UNSUNG BEACONS

Volume XIV

THE FARMER'S CHRONICLES

A compilation of articles featured in Conversations Today 2023

Centre for Social Initiative & Management

Unsung Beacons

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FOREWORD

The series on Unsung Heroes has its origins in the sagacious thoughts of Shri P.N. Devarajan who has been the Bhishma Pithamaha to countless individuals in many a nook and corner. He had the rare ability to spot, nurture and sustain talent, and backed these with an unending largesse of the heart, wherever they were, in a most unassuming manner.

KARMAYOGI SHRI. P. N. DEVARAJAN

Shri PND made it his life's mission to unearth these uncut diamonds and make them splendour in their own chosen paths with an unassuming smile here, a kind word there, and an unfailing helping hand always. He fed all those that were privileged to come under his grace with loads of encouragement and self-belief that helped them discover their call in life, excel in their avocation and eventually help light another candle along the way.

Shri PND has been the beacon of light to many an unknown not only in the days when he energetically practiced his engineering profession in the tallest of organisations but all thorough his life in everyday events. He cared neither for pelf nor power, recognition or kudos…he

went about what he thought as his ordained duty in serving and helping, caring and loving, each in his own unique way.

Shri PND recognised that anyone could aim high and achieve big in any chosen field by pushing the boundaries, persisting with clarity, and aided with an obsessive self belief that nothing is impossible if you put your heart to it.

Shri. PND desired to showcase the successes of achievers whom he had come across, the many that he had guided, to the younger generations if only to inspire latent talent to likewise aim beyond the ordinary so that they too can contribute to the society through pursuit of higher trajectories and laudable goals.

The Unsung Beacons Volume 14 is an excellent compilation of numerous articles, conversations, personal recollections of a sparkling set of experiences in many a daily activity in the farm, at the village bazar, the mandi, all in the rural setting by several muddied palms and wrinkled foreheads, and a whole lot more. This volume strings together the Farmers' Chronicles. Cogently arranged under five fascinating headings the compendium makes for a compelling read and kindles a desire for more on the kaleidoscope of rural India of the 2020's. The various articles portray the reality that is rural India and the realistic optimism of where it could get to by highlighting both the shortcomings and successes, the usefulness and consequences of ignoring sworn virtues, the hope and belief of a better morrow when need intersects opportunity and together transcend preparedness.

Ms. Marie Banu Rodriguez, the Chief Editor has created a treatise in this book, worth every word and meriting a second read in leisure. Compiling, arranging, editing and publishing the 41 gems of varied but interwoven titles that are included in this book authored by no fewer than 30

stalwarts is not an easy ask; Marie has outdone herself in this monumental task. Ably assisted by Archana Ramesh, Rahul Philip, T Shanmuga Priya, Shreya Pareek, and many other happy volunteers, the book covers a number of nuanced topics, highlighting the saga of life in rural India, the unending challenges in making ends meet for the farmer, vexatious visitations of unpredictable monsoons further exacerbated by global warming and the attendant climate change, rapacious market places and the hapless villager who struggles to keep the embers of his hearth glowing. Then there are also a number of pieces resplendent with bright glimmer of hope from the enlightened awakening of the need and benefits of infusion of more organic matter in to farming, the return to natural farming, rejuvenation of the soil, the axiomatic underpinning of 'feed the soil, not the crop' and the return of the forgotten Vetiver being rediscovered in its very own country of origin!

Agripreneur is a clever wordplay well formatted and aptly used in this compilation to draw our attention to emphasising the value and need for twinning the importance of farming without neglecting to make it economically beneficial as well. From time immemorial, 'Anna Dhata Sukhi Bhava' has been our fervent thought, wish and blessing on the hard-working farmer without whose sweat and toil the universe cannot survive; how then can the farmer give forth his best if he were also not happy? Ergo, Agripreneur denoting a successful farmer who is blessed with prosperity for his noble call of feeding the world is an apt addition through this book to our good thoughts, words and deeds too!

Dr Gurumurti Natarajan

ACKNLOWLEDGEMENTS

With the unveiling of Unsung Beacons Vol. 14, a profound sense of gratitude washes over me, compelling me to extend heartfelt thanks to all those whose dedication and passion have breathed life into the pages of this publication. Their experiences, perspectives, and narratives serve as beacons of guidance, motivating readers from all walks of life.

At the outset, I must express my gratitude to God for guiding me on this transformative journey. I am thankful to the unwavering support and encouragement of Mr. PN Subramanian and Mrs. Latha Suresh who have been instrumental in shaping the vision and direction of this endeavour.

My indebtedness knows no bounds as I reflect on the countless individuals whose steadfast support has made my literary journey possible. I extend my heartfelt appreciation to the remarkable individuals who generously shared their time, knowledge, and experiences for the interviews featured in this volume. Their passion and commitment to fostering a healthy ecosystem are truly inspiring, enriching the essence of our publication and serving as a testament to the power of collective action.

Furthermore, I am deeply grateful to the talented writers who skillfully captured the essence of each changemaker, crafting narratives that resonate deeply with readers.

Despite the inherent challenges in their causes, their ability to convey stories with optimism and sincerity lends greater weight and impact to the articles, igniting a spark of hope in the hearts of all who encounter them.

In addition to the luminaries featured within these pages, I am immensely thankful for the unwavering love and support of my parents, whose guidance and encouragement have been a constant source of strength throughout my journey. Likewise, my sons, Shakthi and Surya, have been a source of inspiration and motivation, driving me to pursue excellence in all my endeavours.

I wish to express my heartfelt appreciation to our readers. Your engagement, interest, and support sustain us, fueling our passion to continue amplifying the voices of changemakers and shedding light on stories that deserve to be heard. I am confident that the stories within these pages will continue to serve as a wellspring of inspiration and motivation for driving positive global change, inspiring readers to embark on their own journeys of transformation and impact.

I am honored to play a small part in amplifying the voices of those who are making a difference in our world. Together, let us continue to celebrate the unsung heroes whose tireless efforts and unwavering dedication are shaping a brighter future for generations to come.

Marie Banu Rodriguez

Chief Editor – Conversations Today

Director, CSIM | Director, SAN, UK

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Agripreneurs

Meet the unsung heroes of agriculture, agripreneurs. Their innovative spirit transforms farming, blending tradition with modernity for sustainable practices.

1. The Aga Khan Rural Support Programme (India)

The Aga Khan Rural Support Programme (India) is primarily dedicated to enhancing the livelihoods of vulnerable rural communities. At the heart of AKRSP India's mission lies community-driven initiatives tailored to the specific needs and priorities of local populations. These initiatives are rooted in the establishment of community-based organisations (CBOs) that serve as the foundation for the organisation's work. These CBOs operate in various domains, including agricultural livelihoods, skill development, and enterprise opportunities for rural youth, as well as endeavours aimed at improving rural governance.

A significant focus of the organisation is the economic empowerment of women, a key outcome area. Over the past four decades, AKRSP India has positively impacted the lives of 3.5 million individuals through its on-ground programmes. Additionally, the organisation has played a pivotal role at the state and national levels in influencing

critical policy matters, such as natural resources management and access to clean drinking water.

"There are three challenges which are hampering the progress of rural communities," says Naveen Patidar, CEO at AKRSP India, "These are the impact that climate change has on small farmers, the unemployment among rural youth, and rural governance."

He adds: There is increasing uncertainty around agriculture livelihoods due to changing weather patterns. We are experiencing uneven rainfalls, cyclones and droughts more frequently. These events are going to further increase in the coming future, and it is important to keep rural communities resilient when they occur."

However, it is unemployment or under-employment among rural youth, Naveen says, which is a persistent challenge, especially in the context of decreased land-holding among farming families: "It is critical that they (rural youth) are productively employed, in the interest of overall prosperity of rural areas."

He adds that there is massive scope to improve decentralised governance systems to empower the most marginalised within rural areas. "For example, while there is 50% reservation for women in Panchayats, their current participation in local governance is far from ideal situation," he says "We need to create an enabling environment and capacities at the ground so that decentralised governance systems start benefiting those who are really vulnerable within villages."

Over the past four decades, AKRSP India has been instrumental in enhancing the livelihoods of more than 700,000 rural households, with a particular emphasis

on marginalised communities, including tribals, Dalits, minorities, and other backward classes. Notably, the organisation has prioritised the economic empowerment of women within these households, especially in the realm of agricultural programmes. In the last ten years, AKRSP India has introduced a programme geared towards enhancing the employability of rural youth. This initiative has successfully facilitated employment opportunities for over 20,000 young individuals, enabling them to secure jobs in the formal sector or pursue self-employment options.

"Over 50 percent of these youth have been young women. We have also put efforts in over 300 Panchayats to bring citizen-centric governance processes in these Panchayats," says Naveen, "This has helped over two lakh citizens through access to basic services and entitlements. In addition to this, AKRSP INDIA also promoted large numbers of community-based organisations (CBOs). These CBOs have not only played an important role in planning and implementation of programmes but also ensured the sustainability of programme interventions."

He adds: "We also derive huge satisfaction from the fact that our programmes have created large numbers of capable rural leaders particularly women leaders. Ms. Hirbaiben Lobi who has been conferred with Padma Shri this year is one of such leaders developed by our organisation."

AKRSP India has distinguished itself through the resounding success of its community-led natural resources development and its efforts in bolstering the employability of rural youth. These initiatives have significantly improved the livelihoods of numerous highly marginalised households. The organisation is particularly renowned for its pioneering work in participatory irrigation development, which has

resulted in the expansion of irrigation over 70,000 hectares of land.

Furthermore, AKRSP India's community-led natural resources management programme serves as a compelling example of how communities can effectively and sustainably manage natural resources for long-term benefits. In a similar vein, the organisation's employability programme for rural youth has demonstrated that with effective design, it has the power to transform the career prospects of young individuals from rural areas.

"Our future projects in the field of agriculture and climate resilience will focus on landscapes where communities face high levels of risks due to climate change. We are calling this programme 'Farmer collectives-led agro-ecological systems'," says Naveen, "In our selected landscapes, we are bringing small and marginal farmers to the farmer producers organisations. We will have a production to market approach to implement our agro-ecology approach."

He adds: "At the production level, we will have several improved production practices such as regenerative agriculture, agro-forestry, water efficiency, use of clean energy and improved livestock health. This production system will lead to improved income, improved biodiversity, and improved food security for the targeted communities in addition to reduced GHG emissions."

The organisation is also focusing on developing a more sustainable market for produce through FPOs. Naveen says women farmers will play a crucial role during the agricultural transition. "Today, small and marginal farmers are facing disproportionate impacts of climate change. If we need to make their livelihoods more resilient then we must work on both mitigation and adaptation approaches

together," he says, "The agro-ecology approach integrates several activities at the local level to achieve better resilience. In the long term, it will also address the much-needed transformation of food and fibre systems at local level and beyond."

AKRSP India has established a clear set of overarching objectives. These encompass an ambitious plan to expand the Agriculture and Climate Resilience programme, with the aim of benefiting one million farmers. The organisation also seeks to support 10,000 rural youth annually in their pursuit of meaningful employment while simultaneously promoting improved local governance across approximately 2,000 Panchayats over the next five years.

A central focus will be to strengthen the micro-enterprise development programme, particularly directed at young women and men. Additionally, AKRSP India is actively engaged in developing a comprehensive local governance programme and intends to play a significant role in influencing systemic change within the agriculture livelihoods sector through contributions to knowledge and policy development. In the coming years, the organisation has plans to significantly expand its operations, extending its reach from 3,500 to 8,000 villages. "We will be expanding our operations within the adjoining tribal regions of Gujarat, Madhya Pradesh, and Maharashtra," says Naveen, "We will also have a comprehensive coastal development programme on the coasts of Gujarat and Maharashtra. We will also expand our Bihar programme to around 10 to 12 districts in coming years. We may also think of expanding to at least one other state; we see good opportunities in states such as Jharkhand and Chhattisgarh."

Rahul Philip

2. Faborg

Fashion industry is one of the top pollutants in the world. From synthetic materials that create toxic waste, to artificial dyes causing water pollution, to fast fashion piling up on the landfills year after year, the industry is in dire need of change. While the ethical fashion market is steadily on the rise, it still accounts only for a measly 5% (approx.) of the global market.

Cotton, silk, linen, are all commonly known varieties of natural fabric. They are comfortable, luxurious and trendy. However, sustainable they are not. There is excessive usage of chemical fertilizers, artificial dyes and wastage in the production of these fabrics that renders them in a bad light. There is an ongoing quest to identify naturally occurring fibres from plant sources that can also be harvested and processed in a more environment friendly manner. This is where people like Shankar make a difference.

Shankar is the founder of Faborg, an eco-business that manufactures fabric from the wild plants Calotropis Gigantea and Calotropis Procera. Known in Tamil Nadu as 'Erukam poo', the flowers of the Calotropis plant are usually made into a garland, as an offering to Lord Ganesha. Shankar, however, noticed the fine strands sticking out of the pods of the plant and those from within the stem of the plant, and decided to experiment with them.

Shankar hails from a centuries-old traditional weaving community in Tamil Nadu. Mainly weaving silk and occasionally other kinds of fabric, his community has for generations remained committed to their artisanal traditions. So connected is his community's ties to the woven fabric, that Shankar's childhood was filled with mythology, stories of sages who wove clothes for Lord Shiva Himself.

"As a child I grew up listening to these fantastic stories. It turned into a quest of mine, to unravel the mysteries behind some of these mythological stories, which in turn have become part of my very identity," he says.

It was not just the glorious past that Shankar explored. He was also tuned in to the various opportunities and problems in his community. For instance, he noticed there was a simmering discord between the weaving community and the farming community in his region. The farmers, who provided cotton among other things to the weaving community, did not like that the weavers were part of the larger water pollution that was affecting their villages. The toxic dyes that the weavers let out into local canals directly flowed into the irrigation system. This set Shankar on a course of discovering the most holistic sustainable process to produce clothing.

Since starting Faborg in 2015, Shankar has been looking at end-to-end solutions. Identifying the least invasive methods to extract fibre, weave cloth, recycle the residue that gets created in the weaving (fabric making) process, and also identifying ways to create fashionable clothing using natural, nontoxic dyes, attempting overall, to conduct his business in the most environment-friendly way possible. At this point, he has developed 'Weganool'- vegan wool made from the Calotropis plant, and 'Arka', a natural insect repellant that is made from the residues of Weganool from Calotropis fibre extraction. Arka has been tested and proven to keep agricultural crops, house-plants, and neighborhoods free of insects and pests. It is Shankar's offering of truce to the farming community, to say that he is eager to be a part of the solution.

Newer and more diverse uses for the Calotropis plant are showing themselves up, day after day and Faborg is determined to put this plant on the national map. Shankar suggests that if he gets the support he needs, he would utilise wastelands to cultivate the perennial Calotropis plant, generate employment for people by the thousands and also help reduce water pollution all over the country. He has even worked out regions that are known for their drought-like conditions where Calotropis can thrive.

At the heart of Faborg is Shankar, whose maverick ideas keep him busily working, testing his own inventions and understanding governmental regulations (which are many) surrounding his business. Having previously worked in the high-fashion industry, he now runs a pilot unit just outside Auroville in Villupuram District, Tamil Nadu. His wife Elen works right alongside him, helping him out in every way in this journey. An Estonian by birth, Elen met Shankar at a small get-together at a mutual friend's place. They soon fell in love and got married. Elen left her high-flying sales

career back home in Estonia in USA to live with Shankar in India to work for the Mother Earth. “We are constantly working together, day and night. We have this amazing energy between the two of us,” says Shankar, “There is no decision I would make without first running it by Elen.”

Faborg has earned clientele both from India and outside. Their clients include on the one hand, fashion boutiques that are happy to use Faborg’s Weganool- vegan wool, and on the other, local farmers who rave over the efficacy of Arka- the pest-repellant made from the Weganool residue. Shankar is excited for the times to come. He is gradually looking to expand his small but mighty team. He feels especially protective of the farming community around him who have supported his Arka-pest-repellant even through the challenges of the ongoing pandemic.

“I want Faborg and the principle behind my eco-business to live on long after I am gone. I wish to keep all my knowledge open and available for the taking. At the same time, I’m wary of people who may want to tamper with the processes I have painstakingly developed. Weganool and Arka are mutually complementary products. In order to be sustainable, they both must be part of one larger process. Just this past year the government has announced a list of 10 natural dyes that can be derived from local plant sources. This opens up a whole host of opportunities for us” says Shankar, who has already begun working with natural dyes for Faborg.

“Innovation should not be restricted to just the crème de la crème of society. With just a little cooperation between stakeholders, even a plant growing in the wild can serve as a consummate solution to several problems.” he adds.

Archanaa Ramesh

3. Farm Green Track Services

Agriculture is not a rural activity anymore. It has expanded its presence into urban and peri-urban environments as well. This evolution is driven by various factors and reiterates the vastness of farming as an extensive industry. These days it is not uncommon to find individuals who leave mainstream careers to pursue farming. This is more than just a passing trend and represents a significant shift in mindset and lifestyle for many individuals. "The concept of regenerative agriculture, which focuses on restoring soil health and biodiversity, as gained traction. People see farming as a means to contribute to this movement and heal the environment. But not all of them have the time and means to pursue farming after this realisation strikes," says Mr Kannan Ponniah, Director of Farm Green Track Services in Madurai, Tamil Nadu.

A qualified Physicist with a Doctorate in Radio Astronomy, Kannan was a renowned professor who had worked in

many colleges and schools. As his father was a farmer Gudalur, Theni, he did not drift far away due to his career. “At one point, I knew it was farming for me. I longed to start somehow,” he recalls. While still working, he bought a coconut farm in the outskirts of Madurai and followed organic practices thoroughly, right from the beginning. However, the yields were not satisfactory and the revenue earned from 2000 coconuts from 400 trees was not good enough to maintain payments for the staff and farm inputs. Soon, in a matter of three years, this revenue increased by 12.5 times and Kannan made 25,000 coconuts from the same 400 trees in his farm. “The revenue increased, I began to see profits. I thought of maintaining this cycle but my wife had new plans,” he shares.

Kannan sold his coconuts to retailers who bought it from him and resold it in different places. However, his wife saw the potential in this and suggested that a team of women be engaged in dehusking the coconuts so that they can sell their coconuts themselves. “It was a good idea to connect to buyers directly, but it involved human resource costs. I was skeptical, but still we went ahead and engaged a team of ten women and five men who would dehusk coconuts and take them to various places for sale. It worked and our profits increased gradually. But more than profits, this experiment helped me see the importance of value addition. I was by now ready to get into this full time,” says Kannan who was still doing farming as a part time activity, completely supported by his wife who managed the coconut farm full time.

Soon after six months, he quit his job and wanted to expand his farm activities. As usual, his decision was ridiculed by some but also applauded by few. He wanted to do it bigger and sold his farm of eight acres, in search of a bigger land. After spending about two years in searching for a larger

land he identified one in Thenkasi and purchased 120 acres. "I wanted to start slow, but intended to buy a bigger piece of land so that I can expand the business eventually," he adds. When he shared his pursuit and land purchase with his friends, he was amazed at how interested others were too. They also wanted to invest in few acres and with more members showing interest, Kannan thought that cooperative farming was the way forward. Mr Peramanallur Narayanaswamy Subramanian (PNS), Managing Trustee of Manava Seva Dharma Samvardhani, also bought a few acres and we both wanted to develop a sustainable business model cashing on people's interest.

By now, Kannan very well understood that farming was something many people related to but were not able to openly pursue due to their current career commitments. Not all of them could afford the risk of this transition. And for that matter, not all of them may have the right knowledge to move ahead. For all such people, he felt absentee landlordism could be the answer. He, along with PNS founded the Farm Green Track Services in 2009 to encourage interested individuals to buy land from them so that they can do farming on that land for them.

"I was doing the same work on a bigger land, but the revenue was distributed now. I manage a bigger farm now, on behalf of new owners, but had the liberty to try out different cropping patterns. Owners who registered with us not only get annual returns, but also see a rise in asset value within two years. The model worked well and soon we had over 25 members who registered with us. In seven years, I reclaimed my full investment," shares Kannan.

Given the advantages of large scale farming, his idea made sure that land fragmentation was not an impediment anymore. Backed by good research of the local soil, root

microbiology, and an independent team that produced manure needed for the total land area, he was able to recover from the first three years of loss. It was all a learning process for someone, who hardly knew anything about selling and market behavior.

“I learnt because I knew quality is important and that only quantity can give you the money. We initially harvested about six tonnes of tomatoes per acre and now we make around 50-75 tonnes on the same stretch of land. Our spinach and greens are exported to London too. With clients across India, USA and the UK, we have been able to prove that farming can be managed remotely as an industry,” says a proud Kannan.

At Farm Green, orchards are also grown and Kannan has huge plans for value addition and eco-tourism here. All set to try out inter-cropping vegetables in these orchards, his business expansion is planned in such a way to generate employment opportunities for the local population.

Shanmuga Priya.T

4. Krishi Jagran

In the vast expanse of India's agricultural landscape, where the livelihoods of millions are intertwined with the rhythm of the land, Krishi Jagran stands as a testament to the power of information dissemination in catalysing growth, innovation, and sustainability within the farming community. With its roots deeply embedded in the soil of rural India, the agricultural magazine has emerged as a vital resource, bridging the gap between traditional farming practices and modern advancements.

"I belong to a farming family and a farmer's son. So, it was quite natural for me to feel connected with agriculture more than with anything else so easily," says MC Dominic, founder and editor-in-chief at Krishi Jagran, "Though I tried treading different paths in life, I guess I eventually found my calling in agriculture and realised there are various desks in media houses – be it entertainment, sports, or business but never agriculture per se! That's the gap I thought I was born to fill. So, I started this business in 1996 and the rest as they say is history!"

Agriculture is the backbone of the Indian economy, providing livelihoods to a significant portion of its population. However, the sector faces challenges, ranging from outdated farming practices and lack of access to modern technologies to volatile market conditions and the adverse impacts of climate change. In this context, Krishi Jagran helps disseminate information, best practices, and success stories that empower farmers to overcome challenges and embrace opportunities.

By his own admission, Dominic started the magazine because there was a dearth of media when it came to agriculture. Years back, I was sitting in a government office and saw all sorts of magazines but didn't find a single copy on agriculture, and that really hit me," he says, "We're an agrarian economy and when I didn't get to see any hardcore agriculture magazine there, I realised that this is one occupation where the majority of our population is involved ub but isn't properly covered or informed due to no proper journals, for a simple economical reason — they might not be profitable."

He adds: "All this weighed in on my mind and made me not only launch Krishi Jagran in Hindi in 1996, but continue with the launch of 23 editions in 12 languages in the years to come. This also got us featured in the 'Limca Book of Records' for being the largest agri-rural magazine."

The magazine covers a diverse range of topics relevant to the agricultural community. From innovative farming techniques and sustainable practices to updates on government policies and advancements in agricultural technology, Krishi Jagran serves as a one-stop platform for farmers, agronomists, researchers, and agricultural enthusiasts. It equips its readers with the tools they need

to make informed decisions and optimise their agricultural endeavors.

According to Dominic, reaching out to as many readers as possible, was always part of the plan. “Given our diverse country, bringing local content in local news was the only option that I thought could help our farmers,” he says, “Even now, we are planning to expand the magazine’s circulation to foreign languages as well, since knowledge knows no boundaries.”

Circulation of Krishi Jagran though, didn’t happen overnight. The team kept brainstorming on various ways to ensure delivery in 28 states. “With the digital world we live in today, social media is helping us take our stories all the more deeper in villages across the country,” Dominic adds.

One of Krishi Jagran’s noteworthy achievements is its ability to bridge the gap between traditional wisdom and modern advancements. The magazine acts as a conduit, facilitating the exchange of ideas between experienced farmers and experts in various fields. This amalgamation of tradition and innovation has the potential to revolutionise farming, ensuring higher yields, reduced environmental impact, and improved livelihoods.

As the world grapples with the challenges posed by climate change and environmental degradation, sustainable farming practices have gained prominence. The publication takes a proactive stance in promoting such practices that balance productivity with ecological conservation.

Through its articles, features, and case studies, the magazine educates its readers about techniques like organic farming, precision agriculture, water conservation, and crop rotation. By doing so, it not only contributes to the well-

being of the farming community but also addresses broader global concerns related to food security and environmental sustainability.

Krishi Jagran goes beyond being a mere source of information; it is also a catalyst for rural entrepreneurship. The magazine features stories of individuals who have transformed their passion for farming into successful agribusiness ventures. These stories inspire readers to think creatively, explore innovative ideas, and consider value addition beyond traditional cultivation. By showcasing the journeys of these rural entrepreneurs, Krishi Jagran instills a sense of possibility and optimism in its readers, encouraging them to explore new avenues for growth.

In an era marked by digital transformation, the magazine has embraced technology to extend its reach and impact. Through its online presence, including a website and social media platforms, the magazine ensures that its content reaches even the remotest corners of the country. This digital approach not only widens its readership but also fosters a sense of community among farmers who can connect, share experiences, and seek advice in virtual spaces.

Dominic points out that in a print edition, the magazine's circulation was a few lakhs. However, the "curiosity" displayed by farmers, in seeking out information, has propelled Krishi Jagran's social media reach to hit crores. "Our programme, FTJ or Farmer the Journalist, has seen us train more than 1,500 farmers who now report on their farming-related issues via videos they make using their phones for our YouTube Channel," says Dominic, "So, digital channels have given us the opportunity to reach, where we couldn't have reached or would have taken too long to reach, in no time."

Krishi Jagran stands as a testament to the power of knowledge in transforming lives and communities. Through its commitment to disseminating accurate, practical, and forward-looking information, the magazine has become an invaluable companion to farmers and agricultural stakeholders across India. In a sector that constantly evolves, its role in facilitating this evolution is commendable. As it continues to inspire, educate, and connect, the magazine contributes significantly to the growth of Indian agriculture, fostering a future where the nation's farmers thrive in harmony with the land and its resources.

Rahul Philip

5. Millet Foundation

Health is the most valuable asset. It is true that our generation is not consuming the quality and variety of food our ancestors did. The changes that green revolution introduced in our food chain and agricultural production processes have had a long lasting impact on our health. With the advent of modern agricultural practices, there has been a shift towards mono-culture crops like rice and wheat, which are more profitable and easier to cultivate on a large scale. Unfortunately, this also led to the displacement of small farmers, who were unable to afford the high cost of modern inputs and technologies required for the cultivation of high-yielding varieties of rice and wheat. It was these small farmers who were often the traditional custodians of millet cultivation. “It did manage the food crisis back then. But what it resulted in is an exponential decline in the cultivation and consumption of millets,” laments Rotarian S. Sundar, Managing Director and Co-Founder of Millet Foundation in Chennai, Tamil Nadu.

The decline in millet cultivation has been linked to several negative outcomes, including the loss of genetic diversity, the degradation of soil health, and the reduced resilience of agricultural systems to climate change. “But now, there is a resurgence,” says Sundar hopefully. Having spent almost two decades in sales and marketing in the telecom sector, he despised corporate life. He wondered why mankind easily accepted things in spite of knowing they were not good. Passionate about food, he began to introspect why people ate poison on their plates easily. “We do know it is loaded with chemicals, but we consume it effortlessly. Can we not eat and cultivate poison-less food? Is it really that difficult? This is when I extensively researched about our ancestors’ food practices and arrived at millets, which made up almost 40% of their everyday diet. There is more to millets than being diabetes friendly,” he laughs.

Millets are highly nutritious and offer several health benefits. They can adapt to a wide range of environmental conditions including droughts. In addition to their drought tolerance, millets are also relatively resistant to pests and diseases, making them a more resilient crop option compared to other grains. They have a short growing cycle and require less water and fertilizer inputs compared to other cereal crops like wheat or rice. This makes them a more sustainable and climate-resilient option for farmers and food systems. “All of this wisdom is now hitting us again, with an internationally growing recognition of millets,” he says.

Catching up with the regional, national and international efforts that recognise and promote millets, he co-founded the ‘Millet Foundation’ in 2022 in Chennai. India is largest producer of millets and Tamil Nadu is a millet renowned state in the country. With United Nations declaring 2023 to be the International Year of Millets, Millet Foundation has

left no stone unturned in using this opportunity to build on a millet mission for the country. Millet Foundation has played a significant role in promoting the adoption of millet-based farming and food systems in India, particularly in Tamil Nadu. The foundation has developed several innovative millet based food products, such as millet based noodles, ready-to-eat meals, and energy bars, and has worked with farmers to develop value chains for millet products. The foundation has also organised several events and campaigns to raise awareness about the nutritional, environmental, and economic benefits of millets.

Millet Foundation is expanding its wings to reach all 38 Districts at grass root level and create many Millet-preneurs in Tamil Nadu. Their specific focus on young adults from 18 to 25 years age group has created a trend on millet consumer awareness. Backed by their baseline that revealed total lack of awareness on millets among young adults, Millet Foundation came up with a variety of initiatives like the Millet Walkathon, targeting this age band as they will be able to decide and influence the diet of elders in the family and their children in the near future. They have been visiting colleges and schools to influence responsible diet choices in the formative years itself. They set up stalls or small shops in colleges, in collaboration with their respective EDCs (Entrepreneurship Development Cell) and train youngsters to become 'millet-preneurs'. "Yes, we coined it and it became a huge hit among students," smiles Sundar.

Millet Foundation has a research and development unit that has developed 555 value added millet products under its brand name 'TanMillets' that are easy to use, faster to cook and preservative free. "To encourage millet consumption, we should also acknowledge the challenges in it. The soaking time is certainly a concern but the bigger concern

is that not many know how to cook millets. So we had to innovate and make sure that new consumers had a good number of options on their tables," he adds.

Millet Foundation led the Tamil Nadu Millet Conclave in January 2023 where it created the world record of showcasing its 555 millet products. Facilitating an international millet conference with experts from 13 countries, the conclave also had more than 100 stalls and live counters for farmers and entrepreneurs to present their produce. It was also a cross learning platform where challenges in millet cultivation were also discussed with experiences from other countries. Presenting millet-preneurs with networking and marketing opportunities, this was one of a kind event that had taken a step towards millet revolution.

"Millet Foundation has plans to introduce millet diet ideas for 365 days and promotes the idea of one millet meal per day in all its campaigns. We want to make it bigger. Our dream is to build 5555 millet-preneurs during the year and lead the millet mission in our country," says an ambitious Sundar. He can be contacted at ceo@ tanmillets.com

Shanmuga Priya.T

6. Sankalptaru Foundation

Planting trees has been a part of our evolution story, focusing on the supply of a service or product like timber for shipbuilding. However, planting trees on scale for ecological restoration and climate change mitigation has taken off fairly recently in the second half of the 20th century. Trees form a significant part of nature as a whole. Yet, they too are delicate and nurture varied relationships with all living creatures in their eco systems. “Our plantation efforts look forward to enriching ecosystems, sustaining biodiversity and enhance the green cover, all of this while individuals, families try to celebrate memorable occasions,” begins Mr Apurva Bhandari, Founder of Sankalptaru Foundation in Uttarakhand.

Having grown in the lap of nature amidst lakes, forests and mountain ranges in Uttarakhand, Apurva did not find the experience in information technology, oil and gas sectors endearing. He was increasingly concerned about nature losing its original form due to mankind’s unscrupulous

extraction of resources and unmindful damage to every relationship in nature. “My seven years in the corporate sector which also included a brief stint in the United States made me a feel a strong disconnect from nature. I was not only missing it around me, rather I missed being part of it,” he introspects.

Back in India, he founded the Sankalptaru Foundation in 2012 to help many more people like him realise the opportunity to reconnect and feel one with nature. The idea of online plantation and real time tracking of the planted trees was thoroughly studied, discussed and then launched. The model reached six states within two years of establishment and this momentum reiterated the need for such an initiative that not only allowed plantation but also informed contributors about the growth of the trees they had contributed for. “It is important that somebody takes the responsibility to ensure that every tree planted actually survives in its environment. This is where technology came in handy and the geo tagging process also brought in the aspect of transparency. As a donor I can learn the stage of growth, plant’s height, its species family and position in the local eco system,” he reassures.

Apurva and team planted fruit and fodder trees on the lands of rural farmers, setting in place a symbiotic relationship between farmers and the trees. While farmers took the responsibility of nurturing the trees, they were allowed to use the produce from those trees. Known as the Rural Livelihood Support program, its execution was planned in such detail that operational excellence was inevitable. With almost forty percent women farmer beneficiaries, this program has impacted livelihood, poverty alleviation and women empowerment in the project areas. In the urban areas, plantations are aimed at checking pollution levels while also encouraging urban residents to build green

habitats and reduce their carbon footprints. With growing sensitivity about carbon footprint, community members only need an avenue to realise how they can make a difference within their limits. “We showed it is possible and the reception is incredible. We are also part of events where organisers choose to plant a tree for every participant, in a pledge to offset the carbon footprint that results from that event. Green values are prioritised and Sankalptaru has done every bit to utilise such momentum,” adds Apurva.

Sankalptaru also works with gram panchayats and urban civic bodies to develop a green canopy in barren community land blocks or places that overflew with garbage. After a successful execution in Nagapattinam, Apurva and team are now preparing themselves to demonstrate the impact in Coimbatore as well. In Nagapattinam trees were planted for the purpose of disaster mitigation, to arrest the intensity of hurricanes/winds, while in Coimbatore the task is to grow a forest on garbage land. In the country’s capital city, Delhi, plantation focused on creating a green lung for the city suffering from dangerous levels of air pollution. In the Himalayan region, trees have been planted to facilitate ground water recharge, check land-slides and rejuvenate lakes/streams. Their Barren Land Transformation Program has introduced a lush green forest in the middle of the inhospitable Thar Desert in Rajasthan. Orchards of pomegranate and other fruit bearing trees were planted not just for poor farmers’ livelihood but also ensure fodder for all the pastoral animals in the neighboring communities.

Planting trees for a wide variety of causes with geography based or zodiac based choices, Sankalptaru made the whole idea of tree plantation so convenient, appealing and easily doable. In the process, they also managed to cover most of the Sustainable Development Goals (SDGs) and reached across 27 states and union territories in India. “We have

planted and survived over six million trees in the last ten years. All that is required from donors end is a simple registration and contribution. Sankalptaru handles the rest," assures Apurva.

Shanmuga Priya.T

7. SPD Women Farmer producers Company

The farmer community has been under the spotlight in the recent past thanks to several reforms in the sector, including the introduction and discussion surrounding farm laws. In this time, there have also been several challenges that the community has had to contend with, including climate change, drought, irrigational vagaries and legislative complications. However, through this all, the FPO or FPC system has benefited several farmers and has become a model for discussion.

For the uninitiated, Farmer Producer Organisations (FPOs) or Farmer Producer Companies (FPCs) refer to a collective of farmers or primary producers of food grains that forms a platform, which in turn gives these producers direct access to markets and government schemes like the Public Distribution System (PDS) or MNREGA. Along the way, other benefits like fair prices and hassle-free operations have also come about through the FPO/FPC model.

"Women farmers who are part of the FPC get better income in three ways – fair market prices, hassle-free farm gate pick-up and the supply of organic manure which creates a poison-less eco-system," says Mr. Ganesan Arunasalam, CEO, SPD Women Farmer producers Company, Coonoor, The Nilgiris promoted privately by Rural Development Organisation (RDO Trust) and currently acting as a Resource Institute, supported by Water Energy For Food (WE4F) - a CSR project funded by USAID.

He explains: "Fair prices come about because there are no commissions at the Mandi level or costs incurred by way of loading and unloading produce and the hassle-free farm gate pick-up saves us transport cost." Ganesan has a point. A number of farmers have seen costs go up thanks mainly to the Mandi system, which sees middlemen fix prices for their produce. Despite minimum support prices, the fact remains that commissions often end up eating into farm incomes. Add to this, farmers incurring costs by way of transportation and wastage that occurs during the process of transportation, and the FPO system makes sense.

However, this doesn't change the fact that FPOs face challenges too. For instance, input costs continue to remain high and climate change continues to weigh in on agricultural activity as a key determinant of output. But there are other factors too. "Many times, we are not supported with fair market prices (MSPs) and post harvest wastage continues to remain a factor," Ganesan says, "Several farmers are also unaware of value additions by way of products, and do not practice crop rotation or multicropping, and choose to be carried away by market demand."

Over the years, farmers from the collective have slowly but surely addressed these problems and worked towards a solution that is not only acceptable but beneficial to all.

"Firstly, we have tried to build a continuous relationship that leads to a trust-based equation that we share with our agricultural partners," Ganesan explains, "We have also built awareness and have conducted continuous training methodologies on the need for natural farming."

Further, farmers are also supported through assurances of sales support when it comes to post-harvest products. The fact remains that healthy partnerships with other stakeholders in the agricultural process are the need of the hour, should agricultural activity take on a dimensions of its own and zoom towards success. However, that doesn't change the fact that factors like climate change continue to wreak havoc on agricultural produce, especially when it comes to small farmers.

"Not just climate change but the overall emergency situation on account of global warming is a factor that could threaten livelihoods of small farmers," says Ganesan, "Then the availability of resources like water and native seeds, and vagaries in market trends also play a role in turning out to be a risk to the livelihoods of small farmers."

He believes that the one way farmers can salvage the situation is by turning towards classical practices and methodologies followed by their forefathers. But the fact remains the continuous awareness programmes for farmers is the more important need of the hour. "Another important need is to arrest rural-to-urban migration by extending extra benefits to the rural and farming community," says Ganesan.

The future for farming is bright thanks mainly to what Ganesan says is an upward curve on many fronts. "We see an upward curve in the present community in terms of increase in the volume of agricultural land and a lot of

social activism in the field of agriculture and farming," he says, "Organisations are also stepping forward to improve the situation."

There is no doubt, though, that the role played by corporate social responsibility (CSR) is invaluable in the process of bringing the environment back to normal, which in turn could support farming and its processes. After all, funds are crucial for both climate-awareness and better agricultural practices, and the support extended by corporate enterprises could well be the deciding factor when it comes to determining how they fare and how much success they encounter.

Given the fact that awareness programmes are the need of the hour for farmers, a great deal of funding must also be spent on ensuring the farmers get on board and are sufficiently educated and made aware of important interventions that play a role in ensuring better produce. Education on climate change, crop rotation and multicropping is also important.

For the moment, however, just the existence of FPOs/ FPCs as instruments of better market reach, lesser input costs and better convenience all-round, has helped farmers reach a new level of doing business with better ease and well-being. This could well help the community achieve better growth and stay in better health for the years to come

Rahul Philip

8. Nagthana

Maharashra recorded 2489 farmer suicides in 2021. Over 50% of these deaths were recorded in the state's Vidarbha region. This unfortunately is a problem of many decades in this region. This problem is what moved a Mechanical Engineer to resign his cushy job in Pune and to start a non-profit based in Washim, a district in Vidarbha region. Narayan Solanke is the President of Universal Versatile Society, a multi-faceted volunteer run organisation that aims to promote healthy, thriving communities through projects that address the multiple vulnerabilities in the region.

Established in 2005, the UV Society runs a regenerative agriculture program, education and environment-protection programs, a mental health program, women and youth empowerment programs. Says Narayan, "A 2018 study by the World Bank reports that seven out of 10 most-affected climate change hotspots in the world belong to the Vidarbha Region. We can attest to this report as we routinely fall victim to frequent changes in weather patterns". It is true

that this region is prone to frequent floods, droughts, changing rainfall patterns and extreme temperatures. The farmer suicides amplifies the magnitude of these problems, spiraling out of control. “I believe that to bring about sustainable development of Vidarbha, we would need to address multiple Sustainable Development Goals (SDGs) through all-encompassing solutions,” says Narayan.

In UV Society’s everyday work, this looks like Green Skill Development programs, adoption of a circular economy and of clean energy, mental health programs and women development programs. The organisation is working towards creating a model village with the attributes of a thriving community that can then be replicated all over the region.

One of the most important programs of UV society is their comprehensive psychiatric rehabilitation project for farmers. Through community gatherings and local media, they promote positive mental health and suicide prevention messaging. They conduct surveys to gather household data on assessing suicide-risk behaviour among the residents. Persons with acute depression are referred to the civic hospital for free treatment. They also provide suicide behaviour management through training the families in the basics of psychosocial care. Local authorities, women’s self-help groups and volunteers come together to plan and conduct “happiness programs” to keep the community engaged. Yoga, meditation and community service are some components of the program too.

The agriculture programs are tailored to help the small-landholders to cope with the drastic climate change by providing them training in alternative and organic farming methods, watershed managements and local economy development.

In any household where suicide is a very real risk, it is the women who are the most vulnerable to losses, not just financial, but more deeply, on the social and personal levels as well. UV society established a Women's Counselling Centre in Washim to provide free counseling, referral and rehabilitative services to women undergoing mortal danger, marital discord or maladjustment.

At Nagthana, they have health checkup camps, vocational training, skill development program self-help group guidance programs to bring women's causes and issues to the forefront.

Women are often denied land rights, entitlements, pensions, and therefore institutional credit and other universal privileges in this region. To work around this problem, UV society is helping establish self-help groups, provide training in the basics of business and is encouraging them to build up their own savings and other financial tools. This is useful for the women in times of financial emergency caused by illness, accidents, funerals and so on.

As a member of the White Ribbon Alliance and What Women Want, UV Society conducted the "Say No to Gender Based Violence" program, in which various topics pertaining to women's rights were discussed including gender-based violence, legal supports against violence and government schemes.

Narayan notes with sadness that education is a major drawback in the region. With local schools being understaffed, the lack of amenities and infrastructure means that children are naturally undergoing loss of learning on many levels. UV society involves partners from the education sector to provide training in computer education

to the children, as well as to train the teachers in essential teaching skills.

Sole dependency on traditional farming is proving ineffective to farmers. In 2010 UV Society established "Vidarbha Infotech" an information science institute that helps build technical literacy among rural youth. It provides computer education, vocational training, guidance on competitive exams and entrepreneurial education as well. Courses offered include sewing, beauty parlour training, bakery production, leather bag manufacturing, desktop publishing, etc. Each year over 400 students go through this institute and its skill development programs.

The Will Win Academy is a UV Society led initiative that provide spoken English, Science and Mathematics programs for students from classes 4 to 10. Along with that they are also encouraged to take up Dance, Singing, Computer, Yoga and Martial Arts classes.

Through the above mentioned programs, the organisation is doing its best to provide the required support for communities living below poverty line.

Due to their acute awareness of climate change, UV Society conducts several practical environment protection programs including the Green School Campus program, the annual eco-friendly Ganesh-idol crafting, and environmental education videos on their social media channels. They also mobilise the participation of youth towards identifying possible climate solutions through their World Climate Change Simulation events at local schools. Young people participate in seminars on deforestation and reforestation, carbon emissions and reducing carbon footprints and other related topics.

For their contribution, UV Society obtained special consultative status with the UN Economic and Social Council, the UN Environment Program, and the UN Convention to Combat Desertification.

When asked what are some challenges that the organisation faces today, Narayan says that their remote geographical location makes it difficult for them to find funders and individual donors. Therefore, they are unable to have paid staff and currently rely on the strength of volunteers alone. It is difficult to train volunteers to be on par with hired staff, who would come equipped with the necessary knowledge and skills to do this work professionally.

Narayan is determined to help prevent farmer suicides through providing mental health resources, basic climate change education and promotion of sustainable agricultural practices, all together leading to the wellbeing of the region in the long run.

Archanaa Ramesh

9. Thuvakkam

It was November of the year 2018 when a cyclone named Gaja made its appearance in Southern India and affected over 80,000 people. Relief camps were set up at several locations, required help was provided to those in need.

And in times like these volunteering played a crucial role. Thanks to the support from hundreds of volunteers, the relief work could be done effectively.

Thuvakkam, a Chennai based NGO came out to support during this disaster in full force. They placed volunteers at different locations who took care of the specific requirements of the victims.

Each region has a unique characteristic and need attached to it and that it had to be dealt with accordingly. Alex Joseph from Thuvakkam said: “We visited each area individually, and after having understood their need, we decided to provide the necessary items to fulfill people’s requirement

to the fullest." They were able to help over 1,000 families with necessary items includes dry rations, tarpaulin, dry grass mat depends on their needs.

This is one of many instances when a simple act of volunteering managed to create unmeasurable impact in the lives of people.

Thuvakkam was started in 2014 by a group of college students who were all in their twenties. Their motto of 'Be the change you wish to see' birthed in a casual conversation with friends. As the discussion on the untidy beach, other societal issues and blaming everyone was in progress, the thought of 'let us be the change we want to see in the society' came to be.

The organisation works in three core areas; environment, education, and humanity.

From organic gardening and tree donation to urban forestry and native tree plantation, Thuvakkam touches upon various topics in the field of environment. Their team ventures into the root of the issue and involves the community to preserve the plants after they are sown. By instilling responsibility in every person, Thuvakkam hopes to seed a sustainable future for all to live in. They even follow Miyawaki method of plantation which involves creating mini forests in small areas using only the native trees. Thuvakkam joined hands with an automobile company and created an urban forest inside his Industrial plant with 170 saplings at 1500 square feet. They not only planted but came back regularly for its maintenance until the whole forest grew very well. Today, over 40 urban forests with 1,30,000 indigenous plants have been created by Thuvakkam.

In the field of education, Thuvakkam runs a programme called Karka Kasandra. In this project, the kids are taught using practical methodologies. Unconventional topics relating to society's political, scientific, and social aspects such as, 'Who am I?', 'Soil, Plants, and Food,' 'Good touch, bad touch,' and 'Learn politics' are taught to kids to expose them to societal happenings and their part in the world as a whole.

"By doing so, the kids start developing societal awareness that instills morality in them at a young age by learning to act rather than react to the things happening around them. It helps them find self-purpose and teaches them a way to connect with their community," said Jeba Rupavathi from Thuvakkam.

Through another initiative called Sponsor for Success, quality education is provided to the kids from the lesser privileged community. This initiative helps ease their economic burden and supports the student to grow and become an independent person. Through this project, Thuvakkam is not just helping just the children, but also assisting the entire family in progressing economically. Over 68 children have been given financial aid to complete their education and more than150 students have been benefitted through the holistic teaching program (Karka Kasadara).

Although, Thuvakkam's journey is an inspiring one, they shared several challenges on the way.

Mr. Krishna Kumar Suresh Founder/President, Thuvakkam said: "Initiating an organisation at our twenties leaves us to learn everything ourselves, like getting permissions from authorities, meeting officials and all the relevant do's and don't's had to be self-taught. We have great people mentoring

and guiding us, but gaining the experience ourselves was a task and have faced difficulties a lot of time."

At present Thuvakkam has 35 full time employees and over 2,000 volunteers working with them. Majority of the projects and initiatives are funded through CSR. There are also regular donors who support specific initiatives.

"We believe, holistic development, in any nature of initiative/program/project, is the sustainability in it. Thuvakkam, believing it, has our focus on strengthening the sustainability in the projects we do," Jeba said.

Seeing the immense positive effects of their model, Alex concluded stating, "The volunteering made me and my fellow volunteers from Thuvakkam confident and also helped us understand that we would be able to serve the people in any kind of a disaster in the years to come."

Shreya Pareek

Inspiring Conversations

Embark on a journey with the stalwarts of natural farming and vetiver cultivation. These guardians of the land employ age-old wisdom and innovative techniques, fostering sustainable ecosystems.

1. Dr. C.K. Ashok Kumar

"Our culture and future is agriculture. The whole conscious shift should come from the consumers."

Dr. C.K. Ashok Kumar is a multifaceted personality. An innovator and founder of First World Community, an entrepreneur enablement platform.

In an exclusive interview, Dr. C.K. Ashok Kumar shares with Marie Banu his passion for natural farming.

About your tryst from corporate to agriculture sector?

I hail from Cuddalore, a predominantly agricultural district, where most of the farmers are engaged in paddy and groundnut cultivation. My father is a teacher, and I grew up in a 20-acre farm with coconut groves and paddy fields. The Cuddalore belt is known for vetiver farming, and we ventured into the sachet industry where we introduced

herbal products like shikakai and vetiver (Chrysopogon zizanioides)

We also run C.K. Engineering College in Cuddalore. Realising that many of our students were unemployed, we motivated them to engage in agriculture and initiated Vetiver centre of excellence in our College.

Around this time, I heard about the International Vetiver Conference in Da Nang in Vietnam. I was curious and attended this conference where the World Bank officials and scientists across the world – Thailand, Mexico, Middle East, China and Africa – were present. I spoke about how the impression on vetiver farming has changed over times.

After this, my interest in vetiver farming became stronger. I came back and started reading more on this and its impact on climate change. Vetiver has carbon sequestration factors and can capture more carbon than any other grass and fix it to the roots. The World Bank scientists called it as 'wonder grass of the world' and more than 150 countries grow vetiver today and use it for infrastructure development. This was a huge learning for me.

About the impact of Vetiver farming?

Vetiver is the pride of Tamil and a gift to the world. The botanical name Chrysopogon zizanioides is derived from the Tamil word vetiver.

Vetiver acts as a natural defence to slow river flow and reduce flooding as a cost-effective means of preventing frequent breaches of river embankments, one of the biggest problems in coastal districts of the state. Its deep roots (two to four metres in depth) bind the soil and prevents erosion. Moreover, when planted in rows to form hedges, the grass

slows down water flow by acting as a barrier, thus reducing the erosive power of the deluge.

I started talking about the goodness of vetiver in several forums and how it purifies the soil. We have registered at TNAU and have formed 'India Vetiver network'.

About the farming sector in our country today?

The fact is that a farmer is the most oppressed or a victim of his/her own farming. Many farmers in Tiruvannamalai district ask why they still living in poverty and only few can succeed.

It is sad that many farmers are not able to calculate the profit they earn in farming as they are engaging in this occupation for generations and are not sure of the revenue they generate. The natural calamities are also a challenge which small farmers face from time to time.

We see a lot of youngsters taking up vetiver farming and natural farming. Weekend farming is now becoming popular. This is in our DNA as agriculture has been our occupation since stone age. We somehow lost our connection with agriculture after the industrial and digital revolution. In fact, many of my IT friends have expressed that their passion for agriculture as they sense more satisfaction here.

As citizens, it is our first responsibility to rejuvenate our soil. The heath of the people today is not as it was of our forefathers. Agriculture is taught in Colleges and schools as a separate faculty and so is health. In my view, Agro-health should be the future because everything comes from the soil. It is based on the concept "உணவே மருந்து" If we take care of the soil, our health will be improved. Each one

should be able to realise this interlink so that we can work together to create a disease-free world.

About Tamil Organic Farmers association and its activities?

We are the first world community that have launched the 'தமிழ் ஆர்கானிக் Farmers association' (THOFA). We conduct a lot of events and awareness programmes to encourage farmers to engage in natural farming that was led by Shri Nammalvar. Our Vision is "நஞ்சில்லா உணவு செய்வோம் நோயில்லா உலகம் படைப்போம்" meaning: TOXIC free food for all; Disease free world.

Through THOFA, we guide small farmers on the government schemes available. Thondaimandalam comprises of 14 districts from Chennai to Cuddalore and Kongu mandalam is from Coimbatore to erode belt. The current mission is to capacitate farmers to support other farmers.

Sikkim is the first state in India to become fully organic as the government has banned chemical fertilisers. We must emulate the model of Sikkim to go organic in a phased manner.

Please tell us about the impact of natural farming?

It was due to famine our country started using chemical fertilisers as part of Green Revolution led by Shri. M S Swaminathan. It refers to a period when Indian Agriculture was converted into an industrial system due to the adoption of modern methods and technology such as the use of HYV seeds, tractors, irrigation facilities, pesticides and fertilizers. This has made our land infertile.

Today, people do not having the vigour and vitality as before. We see a lot of infertility clinics mushrooming in our cities as their ability to reproduce is affected due to the quality of food they consume. Fertilisers and chemicals affect the micro nutrients of the soil.

What is the way forward to ensure productivity in agriculture?

Collective farming is the way forward as it is not successful when marginal farmers engage individually. Traditional farming practices needs to be relooked and there should be marketing support and Value addition given to those who engage in collective farming.

I believe that farmers can easily earn Rs. 50,000 a month and this should suffice to maintain their family. The fact is that the middlemen who earn more than farmers and this is the reason for farmers to remain in abject poverty.

The Amul revolution model by Dr. Cherian had 30 lakh dairy farmers collectively involved. We are in touch with these farmers and through THOFA are now looking at adopting this model and providing a marketing channel for collective farming so that many thousands of farmers will be benefited.

Israel is a small country with less water resources, but is a world leader in agriculture and uses a lot of technology in agriculture. In our country, we have many farmers who have drones and they also lease it to small farmers. IOT (Internet of Things) based agriculture is coming up and modern factory equipment with Japanese support is gaining popularity.

The future is for agriculture. The whole conscious shift should come from consumers. They should motivate their children to engage in agriculture. Capturing the trend, Gujarat was the first to launch an Organic Agricultural University (GOAU) University.

Shri. Shubash Palekar, an Indian agriculturist like Shri. Nammalvar, has practiced and wrote many books on Natural Farming and is successful in Maharashtra. He talks on natural farming or zero budget farming. We have invited him to talk to our farmers and youngsters in a workshop planned by THOFA in Chennai in April 2023.

We are working closely with Agricultural institutions, food industries and the Government to promote sustainable farming practices to help in empowering the small and marginal farmers.

The awareness and consumption of organic food has been globally increasing. India has 4.72 million hectares under organic certification. It has been estimated that the Global ales of organic food and beverages reached USD 180 billion in 2021. The main reason behind this sales is growing awareness about the health benefits of consuming organic food. This trend is likely to continue at a compound annual growth rate of 13% till 2030 and reach a level of USD 500 billion.

2. Mrs.Gauri Sarin

"Understanding the connection between emotions, food, and health is essential."

Gauri Sarin is a notable social entrepreneur with a diverse journey. After graduating from XLRI in 1992 and gaining five years of corporate HR experience, she ventured into entrepreneurship, specialising in HR consulting and talent management. Around 2012, she shifted her focus to social entrepreneurship, actively participating in projects aimed at creating positive societal change.

Her journey began with empowering urban women entrepreneurs and culminated in the founding of "Sahaas for Women" in 2016, dedicated to empowering rural girls aged 14 to 20. Gauri's foray into rural development through Bhumijaa for women foodpreneurs devoted to Organic/ natural and local foods broadened her perspective, leading to the creation of the 'Living Without Medicine' online platform to benefit more people. Now, she has facilitatd one

LWM platform per city and aims to have one per country very soon.

This platform educates people on holistic living and the therapeutic potential of food. Gauri Sarin's journey exemplifies her commitment to empowering individuals and fostering positive change through innovative social initiatives.

In an exclusive interview, Gauri Sarin shares with Marie Banu the benefits of living without medicine.

Could you explain the concept behind "Living Without Medicine" and how it fits into your social entrepreneurship journey?

'Living Without Medicine' emerged from the need to bridge the gap between traditional healing practices, holistic living, and modern healthcare. We wanted to show people that the right food and lifestyle choices could play a significant role in preventing and even reversing non-communicable disorders.

Our approach was to foster a sense of community and trust among individuals who were interested in their own well-being. We created a platform where people could access a wealth of knowledge from experts, non-experts, and individuals who had personal experiences with holistic living. This community-based approach helped people understand the importance of their own health.

We offered programs like "Taking Charge of Health," which guided participants in transitioning from allopathic medicine to holistic wellness practices. We also provided insights into emotional well-being, as we recognised that

emotional conflicts and stress played a substantial role in health issues.

Additionally, we launched a program focused on Ayurveda to empower individuals with knowledge about this traditional healing system. Our goal was not to push people away from modern medicine but to empower them to make informed choices about their health.

Now, we're expanding our efforts by building a learning platform that covers various alternative healthcare approaches. Despite limited funding, we're committed to making a positive impact on people's health and well-being through education and community support.

Explain the significance of helping individuals make informed decisions about their health through your initiative.

Absolutely, it's crucial. Many people tend to "hospital shop" or "doctor shop," trying various methods to address their ailments without truly understanding their options. Our initiative aims to provide them with well-informed choices. Now, when it comes to transitioning from conventional treatments like medication or insulin for a long-standing condition such as diabetes to a natural way of life, it's not a one-size-fits-all approach.

There are several factors to consider. Firstly, the stage of the disorder matters; there are different stages of the condition, and reversing it quickly is easier in the early stages. However, in more advanced stages, even the best of Ayurvedic treatments might face challenges. So, the transition depends on the individual's specific circumstances.

There are typically three categories of people in this context. Some quickly embrace alternative methods, while others prefer to try a combination of conventional and alternative approaches. Then there are those who require more time to understand the benefits of alternative medicine fully. It's important to note that Ayurveda and other alternative therapies are highly personalised, as they consider each individual's unique constitution.

Over the years, Ayurveda has faced challenges and changes in its practice and education. However, it's gradually gaining recognition and credibility, thanks to initiatives like ours and support from organisations and leaders in the field.

In the transition process, it's essential to become part of a supportive community, understand the various practices available, and select the right approach for your specific needs. This might include Ayurveda, Siddha, or other forms of natural healing. We emphasise a holistic approach that also includes lifestyle changes, yoga, and pranayama for emotional well-being because emotions and physical health are closely connected.

Food is another critical factor. Ayurveda teaches us that the food we consume can directly impact our mental state and overall health. For example, consuming hot and spicy foods can affect your mind's focus and lead to aggression. So, understanding the connection between emotions, food, and health is essential.

How can someone in their early twenties transition into a healthier lifestyle?

Young adults today face various health challenges, and it's essential to address them early on. One significant aspect to consider is the impact of modern medicine, particularly on

gut health. Many medications, such as pain relievers and antibiotics, can affect the gut microbiome, which, in the long run, can have adverse effects on overall health. So, if you're in your early twenties and looking to transition to a healthier lifestyle, here are some steps to get started:

1. ***Avoid Over-reliance on Medications:*** One of the first things to understand is that not every ailment requires medication. Sometimes, allowing your body to heal naturally is the best approach. For example, if you have a mild viral infection or other non-serious conditions, consider fasting or consuming light, easily digestible liquids until you recover. This gives your body a chance to cleanse and heal.

2. ***Know the Basics:*** Familiarise yourself with the basics of healthy living, as passed down through generations. Many of the traditional practices, such as those in Ayurveda, have valuable insights. Listen to your grandparents' wisdom and apply it in your daily life.

3. ***Avoid Processed Foods:*** Youngsters often fall into the trap of consuming processed and junk foods, which can be detrimental to health. These foods are typically high in preservatives, additives, sugars, and salts. Instead, opt for whole, unprocessed foods.

4. ***Cook Simple Meals:*** Learning to cook simple, home-cooked meals is an essential skill. Focus on incorporating plenty of vegetables into your diet. Ideally, make half of your plate vegetables, and if possible, choose organic produce. Also, vary your vegetable choices to get a wide range of nutrients.

5. ***Incorporate Nuts and Seeds:*** Regularly include nuts and seeds in your diet. These are rich in essential

nutrients and healthy fats. Consuming a variety of nuts and seeds, such as pumpkin seeds and chia seeds, can provide numerous health benefits.

6. ***Don't Fear Good Fats:*** Healthy fats are crucial for your well-being, so don't avoid them. Ghee, butter, and other natural fats can be a part of your diet.

7. ***Explore Millets and Local Foods:*** Millets are nutritious grains that have gained recognition for their health benefits. Explore traditional and local foods, as they often provide excellent nutrition.

8. P***ractice Yoga and Pranayama:*** Incorporate yoga and pranayama (breathing exercises) into your daily routine. These practices can help improve emotional well-being and overall health.

9. ***Emotional Well-being:*** Pay attention to your emotional health. Practices like Sudharsan Kriya and other healing techniques can be incredibly beneficial. Don't underestimate the impact of emotions on physical health.

10. ***Avoid Overthinking Achievements:*** While it's essential to set goals and strive for success, remember that inner well-being is just as crucial. Avoid putting too much pressure on yourself for achievements and focus on leading a balanced, healthy life.

11. Mr.P. Haridas

"The reach and impact of vetiver grass technology and its applications have truly spread like wildfire."

Mr.P.Haridas was the coordinator of the India Vetiver Network until recently. He has been working as Scientist at Research & Development Department of Tata Tea Limited, Munnar, Kerala since 1984. He was actively involved in establishing R&D Centre of Tata Tea at Munnar. He served as Head of R&D, KDHP Co. (P) Ltd., which is the new company after restructuring of plantation operations of Tata Tea at Munnar and retired in December 2007.

Prior to joining Tata Tea, he worked at UPASI Scientific Department from 1969 to 1983, first as Assistant Botanist till 1975 and then as Advisory Officer at Munnar. He was responsible for introducing Vetiver in tea plantations in South India for soil and moisture conservation. Implementation of the Vetiver System Technology in all Estates of Tata Tea is one of his important contributions.

In an exclusive interview, Mr. Haridas shares with Marie Banu his experience in introducing Vetiver in Tea plantations.

Can you tell us about yourself and your background in agriculture?

Tea cultivation in southern India, particularly in hilly regions, often beset with challenges like soil erosion and landslides. I introduced Vetiver in plantations of Tata Tea.

In mid 1980s the company had initiated a Medicinal & Aromatic Project in which Vetiver was included. I observed that certain obnoxious grass weeds, such as Ginger grass (Panicum repens) Kikyu grass (Pennisetum clandestinum) etc. were unable to creep into Vetiver plot due its thick roots of Vetiver. This observation proved beneficial for organic tea cultivation as grass weeds wer not invading the Vetiver boundary and tea fields. We planted Vetiver along the periphery of tea fields to prevent soil erosion and landslides.

Tata Tea's enthusiasm for Vetiver grew further. The Company preferred Vetiver hedges to contour stone walls to combat soil erosion. Constructing contour stone walls was very expensive requiring 300 workers for one hectare for constructing contour stone wall at strategic locations. In contrast, establishing Vetiver hedges could be carried out with only 90 workers. Encouraged by this, Tata Tea decided to implement Vetiver planting in all their estates in South India.

From mid 1980s Tata Tea decided to replant low yielding fields. Instead of constructing stone revetments, we embraced Vetiver by planting it as hedge.

It may be noted that the first ever reference to Vetiver in Tea , dates back to the 1940s. A Tea Scientist, Dr, T Eden, who worked in Ceylon and Kenya, experimented with various grasses, including Vetiver, to counter soil erosion. Among the various grasses tested, Vetiver emerged as the most effective in preventing soil erosion. Eden's historical finding unfortunately went unnoticed and did not receive due attention. In essence, my deep interest in Vetiver developed from its strategic advantages in tackling various challenges, and over time, it evolved into a passionate pursuit.

What inspired you to introduce Vetiver Systems in tea plantations for soil and moisture conservation?

We utilised Vetiver by cutting it for mulching. Mulching with Vetiver brought forth numerous benefits. Firstly, it effectively prevented erosion. Secondly, it retained moisture in the soil. This also prevented weed growth. Eventually the mulch gets decomposed and helped in improving organic matter of the soil. This application of Vetiver proved to be of great significance.

I had the opportunity to interact with Mr. Richard Grimshaw from early 1990s. On seeing my interest, he proposed the idea of organising a National workshop on Vetiver and sponsored by The Vetiver International. (TVNI) We organised the workshop at Cochin in February 2008, drawing Vetiver experts around the world who presented their research papers.

I was presented with the 'Certificate of Technical Excellence' by Mr. Grimshaw himself. TVNI had begun awarding certificates of excellence. In 2005, I received the Class 3 certificate. It's worth noting that these certificates come in three classes: Class 1, Class 2, and Class 3. In fact, I was honoured to be the first recipient from India class Class 3.

During the National Workshop I was awarded Certificate of Excellence under Class 1.

I was able to identify different cultivars of South Indian Vetiver such as VS-1, VS-2, VS-3,VS-4 etc. Among these, VS-1 stood out due to its vigorous growth and the superior quality of oil.

It's important to mention that globally and within India, two main types of Vetiver exist: North Indian Vetiver and South Indian Vetiver. The root system of North Indian vetiver is shallow, rendering it unsuitable for environmental protection. On the other hand, South Indian Vetiver is deep-rooted, with roots penetrating up to 2 to 3 meters. South Indian Vetiver doesn't produce viable seeds; hence it is propagated vegetatively using tillers / slips. In contrast, North Indian Vetiver can produce viable seeds, leading to the potential for it to become a weed thus causing problems to the farmer. In light of TATA Tea's successful implementation of Vetiver in Munnar and Anaimalais, other tea companies followed suit. Today, when you visit Anaimalais, Munnar, or Nilgiris, you'll find Vetiver plantings to combat soil erosion and landslides.

Have you noticed any other positive environmental impacts from implementing Vetiver System beyond soil and moisture conservation?

One of the most significant applications of Vetiver lies in its ability to enhance water quality. In our country, we have a multitude of water bodies ranging from small ponds to vast lakes, but the water often remains polluted and unfit for consumption.

Let me delve into the underlying reasons. Invasion of Algal growth in water bodies like ponds, lakes is mainly due to

presence of pollutants and residues reaching water bodies from farmers' fields.. These residues contain significant amount of substances like nitrate, phosphate, and sulphate. Interestingly, when Vetiver is floated in water, it exhibits a remarkable capacity to absorb nitrate, phosphate, and sulphate far more effectively than any other plant. By absorbing these substances, Vetiver effectively starves the algae, leading to water purification.

Undoubtedly, this marks a crucial and impactful application of Vetiver contributing to the purification of water bodies and significantly improving water quality.

What advice would you give to other tea plantation owners or agriculturalists interested in adopting Vetiver Systems for conservation purposes?

The reach and impact of Vetiver grass technology and its applications have truly spread like wildfire, extending beyond the borders of India to numerous other countries. Presently, there are over 25 diverse applications for this remarkable grass. One striking example is the handicraft industry in Thailand, where handicrafts are crafted not from the root, but from Vetiver leaves. This industry has grown substantially and contributes significantly to the local economy.

Interestingly, the tender foliage of Vetiver serves as an excellent fodder for cattle, proving to be a boon for farmers. The distinctive aspect here is that mature leaves will not attract cattle, but they readily consume the tender leaves. Numerous scientific publications have highlighted the nutrient values and benefits of using Vetiver as fodder.

Can you share some specific results or success stories that demonstrate the positive impact of Vetiver Systems on soil and moisture conservation?

A farmer planted rows of bananas. Adjacent to these rows, another set of banana plants was cultivated, with Vetiver planted nearby. Surprisingly, the row with Vetiver led to the early flowering and fruiting of the adjacent banana plants by nearly a month compared to the untreated control. The yield also notably increased in the presence of vetiver.

Researchers observed that Vetiver roots exhibited a tendency to interact with banana roots, enhancing moisture levels at the root zone. Furthermore, scientists in Thailand discovered that Vetiver has the ability to foster the growth of beneficial microorganisms at the root zone. This characteristic allows Vetiver to thrive in various soil conditions, irrespective of soil fertility.

12.Dr. Irulandi IFS (Retd.)

"Sustainable forest management practices are crucial for preserving biodiversity and ecological balance."

Dr Irulandi hails from a small village in Srivilliputtur Taluk of Virudhunagar District -Tamil Nadu. He joined the Indian Forest Service in the year 1982 and underwent Service Training in Indra Gandhi National Forest Academy at Dehradun for nearly 2 Years. On completion of his service training, he was assigned to the Tamil Nadu Cadre.

From 1985, he served as the District Forest Officer in many districts, was the Conservator of Forest of Vellore Circle and the Additional Principal Chief Conservator of Forest and Head of Forestry Extension wing in Tamil Nadu Forest Department, Chennai. He retired from the Indian Forest Service in the year June 2015.

While he was heading the Forestry Extension wing of Tamil Nadu Forest Department, Forestry Extension wing activities were recognised and was awarded the "Indra Priyadarshini Vrikshamitra Awards" 4 time, by Government of India. This is the highest award constituted in Forestry Sector by the Government of India. He is currently the President of Rotary club of Alandur.

In an exclusive interview, Dr. Irulandi IFS (retd.) shares with Marie Banu his experience in Indian Forest Service.

Can you explain your motivation behind joining the Indian Forest Service and why you chose this career path?

Hailing from a small village in Srivilluputur Village, Virudunagar Taluk, my family has a background in agriculture. I pursued my graduation at Tamil Nadu Agricultural University, Coimbatore, and completed my Post Graduation at the Indian Agricultural Research Institute, New Delhi, focusing on Forest Entomology. Subsequently, I earned my doctoral degree in Forestry Extension.

During my academic journey, I had the opportunity to visit various forest areas and study vegetation for Insects Collection as part of my assignments. My visits to the Himalayas particularly ignited a profound love for nature, especially forests. Upon experiencing the beauty of the various types of vegetation, my passion for agriculture and forests has continued to grow.

Upon learning about the Indian Forest Service, I aspired to serve and conserve nature. I cleared the UPSC examination in 1982 and underwent training at the prestigious Indira Gandhi National Forest Academy in Dehradun.

What do you think are the most significant challenges faced by the forestry sector in India, and how did you address them as an Indian Forest Service officer?

Initially as a District Forest Officer, I served in 10 districts of Tamil Nadu. I also served as Conservator of Forest Vellore Circle for nearly 3 years and Jawadhu hills area is part of my Circle area.

In this, we managed the forest suits to the needs of the local Community needs as well as local forest types. The tribal Villagers are allowed to Collect Usufructs and other Minor forest Produce are allowed to Collect in the Project area and market it on their own with the guidelines of forest officials.

The original system of forest management that is dominated by tribal community is that these communities who are engaged in collection of forest produce are allowed to enjoy the produce as much as they can only for personal consumption; the rest being handed over to the Forest department for revenue generation. Further, the support of the local community is offered a remuneration to protect the forest.

In Jawadhu hills, there is a good wealth of sandal wood. Between 1990 to 2000, the outsiders conniving with the tribals, illegally removed the entire sandal along with other timbers in this area. As an IFS officer, I tried to recreate the wealth with the cooperation of the tribals and adopted a strategy by joint forest management. We launched 'Tamil Nadu Biodiversity Conservation and Greening Project' with funding support from foreign agencies. The activities implemented through this project were aimed to benefit the tribal population. Guidelines were drawn to allow the tribals collect the usufructs, market it, and the amount approved for sale of products used for village development fund.

The revenue department and forest department are now in the process of identifying the areas to be handed over to the forest dwellers following the Forest Rights Act of 2006.

Protection of Forest resources such as Timber, wildlife, forest land from encroachment is the biggest Challenge in the Present-day Problem for Forestry Sector. However, the Forest authorities put fullest efforts to safeguard the forest wealth by legal enforcement as well as will with the participation of forest dwelling communities and the people who are living adjoining to forest area by implementing People benefits oriented Schemes.

What are your views on the integration of technology, such as remote sensing and GIS, in forest management and conservation? How would you utilise such tools to enhance your work as an Indian Forest Service officer?

The integration of technology, particularly remote sensing and GIS, has been a game-changer in forest management and conservation. In Tamil Nadu, we have been utilising GIS for the past 15 years, primarily for mapping and analysing various aspects of forest management.

A dedicated GIS unit was established long ago to support forest management practices, such as detecting occurrences of forest fires, identifying encroachments on forest land, combating illegal poaching and mining activities, and conducting advanced mapping and spatial analytics for forest vigilance purposes.

As an Indian Forest Service officer, harnessing these tools enables me to make informed decisions, enhance the effectiveness of forest management strategies, and promote better conservation practices.

What steps can we take to promote sustainable forest management practices and conservation of biodiversity?

Sustainable forest management practices are crucial for preserving biodiversity and ecological balance. The United Nations has formulated forest management practices as part of the Sustainable Development Goals, and in Tamil Nadu, the Forest Department has established a Sustainable Development cell to oversee various forest management issues, including protection, encroachment, and mining.

Originally, we thought we can manage the forest ourselves with the support of the local communities. It is a herculean task as our population has expanded multifold and the forest areas is less.

The Forest and Trees Cover of Tamil Nadu State is only 23.8% which is Slightly Lower than the National Forest policy 1988 target of 33%. To address the challenge of low forest cover, initiatives like the Tamil Nadu Biodiversity Conservation and Greening Project have been instrumental in creating tree wealth outside forest areas, including wastelands, roadsides, and community lands.

To reduce the gap, large scale tree planting activities have been undertaken by Forest Extension wing of Tamil Nadu Forest Department which I led for nearly 15 years. The main function of this wing is to educate and motivate the People to grow trees in Community lands, agroforestry, etc so as to improve the Tree Cover of the State. Further this wing brought the Public Closer to the forest Department. Otherwise, forest Department was functioning in isolation without much Connection with Public.

How could we balance the needs of the local Community who depends on forest resources for their Livelihood with Conservation goals?

To strike a balance between the needs of local communities and conservation goals, certain initiatives have been implemented:

Empowering local communities: Providing local forest communities with the autonomy to collect and market Minor Forest Products allows them to sustain their livelihoods while still adhering to conservation principles.

Forest Schools and education: Establishing Forest Schools to educate Tribal Children not only imparts knowledge but also fosters an understanding of sustainable forest practices and the importance of conservation.

Involvement in Ecotourism: Engaging Forest Dwelling Communities in Ecotourism management Committees and tourism activities provides them with income-generating opportunities that can be aligned with conservation objectives.

Employment opportunities: Offering employment to tribal youths in Forest Protection activities and integrating them into regular forest establishments not only improves their livelihoods but also fosters a sense of ownership and responsibility for forest conservation.

By combining these approaches, we can harmonise the needs of local communities with the overarching goal of sustainable forest management and biodiversity conservation.

13.Prof. Madaswamy Moni

"Tribal agriculture is a sustainable agriculture which has to be promoted so that they become a part of the global value chain."

Professor Madaswamy Moni is the Director General (Retd), National Informatics Centre, a premier Institution of Government of India in the areas of e-Governance and Informatics development. He is a Distinguished Technocrat and Eminent Informatics Scientist in the area of "e-Governance, Informatics and Agricultural Informatics" in India

In an exclusive Interview, Prof. Moni shares with Marie Banu his efforts in SMART Village Project in India.

About SMART Village Project and how you conceived this initiative?

I am from a rural village in Tamil Nadu. I did my Post Graduation in Mathematics at Ramakrishna Mission Vivekananda College, Mylapore (Chennai) 1974-76 and M.Tech in Computer Science at IIT Madras (1976-78). For me, rural India means agriculture has to be digitalised and Agri MSMEs should be present.

India is an agrarian economy and we have 365 days of sunshine; 127 agro-climatical zones and 400 agricultural commodities. We can produce for the whole world if we adopt the best practices. Now it is a 145.3 million operation holding and 85% of small and marginal farmers having less than 2 hectares of land who need to be supported. They are our food security network and have to be given remunerative prices so that we have a complete value chain.

A village is complex and every aspect of natural resources for the village has to be collected and digitised. A rural area means that it has well defined agricultural activities. If you are able to have all the information of a village systematically on what is available below the ground and above; it will facilitate information on what to grow, where to grow, and how to grow.

A SMART village means a comprehensive information system on a village which will facilitate to have a time series data based on every agriculture field which can be applied to analytical tools. During the period 1987 to 2002, there were no advanced analytical tools (Spatial or Non-spatial) available, but NIC worked on building District Information System Programme of NIC (DISNIC) in 28 Development sectors in 512+ districts, a front-runner of today's Digital India Programme.

We proposed the SMARTVillage Programme, SMART Island Programme and Grassroot Informatics Development (GRID) programme to the then Planning Commission, and got it approved for the 2002-2007 five-year plan. But it was not operational due to various administrative issues.

In 1995, I was instrumental in visualising 15 informatics development programmes – an IT blueprint for Agricultural Sector – through a National Conference on Informatics for Sustainable Agricultural development (ISDA95) held at Vigyan Bhawan, New Delhi. Since then, I might have visited many rural districts of the Country, and realised that youth did not want to engage in agriculture through adoption of Digital technology.

In 2013 when I retired as DG NIC, I decided to roll back and keep working on the SMART Village idea. I was invited as Professor Emeritus to Shobhit Institute of Engineering and Technology (Deemed to be University) Meerut, the first Deemed University had "agriculture as a Use case" in Engineering Discipline and was instrumental in establishing Centre for Agricultural Informatics and e-Governance Research Studies (CAIRS); Centre for Agri Business and Disaster Management Studies (CADMS); Centre for Informatics Development Solutions and Applications (CIDSA), Centre for Industry 4.0 Technology Studies and Applications (CITSA) and Centre for Health Informatics and Computing (CHIC). The CAIRS is getting replicated in other Higher Education Institutions (HEI) of the Country, now, to promote digitalisation of Agricultural systems and establishment of SMART Village and SMART Farming.

How can we make use of technology governance?

Governance? Anything related to a rural area should have an e-governance approach and it has to be completely a

reformed approach not only website creation. We have 63 million SMEs in our country, out of which 3 million are Agro MSMEs that need to have Industry 4.0 technology adopted.

About the health data, it is generated from plant health, soil health, animal health, water health, fish health, and environment health. The common phenomena is that minerals in soil control the metabolism of human cells, plant cells, and animal cells. Hence, soil has to be healthy for sustainable development of a village. Therefore, India needs to establish a Health Informatics Network Value Chain.

The COVID19 Pandemic has taught us enough lessons. The Proposed Health Informatics Value Chain is estimated to be a "trillion-dollar data economy" which needs to be look at. Technological Tools such as AI/ML, Data Analytics and Blockchain can facilitate undertaking research studies to ensure optimal nutrition in soil and harvested foods to minimise human diseases. I think, India should take advantage of it and have a data centre with 10,000 data scientists who will work only on Health Informatics Network Value Chain, for the benefit of entire World.

About your seven Mission mode programme for Digitalisation of Agriculture?

I was associated with the 'Doubling Farmers Income by 2022 (DFI-2022) Committee' which was announced by Hon'ble Prime Minister of India, Shri Narendra Modi in 2016. This Committee was chaired by Dr Ashok Dalwai IAS. The Ashok Dalwai Committee on Doubling Farmers' Income by 2022 Report (2018) recognises Agriculture as a Value-led Enterprise and lists 13 components of the strategy to double farmers' incomes. As Chief Advisor

(IT), Department of Agriculture, Cooperation & Farmers Welfare, Government of India, New Delhi, I chaired two Volumes as its Group Leader: Volume-11: Empowering the Farmers through Extension and Knowledge Dissemination, and Volume 12B: Digital Technology in Agriculture.

The DFI-2022 Report (2018) Volume 12B – Chapter 10 details seven DFI-2022 Mission Mode Programmes, for adoption in a time bound manner, to digitally transform more than 14.5 Crore operational farm holders of India and their farming activities viz.:

1. Digital Agriculture – Digital Technology and Innovation in Agriculture: Digital India, Make in India, Skill India and StartUps India Programmes for Transformational Reforms in Agricultural Sector (SMART Irrigated Farming, SMART Rainfed Farming and SMART Tribal Farming);
2. Digitalised Agro-Met Advisories & Agricultural Risk Management Solutions;
3. Digitalised Agricultural Resources Information System and MicroLevel Planning for achieving SMART Village and SMART Farming;
4. Digitalised Value Chain for about 400 agricultural Commodities;
5. Digitalised Access to Inputs, Technology, Knowledge, Skill, Agricultural Finance, Credit, Marketing and Agribusiness Management, to Farmers;
6. Digitalised Integrated Land and Water Management System – Per Drop More Crop;
7. Digitalised Farm Health Management for reduction of Farmers' Losses.

I was able to bring out a comprehensive programme (from learnings from 1987 to 2016) as a Seven Mission Mode programme. It will facilitate digital transformation of Agriculture with synergisation of all government schemes at village levels: SMART Irrigated Farming, SMART Rainfed Farming and SMART Tribal farming.

Indian Agriculture confronts with its sheer complexity, inadequate factors of production, weather uncertainties, multiplicity of schemes and multiplicity of institutions, at farm level. Agricultural services such as agricultural advisories, financial services, agricultural marketing and risk transfer, are required for the entire Agricultural Commodity Value System (AVS) of the Farmer. Tribal agriculture is a sustainable agriculture which has to be promoted through SMART Farming methods and Agricultural Value Systems so that Tribal Agriculture becomes a part of the global value chain.

India is home to 2.50 Lakh Grampanchayats empowered with 29 functional items (as per the 11th Schedule of the Indian Constitution and is to equipped with one AgriTech StartUp per Grampanchayat to facilitate digital transformation in Agriculture.

Tell us about your webinars and how one can participate?

Every Thursday from 11am to 1pm, I conduct a National Webinar Series on Doubling Farmers Income by 2022 DFI2022) – 112 Webinars and on Saturdays, from 11.30 AM to 1.00 PM, an international webinar Series on Open-source Digital Technologies towards Self-Reliant India – 109 Webinars, on related topics to increasing Farmer's Income since August 2020 onwards. The International webinar Series is organised in association with the African Asian Rural Development Organisation (AARDO) New

Delhi. The Webinar Topics are well received both nationally and internationally, and the talk links are available in the University Website.

The University welcomes Experts, NGOs, StartUps, Researchers, Rural Youths etc. to participate in delivering talks and also can view these Webinars through URLs published well in advance. The Topics are also encouraging relevant research activities and pilot projects. The University has also initiated SMART Tribal Farming Projects (Pilot) in a cluster of 10 Tribal Villages each in many States, in collaboration with local NGOs. Such pilots, after successful implementation, are required to be scaled upto 1.45 Lakh Tribal Villages of the Country in due course.

14.Mr. C. Pandian

"Vetiver, for me, is not just a cash crop; it's the main root of health and happiness."

Mr. Pandian, initiated his journey into Vetiver farming by collecting wild varieties of this versatile grass in the Sivagangai District of Tamil Nadu. Over time, he transitioned to cultivating new varieties, particularly those developed by the CSIR-Central Institute of Medicinal and Aromatic Plants (CSIR-CIMAP), a prominent Indian research organisation. Notably, Pandian has played a pivotal role in the dissemination of Vetiver saplings for both commercial cultivation and public awareness.

His contributions are substantial, with the supply of 1.5 crores of saplings facilitating widespread commercial cultivation. Furthermore, he has distributed over 60 lakh saplings as part of public awareness initiatives, emphasising the importance of Vetiver in sustainable farming practices.

In addition to his cultivation efforts, Vetiver Pandian has diversified his portfolio, now producing over 100 types of value-added Vetiver products. This extensive range includes handicrafts, cosmetics, and medicinal items, showcasing the versatility and commercial potential of this wonder grass.

In an exclusive interview, Pandian shares with Marie Banu, his experiences in the realm of Vetiver farming in India.

Can you share your experiences in venturing into Vetiver cultivation?

Certainly. I hail from Sivaganga district of Tamil Nadu, where I own a 10-acre land. The decision to explore Vetiver cultivation was not merely a financial endeavor but a transformative chapter in my life, one that would redefine my understanding of agriculture and its potential.

Due to financial constraints, I worked for a brief while in Singapore as a cashier in a mall. When I returned to India and worked in Coimbatore, an article emphasising the role of agriculture in India's prosperity caught my attention, sparking a curiosity that would change the course of my life. In 2007, I stumbled upon Vetiver and its myriad uses, realising the untapped potential this grass held.

About your entrepreneurial venture?

The turning point in my journey came when I decided to set up a stall at the Agriculture Expo in Coimbatore. Distributing small packets of Vetiver and informative leaflets, we witnessed an overwhelming response. In just four days, we sold out all the packets and started disseminating leaflets on

the benefits of Vetiver. This marked the humble beginning of my entrepreneurial venture.

How did you integrate traditional wisdom and innovative applications into Vetiver cultivation, and what unique products did you develop?

Recognising the need for authenticity, I documented the medicinal properties of Vetiver from a laboratory and delved into Siddha books for additional insights. Names like "Vasiya Moligai" and "Nidhi Nayakan" from Siddha books found their way into our products, adding a layer of tradition to our offerings. Beyond traditional uses, we explored innovative applications, creating products like curtains and essential oils.

What challenges did you face in marketing Vetiver products, and how did you navigate them?

Unlike conventional marketing strategies, we chose not to give our products on credit, and we refrained from enrolling external marketers to minimise expenses. Instead, we focused on crafting products that catered to diverse health needs. This decision, while challenging, allowed us to maintain quality and profitability.

How do you perceive the multifaceted benefits of Vetiver?

Vetiver, for me, is not just a cash crop; it's the main root of health and happiness. With its diverse applications, from eye care to skin health, Vetiver addresses various health needs. Moreover, its use in preventing soil erosion, its moisture retention property, and its potential for groundwater replenishment make it an environmentally sound choice for sustainable farming practices.

Vetiver symbolises transformative change in agricultural practices. Vetiver's potential extends beyond profit margins to encompass environmental stewardship, community prosperity, and a redefined narrative for sustainable agriculture. It stands not just as a cash crop but as a symbol of harmonious blending—tradition and innovation, profitability, and sustainability.

How did your journey evolve into establishing Cm. Eco – Herbal Plantations?

In 2006, I took a significant step by establishing Cm. Eco – Herbal Plantations in Tirupattur, Sivaganga district. This venture involved contractual production of Vetiver in 60 acres and the promotion of Vetiver in my own 10-acre plot. Beyond cultivation, we ventured into value addition, developing various products from Vetiver. These products are actively marketed through online platforms and direct sales.

What initiatives have you undertaken to raise awareness about Vetiver cultivation?

My commitment to community development extends beyond my farm. I supplied nearly 60 lakh Vetiver slips for public awareness campaigns focused on soil and water conservation. Additionally, I distributed 1.5 crores of planting material of Vetiver varieties to fellow farmers, encouraging them to take up cultivation. These initiatives foster a sense of collective responsibility towards sustainable agricultural practices.

The essential oil distillation unit was a pivotal addition, allowing us to extract and market high-value essential oils derived from Vetiver. This innovation added sophistication to Vetiver products, creating new avenues for revenue.

Please tell us about your plans for furthering Vetiver in the coming years?

Looking ahead, I envision promoting Vetiver Farmer Producer Organisations (FPOs), connecting the fragrance market with FPOs, and obtaining Geographical Indication (GI) tagging for Cuddalore Vetiver. These initiatives, with the support of The India Vetiver Network, aim to propel Vetiver cultivation into a mainstream and sustainable agricultural practice.

Vetiver's potential extends beyond profit margins to encompass environmental stewardship, community prosperity, and a redefined narrative for sustainable agriculture. It stands not just as a cash crop but as a symbol of harmonious blending—tradition and innovation, profitability, and sustainability.

What overarching lessons can be drawn from your personal journey and the broader implications of Vetiver cultivation?

My journey is a testament to the transformative power of innovative thinking in agriculture. From financial constraints to international recognition, it underscores the potential of harnessing nature's bounty for the greater good. Vetiver's impact extends beyond profit margins to encompass environmental stewardship, community prosperity, and a redefined narrative for sustainable agriculture. It is a symbol of transformative change, illustrating how a humble grass can redefine the narrative of agriculture, becoming a source of innovation, entrepreneurship, and holistic community well-being.

15.Shri Patanjali Jha, IRS (Retd.)

"Vetiver can save humans from mass extinction."

Shri Patanjali Jha, IRS (Retd.) has served as Commissioner in Indian Revenue Services in Bhopal, India. He also served as head of the Income Tax department of the Mumbai region. He has pioneered and experimented on the concepts of multi layered and no till farming at a farm called Vanya.

Patanjali has worked with the Eco Task Force of the Territorial Army and has donated more than 12.5 million slips of vetiver, a grass that does carbon sequestration and helps fight both soil erosion and depleting groundwater. He has also tied up with the Ramakrishna Mission and Seva Dham, Ujjain, to whom he sends seeds for planting. Besides this, Patanjali goes all over the country delivering talks on his experiences as a food forestry farmer besides time spent at the farm explaining to visitors the benefits first-hand.

In an exclusive interview, Shri Patanjali Jha shares with Marie Banu the benefits of Vetiver in farming.

What was the inspiration for you to venture into natural farming?

About two decades back, I got to read The One-Straw Revolution: An Introduction to Natural Farming by Masanobu Fukuoka. This book changed my life! The book is full of philosophy and all about life. The punch line which moved me most is: "The cultivation or the growing is not about produce; it's about perfecting a human being." The journey started from there.

I was sure about no-tilling and learnt a lot from contemporary scientists and people involved in agro-forestry. Above all, I have reverence for our Mother Nature. Every religion says that Nature is the available form of God, but no religion is doing enough.

We started to grow Vetiver in the centre stage making it an integral part of plantation, which otherwise people normally used to grow as a hedge or to stop soil from erosion. This was an incredible success so much so that my brother bought a piece of land in the interior areas of Madhya Pradesh where the soil was completely compacted and not a blade of grass was growing. However, I was very confident of the power of Vetiver and in three years' time this land has transformed.

Your efforts to promote natural farming practices?

Over the last 20 years I have created and developed Vanya Farms, a food forest spread across 100 acres of land situated in Madhya Pradesh and Bihar, with vetiver, moringa and a range of other trees and plants having commercial and

medicinal value. The forest is self-sustained with pollinating bees and grasslands. The Vanya Farms has now become a proof of concept of no-till, no-external input, multi-layer farming and has been a source of inspiration for many to raise and switch to natural farming and raising food forests in place of traditional destructive farming practices that use tilling and pesticides etc. This has led to natural farming practices being followed on 1000 acres of land.

I have worked in close tandem with the Eco Task Force of the Indian Army in its afforestation efforts. Through my efforts to I have made known the effectiveness of the Vetiver System and have gifted over one crore Vetiver Slips for the afforestation and landscape stabilisation and decontamination efforts of the Eco Task Force in Marathawada, Samba Sector, Banks of River Ganga etc. These efforts have also contributed to the revival of the Ganga river ecosystem.

As a natural farmer, I have been instrumental in creating a team of like-minded individuals from varied professional backgrounds and have proposed a composite solution to the global problems based on field experience and thorough study by synergising the virtuous cycles associated with food forests and the Government's policy on compressed bio gas (CBG). This team is now acting as an advocacy group for the adoption of this concept and reaching out to the Government, Corporates, Voluntary Organisations and Individuals.

Can you describe the role of Vetiver in carbon sequestraion?

Vetiver does enormous amount of carbon sequestration, ranging from 15 to 50 kg carbon per square metre. Vetiver, when grown surrounding the trees, holds the topsoil and

retains the moisture besides helping other plants to grow better. Vetiver also brings the micronutrients from the lower depths to the root zone of these trees.

We experimented and realised that it is the best companion plant that you can ever think of for it's obvious advantages of its deep root system and mulching you get by pruning. So, you do not need to create a vermi-compost or as it is in situ. Microbes flourish under damp condition, hence mulching and covering every inch of soil is important. This in turn preserves the moisture content of the soil, retains water in the topsoil and recovers groundwater levels, leading to less need of irrigation, and provides advantageous conditions for microbial growth. In our farms, almost every inch of soil is covered by live mulch. The thick cover of Vetiver mulch increases water infiltration and reduces evaporation, particularly important under the hot, dry conditions. It also protects the soil surface from the impact of raindrops, a major cause of soil erosion. The mulch on the ground makes the sunlight that does reach through the trees on the ground lose its harshness that could destroy the living organisms feeding on the mulch from trees.

The soil requires nitrogen, so we started planting Subabool, Tur and later with Agastya, tubers like sweet potato, black mustards to make the soil better.

Fukuoka says to prune the crops and grasses and add slurry of chicken poop so that the bacteria and fungi start working on it. The rain takes the decomposed matter deep inside this soil for micro-organisms and earthworms. Nobody has defined it better than him.

Vetiver grows 8 feet to 10 feet; 6 feet remains inside the soil. It not only prevents the topsoil erosion but also enriches the soil quality.

If you till a soil, the erosion of soil lost to the wind and heavy rains is nothing less than ten tonnes of soil every year per acre. On a slope, it is much more.

Since we practice no till farming, there are no carbon emissions and no nitrous oxide emissions and no methane emissions. Agriculture in its current form of industrial/ commercial farming is contributing around 30–40 per cent of the greenhouse gas (GHG) emissions. The fault is not of the farmers but instead of how they are taught to do farming in the conventional manner with tilling. These GHG emissions if released remains in the atmosphere for anywhere between 50 to 110 years.

On the contrary, if you don't till the soil you don't release these gases into the atmosphere.

Tell us some examples of how Vetiver has positively impacted farming practices.

Citarum is the filthiest river in Indonesia, like as bad as Yamuna river in Delhi. One NGO along with help of the army started planting vetiver on both sides of the river covering a stretch of 30 kilometers. This is the biggest measure to purify the water and make it drinkable because vetiver can sustain while being submerged in water.

We work closely with the Raah Foundation in Nasik. When I was posted as Principle Chief Commissioner in Mumbai, one of the Foundation members approached me after learning about my passion for natural farming and no till farming. She went back and tried multi-layer no-till farming on ten acres of land. She mentioned that her land had a big well which would run dry during summer months, but after she planted vetiver around the well it has nine feet

of water throughout the year, till date. This is the effect of Vetiver!

Mr. Richard Grimshaw and others from the World Bank took Vetiver to the rest of the world and China has used it extensively in its infrastructure projects of railroads or in urban dumping sites. But, it is only in India that we use Vetiver for farming.

For the right reasons I can state that Vetiver can save humans from mass extinction. We gifted Vetiver to a friend who works in Bokaro Steel City, Jharkhand. He planted them in the steel city. In the first year, the difference in temperature where the vetiver was growing was less by 9 degrees celsius. We are now exploring various usages of the shavings of Vetiver and it would be a great breakthrough if we succeed.

What are the other benefits of Vetiver?

Vetiver water calms the nerves, aids better sleep and turns your body alkaline. The RO water is dangerous because there is loss of minerals. By adding Vetiver in the water kept in an earthen pot, the pH of the water would be perfect for the human body. This would save us from many health issues including cancer.

We were growing a lot of Moringa at that point of time. There is a Japanese study that states Moringa to be the highest carbon sequester on earth. When compared with the carbon sequestration that other 50 tree species would do in 20 years, two Moringa trees will do that in two years. It is this stark!

ISRO's satellite indicate that we are losing the soil at very fast pace and desertification is happening. That can be

stopped in its track if we align Vetiver as it multiplies 10 to 40 times every year on its own. It also helps in recharge of ground water.

Vetiver can be said to have the potential of being the 'Saviour of Mother Earth'. Vetiver along with no till, no poison, permanent multilayer multi-species food forest can be beneficial in increasing biodiversity, reducing temperatures and global warming, carbon sequestering, controlling cancer incidence, water harvesting, rejuvenation of rivers and underground water recharge, and increasing farm incomes.

16.Dr. A. Samuel Rajkumar

"Changing people's attitudes and behavior towards environmental conservation is crucial."

Dr. A. Samuel Rajkumar is the Joint Chief Environmental Engineer, Tamil Nadu Pollution Control based at Cuddalore, Tamil Nadu. Formerly, he was associated with World Bank as Environmental Specialist for an Aided Road Sector Project.

In an exclusive interview, Dr. Samuel Rajkumar shares hares with Marie Banu the efforts required to create a sustainable and eco-friendly future.

About your TNPCB and your role?

The Tamil Nadu Pollution Control Board (TNPCB) is a statutory organisation established in 1982 under the Water Prevention and Control of Pollution Act of 1974. This act was formulated by Smt. Indira Gandhi, the Prime Minister of India at the time, following the United Nations'

conference on human and environmental issues held in Stockholm, Sweden on 5th June 1972. This conference day marked the launch of World Environment Day, which is celebrated annually om 5th of June.

The TNPCB operates as a centralised body, implementing the water and air pollution control Acts enacted in 1974 and 1981 respectively. In response to the Bhopal gas tragedy in December 1984, the Environmental Protection Act was introduced by Shri. Rajiv Gandhi in 1986. These three legislations play a crucial role in addressing air, water, and environment pollution at the national level.

Under the water act, pollution control boards were established across India, including the Tamil Nadu Pollution Control Board (TNPCB), which was formed on February 27, 1982. The TNPCB functions through a three-tier system, comprising a corporate office at the head office in Chennai, officers stationed in various districts, and regional monitoring officers. I serve as the Joint Chief Environmental Engineer responsible for activities in Cuddalore, Nagapattinam, Mayiladurai, and Thiruvarur districts in Tamil Nadu.

My specific role involves monitoring highly polluting industries falling under the 17 designated categories. Additionally, I serve as the Chairman of the Zonal Level Consent Clearance Committee that consists of district-level officers such as the District Environmental Engineer who assesses and grants clearance to certain types of industries. Regular review meetings and other monitoring activities are conducted to ensure compliance with environmental regulations.

What measures have you implemented to ensure that businesses comply with these regulations?

The three legislations hold significant importance for industries, as they require clearance to operate. As part of the clearance process, we issue a consent to establish an industry, which serves as a fundamental requirement. Businesses must obtain a valid consent from the Tamil Nadu Pollution Control Board (TNPCB) to run their manufacturing operations.

In the event of any observed violations, we issue a showcase notice, providing a specific time frame for the industry to respond. Some companies request additional time to rectify the identified issues and may submit photographs as evidence of the repairs carried out. If the industry fails to respond or the issue remains unresolved, we proceed to summon the concerned parties for a personal appearance.

If the non-compliance persists despite these efforts, we escalate the matter to our head office for further action. The chairman of the corporate office is vested with the authority to make decisions in such cases. Subsequently, a closure notice is signed, and a request to disconnect the power supply is forwarded to the electricity board. By following this protocol, we ensure that industries adhere to environmental regulations and take appropriate actions in cases of non-compliance

Looking ahead, what are the major challenges you encounter in the pollution control sector, particularly in terms of regulation and control?

Our team comprises of Post-graduate Engineers and Science graduates, researchers, and scientists who collectively work towards addressing various challenges in pollution control. One of the significant challenges we face is controlling sewage pollution, which often leads to complaint. Additionally, the dumping of solid waste,

improper waste disposal systems, and the prevalent use of single-use plastics pose major hurdles

However, there is a positive development in this regard. Our Honourable Chief Minister of Tamil Nadu has initiated a comprehensive program called "Meendum Manjapai," which aims to tackle these challenges. This program includes extensive campaigns and awareness programs conducted by our departmental engineers in schools across all districts.

Recently, we organised a Hackathon where we announced substantial cash prizes for innovative ideas to combat improper disposal of single-use plastics. So far, we received an encouraging response with innovative ideas.

Changing people's attitudes and behavior towards environmental conservation is crucial. To monitor pollution levels and water quality, we have established a centralised monitoring center at our head office. Several important parameters are monitored there, specifically concerning industrial pollution.

Nonetheless, the most pressing challenge remains the effective management of solid waste and the menace of plastic pollution. It is the collective responsibility of every citizen in India to prioritise environmental care and take individual actions to address these challenges.

What are the efforts required to create a more sustainable and eco-friendly future?

Numerous substitutes for plastic are being actively explored and adopted to mitigate plastic usage. Biodegradable Plastics, made from organic materials like cornstarch, sugarcane, or algae, naturally decompose in the environment, minimising their ecological impact. Paper

and cardboard, renewable and recyclable resources, serve as popular alternatives for plastic packaging and bags. Bioplastics, derived from renewable sources such as plant starches and vegetable oils, provide a more sustainable option with a reduced carbon footprint. Glass and metal containers, particularly aluminum, are viable substitutes for plastic packaging. These materials are recyclable, possess excellent preservation properties, and can be reused multiple times. Natural fibers like cotton, jute, hemp, or bamboo offer renewable and biodegradable alternatives for various products, including bags, packaging materials, and clothing, thus reducing environmental harm compared to plastics. Lastly, compostable materials, including films and packaging, break down under specific conditions, leaving behind nutrient-rich compost. These materials are environmentally friendly choices for short-term use items.

By embracing these substitutes, individuals and businesses can contribute to the reduction of plastic usage and its environmental impact. Exploring and adopting such alternatives are vital steps toward creating a more sustainable and eco-friendly future.

Your advice for youth?

India is progressing in such a way to find a balance between sustainable development and environmental protection. However, the youth, especially with their widespread use of social media platforms like Facebook and Instagram, can play a pivotal role in driving positive change. They can serve as role models by actively developing sustainable manufacturing sectors that others can emulate. By promoting clean technologies and adopting a circular economy approach, the youth can encourage others to prioritise ecofriendly practices.

Additionally, the concept of "greening" can be embraced by the youth, where they take a proactive role in advocating for environmentally conscious actions. For example, initiatives like "one man, one tree" can be championed, encouraging individuals to plant trees and contribute to reforestation efforts. The youth can also engage in innovative thinking, exploring ideas and solutions that align with environmental sustainability.

Harnessing the power of the youth's energy, creativity, and digital connectivity can lead to significant advancements in environmental conservation and sustainable practices. By mobilising their potential and nurturing their passion for a greener future, we can foster a collective effort towards a more environmentally responsible society.

17.Prof. Sara Parwin Banu Kamaludeen

"Vetiver's role in promoting soil health make it a valuable tool for addressing environmental issues."

Prof. Sara Parwin Banu Kamaludeen is an Environmental Microbiologist and Microbial ecologist involved in the remediation of soil and water bodies. She is involved in teaching, research, and farm advisory service services for the past 25 years at Tamil Nadu Agricultural University. She has expertise in remediation of toxic Cr(VI) utilising the biotransformation potential of diverse aerobic and anaerobic microbial communities.

Sara has explored the microbial diversity in chrome contaminated zones and confirmed that microbial manganese oxides trigger reoxidation of Cr in remediated sites, a major challenge. Her main focus of research is Bio/ Phyto and Rhizoremediation of heavy metals and pharmaceuticals from municipal sewage and tannery wastewaters.

Currently, she is working on rhizo-filtration in vetiver, exudation patterns, metabolites characterisation and role of biochars in wastewater treatment.

In an exclusive interview, Sara Parvin Banu shares with Marie Banu her passion for research and her notable projects

What is your educational and professional background? How has your academic journey and career evolved over the years?

I hail from Salem, which is also my native place. My educational journey began here with my schooling. Following that, I pursued a bachelor's degree in agriculture. I continued my academic pursuits by completing a master's degree in Environmental Sciences at Tamil Nadu Agricultural University. Subsequently, I was awarded a John Allwright fellowship from the Australian Council for International Agriculture Research (ACIAR). This fellowship paved the way for my four-year Ph.D. program at the University of Adelaide, which was closely tied to the CSIRO (Commonwealth Scientific and Industrial Research Organisation). This extensive project, initiated in 1996, spanned a decade and focused on remediating contaminated soils in the Vellore region, with funding and support from Australia.

In 1995, I took up a role as an assistant professor at the university. Following the completion of my Ph.D., I remained dedicated to teaching for over two decades, amassing more than 20 to 25 years of experience in the field. Teaching has always been a great passion of mine, and I thoroughly enjoy being a teacher and lecturer.

In addition to my teaching responsibilities, I've been actively involved in research, primarily focusing on soil and water remediation. My research endeavors have contributed to addressing the challenges of contamination in these areas.

Could you describe the pivotal moments and influences that led you to pursue a career in environmental microbiology and soil and water remediation?

To begin with, there were two significant triggers in my journey. First, during my master's studies, I was relatively new to the world of research. I had a deep passion for insects and wanted to explore this further. This interest led me to the field of environmental studies. It was my professor, Dr K Ramasamy who noticed my enthusiasm and suggested that we delve into the gut microbiology of insects. We specifically examined the gut of the mango stem borer, a wood-boring insect. What fascinated me was the discovery of anaerobic microorganisms within the insect's gut that had the remarkable ability to break down cellulose. We decided to inject these microorganisms into biogas digesters, and this experiment resulted in a significant increase in biogas production. This marked my first realisation of the potential of microorganisms in environmental applications.

The second trigger came while working with Sakthi Sugars. The sugar industry faced the challenge of achieving zero discharge, and we had to find innovative solutions. We developed microbial cultures capable of decomposing the Bagasse and effluent from the sugar industry into biomanure that was inturn used by sugarcane farmers as fertiliser.

Another significant turning point was when I worked on a massive Australian project focused on the remediation of chromium-contaminated wells in Vellore. Even after two decades, we discovered that chromium contamination still

persisted, despite extensive efforts such as afforestation programs in both India and Australia. This experience heightened my focus on the importance of soil and water resources, given their contamination, and prompted my concentrated efforts in this field.

What are the main areas you are currently focusing on in your research?

In recent years, I've shifted my attention to water remediation, particularly wastewater treatment, and explored the use of biochar from biomass to trap pollutants. Additionally, I've spent the last five years dedicated to studying the vetiver crop, which led me to collaborate with Mr. P.N. Subramaniam and the India Vetiver Network group.

Currently, I'm primarily concentrating on two areas of research; biochar and Vetiver. We have characterised and used biochars from agricultural residues for metal removal. I'm actively engaged in the remediation of water using vetiver. Over the past five to six years, my research has been focused on exploring how vetiver plant roots can effectively remove metals from water. Vetiver's roots have shown impressive metal-trapping capabilities in our studies. For instance, it can remove up to 80% of chromium, 60% of zinc, and around 70% of nickel from contaminated effluents. It also detoxifies carcinogenic Cr (VI).

When wastewater flows through vetiver plants, the plant's roots and associated microorganisms act to purify the water. This plant has a unique ability to oxygenate the soil due to its fine roots, which makes it effective in treating water with pathogens and organic compounds. We've also studied how the root exudation changes when the plant is exposed to different contaminants, and we're keen on examining the

microbiome associated with vetiver. The ultimate goal is to understand why vetiver is so effective and find practical applications for this knowledge.

Our applications include the purification of water from a variety of contaminants, particularly heavy metals and organic compounds. Vetiver's ability to strip metals from water, its adaptability to different types of contamination, and its role in promoting soil health make it a valuable tool for addressing environmental issues. We aim to standardize the use of vetiver for water purification and work on improving monitoring systems to evaluate its efficiency in real-time applications.

Could you tell me more about your work in promoting non-food crops in areas affected by contamination, and what impact this has had?

Certainly. In regions affected by contamination, we've recommended the cultivation of non-food crops to mitigate the risks of metal and salt contamination in food crops. This guidance is based on research conducted in areas like Vaniambadi, Walajapet in Vellore, where we evaluated the suitability of various plants. Some of our recommendations have included Crossandra, which performs well in chromium-contaminated soils, and jasmine and mullai flowers, which have been effective in coping with metal contamination, including chromium. These non-food crops have the potential to absorb contaminants from the soil and, help to arrest the metals entering into food chain. Our efforts have also involved afforestation in contaminated areas to restore soil quality and promote ecosystem health.

What are some of the notable projects and achievements in your department related to soil and water remediation?

Over the last two to three decades, our department has undertaken several projects related to soil and water remediation with industrial partners. Remediation techniques were developed for tannery affected soils of Vellore region. One of the department project report on Loss of ecology has helped farmers to claim compensation in Vellore region and helped to setup CETP. Baseline databases on tannery, textiles and dyeing effluents were documented to the state government. One noteworthy accomplishment is the development of microbial consortia, "TNAU Biomineraliser" that quickens the composting process to 35 days. We've successfully promoted these cultures among farmers to enhance composting efficiently.

Additionally, we've been involved in the installation of Vetiver Floating Wetlands in Coimbatore lakes and studying its applications. Our team has also been focusing on using floating wetlands as tertiary treatment for dairy effluent that showed promising results. Studying the vetiver root microbiomes of is an exciting avenue for future research. Moreover, we've explored the use of biochar, particularly in small-scale biochar filters for treating dyeing factory effluents offering a cost-effective solution for removing contaminants and color from water. These achievements demonstrate our commitment to addressing environmental challenges, improving soil and water quality, and promoting sustainable solutions for the community.

18. Shri. P. N. Subramanian

"PND followed detached attachment and was inclined to financially support the needy."

Mr. P N Subramanian (PNS) is a Mechanical Engineer from NIT-Trichy and a MBA from XLRI, Jamshedpur specialising in marketing & Finance with 42 years of Experience in various industries and Global Geos. He was awarded Distinguished Alumni Award by XLRI in 2022. He is actively involved in many Charitable activities besides being a passionate regenerative natural farmer practicing in Regenerative Farming for the past nine years with a strong interest in Vetiver promotion focusing on sustainability, soil heath and farmer's income.

In an exclusive interview, PNS delves into the motivations that drive his involvement in the social sector.

Your early impressions about PND as a corporate professional?

My brother left Shriram Chemicals in Kota and joined as General Manager in Hindustan Organic Chemicals Ltd. I was told that he took a substantial cut in his salary to join this Public Sector Undertaking which needed somebody who could make the company more efficient and productive.

I understand that Shri. Lala Charath Ram wanted to retain him at Shriram Chemicals at any cost, but PND chose to move on as he did not consider money as a motivator. He felt that working in a PSU would benefit the government and our country. He became the Managing Director in three months' time and later the Chairman of Hindustan Organic Chemicals.

Many people used to tell me that although PND was a chemical engineer, he was equally strong in electrical and mechanical engineering as well. I was a school-going- boy when PND was setting up Chemplast at Mettur. I even heard him receive a call from the Plant that some equipment had failed. It was around midnight and he walked across to the plant to rectify it. Although, he returned early in the morning he went to his office the same day on time. This was his level of dedication and commitment. I used to look at him with awe for his deep knowledge in any subject and the passion in his work.

My father used to tell us that we should always look at the larger picture and delve deeper as we will gain a different perspective. He quoted the general trait of cattle quickly grazing through the top blades as they are easier to eat. My brother PND delved deep in the way he handled things and that's why he had vast knowledge and experience. He would not like if we spoke at the surface level.

About the trait of philanthropy in your family?

The philosophy of sharing is in our family. My father was a school teacher in Teacher's College, Model High School in Saidapet, Chennai. He used to tell us that when we educate a girl, the family grows very well. He used to donate 1 pice and raise 3 more pices from his fellow teachers or friends. He spent the 4 pices in educating a girl child. (During the British rule, the rupee was subdivided into 16 annas. Each anna was subdivided into 4 pices.)

Although my brother PND served in the corporate sector at a senior level, as a person, he was a down to earth person and wanted to help the needy. His thinking was more in these lines and always felt that he should support girl children. This thought came from our father and was the inspiration for my brother to focus on women empowerment, be it recognising women social workers or educating them.

Once, when PND received a scholarship in College, he shared this money with his friends who needed it to complete their education. He followed detached attachment and was inclined to financially support the needy. He felt that contributing to the needy was more important when compared to providing more for his near and dear ones.

I also believe in detached attachment. While I would spend for my children's education and expenses, I would never start a business hoping that they would take it over. When I was 59 and started engaging in natural farming, people have asked me if my children would manage the farm after me, and if not, wouldn't the investment be a waste. I replied saying: "I am earning for what I want to do and I am passionate about it. It is up to them to choose my path and in case they are not inclined, I would give it away to a social organisation or to someone who wants to run it."

Your Interest in farming?

I believe in leaving behind for the next generation: good soil, good air, good water, good environment and safe food to eat. These are all the ancestorial property that one can hand over to our next generation almost in the same state that was inherited. Beyond this, we can give them land or anything else. I gained this philosophy a result of my interactions with my father and brother.

I keep saying that it was during the mid-1960s, when India experienced two severe droughts which led to food shortages and famines, we adopted the Green Revolution bringing in chemicals and pesticides to grow more food produce. At some point of time, we should have reduced the usage and gone back to our natural farming practices, which we didn't. I do feel that people like me (who are over 60 years of age) intentionally or unintentionally supported chemical farming which has led to several diseases and poor health conditions.

Those days, it was "Unave Marunthu" but these days it is "Marunthe Unavu". I believe that we have to disseminate information so that we see some good change in others. It is being said that in another 60 years' time you will not have enough lands to cultivate and there will be innovation to have a pill instead of food to eat.

What were the key learnings you had from PND?

Personally, PND was a fatherly figure. He was very disciplined and an accomplished person at a young age. I dreaded him in the early days and the moment I started working our relationship changed. He was busy with his own work but did not miss an important function in the family. He had a strong network and I learnt my networking

and people orientation skills from him. Sub consciously, he also influenced me to venture into the corporate sector. When PND was with Reliance he used to help many start a company, but never wanted an equity stake. He used to say that with equity comes ownership, and he was interested only in building industries with the right kind of people, right kind of technology and then leave it to them to handle it. He would always think ahead in different innovative ways. It would be like at least 10 balls up in the air that he would juggle with. Nothing will fall down as he would handle all of that. I have learnt this skill from him.

Your inspiration to engage in the social sector?

My father, PND and my elder sister have been my influencers to engage in social work. My sister used to teach poor children in the evenings. My brother also has been my inspiration. I was more of a volunteer during the early days of CSIM. PND at some point of time wanted to pursue other passions and asked me whether I would take over as Managing Trustee. I gladly accepted the offer as it was an established organisation with a lot of dedicated people and it was the best to happen.

I like to empower people and delegate work. Even if people make mistakes, I always tell them that they should not repeat the same mistake. I would like everybody to be a leader and deliver on their own. I never like to micro-manage and we need to collaborate to do the work. We can't be fully democratic and need some kind of moderation. I always believe in Empathetic leadership style.

Natural Farming Series by Ramashree Paranandi

In this series, we delve into the profound insights of Ramashree Paranandi, a luminary in natural farming. As a partner at The Organic Farm in Nedumaram, TN, her expertise shapes sustainable agriculture. Discover her holistic approach, blending consultancy with harmonious living amidst nature's embrace.

1. Back to Our Fruits

In my school days, we used to visit mom's home-town every summer. We used to make the long journey from Calcutta to Narsapuram by train to Rajamundhry, followed by a bus ride and then a cycle-rickshaw ride. My grandparents' place had a blue wooden gate in those days, and a whole lot of bright pink bougainvillea flowers overhanging the arch on top of the gate. It used to come into view when we turned a corner, and every single time we turned that corner, my heart would do a happy flipflop at the thought of a whole month there!

As soon as we entered, but after the familiar and cheerful greetings had been exchanged, we would all be sent off to have showers, as we'd just traveled for so many hours in rather dusty and sooty second-class compartments. The showers were associated with some memorable sights and sounds - the huge pot in which the bath water was being heated, the tendrils of steam disappearing upwards off the top of it and then reappearing above the palm-leaf roof of

the shed, the breaking of the soap-nut shells by Papamma, the old-timer household help who always seemed to be around, and the squabbling over which hibiscus leaf should go into whose boiling bowl of soap-nut juice. The soap-nut juice was our cleanser - our shampoo if you will, and the hibiscus leaves were our conditioner.

These showers were also associated with the absolute minimum harm to the environment - there was no sodium laureth sulphate, no cocamidopropyl betaine, no guar hydroxypropyltrimonium chloride, no packaging at all, no transporting, no chemical fragrances, no microplastics, no propanediol, no added lye… the list goes on. The bathroom was rather big too, and it had a step in the middle of it. The hot water you used had to run several feet, then flow down the step, and then run several feet more to reach the drain. So by the time it exited, it wasn't hot to the touch at all, just about tepid. And then it passed through a small length of pipe and emerged into the open garden again. So no heat toxicity, no eutrophication, no ecotoxicity.

Our hair did get a little tangled perhaps, but not unduly so. (Even this can be avoided by taking care while washing). And we would all sit in the afternoon, post a very sumptuous lunch, and untangle our hair, or each other's, with our fingers, and chat. [The fights between cousins would start a little later, on the day we arrived, it would always be all sweetness and light :-)]

Soapnut and soapnut trees are still around, luckily, and so are many other natural alternatives to artificial and harmful processes and products. Here are some such all-natural gifts from nature:

- Citrus Cleaners: Citrus juice and peels can be soaked in vinegar and made into citrus cleaners for household

applications like cleaning bathrooms and toilets, kitchen surfaces, utensils, etc. You will find multiple resources on the net telling you how to go about making one, step by step. But even without going through this process, just the outer surface of fresh orange peel, or lemon peel or sweet lime peel, rubbed over a surface and then wiped down with a damp cloth gives you a very thorough and fragrant cleaning…. Try it to believe it!

- Tooth Care: Tender shoots of neem, with the outer bark removed, make for a very superior tooth brush, with a built-in toothpaste! Yes, they have a bitter and astringent taste, but if you choose the ones which are tender but not totally new and reddish, the taste is quite tolerable. In fact, we would tend to rinse out the mouth multiple times when we use raw neem, and that by itself is a very good way of cleansing.

- Hair Colour - Henna leaves left overnight in an iron bowl make for an all-natural hair coloring agent. No ammonia, nor any of the other deleterious chemicals either, that you find in packaged hair dyes. The color you get isn't jet black, but a pleasing brownish black, which takes on a red-gold hue if you stand in the sun. Henna leaves ground and applied to the palms and feet are an age-old antifungal and antibacterial. Particularly in the rains, you will see plenty of people in rural areas with it on. It prevents foot fungal issues that could arise because of working with the feet damp all day.

- Teas: Camellia sinensis is the plant from which conventional tea is made, but hibiscus tea and tea made from clitoria ternatea is very tasty too. You just have to pluck 3-4 medium sized tender hibiscus leaves, steep them in hot water, add a little honey, mix and then strain the mixture to enjoy a soothing cup of hibiscus tea.

With 'shankha pushpam' (clitoria ternatea), its the same process except that you would pluck 1-2 mature flowers to steep, for the best flavour. The blue or violet clitoria ternatea flowers have known anti-diabetic properties, (which I can personally vouch for incidentally) in addition to many other positive impacts on health.

- Hair Conditioners: Steeping Indian gooseberry (amla) leaves and hibiscus leaves in hot water, and using the strained water as a last rinse subtly conditions your hair without the use of chemicals. Amla water also darkens the hair and adds a sheen to it. Amla powder is available freely, but in fact even just fresh amla fruit slices and leaves steeped in water work well as a hair nourishing and darkening solution.

- Skincare: Plant life is full of skin salves. Ground fresh turmeric root, ground fresh cucumber paste, papaya fruit paste, neem leaf paste, bilva fruit pulp, diluted aloe vera stem pulp are some of the face and skin salves that plants offer. Ground sandalwood leaves also offer a fragrant facepack - this is a way in which the powers of sandalwood can be enjoyed without killing the tree for its trunk.

- Loofah: Gourd fibre makes for a wonderful bath sponge, it is the exact texture that will give you a nice massage without hurting the skin at all. Of course, if its your cow you want to bathe, then coconut fibre is the better material.

This is just a very cursory list of all the ways in which plants can provide us with everything we need without messing with the environment and the climate and the soil and the groundwater. On a multicropping farm, all these plants are there all around you, and as a multicropping farmer, you can

use any or all of them to dramatically increase the variety and attractiveness of the basket of produce you offer to the end consumer. And you can also simultaneously create a truly inclusive, sustainable and memorable household for your children, and their children…

2. Beauty is Simplicity

Health is a beautiful thing, whether we're speaking about humans or plants. A fresh and flourishing field is a sight to see, one that fills you with peace and happiness and gratitude. And to achieve health for plants, there are only two things you need to do - feed, and protect. In other words, you need to get them the food and water they need, and you need to protect them from anything that threatens their health such as diseases and pests. The challenge is to do these as simply and with as less expense and fuss as possible. Because the more complex we make things, the less likely it is that they will endure. This is in fact true in every sphere of life - it's the simplest habits and gestures and tasks that bring us the best rewards always….

Coming back to plants, In a mono-cropping system, it often happens that the soil doesn't have enough of the particular nutrition that the species needs. This problem is accentuated by the fact that all the plants in the field need the exact same nutrients. People usually try to address this

by putting into the soil the nutrition that the species needs. This addresses the immediate issue, and the field of plants receives nutrition artificially. But as we know, Nature works in cycles and not linearly. After the plants have had their fill, there are residual chemicals in the soil which have to be removed or recirculated somehow. When they are removed by water movement, they cause problems further downstream, such as algal bloom, and the disruption of the soil-chemical balance elsewhere. When the residue is left in the soil where it has been applied, then too it causes imbalance issues. And these are big problems, even if we choose to ignore the issue of harmful chemicals getting into the food we eat.

The major difference between this paradigm, and a multicropping paradigm is that in a multicropping field, there are so many species that the idea of applying the fertilizer that each one needs to each of the plants of that species doesn't even arise - it would be quite impractical and almost impossible to implement. So the way we do it is to make the soil richer and more nutritious for all the plants. Another difference is that we focus on living nutrition - the belief is that if the soil is a living one, and has enough microbial activity and diversity, then the plants' needs will be taken care of. Yet another difference - and this one is a crucial one - is that the only additives allowed are those that would naturally be found in the soil anyway, and not something which is outside the natural soil cycle. Excluding all unnatural substances is the only way to ensure that soil cycles are not disrupted, and all the nutrition not used by the plants will not be obstructing the soil cycle but be processed out of it naturally, without causing any harm whatsoever. This is the foremost reason why cowdung - or farmyard manure (FYM), and cow urine, form such a major part of any organic fertilizer. These are rich natural materials that by themselves provide nutrition to plants, and also

encourage the growth of plant-friendly microorganisms. Ancient Indian farming systems were very aware of this - traditionally, cows have always been a part of the farming ecosystem. Just having some around adds enormous value even if you don't milk them.

There is a lot of literature on organic fertilizers and organic fertilizer technology. Much of it is complex and jargonated, if I may use this word. But in reality, organic fertilizers need only three ingredients to work - a base or matrix material such as farmyard mature, a slow-fermenting source of glucose or sugar such as flour or crushed grain, and a quick-fermenting substance or accelerant such as jaggery. Let's take a quick look at the functions of each of these in the process of soil enrichment.

Farmyard manure is the source of microorganisms. These are the creatures that will cause the fermentation reactions to occur. Instead of farmyard manure, sour buttermilk or a yeast mix or any other source of microorganisms can be used, but farmyard manure is the best one, with which I've seen the best results. Another big advantage is that it's easily and inexpensively available and also easily transportable, both big considerations for a farmer.

Next we need something that ferments quickly, such as jaggery or palm sugar. Adding this makes sure that your plants quickly get the nutrition that they need. And we also need a slow-fermenting material such as flour or crushed grain or rice bran. This is to make sure that even after the quick-fermenting material is used up, there still remains a source of food for the microorganisms, making nutrition available to the plants over a longer period of time too.

Easily available, easily made organic fertilizers are what we need, and a mix of these three discussed categories of

materials is quite sufficient to fulfill all the needs of a vast majority of food plants. Yes, we can get all fancy, and make the whole process long and complex and expensive, but in truth, just one out of each of these three categories suffices to give your plants enough nutrition. The core process is fermentation - you are basically using microorganisms to set up a fermentation reaction in your soil (this is already occurring naturally, you're just increasing and hastening it) so that the products of the fermentation process can become the nutrition for the plants. A huge added benefit is that having such enriched soil attracts earthworms, and we all know the infinite advantages of this.

So we've now taken care of the food for our plants. Water is essential, and this can be arranged through various ways, both short-term and long-term, as we've talked about in earlier discussions ('The Ways of Water', Conversations Today May 2023 https://csim.in/conversations/ConversationsToday-May2023.pdf)

The next thing to do to ensure good health is to protect the plants. Even this can be done really simply - spray plants with anything that repels insects, small rodents and birds. This can be as simple as grinding green chillies into a paste, adding plenty of water, and spraying this water on the foliage. There is another popular formulation called 3G - Ginger, Garlic, Green Chillies - which can also be used in a similar way. Be careful though, to not add more than 25ml of your spicy solution to 1 litre of water for spraying, as making the spray too strong will cause the plants pain, and make them wilt. The best way is to test your spray on a few plants, and then if all goes well, using the spray on all of them.

One more organic repellent is Agni Astram. This is slightly more complex to make as it involves boiling the ingredients

together. The ingredients are all natural though, and consist of gomutra (cow urine), neem leaves, tobacco, green chillies and garlic. There are many guides available online on how to make and use Agni Astram, any of which you can follow and/or tweak to your needs, and according to your input availability.

A full, rich, abundant, green plant enjoying the breeze is one of the best sights of beauty there is. Of all the steps that we can take to preserve this, the simplest ones are the most effective, because come to think of it, the simple things in life are the best, most natural, most sustainable and also the most cherished ones.

3. Green Gratuity

I was checking out the price of tomatoes the other day on a home-delivery app, and it showed 69 rupees per kg. But at other times over the past couple of years, the per kg price of tomatoes has ranged from as low as 8 rupees a kg to as high as 160 a kg. One aspect to it is that even when the price is very high, its not the farmer who makes a big profit, but the middlemen, and when the price is low, one shudders to think what happens to the farmer. But even if we keep this aspect aside for the moment, this whole price fluctuation cycle does present a conundrum that needs thinking about; how is a tomato farmer supposed to earn his livelihood when multiple factors, most of which are out of his control, dictate his earnings or the lack thereof?

Some of the organic shops we supply to in Chennai maintain a standard pricing policy - whatever the price in the open market, the customers pay a standard price for an item and the farmers receive the corresponding standard price too. But this solution is a consumer-side solution, and it takes

very enlightened and committed consumers to make it work. So what is a producer-side solution?

Yes, you guessed it, its that the farmer should multi-crop - grow a whole lot of fruits, vegetables, greens, herbs, and never have to depend on a single crop. Essentially, there shouldn't exist anyone who can be called a 'tomato farmer'. No one should have to tie their fate to the prices of a particular item.

Here's how the economics of multicropping works. We grow fruit trees such as coconut, mango, jackfruit, sapota, pomegranate, sweet lime, lemon, 'khichlikai'(), 'sitaphal' (custard apple), citron and others according to the climate and soil conditions as long-term crops. These trees take between six to ten years to mature and start bearing fruit, but once they reach fruit-bearing age, many of them keep going for sixty to hundred years. After the first few years, the amount of care and watering they need keeps coming down, while the number and quality of fruit that they yield keeps going up. Imagine how well this works for the farmer! Assuming he or she planted the tree in their twenties, when they are in their senior years, these trees keep giving them returns while demanding very little hard labour, except for harvesting. This is exactly like a really nice pension plan or a gratuity amount that keeps increasing season on season. And this is in addition to these old friends also providing us with shade and coolness, oxygen and mulch, and so much beauty.

Of course, a multicropping farmer does not wait for six to ten years to see the first income from his work. Instead what he or she does is, along with the long-term yielding trees, he also plants medium-term crops like banana, papaya, sweet potato, bamboo, sugarcane, turmeric, etc, and intersperses them with short-term yielders like greens, paddy, millets,

radish, mustard, watermelon, muskmelon etc. The medium-term crops bring in revenue at intervals, while the short-term crops bring in the everyday turnover that is required.

This is how multicropping supports a farmer's short-term, midterm as well as long-term financial needs.

The added beauty of it is that, so much of the water, inputs and labour are common across these three sets of crops with varying return times. And the land is common too, as most of the medium term and all the short term crops can be grown under and around the long-term trees growing in the farm.

Looking at this basket of produce from an end-consumer's point of view, we see that having all this variety available for sale from a single farmer makes things easier, more convenient and also most cost effective for the buyer too. They need not go to different places to source safe food for their family - food which is bound to come from all the three different kinds of crops that the multicropping farmer is growing. This is therefore a win-win situation, with the farmer gaining a better price because he sells to the end-consumer, the end-consumer paying less than, say a supermarket, the farmer not needing to go long distances with the precious produce, worrying about shelf-life all the way, and the consumer getting fresh and safe food for their family everyday.

There is however one catch - how is an urban consumer going to ever come across a multicropping farmer from whom he can buy everything he needs fresh, and achieve this happy win-win situation? One way is for the farmer to be willing and able to connect digitally and socially to the nearest community and fulfill all their needs locally. For a multicropping farmer, this is not an impossible task. It

may take a bit of planning, and maybe getting together with other farmers, but its definitely possible. The other way is for the urban consumer to become a little more aware of where food comes from, and in the interests of their own health, and the health of the planet, become willing to travel to the nearest farmlands, and gather everything they need from the producers.

I like to imagine a future where instead of poor monocropping farmers outside the city, and sick, pollution-scarred consumers inside the city, we could have smaller, healthier, safer communities centered around the places and people who produce the food we need to survive on. I like to imagine multicropping farms all around us, from where we could get our food fresh and tasty, and also get to breathe fresh air the plants so kindly give us. A self-sustaining and thriving community with less middlemen, less poverty, less ill-health. And a whole lot more stability in the price of tomatoes!

4. How To Ring in the New

It's the time of the year when we somehow feel entitled to dream aloud and hope anew for all kinds of wonderful things to happen in the new calendar year. Of course, this is probably commerce-driven - just this morning, I saw an ad that said 'New Year, New You' and urged everyone to buy new apparel (or maybe it was new accessories?). Ads like these are just so wrong at so many different levels, but today, it is something else that I'd like to think through with you. It's this - what are the challenges that organic food-farmers and food-consumers currently face, and what can possibly be done to make things better?

Organic food farmers face plenty of challenges, but I think the primary ones are these:

Price Fluctuations: Not knowing whether they can or cannot sell their produce at a price that enables them to make a living

Lack of Demand Data: Not knowing how the demand for a particular item will move, and therefore not being able to accurately gauge how much of each item to sow/plant/harvest to avoid wastage

Inability to predict or control any of the million natural happenings that mess with produce: Our friend Michuang is just one such. Locusts, unseasonal rain, aggressive pigs, heat waves, beautiful but peckish peacocks, and errant neighborhood goats are a few other examples.

Food consumers face the challenge (or at least, conscious ones should face this challenge) of finding clean, chemical-free, fresh, organic produce that won't come back to bite them or their livers or their endocrine systems or their children's lives a little bit down the line, at reasonable prices.

Now lets look at possible solutions to these issues that satisfy both the food-producer and the food-consumer.

Both price fluctuations and lack of demand data, as well as keeping consumers' costs reasonable can be addressed by creating some kind of system akin to a futures market. Here is more info about futures - I'll let you enjoy the story in Dr. Naveen Srinivasan's own words; he is a Professor, and Dean of the undergrad program, at Madras School of Economics:

"Once upon a time, long, long ago - at least 170 years - American farmers worked out a market system to provide some financial sanity in their lives. In essence, it was a kind of insurance and, as with all insurance, it involved paying a relatively small price (premium) as a guarantee against future loss. Why? During the early stages of the development of American agriculture, grain prices were

subject to seemingly perpetual cycles of boom and bust as prices fell when farmers flooded the market with grain at harvest time and then rose later as shortages developed.

The system became known as the futures market and was centered in Chicago. The Chicago Board of Trade was founded in 1848.…A rival exchange, the Chicago Mercantile Exchange, was established in 1874 as a successor organisation.

Despite their association in the financial press with speculation and gambling, futures markets have a valuable economic role. They permit both producers and consumers to transfer risks in such a way that all market participants can be better off. Contracts in the wheat futures markets, for example, typically stipulate the purchase and sale of specific quantities of wheat at fixed prices on a designated future date."

Essentially, a farmer enters into a contract to sell her output at the end of the growing season at a fixed price. A consumer (either an end-consumer or not) can make a contract to buy a farmer's output at a fixed price too, and therefore avoid having to pay more even if market prices rise. Thus both of them are better off by transacting in the futures market.

Can this kind of a model possibly be implemented between individual farmers and individual families, or between farmers and townships of families? Well, there would be some issues to thresh out, such as who would take care of storage if required, and maybe how the logistics would be made workable, but it does seem possible, doesn't it?

And why am I trying to cut out a Board of some sort as liaison between the two? This is because the moment you bring in a third party, not only do all kinds of overheads,

but also all kinds of rigidities, and distances, creep into the system.

There's the rigidity in terms of quantities expected from the farmer to consider, among others; without some minimum quantity, it's simply not possible to support a Board. And as soon as expected quantities go up, the small farmer suffers. He instantly becomes dependent on other people and other people's facilities. Even if a farmer is not a typical small farmer, and in fact owns large tracts of land, the pressure to produce a large quantity of one crop not only deals a death blow to the effort to multi-crop, but also brings with it all the problems associated with monocropping.

And there is the distance between the farmer and the consumer to consider. When there is an opaque Board in-between, the farmer can no longer call up the consumer and say, hey, I've got some strange mid-season raw mangoes out here, do you want some? And the consumer can't call the farmer and say, you know what, my daughter is studying plant responses at school, may I bring her over to touch your touch-me-nots?

Why this distance is a threat becomes clear when we back up a little and consider the third challenge farmers face - the inability to control deterring natural events. If a consumer is used to having personal face-time with the farmer, the farmer doesn't have to explain why bananas are in short supply a little while after a cyclone (as now). The consumer can actually see the bent and broken plantain trees with his own eyes. And of his own volition, he will probably buy guavas or gooseberries for the fruit nutrition he needs. (These usually just fall to the soil in high winds - the trees are not as prone to damage as plantain, and if left on the soil, guavas and gooseberries rot. So it makes more sense to collect and eat them). There are many insects that

attack and destroy palak *(paala keerai)* but leave *paruppu keerai* (*kulfa*/purslane) alone. A consumer who has walked on farmland would know this, and happily substitute one for the other as needed. And so on and so forth with most natural deterring events - knowing how the whole food-growing ecosystem works actually benefits both the farmer and the consumer. The farmer doesn't have to run pillar to post trying to arrange for some particular quantity of an item that is unavailable, the consumer doesn't have to eat some artificially ripened item full of harmful chemicals. Instead, he can buy something fresh, and he will get it at a very reasonable price too.

Perhaps this is a good way to ring in the new year - to work towards living in small, tight-knit communities that bring together food-farmers and food-consumers, communities peopled with those rich ones who are able to eat local and eat seasonal all the time, their intake untouched by preservatives and plastics. People who are therefore absolutely glowing with good health….

5. Of Cats, Cows, Cooperation and More

In an article I was reading, I came across these words - recruitment, services, promotion, drives. Did you think the piece was about marketing, HR, and related fields? Well no, it was about plant interactions with their environment! Plants routinely do all these activities too - they select and recruit specific microorganisms to live on and around them, while rejecting other candidates, they engage microbial services for activities such as biological control of pathogens, growth promotion and abiotic stress amelioration. They have periods when they recruit aggressively - recruitment drives I think we can call them, and they also promote certain species over others differentially, depending on their needs and contexts at the time. (Santoyo, G; 2022)

Recent research is bringing to light more and more examples of complex interactions across plant species, between species and their abiotic environment, and between groups of species in Nature. We are just about beginning to understand these incredibly intertwined interactions, and

how crucial they are in maintaining an ecological balance. As our understanding grows, so does our awareness that it is in fact quite damaging to us to interfere with these cycles - disrupting them has far-reaching and irreversible negative consequences for the entire system.One such example I came across just yesterday was on Netflix, in a documentary on the Okavango Delta. It described how hippos help the entire huge Okavango delta survive and thrive by forging channels for the flood water to spread. If there were no hippos, thousands of hectares of land would stay dry, the entire landscape would change, and this would impact the survival of every one of the diverse communities calling this place home.

But we don't have to look as far away as Botswana's delta to see how species interact with each other, and with the environment, to shape and sustain it. Cows on a farm fertilize and micro-plough the land, setting the stage for multiple plant species and microorganisms to grow. Birds ride along on the cows, satisfying their hunger by eating any insects they may find on their rides' skin, and providing the cows with a dry-cleaning service, so to speak. Earthworms create labyrinthine tunnel systems underground, which become the lifelines supplying air and water to myriad communities. These are some of the very common interactions we see on farms.

But I came across a couple of unusual ones recently. Lately we have been troubled by pigs at our farm, and we have been wondering how to stop them from coming in, because they dig up plants and make very large and deep holes in the ground. Last week, the rains filled up these holes with water, and I was again wondering what to do about the pigs and their digging, when I saw our tuxedo cat Coco approaching one of the holes very carefully and stealthily. Time seemed to stand still as he advanced one paw at a

time, in absolute, utter silence. I couldn't even see what he was stalking, but then out of the blue he pounced with unbelievable speed and suddenness, and the next moment he had a large toad in his mouth. And triumph in his bright eyes, I might add - the hunt had been remarkably swift and totally cruelty-free. After he'd had his well-earned meal, he went back to the water-hole, and drank a little water too. Now, we have a great deal of difficulty making Coco drink water, he just won't have any from the water-bowl kept for the cats and dogs, so the sight of him drinking water voluntarily really made me feel thankful to the pig who had made this mini-pond. Then, looking around, I saw that water from this little pond was following a certain path - it was in fact making a natural bioswale. (If you remember, we spoke of creating bioswales in farms for easy and natural irrigation, in the May 2023 issue https://csim.in/conversations/ConversationsToday-May2023.pdf) The water was flowing down paths of least resistance, covering a great deal more ground than a straight man-made channel ever could, and enriching the water reserves of the land in the process. Pigs contributing towards human irrigation needs….who would have thought of that!

I've also seen some sort of alliance between cats and cows, in which cows make a certain sound that probably means 'hey, there's a big snake here!', and all the cats in the vicinity go streaking towards the cowshed for a juicy meal, and protect the cows in the process. I've seen dogs and cats become fast friends, so much so that a particular cat will leave her kittens with only a certain dog-nanny when she needs some alone time, because she knows the kittens just adore their canine babysitter. Our dogs also routinely chase away cats from 'outside' while fawning over, and licking, the resident cats and kittens in the most affectionate way. And of course, humans cannot survive in an open organic

farm without cats and peacocks - without them we probably would have suffered a hundred snake-bites by now!

In order to be a truly multi-life organic farm, it is most important to appreciate and foster the interrelationships between species throughout the ecosystem, starting from the soil systems to the treetops and beyond. When the natural inter-species interactions, a million of which we don't even know exist, and which research is just uncovering, are in place, each species survives and thrives as it should. Interfering with these cycles is reckless and unnecessary - in the long run, it does immense harm. Using lethal pesticides to remove a few species from a tract of land messes up the whole complex, intricate, awe-inspiring dance of life. Instead, if we can just stand back and marvel at it, we start realising what is really meant by 'vasudhaiva kutumbakam' - This Universe is One Family.

Reference: https://doi.org/10.1016/j.jare.2021.11.020
'How Plants Recruit Their Microbiome: New Insights into Beneficial Interactions'

6. The Light of Good Health

Good health is arguably the single most potent factor in our wellbeing. Happiness, peace, goodwill and good cheer don't coexist very well with ill-health, pain, and debility. There are of course some factors influencing health that are beyond our control, such as heredity, but there is one key factor that is totally in our control - the food we eat.

There are always ways to source good, clean organic food wherever we are - all it takes is some dedicated internet time and research, and an awareness of how crucial it is to not keep consuming harmful chemicals along with every meal. But there is also another way to obtain clean, organic food, at least a part of our daily intake, if not all of it, and that is by growing our own food.

This is actually not as difficult as it sounds. There are many, many families personally known to me who meet a large part of their own food requirement by growing their own food on their terraces, gardens, and on farms in and around the

city. Many families grow food on their family farms, from where they bring in the produce periodically. There are also people who enjoy being close to Nature and farming, and have realised how productive and fun it can be to grow their own food. They are now actively looking to find some land, whether within their own ancestral properties or outside, to start growing their own food - if you are one of them, then this article is for you. Here are some general guidelines on how to go about identifying fertile land in which to start growing your own food.

Water Availability

The Central Ground Water Board, Government of India, has mapped the aquifers of most parts of the country, and has brought out this information in the form of aquifer atlases for different states and districts. These atlases are freely available to all on the website cgwb.gov.in. Studying these aquifer maps carefully and analytically is a good way to find out about the water availability of a tract of land.

Other ways of finding out about the water availability of a piece of land are:

- **Looking for naturally growing coconut palms:** Coconut palms require a lot of water. So if you find coconut trees growing naturally, its a sure indication of ground water availability.

- **Observing the Soil:** Cracked and rocky soil shows the lack of water and soils covered with vegetation tell you that there's enough water underneath

- **Listening to Ambient Sounds**: Where there's water, there is a lot of life. You will be able to hear multiple bird calls in the mornings, and a lot of cricket chirps

and the humming of other insects at night. You'll hear the croaking of frogs and toads, and if you observe carefully enough, you'll see the tiny tremors in the grass that are indicative of lizards and other small reptiles living there.

Soil Fertility

Related to water availability is soil fertility. This can also be seen tangibly in multiple ways.

- **Herbivores:** The presence of cows, goats and other herbivores indicates that the surrounding areas have enough grazing land to support them all, and in turn, that the soil is fertile enough to keep replenishing and re-growing the grasses for them

- **Organism Response:** What happens to the dung of these herbivores is like a direct insight into soil life. In fertile areas, cow dung which is in contact with the soil sort of blooms over, spreads over a larger area, and then disappears over six or seven days. This is in contrast to what happens in the city - the cow dung just sits on the sidewalk, and slowly dries up, because there are neither soil microorganisms nor earthworms to act on it.

- **Vegetation:** Multiple species growing in close proximity would mean that the soil has a variety of micro nutrients and is therefore able to support them all.

Population

This factor cuts both ways actually. If there are a whole lot of villages around and there is a dense human population, you will find it relatively easy to get people to help you with your farming venture. But on the other hand, a dense

population means that the natural resources are already spread thin, so you might have to dig your well deeper, you may also have difficulty finding a large enough plot of land. (The good news here is that it takes as few as 4-5 cents of land to grow enough food for a family, if you're following the multicropping model)

In places with low population, you are likely to find large plots of land easily, and the cost of labour might also be a little less. But you might have to work harder and invest more to make your farm do well. For example, you may need two wells instead of one, as each might be less productive, and you may need to add a few loads of cowdung mix from outside to shore up the fertility of the soil.

Once you have identified where you're growing your own food, the next thing is to figure out what you're going to grow. This also can be done simply and sensibly if you go with a multicropping model in which you grow many different varieties simultaneously. In fact, since we are looking at food for your family and friends, just listing out what you eat on a daily basis will give you a blueprint of what you should be growing. Rice, pulses, vegetables, spices (chillies, curry leaves, coriander, mustard) and a couple of oil-producers cover the basics of everyday cooking, and starting with a few fruit trees like papaya, guava, sitaphal, mango, lemon, sapota and pomegranate will take care of complete nutrition. You could try the many indigenous and heritage varieties of rice our country has, and use the SRI method of cultivation which is working well in our farm, which has lower seed and water requirement.

Growing our own food is actually an extraordinarily rewarding experience, from a health point of view and also from a sensorial point of view. If you can take a basket with you, pick the things that you need to make a meal

from around you, and then cook and eat the meal, you are achieving the central principles of a good, nutrition-rich, healthful, sustainable diet - eating local, eating seasonal, and eating fresh.

Here's to wishing you all a wonderful Deepavali season, with all your days lit up by the best light of them all, the light of good health.

7. What's in the soil?

Rhegos' is the greek word for 'blanket', and "lithos" is the word for rock, 'Regolith' therefore means 'blanket made from material originated from rock'. When we look up at the moon at night, we may not think of it that way, but the moon is actually securely cocooned in its own blanket, its own regolith. Our earth too is warmly swaddled in its own regolith, and the most visible and familiar part of this blanket is - yes, soil.

Soil sustains life. We all know this fact (though we do sometimes miss the marvel and miracle that this is). Along with mineral matter such as phosphates, nitrates, carbonates, potassium, calcium, forms of iron, magnesium, boron, manganese, copper, zinc, molybdenum and others, soil also contains gases, water, pore- space, organic matter and living microorganisms. Keeping the balance of all these intact is necessary to maintain soil health.

The best aspect of soil health is that it can maintain itself as long as we don't mess with it. (But sadly we humans have

this great flaw of messing with everything ourselves, and then wondering what went wrong). Let's discuss for a bit the ways in which we mess with each aspect of soil, how this can be avoided, and how multicropping works vis-a-vis our non-interference.

The Mineral Matter of the Soil: The mineral composition of soil is changed when we add mineral fertilisers such as NPK or any of the other mineral-based soil additives now in vogue. We may think that by doing this we are only adding something 'good' to the composition of the soil, but this is not true - we are in fact disrupting two other very importance aspects - first, we are changing the soil environment in which the existing microorganisms were thriving, thus causing their populations to thin and die out. Second, we are causing chemical reactions within the soil that release other gases and substances, and these take up pore-space, edging out the original occupants of this pore-space and also reducing pore-space overall. Both these changes have the consequence of making soil way less hospitable to plant life in the short-term, and much more in the long-term. The paradox here is that we had added the mineral-based fertilisers in the first place with the intention of improving plant life!

This is required with most monocropping systems. Since there are so many plants of the same species and also of the same age, if we want them all to get their food, there's no other way than to add things to the soil. On the other hand, if you had a multicropping system, then since all the plants have such different requirements, and are also of different ages and different root depths, they could all thrive together naturally.

Pore-Space Management: Let's now turn to pore-space. This refers to the interstitial spaces between soil particles

through which water and gases reach the roots, and which support micro-organic life. Mechanical ploughing with vehicles totally destroys the pore-space versus soil-matter balance - the weight of the vehicles compresses the surface and squeezes in pore-spaces from the top layers, pushing water and air into the lower layers and trapping them there. The compaction that results from this is a huge threat to plant health. Mechanical ploughing is done usually prior to seeding the whole field with the same seeds. Instead, if you were going with multicropping, you would sow different saplings by hand, and later on, you would probably do seed-scatters under the grown trees. In the best case scenario, there would be no need to plough mechanically at all - a little light pruning to allow people to harvest comfortably would be enough.

Water: In a forest, for days after a shower, the water keeps dripping, because it has so many landing places, right from the topmost leaves of the highest trees, to the little flower-cups on the shrubs a few inches from the ground. This staggered watering prevents micro-waterlogging, and helps all the roots in the soil access water at their own pace. When we water fields, the tendency is to over-water, because we want the moisture to last at least 2-3 days. But the problem here is that the weight of the water pulls down soil particles, reduces pore-space and contributes to the compaction problem. Multicropping takes less watering because firstly the density of plants is less, and secondly, the varying heights facilitate the micro-cascading of water, and keep the soil moisturised for longer. Less watering also cuts costs for us.

Organic Matter: Allowing dried leaves, and other tree sheddings that have fallen naturally, to remain on the soil is a wonderful way to add organic matter to the soil and also to provide some natural cover that prevents quick drying

of the soil in the summer sun. In a monocropping system, adding such organic ground cover becomes an extra job, and entails the spending of money, but in a multicropping system, it happens easily and naturally - the taller trees keep shedding, and keep saving cost and water for you, while also enriching the soil and providing ground cover.Soil Microorganisms: All of us study all about nitrogen-fixing bacteria in our sixth or seventh grade texts - probably even earlier these days. This information can be easily applied on the field by interspersing leguminous plants with non-leguminous ones.

For instance, groundnut is a leguminous plant, and its roots host organisms that make the soil nitrogen-rich. Therefore, it makes so much sense to pair this with other non-legumes - there are so many non-legumes that need nitrogen, but while driving on country roads, we so often see acres and acres of groundnut alone. True, some of the fixed nitrates do stay for the next crop, but some part breaks down again, without any other plant having used it... And nitrogen fixing is only one phenomenon that we are aware of. There are so many other such interactions in Nature waiting to be discovered.

It's a common observation that Tulasi and hibiscus grow well together - we don't really know why. Experienced gardeners routinely pair these two plants. We know from our own experience that Chandrakantam flowers bloom wonderfully under mango trees. But we don't know why... and so many more such beautiful friendships abound, if only we gave them a chance to. Multi cropping is not only a profitable business practice, it is also a sustainable way to carry soil health into the future. And on the way, we stand to discover so much more about the marvellous inter-species interactions in Nature...

8. Where There's Water, There's Life

When I was about 8 or 9, we had this beautifully illustrated book of parables at home. One of the stories was about a boy who searches along the forest paths for his friend (Krishna), with his whole school and his school-teacher in tow, but He is not to be seen. The picture was of a young boy looking puzzled, surrounded by big trees, graceful green creepers and flowering shrubs, on a narrow path winding away into a dark forest. This picture always used to puzzle me - "who waters all these many, many plants?", I would wonder… "How are they fresh and blooming in the middle of a forest?"

Years later, I found out how Nature arranges leaves and canopies so that when it rains, the canopy, and in fact each leaf, directs the water to the exact place where the roots of the tree can take it in. This is a circle of space around the trunk, at a distance from it, not the spot where the tree or plant rises from the ground. Also, out of every shower, the foliage holds on to a large percentage of water in all its

dips and hollows. So do the other structures of the plant, wherever there is any space at all to hold the precious drops. And when the next breeze comes along, this water also finds its way to the ground.

Since there are many levels and layers of plants in a forest, right from the tall trees to the little ones on the ground, and each level holds water, then passes it on to the next lower level successively, for many days after a shower, the entire habitat stays water-rich.

The ground also holds water in various ways. Large pits fill up with water, and so do small depressions in the soil. The soil holds plenty of water in its interstitial spaces too. All this water gradually percolates downwards, enriching the underground reservoirs and aquifers. The percolation process is greatly facilitated by the roots of the plants all around, as these keep the soil uncompacted, and ready with numerous narrow channels through which water can slip downwards. Once all the available spaces in the soil are filled, the excess water then flows away towards the lowest point in the area, which is usually a pond or a lake. This water-body gets replenished, and holds the water for future use. The water also continues to seep downwards through the bed of the water-body, and there is a slow but sure enrichment of ground water in the entire areas.

This is a very inspiring and efficient system of water use. When we cultivate multiple crops, it becomes possible to create a water-use system somewhat akin to this one. Though providing water through foliar sprays may not be practical, it is quite possible to dig shallow troughs around trees where water can collect. The donut-shaped belt should mirror the ends of the foliage, where root-density, and therefore their capacity to take in the water, is maximum. Inside this trough, plants that need water and have shallow

roots can be planted. The slopes of the trough can have those plants that do not need much water - the slope ensures that water flows away and does not let the plant be hurt by excess water. The different root zones in a multicropping field ensure that the available water is made use of fully.

The trough around individual trees can be connected with channels, but to do this effectively, you would need to know the specific topography of your land well. Once you do know this, it is quite possible to mimic the natural flow of water in forests in your land too. You can figure out the undulations and dips of your land, and connect and deepen them into channels. These channels, also called bioswales, can then lead water to the lowest point, where it collects into a pond, not only creating a habitat for many creatures, but also ensuring that slow percolation happens constantly in the region, and replenishes ground water. In case there are practical difficulties in leading all the water into the pond, it can be be led to other reservoirs. This is what we have done - we lead excess rain water, and also the irrigation water that runs off, into the well nearby.

In a monocropping fields too, the soil's power to hold, carry and store water can be used to our advantage through bioswales, as long as we are willing to abandon straight lines and square fields, and follow the contours of the land instead. But the shade system that is at work in a multicropping field cannot be seen. In a multicropping field, the canopies of the taller plants provide shade to the surrounding soil, reducing the rate at which standing water evaporates and soil water evaporates, making the soil dry. Therefore, such fields stay moist for a minimum of two full days more than shade-less fields. This means that, instead of watering fields every third day, you can actually plan your watering every fifth day, saving nearly 4 full days of labour spent on watering. The gap between waterings can

be increased even more if you leave the leaves and organic matter that falls from trees on the ground. This organic matter acts as an added reservoir of water too, in addition to providing ground-cover and preventing the drying of the soil.

Further, in a monocropping field, water is not retained at different canopy levels, as there is no significant difference in the heights of the plants of the same crop.

Another interesting aspect is that in a multicropping field, harvests are invariably staggered. And each harvest rarely manages to denude the entire area - there are always some plants that survive the harvest, and reproduce, and very often the new baby plants take root in the moist soil in places where you weren't expecting them. You might have gone out looking for a nice, tangy raw mango to cook, and as a bonus, you might also find a green chilly plant full of plump chillies peeping out from behind the mango tree, and a young 'curry vepa-elai' plant ready to give you two leaves to put into the raw-mango dish…

Nobody watered all these bonus plants - the water was already there in the soil. And where there's water, there's life.

Organic Farmers

Meet the vanguards of organic farming - practitioners who sow seeds of sustainability. Through dedication and innovation, they cultivate ecosystems in harmony with nature.

1. Ms Anuradha Balaji

Transitioning from a career as a librarian to becoming an organic farmer represents a significant change that requires careful planning and commitment. While it can be challenging, it offers the opportunity for a fulfilling and environmentally responsible lifestyle focused on sustainable agriculture and food production. But all this is easier said than experienced. “I made a lot of mistakes in this transition and I am glad I did them. My lessons have been my guiding beacon,” reflects Ms Anuradha Balaji, a librarian turned organic farmer from Chennai.

Her love for reading encouraged her to pursue Masters in Library and Information Science. She was hooked to knowledge building and started her career in teaching and library management. When she moved to Saudi Arabia after marriage, she was consistent with her career choices. She worked as a teacher and librarian there too, for about a decade. Back in India, she joined Chennai Public School as its librarian and passionately continued her work. “Libraries

are cornerstones of knowledge. My deep love for books, knowledge and the power of libraries in promoting self-directed learning inspires me even today," she shares. Her foray into farming was something totally unplanned but not unexpected, as it was rooted in her concern for children's nutrition and health. "My husband and I often spoke about our interests in farming but never desired or endeavored to start something. When the interest set in, there was no looking back at all. My family supported me in full spirit and we invested all our earnings in farming," recalls Anuradha.

In all her passion and commitment, Anuradha tried everything she could on her land in Thiruvallur, including the cultivation of dates. "I had exploited my soil so much. I knew it. But I didn't want to stop. I wanted to figure out remedial measures, revive soil health and again try some other crop. I began to think and act like a farmer," she laughs. Anuradha was certain about one fact – that producing food must be understood as everybody's responsibility. "Had I just wanted organic food for me and my family, I would have restricted myself to terrace gardening. But, we want to think of humanity and therefore foraying into agriculture was inevitable," she adds.

Lack of practical experience and prior exposure did hinder her progress. However, the real struggle was in promoting the idea of women as capable and independent farmers. "Agriculture is a male dominated industry where women form the major part of farm labour. traditional norms and stereotypes undervalue women's work in the sector. Less access to education in agricultural practices and limited access to markets/value chains, prevents them from benefiting economically from their agricultural activities. It all results ion reducing their recognition as full-time farmers," laments Anuradha, who managed to grow in spite of all these obstacles. From her experience, she has become

an ardent believer in women's participation in agriculture. It is not just about social inclusion but allows them to have a voice in community decision-making. It can help break down barriers to their involvement in economic and political life. Above all, it is women who can take a strong stand for good food and nutrition.

Guava, chikku, tomatoes, gooseberries – with every crop it was a new lesson for her. And the changing prices helped her reflect upon people's attitude towards food production holistically. "Didn't we pay lesser for all services like beauty/grooming a decade back? Why is it that price rise in vegetables hurts people so much? While inflation in all other sectors could be understood, accepted, why not in agriculture?" asks Anuradha, disheartened by the disconnect between general community and the agriculture sector. As an insider she saw how prices changed and how it affected the work of a simple farmer. She understood that value addition is a better way of utilising the perishable food produce instead of giving them up for very low prices. "Nobody worries about farmers' plight when prices drop drastically. I didn't want to fall into that trap and felt that value addition gives me the liberty to do something respectable with my own produce," she explains.

Her venture into production of value added products gave her newer insights. Anuradha soon realised that every farmer must be groomed to be a business man so that they can decide on alternative means to utilise their produce during times of crisis. While value addition ensures improved pricing and increased shelf life, it also brings in better profits for the farmer. "This is certainly a productive way. Cooperatives can be formed to build small scale facilities for the purpose," she adds. Her products became her identity and contributed to building her status as a farmer. She has spoken about her journey and experience in a variety of magazines and

channels. Managing organic farming on a ten-acre farm has transformed Anuradha the librarian into an independent farmer/business woman, who now passionately engages in various activities to help people relate to agriculture sector. For her, it is still the beginning and she is determined to encourage more women to prove themselves as farmers.

Shanmuga Priya.T

2. Mr. Dorairaj Kuppurangam

India is often referred to as the land of small farmers who constitute the majority of the farming community in India, with over 85% of farmers owning less than 2 hectares of land. In recent years, there has been a growing trend among small farmers in India towards organic farming, which is seen as a sustainable and profitable means of agriculture that promotes environmental sustainability and enhances their livelihoods. Organic certification is important for these small farmers as it provides access to premium markets, enhances credibility, ensures compliance with regulations, protects against fraud, and supports continuous improvement in farming practices. This can help small farmers to improve their livelihoods, increase their income, and contribute to sustainable agriculture.

However, organic certification is mired in protocols, processes and myriad standards and even today, there is lack of awareness, misinformation that has made it a complex process. Small farmers, especially, find this time-

consuming, involving multiple inspections, documentation requirements, and compliance with strict standards. Therefore, this is a major challenge for them as they may not have the technical and administrative capacity to meet these requirements. Also confronted by limited market access due to the dominance of large agri-businesses and the lack of marketing infrastructure for organic products, they are unable to obtain premium prices for their organic products, which can impact their motivation to obtain organic certification.

With over fifty-four years of experience in the field of agriculture in various capacities, Mr. Dorairaj Kuppurangam is not only aware of such trends and attitudes, he has witnessed the challenges farmers have to go through to prove the worth of their produce. He started his career as an Agricultural Extension Officer with the Tamil Nadu Agriculture Department and then moved into Tata Rallis for thirty long years. In charge of sales and marketing of agro inputs at Rallis, Dorairaj not only understood the needs of his customer base like farmers, agronomists and other stake holders but also developed the skill set to comprehend and present product knowledge, aligned with the market trends at any given point. From there, he entered the organic certification industry.

Thirteen years as the head of Association for Promotion of Organic Farming's Organic Certification Agency (AOCA) he took up inspection and certification of organic projects from across the country. Alongside such technical responsibilities, he also initiated many training programs on organic certification procedures for farmers, agriculture extension officers and other department officials from Andhra Pradesh, Karnataka, Tamil Nadu and NABARD (National Bank for Agriculture and Rural Development). From setting up a seed company to preparing organic

cultivation program for rice, maize, pulses, soya, mango and pine apple, his experiences in Asia and Africa allowed him to study the complete chain of processes from cultivation to certification, and set up farmer producer organisations with a large farmer base. Currently playing a lead role in organisations like the Participatory Guarantee System for Organic Certification in Vellore and the International Competence Centre for Organic Farming in Bangalore, Dorairaj also prepared himself to set up an organic certification company that can grow as a resource institution, building capacities of farmers on organic inputs and the certification protocols.

Chola Organic Certifications Private Limited was established in 2020 in Chennai as an organic certification agency in Chennai. The company's main objective has been to demystify the whole certification process and handhold farmers through the transition period as well. They provide training and support to farmers and processors to help them understand the certification process and implement sustainable farming practices. It offers certification services for a wide range of organic products, including fruits, vegetables, cereals, pulses, spices, herbs, honey, tea, coffee, and more. The certification process involves an initial inspection and assessment of the organic production system, followed by an annual inspection to ensure compliance with the organic standards. Interestingly, they also conduct residue testing of organic products to ensure that they are free from any chemical residues.

Building credibility and empowering stakeholders along the complete supply chain with practically useful information, Dorairaj and team encourage continuous improvement in organic farming practices to improve their productivity, reduce costs, and enhance the sustainability of their farming operations. With the visible transformation towards organic

farming, (the market for organic food is expected to grow at a CAGR of over 25% from 2019 to 2024), efforts to take markets and protocols closer to the farmers and make them easier to adhere to is surely the way forward. Chola Organic Certifications attempts to do just that from an empowering perspective.

The small holder group certification procedure, for example, is a much-needed alternative in the space where certification process costs were a burden on small farmers. Drawing from his vast experience, he felt the need to promote a system in which small farmers can take collective responsibility for certification of their products through an internal control system (ICS). “We believe in democratising information and the processes. For the transformation to be meaningful, every farmer must be counted in. Whatever the process is, they must be able to catch the flow,” insists Dorairaj.

Shanmuga Priya.T

3. Karen Shetty

Spirituality is a deeply personal and subjective experience. It's connection with nature is diverse, and individuals may experience or express this connection in unique ways based on their cultural, religious, personal beliefs. The restorative power of natural environments can have a profound impact on mental, emotional, and spiritual well-being. Recognising the sacredness of nature can lead to a sense of environmental stewardship and a commitment to protecting the natural world.

Karen Shetty's story is an example of how spirituality and nature can intersect in a person's life, creating a completely new path for her to pursue. She does it with grace, humility and a big sense of contentment and says that she did not realise in the 22 years she spent in export business. "The spark can originate from anywhere but one must be conscious enough to recognise it, as I did. I was fortunate to be in a family that completely supported me," she says gratefully.

A post graduate in business administration from Coimbatore, Karen was able to participate productively in her husband's export business. Handling logistics, regulations and exports from Tiruppur, her experiences showcase her as a result-driven professional with extensive knowledge in the sector. But the day she met her guru, a Himalayan Yogi, it was not a simple encounter. It was a transformative one that left an indelible mark in her life.

"In the simplicity of mindful breathing and the embrace of solitude, I realised a profound sense of peace in him—that permeated every aspect of his being. That realisation helped us connect and I learnt that we are more than what we see for ourselves," she reminisces.

To Karen this was not a wake-up call but the first step towards an inner evolution to rediscover herself. She travelled widely across the Himalayas, meditated and spent a lot of time to understand the process that was happening in her. The vision of a landscape at the foothills of Himalayas was the 'spark' that defined her purpose in life now.

Back in Tenkasi district, she identified a land in SathankulamVillage, near the Kodanadu Tiger Reserve Forest that was surrounded by a river. This land was just the kind of place she was looking for to live in and nurture.

In the initial days, she rented a house in the nearby village and explored various possibilities. She started with planting trees but soon felt the need to stay closer to her land. That is when she made bricks from local materials and built a mud house for herself. With the Department of Forests giving her 4000 trees, she felt drawn to her vision. "Things were falling in place gradually and naturally," she smiles.

Located in a remote surrounding on Agastya foothill, often characterised by rough winds, extreme weather, and absence of any modern facilities like transport or internet, it was all her call and exploration that eventually transformed this landscape into what it is today.

Karen tried mono cropping with peanuts and potato and did not use any chemical fertiliser or tiller. "I am not a farmer but grew myself to be one. With every trial and error, the resolve to not disturb the natural composition of soil drew me closer to the notion of soil being the foundation of life in various forms.

Every species has its own place in nature and every form of life benefits life as a whole. Valuing every part of nature is crucial to show respect for mother earth," iterates Karen.

Very soon she saw the live nature of soil in her land. The farming activities rejuvenated the soil here and it allowed everything to thrive on it. "As the soil was alive, everything thrived, including us. And the weeds were no longer in picture. As trees grew bigger many birds started coming in. We now have over seven thousand trees and the trees are now about thirty to forty feet in height. Animals like leopards visit us. Our space is for us and the all of them. We rebuilt a natural habitat and co-existed with all those natural beings. I live here as part of this whole – as part of Nature itself," she explains.

Mud is Karen's gold, literally. A lot of trial error in the design of her house in the first three years made her realise that mud was a potent building material but the knowledge about it was wading. The localities were able to share what they knew but this was not complete information. "Like most of us, they were also losing touch with traditional knowledge and natural materials. It was only when I got

my hands on mud I started realising its nature, properties and strength," she adds.

As she worked to combine mud with other materials like limestone, bay and corn cobs (also used for the briquetes), she also observed how the materials worked in different weather conditions. When it rained, she saw how the walls reacted. "It was a completely organic process. Every species on earth knows to build its house. As I laid my hands on soil, it felt as if my cell memory got revived. Every element fell in place. It was like nature rising up to form a shelter for your protection and well-being," recounts Karen overwhelmingly.

The first house Karen built was spread across an area of 2,500 square feet. Having built over five houses till now, Karen explains that the real challenge is in the plastering stage. Guidance from a builder from Rajasthan helped her overcome that.

The plantation, the construction and the farming processes – all of it went hand in hand in regenerating the land in a homeopathic way. An acre of land that needed 150 kilograms of chemical fertilisers now provided yields with only 25 grams of organic inputs.

"This is soil rejuvenation in real work. We must get our hands on it to see it, to feel it and embrace our oneness with nature," she confirms.

Shanmuga Priya.T

4. Mr.Karunanidhi

Natural farming, also known as organic or sustainable farming, is an agricultural practice rooted in the philosophy of working in harmony with nature. It emphasises the preservation and enhancement of ecosystem health while promoting sustainable food production. There are a variety of principles, methods, and benefits of natural farming that only go to highlight its significance in today's world.

In a small town called Moranam near Cheyyar, Karunanidhi's natural farm sees student interns from the Vellore Institute of Technology. Over the years, he has developed a unique model wherein he works with a few companies in producing inputs for organic farming. Karunanidhi's farm is also a centre of excellence, testing products for various efficiencies, even as he collaborates with countries like Japan for initiatives in the agricultural sector.

In a nutshell, natural farming has a few rules that it abides by. There are:

No chemical inputs: Natural farming avoids synthetic pesticides, herbicides, and fertilisers that can harm the environment and human health. Instead, it focuses on utilising natural alternatives such as compost, crop rotation, and biological pest control.

"It brings down the cost of production and helps reduce toxic levels of agri products," says Karunanidhi, "Natural farming also improves soil chemicals and contributes to maintaining a clean environment." He adds: "food safety can be achieved by natural farming and a healthy young generation can be the result of such actions."

Biodiversity and ecosystem preservation:

Natural farmers prioritise maintaining a diverse range of plant and animal species on their farms. This practice creates a balanced ecosystem, discourages the spread of pests and diseases, and promotes pollination and soil fertility. However, there are challenges.

"Conversion of soil into high microbe levels takes a year, and during this period the production yield is expected to stay low, which in turn results in losses for farmers," Karunanidhi explains, "Small farmers with no cash flows cannot think about natural farming without the support of Government."

He also explains that with academic and farmer collaboration yet to find steam, there is potential for natural farming practices and studies to be adopted at schools, colleges and universities.

Soil conservation: Healthy soil is vital for sustainable agriculture. Natural farming emphasises soil preservation and enrichment through techniques such as cover cropping, mulching, and the use of organic matter. These practices enhance soil structure, water retention, and nutrient availability. Karunanidhi explains that there are some things farmers must remember while practicing natural farming.

"Avoid any form of chemicals, use low-cost methods, prepare all manure at your own farm, and ensure workers are trained and oriented towards practices," he explains.

Water conservation: Natural farming promotes efficient water usage by employing methods such as drip irrigation, rainwater harvesting, and contour plowing. These techniques minimise water wastage and ensure that water resources are utilised optimally.

"Natural farming causes a positive impact on the environment since chemical usage is low, which in turn reduces stress on ground water and the air around us," says Karunanidhi, "This in turn enhances quality of feed for cows, chickens and goats, which end up becoming healthier and produce high-yield dung, good-quality milk, eggs and meat."

Methods of Natural Farming:

- **Composting:** Organic waste materials like kitchen scraps, crop residues, and animal manure are converted into nutrient-rich compost. Compost improves soil fertility, enhances microbial activity, and reduces the need for chemical fertilisers.

- **Crop rotation:** By rotating different crops in a planned sequence, natural farmers prevent the buildup of pests

and diseases specific to particular crops. This practice also helps maintain soil health and balance nutrient requirements.

- **Natural pest control:** Natural farming employs various techniques to control pests without relying on harmful chemicals. These methods include using biological controls like beneficial insects, crop diversification, trap crops, and physical barriers.

- **Agroforestry:** Integrating trees and shrubs into farming systems provides numerous benefits. Trees offer shade, windbreaks, and habitat for beneficial organisms. They also improve soil quality, sequester carbon, and diversify farm income through the cultivation of fruits, nuts, and timber.

Benefits of Natural Farming:

- **Environmental sustainability:** Natural farming minimises pollution, reduces soil erosion, protects biodiversity, and conserves water resources. It promotes sustainable agricultural practices that ensure the long-term health of ecosystems.

- **Healthier food and safer environment:** Organic produce from natural farming is free from synthetic chemicals, making it healthier for consumers. It also reduces the risk of pesticide contamination in soil, water, and air, creating a safer environment for farmworkers and nearby communities.

- **Resilient farming systems:** Natural farming techniques build resilience against climate change impacts by enhancing soil moisture retention, reducing the need for external inputs, and promoting carbon sequestration. These practices contribute to long-term food security.

- **Economic viability:** Natural farming can provide economic benefits to farmers by reducing input costs and increasing market demand for organic produce. Moreover, it fosters local food systems, connecting farmers directly with consumers and strengthening community ties.

"There is a slow momentum of awareness that is being built around natural farming, however the government needs to do more in order to promote the practice through campaigns involving the private sector," says Karunanidhi, "social media can also be utilised to spread the word on knowledge platforms and reach out to the farming community. At the same time, awareness and education also needs to reach smaller farmers with no access to social media or smart phones, and this necessitates a crucial role that must be played by NGOs and volunteers."

Natural farming embodies a holistic approach to agriculture, aligning our practices with the wisdom of nature. By adopting sustainable principles and methods, we can create resilient farming systems that nurture the Earth and sustain future generations. Embracing natural farming is a vital step toward achieving a harmonious balance between human needs and the well-being of the planet we call home.

Rahul Philip

5. Mrs.G.Kirubasankari

GROWING BEYOND PESTICIDES: THE BENEFITS OF ORGANIC FARMING

Agriculture continues to be a way of life for many families. But the changes it has been through as an industry and as a process has influenced the attitude of second generation farmers remarkably.

While it continues to sustain a wide variety of species, sustaining agriculture itself has become extremely challenging due to multiple factors.

Mrs.G.Kirubasankari, Assistant Agriculture Officer, Government of Tamil Nadu, currently posted in Chengalpattu district, opines that all stakeholders –including the farmers and government departments –miss a holistic understanding about the changing patterns in agriculture.

Having served in more than 70 villages across Tamil Nadu, Kiruba has had an opportunity to interact with farmers about almost everything related to farming. “Right from tilling land, sowing and up to harvesting, we officers ensure that farmers receive all kinds of support and services from the Central and State Governments. In this completely field based job, what we get to see is a firsthand account of how farmers perceive agriculture, the way they operate, their attitudes towards farming, and how all of this is received by the next generation,” she says.

Kiruba is aware of the potential of organic farming but is perplexed about how farmers choose to do organic farming for their personal use but load chemicals on the produce that are cultivated for sale. “Why do we even call it organic farming? It is natural farming in true sense and this is why farmers keep it chemical free in the part of the land where they sow crops for their personal use. They are unaware that natural farming cannot be sustained like this,” she laments.

While the struggle for land and water rights is making enough noise, Kiruba feels that land ownership is not a pre-requisite to be acknowledged as a farmer. “One need not advocate about land rights for lease farmers and farm labourers. Rather, policy makers must be urged to recognise farming skills of landless farmers as well. Promoting their skills in the best interest of livelihood and agriculture in the region must be the guiding perspective,” says Kiruba, who is disheartened at the plight of farm labourers who cannot access any benefit, whatsoever. She hopes that the inclusion of farmers as a beneficiary category who can apply for financial assistance under the Agriculture Infrastructure Fund (AIF) will be widely defined to include all vulnerable farmers. “In spite of working so hard, they are pushed to penury. This is not only unfair to them but also to those

who may aspire to take up agriculture as a full-fledged occupation," she says.

Enlightening about schemes on agricultural engineering, soil and water conservation, training in agriculture machinery, etc., Kiruba also tries to throw light on the need for real time financial support for farmers. While subsidies do intend to resolve the issue, they are not timed correctly and therefore lose the purpose. Also, some of the schemes that have been understood to be beneficial for farmers do not even reach them. Propaganda is one thing but what actually benefits the farmers is another. Able to distinguish the two, Kiruba confesses that Agriculture Officers walk a tight rope with a larger vision. "This is why the promotion of organic farming as a trend in social media and promotion of farming by individuals who crossed the halfway mark in their careers doesn't excite me. They do promote farming but they are not real farmers according to me. Real, full time farmers are innocent, lack awareness and are always struggling. They are the ones who continue to take tough decisions to keep agriculture alive. It is high time policies reflected on their performance. Why can't agriculture be perceived as a performance based occupation?" she wonders.

Farmers' Security is another attribute that has not been prioritised enough by the state. While pension schemes have been in operation, they need to be further strengthened in order to be meaningful. "Many times, we find in the field that what is given is just a token amount. Farmers still take it and government continues to give it, even if the real purpose is not addressed. A thorough contribution audit of all agriculture and farmers' schemes is definitely an impending need to help define the vision," she suggests.

Agriculture needs to be understood as a life sustaining process and therefore anybody who is interested in cultivating their food must be encouraged. Influenced largely by dynamic factors like weather and climate, agriculture must now be looked at as humanity's responsibility.

"We have different programs under which terrace gardening, nutrition gardens are also being promoted. All an interested individual needs to do is visit the horticulture department, apply and acquire the specific kits and get started. One significant development in the last decade is the simplification of processes and promotion of small scale initiatives that can demonstrate the potential of sustained investment," she comments.

Shanmuga Priya.T

6. Ms. Manimozhi

The gender gap in land ownership is both a national and an international concern as data continues to point out that women are less likely to be land holders than men. Irrespective of the reasons, what emerges clearly from this stalemate is the line of obstacles for women farmers. “We are easily accepted as agricultural labourers who work on commands but not as land owners and capable farmers, who can take wise decisions on yield, productivity and farming methods. Situations led me to farming after marriage, but it all started with my husband,” reflects Ms. Manimozhi, Founder of the Vandavasi Organic Farmers’ Group in Thiruvannamalai district, Tamil Nadu.

Hailing from Soraputhur village near Vandavasi, Manimozhi was the eldest among five siblings and therefore her parents decided to get her married early. Married off as a teenager, she took active interest in agriculture with her husband who encouraged her to participate in all activities on their land. “It took me four years to understand rural life. For an

amateur teenager who hardly knew if rice grew on tree or plant, first-hand experience in farming was marvelous, to say the least," she says, adding that she was a fast learner. She also engaged her two children in the process and started managing farm activities efficiently.

"What changed my course was my husband's demise. As he was an alcoholic, farming gave us the much valuable family time. My children stood by me and we decided to continue to engage in farming. Now that I was completely into agriculture, every aspect became even more clear and I started thinking futuristically. In 2007, I attended a meeting in my village and developed interest in organic farming. While the gender linkages were not so comprehensible to me, organic farming helped me completely focus on land and overcome my personal loss," shares Manimozhi.

She tried organic farming on 50 cents of her land and the successful yield drove her to try bigger. With a huge debt to repay, her son discontinued studies and both of them built their land from the scratch. "Economic hardships in the family usually force you to stick to chemical methods but fortunately, my son understood my decision and we both worked passionately," she adds. Despite all the challenges and the criticism, Manimozhi never gave up. Very soon, all her seven acres were farmed organically and she experimented all methods she had learnt.

"Once you go the nature way, there is so much you can do without fear and confusion," she says. Manimozhi got back to all her contacts from the first farmers meeting she had attended and took guidance from every source possible. She also shared her experiences with others, which in turn encouraged others to stay in touch and learn mutually from these interactions. "Our interests kept each other growing and the help from District Agriculture Department officers

increased our knowledge. I started seeing the potential of a network and wanted to influence as many farmers as possible to understand organic farming as the best way to replenish land nutrients and improve yields. Land is the mother of everything and we must do what is in our capacity to keep it productive. Organic farming teaches you why it is critical to give natural resources the time to rebuild. One can never regret this decision, I was confident," says Manimozhi, who faced flak from her family while being hailed as a leader by farmers in her network.

Manimozhi's perseverance and support from kids encouraged her to widen the network and in every interaction with farmers in different villages, there were at least two of them who would want to try organic farming like she did.

Vandavasi Natural Farmers' Group grew bigger and moved far and wide to spread knowledge, share experiences and also provide organic fertilisers, pesticides and other materials for those who wanted to purchase them from Manimozhi. "The scale of farming worked favorably for me. As I started distributing materials, I saw how interactions were the main source of information and learning in many villages, especially for women. I also saw women naturally driven to trying organic methods. Women saw it simpler, convenient and above all, safer for their families. It was too much to consume but all of it kept me going," she reflects.

From only four organic farmers, Manimozhi now leads more than 20 farmers and realised the need to work strategically, because no matter what or how much they all produced, organic farmers needed a strong marketing network to ensure their products were not compromised from the price point of view. She worked hard to recognise correct channels for different products and eventually, she herself was impressed by the presentation of organic products from

her farmers' group. CSIM helped Manimozhi see things in perspective. "My classes from CSIM made me see my mistakes clearly. I did many things simultaneously, as and when they came up. I had to organise and also do value addition to our products. We are now better equipped to take regular orders and promote our products. We also regularly visit farmers' festivals like exhibition of rice varieties in Arcot district. We have learnt to identify ourselves with farmers like us. Above all, branding is something we never really thought of. Thanks to CSIM, consumers now know how to get back to us for repeat orders," she says.

Shanmuga Priya.T

7. Mr. Manna Egambaram

Love for nature and passion for farming together have inspired individuals from different walks of life to venture into organic farming. They all look up to mentors who have demonstrated that nature and its cyclic systems are more efficient in adapting to modern requirements. “All we need to give them is space, some room for thought, introspection and execution. Nature finds its way. We only have to overcome the obstacles,” says Mr. Manna Egambaram, who takes pride in being known as the son of a farmer.

Born in Senji, Villupuram, Egambaram grew watching his father struggling with farm loans and low crop yields. Farmer suicides, on the other hand, bothered him much as most of the adults who lost their lives were farmers he knew well. “Why is agriculture, the profession closest to nature, unpredictable and unsustainable? Where are things going wrong? Why do farmers give up?” he wondered.

Egambaram dropped out of College not only due to the dis-interest he had in city life, but for the reason that he was in love with farming and wanted to pursue agriculture. "My heart is here, in our farms. I was associated with Nammazhvar's 'உயிர் சூழல் நடுவம் Trust'. The 25 years I spent with this renowned organic farming champion not only inspired me, but also made me realise the magnitude of responsibility I was going to handle very soon," he adds.

Ekambaram was trained by Shri. G. Nammazhvar in organic farming and now he is into training many farmers across different states in India in this farming technique. He engages in building model farms through participatory learning signifying his approach, which is relatable and reliable. He explores local herbs and materials to prepare plant and soil tonics, pest repellants, and food for microorganisms in the soil.

Egambaram has also worked with Government departments to promote organic farming among farmers in the State. Under his leadership, his team curated the practical training module for the course on Rural Development Science in Arulanandar Arts College in Madurai, Tamil Nadu.

With financial assistance provided by CSIM, Inba Seva Center and various other organisations and friends, he conducts training and seminars in the name of Shri. Nammazhvar Natural Agriculture Center for farmers in organic farming and develops model farms in Manipur, Nagaland, and Assam, along with HMI, and institution based in Hyderabad.

As Egambaram grew popular, his work in the farms of noted civil servants recognised the leader in him and soon he began to teach organic farming to be as a way of life.

During his early years as a organic farmer, he learnt about CSIM from a friend and is still glad that he made the decision to join CSIM. “I dropped out of Polytechnic because I wanted to live as a farmer.

“I consciously tried to disconnect from city life as I had my own faulty assumptions. CSIM taught me how cities and villages constitute a whole. I began to see the city village interface for what it is and the opportunity it promised for farmers like me. I learnt to see the goodness on all sides and this inspired me to explore farming from a local perspective. I now proudly advocate locally made farm materials fertilisers and pest repellants. I learnt how to promote cultivation of traditional crop varieties,” shares Egambaram, quickly adding that CSIM helped him understand marketing from a social perspective.

An important aspect of Egambaram’s trainings is the inter-generational workshops in community halls where age-old, sustainable land and water use systems are discussed. Facilitating the same, he feels it is also important for farmers to evolve organically. Soon, he helped trainees focus on local crop varieties that had interesting characteristics. For example, Tahabrikshan is a rice variety from Manipur that helps in treating cancer. He cultivated this crop in his farms and also taught the technicalities to 80 other farmers.

“That is how the chain grows,” he says. Sandikar, is another variety native to Ramanathapuram district in Tamil Nadu that helps build immunity and can grow in dry, drought prone areas. “Traditional crops also give more pasture for farm animals. They personify co-existence. There is a lot about tolerance and adaptation that we can learn from plants. All we need are the eyes to see them,” he says.

Egambaram's passion and work not only inspires other farmers but compels one to question why organic farming is not the common norm. He assures that organic arming will be our future and he will do everything possible in his capacity to make this transition smooth and worthy.

Terrace and kitchen gardens administered by women and children is an incredible testimony to this transition already in place. Compost pits that recycle wet waste from kitchen not only give manure but also show the value of reducing waste. His movement ' பசுமை இயற்கை விவசாய இயக்கம் ' has been demonstrating the strength behind cultivation of native crops through organic methods using local materials on his 30-acre farm. He has also been producing and selling vegetables, fruits, small grains, pulses, and oilseeds.

"The idea is to show how everything in nature is cyclic and an embodiment of interdependence. We must respect the requirements of plants and fields. Once this mutual bond is in place there will not be any exploitation of resources from any side. Good health is plant and soil's right too," he insists.

Shanmuga Priya.T

8. Mr Rahul

Organic Farming is a family of processes that nurtures the soil and crops in every step. Ensuring that the land is cared for every day, through every process, keeping it potent for current for future yields is at the heart of regenerative farming. “That is my favorite word in the context of agriculture. Even leaves that store the excess nutrients fall down as manure for the next cycle of crop. Hence the significance of intercropping. Organic farming is so integrated that you naturally discuss one process after another,” says Mr Rahul, an industrial engineer turned organic farmer from Tiruppur.

Hailing from a textile family, he was literally forced into farming by his father. “I studied Electrical Engineering from Coimbatore and then moved to Germany to study Industrial Engineering. He studied in German medium and worked there for over 18 months. I simply flew down for a vacation in 2021 and that is when my father gave me the

responsibility to do farming in the land he had purchased in Pudukottai," recalls Rahul.

From 30 acres his farm now stretches to about 42 acres, but the growth and transition was not as rough and difficult as he had anticipated. "All hypes post the pandemic actually convinced me easily," he laughs. Rahul and his father were very clear about doing only organic farming. "For some reason my father could just not think of producing crops with chemicals and I stood by it. As the pandemic too made us conscious of what we consumed as food, this decision was not a hard thought one but very timely and born out of concern," adds Rahul, who wanted to earnestly prepare himself for this new role.

He first attended a class at Isha in Coimbatore and followed all leads and connections from here to learn organic farming. He had travelled up to Pune, Nasik to meet organic farmers and learn their practices. "This is when I understood why experiential learning was important in agriculture. Every piece of land, every crop and every farmer is different. All processes must be adapted to allow these diversities to complement each other. That is the beauty of farming as I learnt from visiting over 100 farms," he says. It took three months for Rahul to prepare his land as it was covered by thorny bushes. He then planted 1300 coconut saplings followed by fruits like guava, amla, fig and mango.

Soon a lead from Theni encouraged him to explore moringa plantation on scale. He attended a training at Periyakulam University and undertook moringa plantation immediately. The leaves were processed into powder, tablets, soups and flavored teas. Dedicating almost nine acres for moringa, he followed another lead in Theni and formed an FPO (Farmer Producer Organisation) with three more farmers, to further

explore opportunities in moringa plantation, value addition and marketing.

Rahul thoroughly enjoyed the processes on his land because by now he was fully aware of the benefits he would reap sooner and this encouraged him to continue exploring. Inspired by a video on you tube, he interacted with a renowned farmer from Chittoor, Mr Shanmuga Sundaram and co-founded the Integrated Banana Growers Federation in Erode to promote integrated farming and value added products from banana. With over 300 farmers associated with this federation, Rahul and team have been providing technical support to more than 100 organic farmers to follow integrated farming on their lands. "When we say integrated, it is a model where every element contributes to another while also allowing the farmer to earn from multiple sources through the year. So, a small pond with fish and a shed above it housing ducks and chickens is a wonderful system where the birds' waste feed fish and the ammonia waste from fish can be converted into nitrate for the plants," he elaborates.

While promoting banana wine in various stalls, Rahul was approached by a Malaysian firm with whom two memoranda have been signed for collaboration. With more exporting and marketing plans in mind, he insists that organic farming needs patience and passion. "We cannot push nature to walk faster. Land has to recover and get ready for crop cycles. It is this testing period that we must pass successfully. After that there is no looking back. Since I started with the motive of organic farming as the main end there was no diversion and my explorations kept me hooked. I could channel income from more than one source while my plantations may take two more years to give me that. Yes, it takes time initially but in the long run input costs fall drastically and yields are steady or increasing,"

assures Rahul. However, he also warns that some organic farmers are themselves not fully aware of the complete food chain. His father, who passionately urged him to take on organic farming continued buying vegetables for their household from a regular green grocer while Rahul had to intervene and regularise purchases from an organic store. "Farmers are very much part of the demand cycle too," he adds. While economically organic farming could be a tough call, it is totally worth it for the sake of our children.

Working out to be cheaper, sustainable and friendly to the land, soil, Rahul quantifies that two cows are enough to produce all organic farm inputs for 7-10 acres of land. And mulching, is his favorite process allowing him to appreciate the play of all natural elements on a small piece of land. The techie in Rahul was also alive in these months and he co-founded the Renquark, solar energy solutions company in Tiruppur, with his friend from Germany that provides solar energy installation, management and regulatory services in the domestic and industrial spheres. "Sun is a big ball of energy. It amused me as a student and now, as an organic farmer I am in awe of its potential in building all forms of life," says a content Rahul.

Shanmuga Priya.T

9. Mr. Sakthivel

Farming is a tedious process and the decision to choose organic farming methods over chemicals is really a tough one. Farmers are aware of the potential and benefits of organic farming. They do know that chemicals drain the soil of its nutrients, eventually reducing its productivity. Yet, they are not able to easily shift to organic farming. This is because of the hardships they are unable to cope with during the transition period. “The land, soil and crops need time to adapt to new inputs. Farmers need time to learn, prepare and follow organic methods. During this time, they definitely need proper guidance and support services. They cannot afford to miss a yield. For them to take that risk to protect soil and food security, there must be an ecosystem of support services,” insists Mr. N. Sakthivel, an organic farmer from Parameswari Mangalam village in Kalpakkam, Tamil Nadu, who overcame all hurdles of transition, one by one.

Sakthivel always loved life in the country side and accepted farming for life as he felt that farming kept him closer to nature. Following his father's experience and taking cues from emerging trends he did all that was possible to keep his farming activities on. Over time, giving in to use of chemical fertilisers and pesticides, he realised an unfavourable change happening. It was becoming difficult to earn the investment he had made, leave alone the profit. Cost of labour and farm machinery increased manifold and he mortgaged his land to manage these costs.

"Although I struggled much, I never thought of giving up on farming. I continued my interaction with different farmers' groups and this gave me new insights. That is how I started introspecting on naturalfarming," he shares.

Sakthivel believed that farmers best learnt from other farmers' experience. He enrolled in a government exposure cum training program and the interaction with experts worried him. "Use of chemicals in agriculture was preferred by almost everybody. Hybrid varieties were preferred for the yield they delivered. All these made me feel distant from nature and I began to despise agriculture," he recalls. In spite of all the confusion, he decided to try farming with reduced dose of chemicals inputs. "Chemicals anyways led to loss so why not try with reduced dosage?" he questions. He also took part in a farmers' exhibition in Coimbatore but was disheartened to see tractor, motor and fertiliser companies promoting their products. "There was only one small nursery. I felt discouraged," he says.

Sakthivel's questions are very much valid as every farmer goes through this phase at some point of time. After all the hardships, when there is no rice inside the husk, it could be devastating. It was such disappointments that pushed him to experiment with organic farming techniques. "We

farmers just go and buy chemical fertilisers and pesticides, nobody thinks of brand or quality, as long as we get our yield and returns," confesses Sakthivel. From such a mind-set it took sheer determination for him to attempt farming with reduced use of chemical inputs and he saw a difference in his yield.

Soon he came to know about Jeeva Sakthi, an organic fertiliser produced and promoted by a Dharmapuri based company.He tried one cycle of cultivation using Jeeva Sakthi and farms waste. But then, he realised that the cost of organic and chemical farming was nearly the same. Sakthivel continued his experiments in spite of his increasing debts. He adopted principles of both natural and organic farming and there was a rising demand for his watermelons, which were smaller in size than those produced by his counterparts who used chemicals. This surprised him. "The buyer paid a good price and took all my watermelons to Mumbai," he recalls with delight.

Sakthivel travelled a lot to learn from farmers across states. The next valuable lesson he learnt was about the influence of good water on yields and his trials proved that lake water fetched better yields on his land. He used every piece of information he acquired, and each time his knowledge and wisdom widened. He was now confident to try organic farming on one acre land.

His experience led him to form a Farmer Producer Group where he further delved into farmers' issues, and became a resource person on organic farming. His association with natural vegetables producer groups and farmer groups who cultivated traditional rice varieties exposed him to newer aspects of organic farming. His yield kept growing and soon, he produced 35 bags of rice from two acres of land. Cultivation of traditional rice varieties worked very well

and the production of organic fertilisers like Panchakavyam and Dasakavyam also picked momentum.

While being a full time farmer, Sakthivel also took time to teach other farmers. He reached out to more than ten villages and trained farmers in availing subsidies under various government schemes. College students also visited his farm and learnt from him about the cultivation of traditional rice varieties. “The most cherished piece of learning is about the difference between organic and natural farming. They are different and are certified separately. Students and farmers are shocked to know that they are different from each other. I now know that I have moved away from chemical farming, trying out organic farming in order to pursue natural farming,” he clarifies.

Sakthivel’s learnings are not only valued within farmer groups. His association with NGOs in the field also led him to a radio channel. His podcasts on ‘உழவன் சக்தி’ radio channel are now listened to by more than 10,000 farmers across Tamil Nadu. He is now engaged in demonstrating the strength of group farming for traditional rice varieties. “All farmers are not the same. There is a sense of insecurity. After all efforts, a farmer told me that he used fertilisers only on the soil but the remaining inputs through out cultivation was organic. They will pass this insecurity too,” says a hopeful Sakthivel.

Shanmuga Priya.T

10. Mr. M. Senthil Kumar

Many people are becoming more conscious of the impact of conventional farming practices on human health and the environment. Natural farming avoids the use of synthetic pesticides, herbicides, and fertilizers, reducing exposure to potentially harmful chemicals in the food we consume and minimising pollution of soil and water resources. Natural farming emphasises sustainable agricultural practices that promote soil health, biodiversity, and conservation of natural resources. By using techniques like crop rotation, composting, cover cropping, and integrated pest management, natural farming aims to maintain and improve the long-term fertility and productivity of the land.

Also, by reducing reliance on fossil fuel-based inputs, preserving soil carbon, and promoting sustainable land management, natural farming can help reduce greenhouse gas emissions and increase the resilience of agricultural systems to climate variability. The combination of such health and environmental concerns have contributed to the

growing popularity of natural farming as a sustainable and responsible approach to agriculture.

Mr. M. Senthil Kumar from Rishiyur Village in Needamangalam Taluk, Thiruvarur District hails from a farmer family, whose father continued to do farming till his last breath. His family has been farming since the last 150 years. His father strongly believed that farming can never be given up, irrespective of the scale of hassles farmers have to go through. "It is a big responsibility to feed generations. We must listen to our soil," he would say, as Senthil emotionally recalls. Farming did not give his father much profit in the last thirty to forty years, yet he continued. But Senthil did not start as a farmer. He studied Masters in Business Administration and worked in the corporate sector for almost twelve years. It was the sudden demise of this 78-year-old father that brought him back to the village and his family.

"I just could not accept that my father could fall a victim to multiple organ failure. He led a healthy lifestyle and we siblings were looking forward to plan a grand celebration for his 80th birthday. I explored more about why his health deteriorated. Spoke to friends, doctors and found out that his regular consumption of pain killers, which are actually not advised to be consumed continuously for more than seven days, affected all his organs. In the process, I was drawn to health as a phenomenon," explains Senthil.

A study on 400 farmers above the age of eighty years in 2013-2014 caught his attention and he was impressed by the science of early morning oxygen content in our surroundings, quality of food they consumed and their active lifestyle. "None of this was new, our ancestors also lived like this before. What changed us?" he introspects. He soon understood that natural farming is the only way to

keep air, water and soil clean. "Only then all species will be healthy. For humans to be healthy, all other species should also remain healthy," he adds.

Senthil started the Healthy Kids play school in Chennai to demonstrate the power of chemical free natural food on children's health, concentration and performance.But the level of adulteration in food crops convinced him to start farming on his land. He started on three acres and today, farms over 20 acres, producing more than 40 tonnes of different traditional varieties of rice. He showed how profitable cultivation of sesame seeds could be, in just a matter of three months. He used only natural methods and got in touch with many such farmers, soon forming the Tamil Nadu Iyarkai Unavu Urpathiyalar Kootamaipu enrolling more than five thousand farmers. This federation is now planning to do large scale composting to ensure steady supply or organic manure for the farmers. They have adopted the Jawadhu Hills in Thiruvannamali district, Tamil Nadu and aim to transform it into a replicable model 'natural farming zone'. "Awareness and sensitisation always keep happening through food festivals and other campaigns. A model natural farming zone will be able to better demonstrate the principles of integrated agriculture management so that the symbiotic relationship between air, soil, water and health is intact," he says.

Senthil has also formed a 500 members farmer producer group. He uses all his networks and opportunities to promote the idea of 'family farmer'. "Every family needs a family farmer, just like the family doctor and family lawyer they have. By doing so, families are assured of getting naturally grown, toxin free grains, vegetables and fruits. On the other hand, farmers are assured of a minimum price and a consistent demand for their produce, without middle men thus ensuring that they don't run into losses in spite

of doing the most significant work for humanity. Farmers and consumers get to interact with each other directly, build a bond and sustain agriculture for the next generations to follow suit," says Senthil.

A recipient of many awards like the Nammazhvar Award (2022) from the Government of Tamil Nadu, Best Farmer Award (2020) for producing traditional rice varieties from the Tamil Nadu Agricultural Technology Management Authority (ATMA), Velaan Semmal Award (2022) from the Lions Club International, Trichy chapter, Nel Jeyaraman Award (2022) from the World Centre for Tamil Culture, Senthil continues to inspire many youngsters who are passionate about natural farming. "Once you choose your family farmer, you will be, too," he laughs.

Shanmuga Priya.T

11. Dr. Sundaram Seshadri

Research in agriculture has been a critical part of India's growth story. It not only ushered in an era of increased agricultural productivity and food, nutrition security, but also impacted rural poverty greatly. Scientists have consistently endeavored to study farming and farm ecosystems to ensure that farmers are able to efficiently plan their harvests. "This is just a sliver of the full scope. Technology is a big promise that can deliver if channeled towards the right end," claims Dr. Sundaram Seshadri, Secretary of the Indigenous and Frontier Technology Research Centre in Chennai.

He is a botanist by qualification who has had various opportunities to identify research and development potential in all the capacities he worked in. His first job in a company required him to handle production of bio-fertilisers and bio-pesticides. He also managed a large nursery in Tamil Nadu with 10,000 oil palm seedlings. "Bio-fertilisers have paramount importance in soil fertility management and the

strains identified so far have evidently shown the potential in this field. I was drawn to research again," shares Sundaram.

His research experience at Loyola College in Chennai involved examining microbe interactions to develop genetically modified plants whose grains had a larger shelf life. He also spent a few years teaching micro biology and genetic engineering.

As a Visiting Professor at the Chungbuk National University in South Korea in 2003-2004, where he also served as a visiting scientist from 2017 to 2020, he published many papers on microbial strains beneficial in eco-friendly agriculture. "While guiding students I realised that food security was a common thread that united minds from all over. I helped them in developing microbial cultures to promote plant growth. I came to India with the same enthusiasm and taught again," he says, acknowledging that student interactions have been invigorating in both the countries.

But Sundaram's heart was in research. He wanted to contribute towards developing efficient farming practices through his studies. He joined the Research, Development and Dissemination unit at Shri AMM Murugappa Chettiar Research Centre in Chennai. Inspired by the idea of developing technology that was appropriate for societal development, he engaged in many projects. He took the notion of alternate cropping using medicinal plants to large groups of farmers and simultaneously promoted rural biogas production from farm wastes. He also worked in a project where farm residues were used to produce bio- char, which can either be used as fuel pellets in iron boxes or grills or as incense sticks with added fragrance. His aim was to demonstrate the use of bio char in improving soil quality and thereby reduce the use of chemical fertilisers. "The

resultant nitrogenation of the soil is a beautiful process and the enhanced water retention capacity is an added advantage. These are a cluster of processes, which when managed together in a farm, not only help in overall management of the farm but also replenish soil nutrients. That's the beauty in developing practices for eco-friendly agriculture. You look at the whole and plan for an ecosystem," he explains.

Sundaram has also mentored projects that worked on sand filters and the use of carbon to make water potable. One of his significant findings, according to him, is the isolation of pink pigmented facultative methylotrophs – a form of bacteria which is also available in polluted areas and can be used in the production of plant growth hormones.

"All these years I was working in the lab, with farmers and have also mentored students. I helped each of them to analyse their problems and taught how complementary alternate agronomic processes could be. It was time to focus on connecting traditional knowledge with advanced technology. That is how Indigenous and Frontier Technology Research Centre (IFTR) was born in 2002," shares Sundaram.

IFTR aimed at improving rural livelihoods using adapted/ retrofitted advanced technologies. The problems faced by rural masses is the guiding principle and suitable solutions are worked out using technology already available. For example, rural women groups were engaged in producing eco-friendly paper from agricultural wastes. Entrepreneurship development, skill development, village development (like provision of sanitary complexes) are some of their focus areas.

The biodiversity program intends to promote Ecological Regenerative Agricultural practices in the farms and help

the farmers understand how to preserve their ecosystem for better coexistence of plants. Development of millet and paddy varieties that allow improved intake of zinc and iron has been very promising and the fact that IFTR tries to look at good yield with nutrient rich food has also encouraged and shaped farmers' perspectives to understand their farms as a holistic ecosystem.

A member of the Association of Microbiologists in India, Asian PGPR Society, Chair Person – Strategic Committee at the Bharatiya Yuva Shakthi Trust in Chennai and various other forums, Dr. Seshadri has continually engaged in shaping research, development and entrepreneurship interventions in the field of microbiology and agriculture. He is the recipient of Brain Pool Fellowship (2017) from the Korean Federation of Science and Technology in Korea and was acknowledged as the Exemplary Mentor of Change by the NITI Aayog, Government of India in 2020.

Sundaram's explorations continue even today and the myriad interactions with academia, students and the farmers keep inspiring him to pursue newer projects.

Shanmuga Priya.T

12. Ms. Vijayalakshmi

India, with its diverse ecosystems, rich agricultural heritage, and growing environmental challenges, has emerged as a hub for permaculture practices and principles. Permaculture's holistic approach to designing sustainable systems aligns closely with India's cultural and ecological ethos, making it an ideal framework for addressing the country's agricultural and environmental needs. From small-scale organic farming to large-scale landscape restoration, permaculture is gaining momentum across India, offering hope for a sustainable future.

"Individuals, communities, and organisations have begun adopting principles and practices of permaculture in India," says Vijayalakshmi, farm consultant at Vishwapriya Permaculture, "The concept aligns with our diverse agricultural traditions and the growing interest in sustainable and organic farming methods."

She adds: "Permaculture techniques can be particularly relevant in addressing challenges such as water scarcity, soil degradation, and climate change resilience."

In India, permaculture also finds resonance with traditional agricultural practices deeply rooted in ecological wisdom. Farmers have long understood the importance of working in harmony with nature, and permaculture builds upon this foundation. By observing natural patterns, leveraging local resources, and emphasising biodiversity, permaculture offers innovative solutions to the challenges faced by Indian farmers, such as water scarcity, soil erosion, and unpredictable weather patterns.

"More awareness through courses are inspiring people to take to permaculture," says Vijayalakshmi, "Thousands of certified teachers silently working to spread knowledge and educating. The prevalence of a certified PDC course, Advanced PDC course and practical work on design principles has increased in the last decade, not to mention the benefits of regenerative permanent agriculture are great lessons in going back to the roots."

In 2013, Vishwapriya Permaculture commenced operations in Bangalore. Previously, its practice and natural farming methods were being taught. The main objective of introducing permaculture was to bring about awareness in urban communities and train children as the grass-root level.

Water management is a critical aspect of permaculture in India. With a large part of the country facing water scarcity, permaculture techniques such as rainwater harvesting, contouring, and swales have gained popularity. By capturing and storing rainwater, farmers can ensure a steady supply of water for their crops, recharge groundwater levels, and

prevent soil erosion. Additionally, permaculture promotes the use of efficient irrigation techniques like drip irrigation, minimising water wastage and maximising crop yield.

Permaculture gardens and farms in India prioritise biodiversity and sustainable food production. Traditional Indian farming systems, such as agroforestry, are integrated into permaculture design, allowing for the cultivation of multiple crops and trees in a harmonious and mutually beneficial manner. Polyculture gardens, where different plants are grown together, mimic natural ecosystems, enhance soil fertility, reduce pest and disease pressure, and provide a diverse and nutritious food source.

“We can inspire people to bring change in their lifestyle and the food they consume,” says Vijayalakshmi, “Our workshops have helped thousands of people in taking concrete steps towards healthy living and this has paved the way to collective realisation of the responsibility humans have towards mother nature.”

Community-driven initiatives have played a significant role in promoting permaculture across India. Collaborative efforts between farmers, environmental organisations, and local communities have resulted in the establishment of permaculture demonstration sites, training centres, and knowledge-sharing platforms. These initiatives empower farmers with the skills and knowledge needed to adopt sustainable practices, revive traditional wisdom, and regenerate degraded landscapes.

“I am now working more in rural areas, as permaculture can be practiced anywhere,” says Vijayalakshmi, “I believe we need to pass on the knowledge we’ve received for the betterment of the future and the ecosystem of earth.”

However, permaculture's impact extends beyond rural areas; it has found relevance in urban environments as well. Urban permaculture initiatives in India focus on sustainable urban design, organic gardening, waste management, and community engagement. Rooftop gardens, vertical farming, and community gardens are transforming concrete jungles into green oases, providing fresh produce, mitigating urban heat islands, and fostering community resilience.

"Urban spaces are quicker and find it easier to adapt to the principle, as the majority of people live in the city are generating more waste which can be recycled locally to produce locally," says Vijayalakshmi, "Work within the local community paves way for this."

The principles of permaculture are not limited to agriculture; they extend to other aspects of life, including energy systems, building design, and waste management. Renewable energy sources, such as solar and wind power, are integrated into permaculture designs, reducing dependence on fossil fuels and promoting sustainable energy solutions. Natural building techniques, such as adobe construction and bamboo structures, minimise the ecological footprint of infrastructure projects. Additionally, permaculture promotes waste reduction, composting, and recycling, closing the loop and minimising environmental pollution.

Government agencies and policymakers are recognising the potential of permaculture in addressing India's environmental challenges. Several states have initiated programs to promote organic farming, sustainable agriculture, and permaculture practices. By integrating permaculture principles into national policies and initiatives, India can pave the way for a sustainable and regenerative

agricultural sector, protect biodiversity, and mitigate the impacts of climate change.

Permaculture in India is not just a set of techniques; it embodies a mindset that values the interconnection between humans and nature. By embracing permaculture, India can build a resilient agricultural system that conserves resources, enhances biodiversity, empowers local communities, and ensures food security. It provides a pathway to reconcile traditional wisdom with modern challenges, demonstrating that sustainable development is achievable.

"In the name of development, we have moved four steps ahead, and now we really see that it is not leading anywhere," says Vijayalakshmi, "Going three steps behind can give us clear solutions — to go back to our roots, culture and agriculture is the key to permanent development."

She adds: "Our culture and our agriculture together is permanent, and that's what permaculture is all about."

As permaculture continues to gain momentum in India, it holds the potential to transform the agricultural landscape, regenerate ecosystems, and inspire a new generation of environmentally conscious citizens. By nurturing sustainable landscapes and promoting a holistic approach to development, India can forge a path towards a greener, more sustainable future for itself and serve as an inspiration to the world.

Rahul Philip

Vetiver Entrepreneur

Enter the world of farmers dedicated to cultivating vetiver, nature's versatile gift.
With unwavering commitment, they nurture this resilient grass, weaving it into sustainable solutions.

1. The Divine Grass

A Miracle Grass with origins in Tamil Nadu and hence its name, also called Khus-Khus, Chrysopogon zizanioides is Natures gift to the World with multiple end uses and benefits. It is now used by about 100 Countries in the world for its properties.

I attended the Seventh International Conference (ICV-7) in Chiang Mai, Thailand during 29th May to 1st June 2023 along with nine delegates. The event was extremely well organised with participation from more than 25 countries including India, Bangaladesh, Thailand, Indonesia, Vietnam, China, Taiwan, Bangladesh, Malaysia, South Africa, Netherlands, UK, USA, etc.

There was an exhibition displaying various products from Vetiver and multivarious applications in Commercial scale besides Pilots, conducted by Thailand Government Her Royal Highness Princess of Thailand, Maha Chakri Sirindhom graciously presided over the Event and

bestowed King of Thailand Vetiver Awards to Winners. We were excited to gift Her Royal Highness a Vetiver Saree produced in Anakaputhur, Chennai.

Agriculture World magazine belonging to Krishi Jagran published by Mr. M.C. Dominic, Founder and Chief Editor, carried a full June issue Dedicated to Vetiver and Mr. Dominic and family were part of the Delegation from India too.

World Bank Agriculturists Mr.Richard Grimshaw and Mr.John Greenfield promoted Vetiver Globally when the Duo was part of the Team in India. Historical texts reveal the King Raja Raja Chozha used Vetiver for its erosion resistant properties.

Though there is research going on for its uses and impact, Indian Government should become the forerunner and invest in R&D, Develop Policy framework to introduce VG (Vetiver Grass) in various areas. We are taking initiatives to Approach the concerned Govt Departments to bring policy initiatives.

Dr. C. K. Ashok Kumar, President of Indian Vetiver Association is guiding a Core Team to take Vetiver to Greater Heights in India and Globally. Mr. Richard Grimshaw, even at this ripe age, is contributing extensively in the Indian Vetiver Group and advising us various aspects

Use of Vetiver and its benefits

- Hedgegrows for Soil and Moisture Conservation
- Bio fuels (Bio mass , briquettes for cooking and ethanol)

- Thatch for roofing
- Handicrafts for home and markets
- Soil enrichment for Regenerative natural farming
- Livestock feed
- Mulching

Roots Below the Ground

- Essential Oil for perfumery, Aromatherapy
- Production of Crafts
- Soil stabilisation
- Erosion control
- Ground water recharge
- Phytoremediation for waste water
- Removes Nitrates, phosphates, heavy metals and other contaminants
- Tolerant to Solids with high and low Ph, salinity and heavy metals
- Drought and fire resistant
- Carbon sequestering
- Mix vetiver with drinking water in earthern pots
- Vetiver curtains as eco-friendly alternative to A/Cs

Future Plans

- Identify volunteers who can allocate minimum of 1 Acre of Land to experiment and analyse multiple uses of VG
- Delve into Carbon Sequestration capability of VG and develop a Carbon Credit Model
- Lobby with Govt to plan and implement Policies including providing incentives, subsidies. etc to grow VG in many areas
- Develop nurseries in different parts of the country to cultivate different varieties and recommend them for various applications
- Declare a year for Vetiver, the Divine Grass like 2023 being a Millet Year
- Become a Global Leader in VG and support various countries using our Miracle Grass

P.N. Subramanian

Managing Trustee, MSDS,

President Thofa and a Passionate Regenerative Natural Farmer

2. Ms S Nirmala

Entrepreneurship is a comprehensive skill that develops with time, but for some it is their fundamental thought process. Irrespective of age, gender, education and back ground, these individuals are characterised by resilience and relentless pursuit to demonstrate that their ideas can actually work in reality. For Ms S Nirmala, member of a self-help group from Thirupuvanam, Sivagangai district, it was also the desire to be unique that geared all her efforts thus far.

Raised in a joint family by a single mother, who worked as a teacher in a mid-day meals school, Nirmala was fully aware that she will be married off soon after completing her school education. While this mentally prepared her for new responsibilities, her husband's work in a sugar factory that required shifting to new towns every three years allowed her to introspect on roles she was capable of taking up.

She was completely focused on her family until 30 years of age. As both her children grew older and capable of managing their routine, Nirmala found a window of opportunity to engage with different groups.

She helped B Ed students with their craft projects. She also attended many vocational training programs and taught interested women in her neighbourhood. Every interaction and engagement expanded her social circle.

Seven years ago she moved to Thirupuvanam in Sivagangai district and started making fur toys at home. While she gifted most of the toys to her friends and family, she also considered the idea of putting up stalls at exhibitions and events. “I came across an advertisement of a self-help group, inviting women to learn the art of making jute bags. I was instantly drawn to it because it was something new to learn and also a widely accepted attribute of sustainable lifestyle,” says Nirmala.

Since toys were her identity so far, she went to the training venue with her toys. Surprisingly, all women liked it and came forward to buy them. “They were all samples I had taken to show that I was capable of developing a product, but those women purchased them. It felt good and rewarding,” she recalls.

Thus began her stall activity with the SHG members as they guided Nirmala to register and promote her products at various colleges and events.

A decade ago, revenue from her first stall in Thirupathur was around 750 rupees. “I knew this was not very lucrative, but I also understood that my customers were primarily students who cannot afford to buy expensive products.

I therefore started making smaller toys to suit their needs," reflects Nirmala.

With no business acumen in the family, she wasn't as apprehensive as one would expect her to be. "It wasn't the absence of fear really. Rather, it was an excitement to present myself as able and determined," she adds.

With time, she became a prominent name in her circles and marketing managers from the Department of Rural Development intimated her and her SHG about stall opportunities across the state. Within three years, she was also chosen to attend the Entrepreneurship Development Program offered by the Government of Tamil Nadu.

"I started from an activity I engaged in leisure. This program taught me the value of naming a product, branding it and the marketing strategies that may suit different stake holders. I saw it all with awe but the experience from stalls helped me relate my work in the larger scheme of things. I earned 10,000 rupees per day from my stall. It gave me the confidence to avail a loan from the Department of Micro Small and Medium Enterprises. I now have six members working with me. With each day, we are evolving into more capable and stronger individuals," contemplates Nirmala.

From toys to the 70 different products under her SHG's (Samayapurathal Self-Help Group) banner, it was diversification of products and acquisition of new skills that widened her networks. She learnt English to communicate to foreign customers. She taught skills like chocolate making to other SHGs and college students.

"I started as a learner. With chocolate making, I didn't even know how to manage temperatures. In the beginning, I faced loss and learnt my lesson. With growing awareness

on millets, I tried making chocolates with pearl millet and it worked very well. While the result is visible, the time and effort that went into arriving at the right mix of ingredients is implicit. In all my classes, I insist that students dive into challenges and adopt means to overcome them because these are the true strength of an entrepreneur," she recalls, as a recognised trainer with the Department of MSME.

During the pandemic, Nirmala had to try a new product and her trials with Vetiver opened new avenues. She visualised its uses beyond the conventional wisdom and made products like hand fans, tea, car hangings, door garlands, body/hair wash powders, etc. Inspired by the versatility of Vetiver, she dedicated more time in developing new products and marketing them.The biggest hit was the herbal mosquito coil which has a huge fan base in Chennai, Tamil Nadu.

A recipient of many awards including the Best Seller Award from the Department of MSME, Nirmala has come a long way to show all women that the ability to adapt, learn and persist are the fundamentals to growing as an entrepreneur. "It is the tenacious pursuit of opportunities, creativity and a willingness to take risks that defines entrepreneurial spirit in anybody," she affirms.

Shanmuga Priya.T

3. Mr V C Sreeram Nath

Inspiration has the potential to transform individuals and societies. It can spark action, creativity, and personal development, leading to positive changes in various aspects of life. “It keeps you curious and always prepared for life-long learning. I began to realise it as a valuable tool for personal and collective betterment,” admits Mr V C Sreeram Nath, Founder and Secretary of Rameswaram Vetiver and Environmental Foundation.

Hailing from a farming family in the culturally, historically significant town of Thiruvarur in Tamil Nadu, Sreeram aspired to be a journalist. He was exposed to heritage thoughts since childhood and this fostered a sense of connection. He saw his responsibility in knowledge transfer and preservation of native ideas, practices. Drawing inspiration from Dr A P J Abdul Kalam and Mr Varghese Kurian, he always envisioned building a brand for a locally developed product. “The glow of goodness that Kalam sir talks about and the success of building a brand for

the cooperatives from Anand village in Gujarat leave the same legacy. The clarity on greater cause, the achievement defying all odds and their perseverance are lessons for life and I chose to be led by the energy from this inspiration," adds Sreeram.

He studied BABL in Trichy and settled in the same city running an Amul outlet for over fifteen years. He also owned a personalised gift centre and managed his father's coffee shop, adding in his elements of interest like the cassette unit, book shelves for the customers. "Kalam sir visited our coffee shop once and I helped with his selection of cassette. I also started a book shop in an auto to take Kalam sir's books to rural students. I tried everything to be associated with his thoughts," he exclaims. Kalam sir's death came in as a shock and Sreeram came to Rameswaram in his auto. He liked the ambience of this town and immediately decided to shift here. His first venture in Rameswaram was a coffee shop right opposite to the Kalam Memorial. It was during this time that Sreeram got to learn about the magical, versatile and perennial grass native to the region – Vetiver.

While the coffee shop had to shut down during the pandemic, Sreeram kept his learning on Vetiver alive and explored a variety of sources to learn more about this grass, its applications and uniqueness. He appreciated this as a plant gifted by nature for the society. "It can purify all five elements of nature from the Natarajar statue in the renowned Chidambaram temple. I saw its applications in soil erosion control, natural pest control, livestock forage, perfumery, medicinal uses and also the cultural uses. Have you not seen vetiver used in homams to purify the air around us?" he points out.

Drawn into the versatility of this native grass, Sreeram began to share his knowledge in all his social circles and

the social media pages became very active with discussions on vetiver. Soon, a senior scientist from the Central Institute of Medicines and Aromatic Plants (CIMAP) saw his posts and invited Sreeram to their research lab. “I was surprised to see five varieties of vetiver. I learnt their variety of applications and wanted to cultivate all these varieties in Rameswaram,” he recalls. Soon, he founded the brand Rameswaram Vetiver and enrolled seven farmers from the region. His team managed to bring around five acres in Palkulam village under vetiver cultivation since the inception in 2021. Now that the cultivation was successful, CIMAP offered him a distillation unit under the aroma mission to encourage value addition processes. “Right from the beginning CIMAP has been very supportive. Be it the provision of one lakh saplings or the machinery, they knew why this was important and also understood my efforts to build this as a local brand. We formed clusters and continued production,” adds Sreeram.

His marketing of vetiver has been touched by various aspects and fully informed by the ecological benefits, cultural significance. “We have supplied vetiver to Adyar river in Chennai too. Water purification using vetiver is an age old practice and its deep, extensive, fibrous roots allow sediment retention, erosion control and enhances wetland ecosystems. As a low maintenance plant, it is an eco-friendly choice for sustainable landscaping,” he elaborates. His latest achievement with his brand is the establishment of the stall at Mandapam railway station through the central government scheme ‘one station one product’. With a minimal rent of one thousand rupees, this scheme intends to promote local products and assured the right leverage Sreeram looked forward to within the town.

The foundation has been regularly organising meetings headed by Mr. M.Muruganandam, Founder and Managing

Trustee of Rameswaram Vetiver and Environmental Foundation & Chairman of Excel Group; and declamations on vetiver, its wide applications, especially in arresting soil erosion. The latest in the series was held in Dhanushkodi where farmers also convened on ways to promote vetiver cultivation.

As the base oil for perfumes and many cosmetic products, its commercial applications are also being promoted to bring more farmers into the foundation.

Sreeram envisages to develop Rameswaram Vetiver as a brand open to all and this vision has enabled the development of buy back platform without any investment in land. “My vision is guided by vetiver’s significant role in carbon sequestration and sustainable eco-tourism. Working for this on Kalam sir’s land, adapting Kurien sir’s principles gives me a sense of uniting with them. The soil revolution that vetiver promises and has demonstrated over ages needs wider recognition and our foundation is determined to take this farther,” he says with conviction.

Shanmuga Priya.T

4. Vetiver Revival Project

150 student volunteers, along with around 30 others, planted about 5,000 Tillers at a rate of 2 Tillers per pit.

The first phase of our project took place on October 8, 2023, where we successfully planted approximately 5,000 Vetiver Tillers. We were honored to have the following distinguished guests: Chief Guest: Shri Vikram Kapoor, IAS - Additional Secretary, Planning, TN Government. Guests of Honor: Shri Subramaniam, IAS - Commissioner, Agriculture, TN, Shri Lakshmipathy, IAS - Sub Collector, Chingleput District, TN

The event was organised by Ms. Santha Sheela Nair, who played a pivotal role in its success. In addition to our esteemed guests, we were joined by: Dr. CK Ashok Kumar - Founder of First World Community (FWC)

Mr. John Alex - Director, Equitas Bank, and Trustee of Exnora, Mr. P. N. Subramanian - Vice President of India

Vetiver Network and President of the Tamizh Organic Farmers Association (THOFA) and Mr. Ganesan - Vice President of THOFA

Ms. Santha Sheela Nair, IAS Retd facilitated the event and extended invitations to Senior Serving IAS Officers for the inaugural function. Ms. Tara Sudhakar, President of Padur Panchayat, was also present.

I shared the history of Vetiver, its origins in India, and the significance of reestablishing India as a global leader in Vetiver. This event was further enriched by the presence of a group of Organic Farmers from across the state who presented their issues and suggestions.

Manava Seva Dharma Samvardhini contributed 10,000 Vetiver Tillers to the project. Dr Anbu coordinated support from Akshaya Kalpa who provided complimentary buttermilk packets, bananas, and sandwiches for all attendees. Watsan Envirotech provided three natural water filters, free electricity, and drinking water supply to all attendees.

Dr. Sangeet from Padur Panchayat organised volunteers from Hindustan Arts College, Padur who selected a section of the lake and cleared it with the help of workers. Pits were dug for planting, and the Tillers were segregated and placed in open containers for easy access.

On the day before the inauguration, I briefed the volunteers about Vetiver, its history, applications, and planting procedures. Approximately 150 student volunteers, along with around 30 others, planted about 5,000 Tillers at a rate of 2 Tillers per pit. The inauguration was a collective effort, with all the dignitaries participating by planting a few Tillers each.

Mr. Lakshmipathy, IAS, Subcollector of Chingleput District, shared his positive experiences using Vetiver in his previous assignments in the rural development sector. He offered encouragement, and contact information was exchanged for future collaboration.

Ms. Santha Sheela Nair connected the team with Shri Vijay Kumar, IAS, Chairman of the River Restoration Authority, Chennai, who was equally encouraging and introduced us to his team. They had already planted Vetiver in the Adyar River and expressed interest in our project.

For the second phase, we cleaned up and dug pits on October 15, enlisting the help of volunteers from TREES Trust to plant the remaining 5,000 Tillers. We were also fortunate to have 10 Black Cat Commandos from the National Security Guard join us, allowing access to challenging planting locations in one part of the lake. During this process, we observed that some of the previously planted Vetiver had grown well, while others were damaged by human activity and cattle. Given the open nature of the lake's surroundings, this challenge was difficult to prevent due to frequent visits by fishermen.

We express our gratitude to Ms. Santha Sheela Nair, IAS Retd, for her invaluable support in facilitating the event and extending invitations to Senior Serving IAS Officers to inaugurate and address the event. We were also honored to have Ms. Tara Sudhakar, President of Padur Panchayat, join us for this occasion. This event was further enriched by the presence of a group of Organic Farmers from across the state who presented their issues and suggestions. We remain committed to our mission and hope to continue our efforts in rejuvenating lakes and the environment.

P.N. Subramanian

The Unsung Beacons Volume 14 is an excellent compilation of numerous articles, conversations, personal recollections of a sparkling set of experiences in many a daily activity in the farm, at the village bazar, the mandi, all in the rural setting by several muddied palms and wrinkled foreheads, and a whole lot more. This volume strings together the Farmers' Chronicles. Cogently arranged under five fascinating headings the compendium makes for a compelling read and kindles a desire for more on the kaleidoscope of rural India of the 2020's.

Dr Gurumurti Natarajan

CSIM

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