the frequent floods.

Unlike before, the rice plants now remain anchored during floods, surviving and thriving despite the adverse conditions. This successful shift to SRT farming has not only improved the crop yields but also brought recognition in the form of various awards at the *taluka* and district levels. This acknowledgment elevated my standing in the society and has been a great encouragement, particularly in my social work endeavours. SRT farming is not just a farming revolution but for me it has been a catalyst for personal and social growth (Figs. 74, 75).

Fig. 74. *Shri Sachin Nivritti Mali -SRT method elevates water level in the well and helps vigorous crop stand*

Fig. 75. *Ms Rasika Phatak with Shri Chandrashekhar Bhadsavle in rice field*

Shri Santosh Gonate

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Maval, Dist. Pune
(Maharashtra)

I have been a SRT farmer in the Tungi, Maval area Dist Pune (Maharashtra) since 2017 (Fig. 76). Adopting the SRT method revolutionized my farming practices. One of the most significant changes is the reduction in the number of watering shifts needed for my crops, which has been a major time and resource saver. Additionally, the productivity of my crops has increased significantly. I am now able to grow three different crops annually in the same field, tripling the use of my land. Another remarkable benefit I have observed is the impact on my farm's well. Thanks to the improved soil texture and structure from no-till farming and the increased infiltration rate associated with SRT practices, my well is consistently abundant with water now. This is a testament to how sustainable farming methods like SRT can positively impact not just crop yield but also subsoil water resources.

Fig. 76. *Shri Santosh Gonate of Maval, Pune reaps the fringe benefit of 6 SRTs in the form of well full of water*

Shri Harish-chandra Patil

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Pen, Raigad
(Maharashtra)

Located in Pen, Raigad, near a creek, my farm used to face significant challenges every rainy season. The annual flooding of the creek brought saltwater into the fields, severely damaging the paddy crops. This recurring issue prompted me to seek a viable solution, leading me to Chandrasekhar Dada's farm in 2018. There, I witnessed the successful implementation of SRT farming. Inspired by what I saw, I decided to experiment with this method on my own farm. The results were remarkable right from the first year, with SRT farming yielding substantial crops despite the challenging conditions.

One of the most noticeable changes has been the gradual decrease in soil cracks, a sign of improving soil health. Encouraged by these positive outcomes, I expanded SRT farming to a 10-acre area. My success with this method has not gone unnoticed; surrounding farmers, observing the benefits, are now increasingly adopting SRT farming techniques (Fig. 77). My journey with SRT farming also had a broader impact on my community role. Last year, I was elected as Sarpanch, a position that allows me to further advocate for sustainable and effective farming practices in our area. This experience has been incredibly fulfilling, both as a farmer overcoming environmental challenges and as a community leader influencing positive change.

Fig. 77. *Shri Harishchandra Patil's journey from salination of field by sea tides to successful SRT farming Pen, Raigad (Maharashtra)*

Chapter 12

Way Forward for Greener Future

The immense potential and growth opportunities in Rural India are manifested from the success story of Shri Chandrashekar Bhadsavle. The enthusiastic young entrepreneurs like him have a lot of scope for development with the abundance of natural resources in rural India. The secret lies in the utilization of the natural resources for generation of wealth. Contrary to urban areas where the growth is possible only vertically, rural India has tremendous scope for horizontal growth. There is major scope and ample opportunities for the young entrepreneurs to study carbon sequestration by setting-up carbon evaluation centres (CECs), data processing units, and assisting in carbon incentive. This opens to them the door of infinite possibilities to support the agricultural practices. Rural India is rich in flora and fauna and nature's bounty in the form of various resources that can be discovered only if we stay closer and connected to the rural area. There is a treasure trove of knowledge waiting to be discovered and shared. The unique characteristics and micro-projects require commitment for deep study and its benefits. Ability coupled with discipline will help the young entrepreneurs to chalk out a path for themselves and achieve success. Their individual development would reflect in the development of the country. An interesting and rewarding activity here would be to develop the concept of "Finding a Farmer Friend (FFF)" and developing connections to ensure faster growth of agriculture leading to food security.

Shri Chandrashekhar believes in being helpful which earns you friends who become your strong support system in times of need. Over the years, he has developed a strong network of friends all over the world. Have faith in your work and tirelessly share it with the people who are interested to know about your work and have the potential to be the advocate of SRT or 'agro-tourism'.

Shri Chandrasekhar says that all State Agricultural Universities (SAUs) must demonstrate:

- Effective carbon sequestration to minimum 0.4 per cent
- They must demonstrate higher productivity of relevant crops than the SRT farmers
- Reduced cost of production than at present
- All forest lands and public places must prevent wildfire and demonstrate increase in greenery.
- The developmental problems of the country such as cleanliness, water scarcity, food security, fruit and vegetable export, healthy forests and wildlife, exploiting *Ayurveda* potential, etc. can be overcome only if we are able to attract able youth into rural *Bharat*. 'Agro-tourism' can be the easiest and effective tool to achieve this.
- Unless we stop ploughing, the Sujalam-Sufalam सुजलां–सुफलां farming is impossible.
- Perpetually deforested, barren and degraded forest lands amounting to thousands of hectares must be converted to high density green eco-spots. This is only possible by handing over the pieces of this land on an experimental basis to enthusiastic groups for about 5 years and evaluating the results.

The foundation of any successful sustainable agriculture venture lies in understanding the local environment and community for which the following important points need consideration:

- Start by immersing yourself in the local ecological conditions and climate patterns.
- Study the soil types, rainfall trends, and typical crop cycles.
- Equally important is to connect with the local community.
- Understand their needs, aspirations, and challenges.
- Remember, sustainable agriculture is as much about nurturing the land as it is about supporting the people who depend on it.
- Physical involvement on the farm, combined with a clear vision and a strong desire to contribute positively to others' lives, is crucial in this journey.

Shri Chandrashekhar and his team are simultaneously working towards prevention of wildfire in the mountain regions. He has undertaken the cleaning and revival of waterbodies. The testimony of the success of this project is a big lake

of 40 acres at Sambhaji Nagar that has been freed of water hyacinth (*Eichhornia crassipes*). With discipline, commitment and being helpful to each other, we could achieve the progress as the United States of America achieved. In this success story, we could see how Shri Chandrashekhar could achieve his dream of creating "*his own America*" in his country as he promised to himself at the age of 25.

In an effort to promote sustainability in agriculture and acknowledge the crucial role of farmers in our ecosystem, we are thrilled to introduce SRT's Panchamrit (Fig. 78), a holistic approach to farming that embraces both environmental health and agricultural productivity. This initiative focuses on five key elements, namely, lesser GHG emissions, soil conservation, improved life below soil, water conservation and happy farmers that contribute to a more sustainable future for farming.

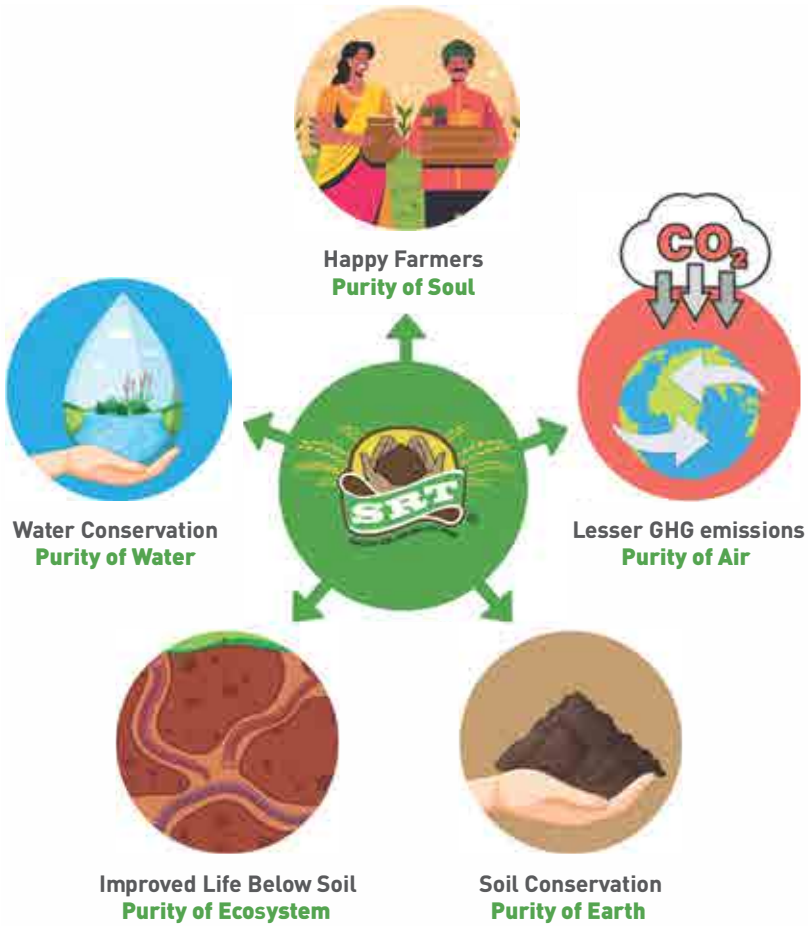

Fig. 78. *Panchamrit of SRT*

Awards and Recognitions

1. Chhatrapati Shivaji Maharaj Vanashree Award, Forest Department of Maharashtra, February 2023
2. Vande Kisan by Hon'ble Shri Bhagat Singh Ji Koshyari, Governor of Maharashtra, Mumbai, December 2021
3. Father of 'Agro-tourism' in India by Maharashtra State Agriculture and Rural Tourism, 29 December 2019
4. "*Krishi Ratna* 2015", Govt of Maharashtra by Hon'ble Governor Maharashtra Shri C Vidyasagar Rao, 14 February 2019
5. Earth Care Award (SAARC) by JSW and Times of India, 25 November 2016
6. WatSave Farmer Award by International Commission on Irrigation and Drainage in Thailand, 8 November 2016
7. "*Jeevan Gaurav Puraskar*" by Rashtriya Chemicals and Fertilizers Limited (RCF), Chembur, Mumbai, 26 January 2016
8. *Krishi Gaurav Puraskar* by Bharat Krushak Samaaj, New Delhi, January 2016
9. Innovative Farmer Leader, Indian Institute of Rice Research, Hyderabad, 29 August 2015
10. ABP *Maza Samman Puraskar*, Mumbai, 30 January 2015
11. *Hutatma Gaurav Puraskar*, Raigad Press Club, Raigad (Maharashtra), 2015
12. *Vasantrao Naik Pratishthan Puruskar*, Mumbai, 1 July 2014
13. *Udyog Shree Puraskar* by Dr Anil Kakodkar, Mumbai, January 2012
14. Innovative Rice Farmer, Indian Institute of Rice Research, Hyderabad, 2011
15. *Jagjivan Ram Kisan Puraskar*, ICAR, New Delhi, 2004

16. *Arekar Pratishthan Puraskar*, Karjat, Maharashtra, 2004
17. Asian Fisheries Puraskar, Central Institute of Fisheries Education (CIFE), Mumbai, 2002
18. LM Patel Farmer of the Year Award, Aspee Foundation, Mumbai, 2001
19. *Krishi Bhushan*, Govt of Maharashtra, 1998
20. *Vasantrao Naik Puraskar*, Pusad (Maharashtra), 1994
21. Innovative Farmer, Indian Society of Extension Education, New Delhi, 1992

Krishi Bhushan Award by Governor of Maharashtra in presence of parents, 1998

LM Patel - Farmer of the Year Award by Mr Purushottam Rupala, (then Agri Minister, Gujarat), 2001

Jagjivan Ram Kisan Puruskar by Hon'ble Shri Sharad Pawar, then Union Minister of Agriculture, 2004

WatSave Farmer Award by International Commission on Irrigation and Drainage (ICID), Thailand, 2016

Earth Care Award by Jindal South West (JSW) of The Times of India by Dr Raghunath A Mashelakar, Former DG, CSIR and Mrs Sangeeta Jindal, 2016

Krishi Ratna Award by Hon Governor of Maharashtra, 2015

SRT in Newspapers

Chandrashekhar Bhadsavle's work covered by press media (Newspapers)

About the Author

Shri Chandrashekhar Hari Bhadsavle - *Krishi Ratna* & *Krishi Bhushan* Awardee, born on January 29, 1950, is a distinguished figure in the realm of agriculture, acclaimed for his innovative and sustainable farming practices. Hailing from a family deeply rooted in staunch nationalism and agriculture, he embarked on a journey that not only transformed his own farmland but also left an indelible mark on the agricultural landscape of Maharashtra. His late father Shri Haribhau Kaka, a freedom fighter has had a great influence on Chandrashekhar. The letter from him served as guiding principles for Chandrashekhar at every step of his personal and professional journey. He gives credit of his success to the values imbibed by his father.

Education played a pivotal role in shaping Chandrashekhar's understanding of agriculture. He earned a Bachelor's degree in Agriculture from Dr Bala Saheb Sawant Kokan Krishi Vidyapeeth, Dapoli, in 1970. His pursuit of knowledge took him to the University of California, Davis, where he obtained a Master of Science in Food Technology in 1972. During his academic journey, Chandrashekhar delved into the scientific aspects of agriculture, contributing a paper to the American Journal of Microbiology titled "Isolation and Identification of Psychrophilic, Spore-Forming, Anaerobic Bacteria from Milk."

Armed with a solid educational foundation and blessings from his father, Chandrashekhar entered the world of agriculture, dedicating himself to the land with a vision for sustainable and regenerative farming practices. He began working on the family's 35 acres of land, steadily expanding it to over 55 acres of diversified cultivation. Noteworthy components of his integrated farming approach include 10 acres devoted to aquaculture, 10 acres to agroforestry, 15 acres to horticulture, 15 acres to field crops, and 5 acres to cattle barns, vermicomposting, and an activated slurry project.

Chandrashekhar's commitment to agriculture goes beyond traditional farming; he has successfully integrated tourism into his farming model, creating a unique

example of Agro-tourism known as "*Krishi Paryatan*." His farm, *Saguna Baug*, located in Dahivali, Karjat, Maharashtra, has become a symbol of sustainable farming practices and a hub for agricultural enthusiasts and tourists alike. A trailblazer in the field of agriculture, Chandrashekhar is the Chief Promoter and Managing Director of *Saguna* Sustainability Solutions Pvt. Ltd. He is also the Founder and Managing Trustee of the *Saguna* Rural Foundation, an organization dedicated to promoting sustainable rural development. His role in the Public-Private Partnership-Irrigated Agriculture Development (PPP-IAD) program by the Government of Maharashtra from 2014 to 2016 demonstrates his commitment to advancing innovative farming methods.

One of Chandrashekhar's notable contributions to agriculture is the development of the *Saguna* Regenerative Technique (SRT), a 'Zero-till' Conservation Agriculture technique for rice-based farming systems. This revolutionary method has garnered recognition at both national and international levels, earning him invitations to present his work at conferences and institutions around the world, including FAO, Rome, and Cornell University, USA. In addition to his groundbreaking agricultural techniques, Chandrashekhar is a prolific writer and speaker. He has authored books on Agro-tourism and the SRT technique, and his TEDx talks*, such as "Dignity to Farmer - Farmer Friendly Techniques," reflect his passion for advocating farmer-friendly and sustainable practices.

Chandrashekhar's dedication to sustainable agriculture has earned him numerous accolades, including the prestigious "*Krishi Ratna*" award from the Government of Maharashtra in 2015 and the "Earth Care Award" by JSW and Times of India in 2016. His commitment to environmental conservation is evident in his development of the Saguna Van Samvardhan Technique (SVT) for reducing risk for forest fires and rejuvenating degraded hills. As a farmer, innovator, educator, and advocate for sustainable practices, Chandrashekhar Bhadsavle, *Krishi Ratna* awardee continues to inspire and lead the way toward a more sustainable and dignified future for farmers in India and beyond.

**Please scan this QR code to watch Chandrashekhar Bhadsavle's TED x IIM Kashipur*

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3. Enhancing Fertilizer Use Efficiency for Sustainable Soil Health - Policy Brief, November, 2023.
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9. National Symposium on Food, Nutrition, and Environmental Security: Towards Achieving SDGs – Proceedings and Recommendations, 29-30 August, 2022.
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