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Agriculture & Industry Survey

India's Leading Business Magazine for Agriculture

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Revolutionising organic farming with soilless farming system. Discusses at length on doing farming in urban environment.

Dr. Praveen Singh

Disseminating knowledge around hydroponic growing system and associated with around 4000 hydroponic aspirants through different platforms.

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The institute engages in training, education research and consultancy work in important domains concerning cooperation and rural development

Dr. Sowmini Sunkara

Agri - entrepreneurship in rural areas, its scope, and prospects.

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Climate change & Agriculture!

The new buzzwords for the current agri policy making!

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[MINISTRY OF AGRICULTURE & FARMERS WELFARE, GOVERNMENT OF INDIA] KOCHI, KERALA. PH : 0484-2377266, 67

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Farmers' prolonged protest and agitation come to an end!

Public opinion on farmers' issues now would get some clarity?

On the day of the great Sikh saint, Guru Nanak Dev day the government thought fit to withdraw the most draconian three laws on the famers' issues. Those who had agitated were the farmers of three most agricultural states, Punjab, Haryana and Western UP which together contributes to the most successful agricultural production and export targets of the government.

All these three controversial laws were aimed at very substantial issues that were agitating the farmers for long. But what created the big why the biggest ever farmers one-year long protest that had not been seen in the country's history in the free India where, before that, we had always read about the many famine, hunger and poverty in the Indian agricultural sector about which no British historian had written in any depth and concern nor any of the other Indian historians gave much attention. Even in the post independent Indian writings, we had no any new perspectives on the farming issues, issues that ironically led A.O. Hume to found the Indian national Congress.

Now, gradually, the Indian economic history, we hope would be written in some broad perspective where the bulk of the Indian population are still dependent on agriculture for their livelihood. As per the latest statistics, India's agriculture today contributes just 14 percent of output to the Indian GDP while 40% of labor is still dependent on the agri sector only. We have to have great sympathy and humane concern with the Indian farmers even now for what triggered. The farmers agitation today to such an irrational length is the deep-rooted poverty and stagnation and thus more persistent hunger and under nutrition and poverty. We saw only too recently the reverse migration of rural labor on the occasion of the Corona Virus Outbreak and thus it was also a reminder of the India's backwardness and poverty and a sort of political negligence.

The point we want to highlight is not any political issue at all. The over-all Indian mindset that evolved with the history, from pre-mogul Times to the British days where the caste system and the religious pro-activities and social inequities always held down the lower social groups and only the tiny upper crust held all the privileges. Even now, we dare say, the democracy we pretend and practice is a sham as once we all seized power in the name of democracy we resort to much arbitrariness, we don't take the Constitutional provisions seriously.

Bureaucracy is spreading and taking hold much of the civil society activities, from administration to other areas, the hold of the retired bureaucratic officials are spreading with an iron grip all the civil liberty areas. Beware of this unhealthy social and political outlook. This is just a slight warning, in spite of so much fear and selfishness on the part of the well-off sections, the middle and upper classes.

We don't even care for the Parliamentary procedures. We issue ordinances to promote agricultural reform laws! We rush through Parliament without a debate as such. We don't refer to the Parliamentary committees. Why such rush and hurry? Why we so quickly forget democratic processes. At least this time, much suffering, a death of high number, about 700 farmers lost their lives, let us be more sympathetic. Let not narrow political dividends, elections in UP, Punjab and elsewhere dictate our policy making impulses. Let the vibrant democratic norms take hold our power wielders, let us demonstrate, a real change of mind and show much magnanimity when it comes to the down-trodden and the poor rural people.

Farmers even when they earn in big sums are after all are no match to the non-farmers, the urban migrants are much better today. So, we need deeper commitment and strong willed policy making thrust.

Let us spread a liberal and secular mindset. Let us lay the foundation and not the penchant for revenge. Jai Hind!

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CLIMATE CHANGE & AGRICULTURE AND MUCH ELSE!

The new buzzwords for the current agri policy making!

Climate change is now a grave reality. There is a debate in the distant Glasgow. At the same time there is flood in Chennai and there is dire prediction the Chennai city might sink in the sea to the depth of 1.8 feet before the end of this century. What more reality we need than this NASA report?

It is time to think radically and do many things on many fronts. The COP 26 Glasgow Climate Change Summit that had sought to set a new "agenda of action, as one of its sessions" described, has really, with all qualifications and skepticism is really a breakthrough. We have to welcome the outcome of the very influential international leaders representing some 200 countries. There is much to discuss and debate till the next session billed for Cairo next year. Can the countries of the now say there is some time for rest till the next date arrives?

No, we can't say that within certainty. In fact, what we can say now is there is actually more urgency to clarify and conceptualize many new questions that have been thrown up now. The current scene of climate change with excessive rains. And flooding of Indian cities, more so right here in Chennai city, reminding the year of 2015. Specially, for us who are concerned with what happens to the climate change and the warming of the planet is what are the adverse factors from the agricultural sector with the alleged excessive leak of carbon gas emission coming out of the agri and other crops. This is a subject new for the vast mass of farmers who don't know all these issues so far. Now this issue has come to the frontline and also much other pollution causing agents.

Of course the headline grabbing issue was the stars, the two big countries, namely India and China the two populous countries still using coal, India still 70% coal in its power plants and also China, and negatively the bad name as the two most polluting economies. Also the unresolved question of what the two countries' stand and commitment to the agenda of action!

India's Prime Minister Mr. Narendra Modi in his characteristic boldness and risk-taking strength declared India would set the date of 2070. As the upper limits and thus won over the admiration of nations and thus this time India's highly rated international leader and statesman. India's International profile raised. Yes, this time India's international profile as the most responsible nation and leader of some hope and capability for the world. So, in a way we, Indians, can take some share at this proud moment. This is really a great achievement indeed. But then to earn as a responsible nation India has to do much, besides diplomatically scoring a winning point. But then diplomacy is a new field for India and we Indians have also to earn the art of diplomacy in which the Western nations had shaped the course of world history since the famous Westphalia Peace treaty in the year 1648.

Today we live in the world with some, why, even much anxiety and with the nuclear weapons threat and also the new threat of climate change and many disasters the world have to live through. So, what role agriculture is going to play in the present and future?

Agriculture has actually come centre stage. And a whole lot of new innovations are called for, new seeds, new climate change resistant seeds and use of eco-friendly fertilizers introduction of new agri machinery, improved water saving irrigation through sensors, why even improved agri marketing, most of all really ensuring guaranteeing higher remunerative prices and less exploitative agro reforms are all there to be done. Really, the future of Indian agriculture calls for realistic agricultural land ownership laws are timely. As things are what we need to do to lessen the impact of the international climate change and global warming challenge is to understand science and technology in the agro and rural sector.

There would be progressive urbanization and also international migration. Indian population this generation has come to reality and they migrate at the very first opportunity. The inequity and inequality in society and politics is growing faster than before. Corruption is also growing. Internal institutions are becoming out of date, transparency in administration is diminishing. May be the only certain way to meet the climate change and other future challenges, to put it bluntly, in our opinions to improve governance internally in a more honest and truthful manner.

Are we not going back in the pursuit of our values in our living? Why there are known inequities? Why we refuse to adhere to our own constitutional mandate? Democracy essentially means fixed tens of acquiring and retaining power, isn't it so? Then why, the world over there is the tendency towards dictatorial tendencies?

The world needs dedicated leaders. Where are they? These are not silly questions.

Why do the political process in the international arena not driven by ethics? It is time world leaders shed their narrow focus and give up their adherence to raw power and the use of force. Why there are still wars in the world?

The UN must be strengthened and more international summits and G-7 meets. Only the economically strong nations can give decisive directions to the world. Of course we need new ideas and new insights. This can be given by many, especially by world thought leaders. Let us invite such thought leaders to the UN assembly and other firms. Such independent thinkers are also to be given top viability so that the politicians can shed their egos and learn to behave responsibly.

Nuclear weapons have to be eliminated and for this great men and minds must interact more visibly.

World's top buyer India trims palm oil imports to make space for soft oils

- Palm's discount to soyoil drops to $20/T
- Refiners slash palm imports for Nov-Jan shipments
- Refiners replace palm oil with soyoil, sunflower oil
- Palm oil could regain market share from Feb onwards

Indian refiners have been reducing palm oil purchases and raising soybean oil and sunflower oil imports after a steep rally in the tropical oil reduced its discount to rivals, industry officials told Reuters. Lower purchases by the world's top edible oil importer could weigh on palm prices, which have corrected 10% from a record high hit last month, but may support U.S. soyoil futures .

"Refiners usually give preference to palm oil as it trades at a substantial discount to soyoil and sunflower oil. As there is hardly any price difference now, they are switching to soyoil and sunflower oil," said Govindbhai Patel, managing director of trading firm G.G. Patel & Nikhil Research Company. Traditionally, palm oil accounts for two-thirds of India's annual edible oil imports of 13 to 15 million tonnes.

But Indian refiners are now slashing palm purchases after importing a record 1.26 million tonnes of palm oil in September, as the spread between palm and soy oil has narrowed to $20 per tonne from more than $120 a year ago, dealers said.

Crude palm oil is being offered at around $1,395 a tonne, including cost, insurance and freight (CIF), in India for December shipments, compared with $1,415 for crude soybean oil and $1,445 for crude sunflower oil, traders said.

The narrowing gap has turned buyers to soy oil, which is often perceived to be superior in taste and quality to palm.

India's palm oil imports in November fell to 585,000 tonnes from 693,000 tonnes in October, said Sandeep Bajoria, chief executive of Sunvin Group, a vegetable oil broker. Soyoil imports in November jumped to around 400,000 tonnes from 217,000 tonnes a month ago, while sunflower oil imports rose to 200,000 tonnes from 117,000 tonnes, Bajoria said.

India buys palm oil from Indonesia and Malaysia, with soyoil mainly imported from Argentina and Brazil. It purchases sunflower oil from Russia and Ukraine.

In December, palm oil imports would remain below 600,000 tonnes and soyoil imports could rise above 400,000 tonnes, Patel said. The spread between palm oil and soft oils is narrow for December and January shipments, but is widening from February onwards, said a Mumbai-based dealer with a global trading firm."From February onwards, palm could start regaining market share. But imports would remain lower during the winter season," the dealer said.In winter, household palm oil consumption falls in India as the tropical oil solidifies at lower temperatures.

(Reporting by Rajendra Jadhav; Editing by Devika Syamnath)

Source : www.agriculture.com

India's plans for 20% ethanol-blending will cut sugar subsidy

India's plans to blend 20% ethanol with petrol from April 2023 will help cut sugar export subsidies, Oil Secretary Tarun Kapoor told reporters. India on Wednesday approved a proposal to achieve 20% ethanol-blending with gasoline by 2025, five years ahead of its previous target. Higher ethanol output will cut India's sugar production, reducing the need to give incentives for the export of the sweetener.

(Reporting by Nidhi Verma; Editing by Toby Chopra) - Source : www.agriculture.com

Agri crops in 50.40 lakh hectare hit due to heavy rains & floods

Agriculture crops cultivated in about 50.40 lakh hectare of area have been affected across the country due to heavy rains, floods and landslides so far this year, with maximum damage reported in Karnataka, Parliament was informed.

Agriculture Minister Narendra Singh Tomar, in his written reply to the Lok Sabha, said about Rs 8,873.60 crore has been released as of November 25 from the State Disaster Response Fund (SDRF).

Additional assistance, over and above SDRF, is considered by the National Disaster Response Fund (NDRF) for natural calamities of severe nature and is approved based on the memorandum received from the state governments, he added.

As per the data placed before the Lower House, Karnataka has reported a crop damage in maximum area of 13.98 lakh hectare as of November 25, followed by West Bengal (6.90 lakh hectare), Rajasthan (6.79 lakh hectare), Bihar (5.80 lakh hectare), Maharashtra (4.55 lakh hectare) and Uttar Pradesh (3.61 lakh hectare). On a question that if the Centre plans to waive loans of farmers in the affected districts, Tomar said, "No sir."

He said the Indian Council of Agricultural Research (ICAR) provides training to farmers on effective flood management in flood plains and flood-prone ecologies of India.

Source: economictimes.indiatimes.com

Cane arrear reaches Rs 4,445 cr in 2020-21 season, maximum in UP: Centre

Cane dues to be paid by sugar mills to farmers stood at Rs 4,445 crore during the 2020-21 season (October-September), with maximum arrears in Uttar Pradesh, Parliament was informed. During the 2020-21 season, a total of Rs 92,804 crore was to be paid towards sugarcane price to the farmers. Out of which Rs 88,359 crore has been paid and the balance Rs 4,445 crore dues are pending, as per the data placed before Lok Sabha by Minister of State for Food Sadhvi Niranjan Jyoti.

Of the pending dues during 2020-21 season, a maximum of Rs 3,752 crore cane dues is to be cleared by sugar mills in Uttar Pradesh, followed by Rs 394 crore in Maharasthra, Rs 64 crore in Chhattisgarh and Rs 63 crore in Haryana, the data showed. About

Rs 52 crore dues need to be cleared to farmers in Uttarakhand, Rs 44 crore in Gujarat, RS 37 crore in Andhra Pradesh, Rs 25 crore in Tamil Nadu and Rs 9 crore in Punjab in the said period, it added. The cane dues of Rs 130 crore are still pending for 2019-20 season, while Rs 365 crore for the 2018-19 season, the data showed.

The minister said the data regarding cane dues of the farmers are received from the concerned state governments.

The powers to enforce the provisions of the Sugarcane (Control) Order 1966 with regard to payment of cane dues to farmers is vested with state governments as they have necessary field information for its implementation, she said.

Source: economictimes.indiatimes.com

Rural wages: Kerala tops list, 15 states lag national average

A rural worker (men in the non-agricultural segment) in Kerala earned an average of Rs 677.6 daily for 2020-21, taking the top position among the states, according to statistics released by the Reserve Bank of India.

Rural workers in Kerala earn way more than their counterparts in more developed states like Gujarat and Maharashtra and over double the national average. A rural worker (men in the non-agricultural segment) in Kerala earned an average of Rs 677.6 daily for 2020-21, taking the top position among the states, according to statistics released by the Reserve Bank of India. While the national average is Rs 315.3, in Maharashtra, considered as the most industrialised state and a leading producer of farm products, a rural worker earns just Rs 262.3, according to the data sourced from Indian Labour Journal of the Union Government's Labour Bureau.

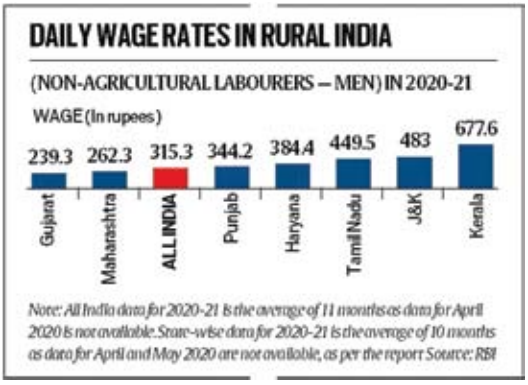
In Gujarat, considered a role model for development and industrialisation, a rural worker got Rs 239.3 during the year. While Uttar Pradesh's rural worker gets Rs 286.8, a rural worker in Bihar gets an average of Rs 289.3 daily. On the other hand, Kerala is followed by Jammu & Kashmir (J&K) where the rural worker got Rs 483 and Tamil Nadu Rs 449.5. Rural daily wage in 15 of 20 states are below the All-India average, indicating that consumption trend across the country could be in line with the movement daily wages. The wage data is available for 20 states.

There is also wide variation in per capita output generated across states. For 2020-21, Goa was at the top, with highest per capita net state domestic product (NSDP) of Rs 3,74,055, followed by Sikkim at Rs 2,57,999, Delhi at Rs 2,54,001 and Haryana at Rs 1,63,992. Bihar had the lowest per capita NSDP at Rs 31,017, behind Uttar Pradesh at Rs 41,023, Jharkhand at Rs 53,489, Meghalaya at Rs 56471. Many states recorded a reduction in per capita NSDP in 2020-21 over 2019-20, possibly due to reduction in output because of the lockdown.

In the rural agricultural segment also, daily wage data shows similar state-wise pattern. In Kerala, daily wage in the agri sector is Rs 706.5, followed by J&K at Rs 501.1 and Tamil Nadu Rs 432.2. While the all-India average is Rs 309.9, Gujarat's agri worker get just Rs 213.1 and Maharashtra Rs 267.7 per day for 2020-21. In Punjab, it was Rs 357 and Haryana Rs 384.8. All-India data for 2020-21 is the average of 11 months as data for April 2020 is not available. State-wise data for 2020-21 is the average of 10 months as data for April and May 2020 are not available, as per the report.

The rural daily wage goes up in the construction sector. In Kerala, daily wage in construction is Rs 829.7 while the all-India average is Rs 362.2. In Tamil Nadu, rural construction worker gets Rs 468.3. In Maharashtra, a rural worker gets Rs 347.9. Migrant workers are the main workforce in Kerala. The total number of other state domestic migrants in Kerala was about 31 lakh during 2017-18, according to a study released by the Kerala State Planning Board in March. The KSPB report says interstate migrants in Kerala, on average, earn about Rs 16,000 per month, of which they are able to generate about Rs 4,000 (on average) per month as surplus income or savings.

Source : indianexpress.com



Over two lakh high-value tree saplings to be planted in Thanjavur farms under sustainable green cover scheme

Over two lakh high-value tree saplings will be planted in phase I of the Tamil Nadu Mission on Sustainable Green Cover on Farmlands in the district. The scheme, launched by Chief Minister MK Stalin last month, is being implemented under the National Mission for Sustainable Agriculture and under the sub-mission of Agro Forestry. "Under the scheme, a willing farmer will be given a maximum of 50 saplings per acre, free of cost, if he or she wants to plant them on the bunds of his field. If the farmer wants to plant the saplings in his field itself, 160 saplings per acre will be given," an Agriculture Department official said.

The willing farmer has to register in the Uzhavan app under the section of benefit registration, providing details such as survey number and Aadhaar number, among others. An officer would inspect the field where saplings are to be planted and an order would be issued for the farmer to collect the saplings from the nurseries of the Forest Department. A total of 2,02,800 saplings have been allotted for the first phase in Thanjavur district, officials said, adding that 52 per cent of the target has been achieved so far in terms of issuing orders to farmers to collect the saplings.

As many as 27 species of trees, including sandalwood, red sandal, teak, Pterocarpus marsupium (Vengai), neem, Melia dubia (Malai Vembu) and Pongame oil tree (pungai) are listed in the app. However, in Thanjavur district, only five species are being made available in the first phase. Teak saplings are made available in the largest number (1,75,600). The government is also providing Rs 7 per tree a year for three years from the second year after planting. P Govindaraj, a farmer from Thozhagirippatti village, said, "If we have to buy a sapling, it would cost us anywhere between Rs 70 to Rs 80. But the government is giving it free of cost. So, it is being received well. I have taken teak saplings to plant in the bunds of my field. The time is apt as there have been rains and the saplings will come up quickly."

Of the 14 blocks in Thanjavur district, Thanjavur, Budalur, Orathanadu and Tiruvonam are getting the highest allocation of 22,000 saplings each, as they have more rain-irrigated fields compared to other 10 blocks in the district. Papanasam block in the old delta area gets the lowest allocation of 9,800 saplings in the first phase.

Source : www.newindianexpress.com

Bayer initiates drone trials in Hyderabad for agriculture

Bayer, an enterprise with core competencies in the life science fields of healthcare and agriculture, conducted its first drone trial on Tuesday at its multi-crop breeding center in Chandipa, near Hyderabad.

Adopting digital technologies, such as drones, can help overcome these obstacles and support more targeted applications of insect, weed and disease-control products. This ensures correct dosage and also limits the risk of accidental exposure to chemicals. Besides, drones also offer real-time agronomic advisory to farmers, enhancing farm productivity and fostering sustainability.

Engagement with government

Bayer has been working closely with the Government of India, Ministry of Agriculture and Ministry of Civil Aviation, industry bodies, regulators, policymakers and drone manufacturers over the last few years to introduce a conducive policy framework for the implementation of drone technology in Indian agriculture. The company secured approvals to conduct R&D and agriculture spraying operations to make the drone technology available for smallholders.

The Union Minister of Agriculture & Farmers Welfare, Narendra Singh Tomar in his message said, "India is making giant strides in technology and digitalisation and adopting these for enhancing agricultural purposes is a step forward in our efforts to provide a strong impetus to farmers' prosperity."

Helping farmers through drones

D Narain, CEO & MD, Bayer CropScience Limited said, drones are operating in other small farmer countries in Asia and have the potential to deliver significant value to smallholders in India, as well as for the economy and the planet. The drone trial in Hyderabad showcases the potential of the future of farming. Bayer has partnered with innovative drone startup, General Aeronautics and conducted several in-house and external R&D trials with universities and central research institutions to generate data to make drone-based services available to farmers.

Based on the initial achievements of drone farming, growers may be able to explore the technology's capabilities in aiding paddy, corn, sugarcane, wheat, vegetables, fruits and plantation crops and harvests in the future.

Source : telanganatoday.com

Five common mistakes to avoid while buying farmland in India

Land as a commodity has many uses and features, however owning a plot of the land brings with it a serious amount of paperwork and background checks. Legal formalities can be intimidating for some but once successfully completed, owning a managed farmland can be extremely rewarding and fulfilling.

Following are the common mistakes to be avoided while buying an agricultural land

IGNORING THE IMPORTANCE OF UN-DISPUTED LAND TITLES:

Checking the title of farmland is the fundamental observance that must be done prior to purchase. If the land's clear and marketable titles are not confirmed, would lead to legal complications. So, it is important to ensure that there are no disputes over the title and area, as these things would only add to the delay in acquiring the land. Farmland title verification should date back to a minimum of 40 years from the date of purchase. It also includes the careful perusal of mother deed documents.

ASSUMING ONE STATE LAW HOLDS GOOD IN ANOTHER STATE:

Agriculture in India is a state subject, which means that different states have different laws. Being unaware of the state agricultural laws could lead to a set of legal entanglements. Depending on the state in which the farmland is located, all the documents required while conducting the due diligence should be done according to the State laws in force. The land area and boundary is also verified with government survey records and physical verification.

Following is the list of the basic documentation required while doing the due diligence:

- Title Documents
- Encumbrance Certificate
- RTC – Record of Rights or Pahani
- Mutation Extract
- Family Tree History
- Patta Book
- Survey Documents include – survey sketch, Akarband extract, Hissa Tippani book extract, Tippani, Phodi extract, Hudbust Register extract, atlas, and village map.
- Conveyance Deeds
- Khata Certificate
- Grant Certificates

FAILURE TO CONDUCT A PROPER PHYSICAL LAND SURVEY:

There is much more to land than its own history. Failing to physically verify the land could lead to a false assessment of the suitability of the land for agriculture. For example – if you are looking for agricultural land for sale in rural Bangalore then, just verifying the documents wouldn't suffice, rather physical verification of the land and its boundaries is also necessary.

NOT KNOWING THE SELLER:

To trace the origin of the property is one of the major purposes of extensive document verification. Tracing should always begin with scrutiny of the earliest document recorded.

For example – if agricultural plots are up for sale in North Bangalore, knowing about the history of the land-owners would tell you about the history of the land-use itself. It is necessary to do because you do not want to purchase the seemingly fertile land only to find out that is located in an environmentally sensitive zone or is under dispute.

A SHORT-TERM OUTLOOK AND FAILURE IN GOAL SETTING:

Most of the time, investing in agricultural land is about farm life experience and connecting with nature. But, it is also important to remember that it is still an investment you are making into your future, in sustainable farming, to grow your assets, and finally invest in the community and the planet. Similarly, Goal Setting is taken pretty lightly by agricultural enthusiasts.

Without setting, goals can lead you down a path of uncertainty and disappointment when you don't get the returns that you expected. While setting goals when investing in farmland is highly dependent on the type of return on investment you wish for. If you are specifically motivated by long-term return on investment then you can invest in Agroforestry, which will bear you a sweet fruit in the forthcoming years.

Source : krishijagran.com/

Want to cut down food-related emissions? Look at supply chains

During GreenBiz's VERGE 21 conference last week, conversations surrounding the food sector and its goal for reducing carbon emissions kept intersecting at one key point — the supply chain.

"All of these commitments are going to be cascaded into the suppliers," Julia Salant, head of sustainability innovation at EcoVadis, a sustainability ratings company, said during a VERGE 21 session on tracking carbon. "All of this will need to be translated into action within supply chains."

But supply chains for food products are inextricably complicated. Every ingredient in a food produced starts at an individual farm and can have many links until it gets to the retailer including passing through a processor, packaging middle man and a branded wholesaler. Knowing every input and output will be key to making the millions of tiny changes that lead to emissions savings.

"Some organizations don't have transparency down to the farm gate, because of the commodity exchanges and how supply chains are organized," said Tim Faveri, vice president of sustainability and shared value at Maple Leaf Foods, a packaged meat company in Canada. "So collaborating with other partners is going to be really, really important."

He emphasized the importance of working with companies that are upstream of the farmer, such as a fertilizer company, to encourage meaningful change from both sides. Food executives know that the key to reducing their companies' emissions lies in the data, transparency of and improvement in their supply chains. But an audience member at VERGE 21 brought up how the many requests for data and formats are a huge burden on the suppliers.

"Your Scope 1 is someone else's Scope 3." "Every company has its own dream questionnaire," answered Jason Kibbey, CEO of Higg, a supply chain management and measuring company. "We need to do a much better job because there's just too much data collection out there. We need to focus on impact and we need smart ways to make that data collection easier."

During the session, Kibbey reached out to fellow panelist Salant to suggest creating a standardized questionnaire that fulfills most of that dream one, so then suppliers would only need to fill in the gaps, removing duplicate work.

As grocery stores sit at the nexus of consumers and suppliers for food, they have a huge influence on what supply chains look like and can force suppliers to adhere to certain sustainability standards, according to Charlotte Linnebank, co-founder and executive director of Questionmark, a nonprofit focusing on researching healthy and sustainable food production. Even with suppliers that might be hesitant or feel they can't do enough.

"Sometimes a supplier is nervous to share information because maybe they're not doing that much in the space," said Chris Brooks, director of sustainability at Walmart. "But then I'd explain that it's better to show you're starting the journey than you're not on the journey at all."

Brian Lipinski, an associate in the food program at the World Resources Institute, outlined that supermarkets should be following in the footsteps of Tesco and Walmart, which use their scale to encourage suppliers to make more sustainable choices. These big players have the resources and contacts for extensive vertical collaboration and communication. Brooks' dream, if he had a magic wand, is to get all Walmart's suppliers in the same room because as Kibbey said, "your Scope 1 is someone else's Scope 3."

Even food waste, which accounts for 8 percent of greenhouse gas emissions each year, is partly a supply chain issue, according to Lipinski.

"If a producer, for example, is not using proper storage techniques, that food might end up having a shorter shelf life because of what happened upstream, but then the waste shows up at that retail level," he said. "Different segments of the supply chain can influence each other but you only have control over what happens in your own boundaries." That is, unless you form strong partnerships at scale all the way down the supply chain. Strong partnerships can address more than just food waste. By working with millions of farmers, food companies can start to make a dent in carbon emissions.

"For farming and agriculture to be a big impact in climate change, it has to be a large acreage, because sequestration rates per acre are relatively low," Emma Fuller, science lead for carbon and ecosystem at Corteva AgriScience, a major player in the American agricultural chemical and seed industry, said during a VERGE 21 session on working with farmers to achieve net zero.

There are 282 million acres of row crop production in the U.S., according to Fuller. Partnering with farmers by educating them about carbon sequestration, making data collection understandable and creating an economic benefit for switching is the only way to bring regenerative agriculture onto all those acres.

Source : World Economic Forum

Online Meetings @

www.agricultureinformation.com

Upcoming events

JANUARY 3, 2022

3:00 pm
Mr. Manik Patil on "Grapes cultivation economics and marketing"

5:00 pm
Dr.Mam Singh on "Protected cultivation of rose"

JANUARY 4, 2022 3:00

3.00 PM
Ms. Tripti Tiwari on "Commercial cultivation of black turmeric – monetary benefits for farmers"

5:00 pm
Ms. Punnam Veera Reddy on "Tissue culture teak plant production and their performance"

JANUARY 5, 2022 3:00

3.00 PM
Mr. Ansari on "My experience in manufacturing agriculture implements since 1955" To know more view https://bit.ly/33WL5RY https://bit.ly/33Moszo

5:00 pm
Mr. Jaykumar Alagundagi on "About mulching film- use in vegetable cultivation" To know more view https://bit.ly/3eII27R

JANUARY 6, 2022

3.00 PM
Dr. Srinivasan V on "Production technology in black pepper"

JANUARY 7, 2022

3.00 PM
Dr. Umesh Shriram Mundlye on "Rain water harvesting -- Appropriate solutions and sustainable schemes"

5:00 pm
Dr. Praveen Singh on " Hydroponics cultivation and marketing " To know more view https://bit.ly/3mvYHdc

JANUARY 10, 2022

3.00 PM
Ms. Mallika on "Old v/s New Fertilizers — Are we adapting to the new technology ! "

JANUARY 11, 2022

3.00 PM
Mr. Manish Khandelwal on "Role of automation in rice milling industry" To know more view https://bit.ly/3qpX4yP

5.00 PM
Mr. Venkatachalam P on "Neem agro products"

JANUARY 12, 2022

3.00 PM
Mr. Yogesh Gawande on " Niyo spray pump - New method of spraying" To know more view https://bit.ly/3Ewz1Dj

JANUARY 13, 2022

3.00 PM
Mr. Ranjith Kumar on "Organic farming in moringa oleifera"

JANUARY 19, 2022
3.00 PM
Dr. Amol Kamalakar Bhalerao on "Climate change and career opportunities for sustainable growth"

JANUARY 25, 2022
5.00 PM
Dr. K. T. Chandrashekar on "Sandalwood cultivation – From nursery till marketing problems and opportunities"

JANUARY 28, 2022
3.00 PM
Mr. Vithal on "AQUASOL - A water testing kit" To know more view https://bit.ly/3yVh6VQ

5.00 PM
Mr. Sriram Prasad G – "Experiences of an IT engineer turned agri entrepreneur"

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Recently Completed Meetings

Mr. Vasudevan V on "Marketing facilities for Farmer Producer Companies"
Mr. Vasudevan V says they are member of a Consortium Producer Company in Tamilnadu. They make arrangements both domestic and foreign markets for value added agricultural products. They are also member in various All India Forums such as Association of FPOs, APEDA. Their leaders of Consortium company are having well connected with CII, FICCI etc.

Priyanshu Jain on "Setting up and marketing hydroponic crops"
Mr. Priyanshu Jain is the Founder of Agri Joy LLP in Agra, Uttar Pradesh. His interests are Hydroponics and Sustainable Agriculture. To know more view https://bit.ly/3gthMdQ

Mr. Nishanth M on "Irrigation automation by Mobitech Wireless Solution"
Mr. Nishanth M is an Agronomist at Mobitech Wireless Solution Private Limited in Erode, Coimbatore. To know more view https://bit.ly/3yaV9Si

Dr. Pankaj Sharma on "Sesame production in India and factors effecting its production; diseases"
Dr. Pankaj Sharma is a Plant Pathologist at Punjab Agricultural University in Ludhiana, Punjab. He says sunflower production in India is going down very sharply and among the major factors, diseases are playing important role. To know more view https://bit.ly/3hgZ9Zi

Mr. Ramakoti K.Venkataramana on "How a small farmer earns higher income by taking up bamboo cultivation"
Mr. Ramakoti K.Venkataramana from Ongole, Prakasam Dist in AndhraPradesh is a retired Scientist from CSIR-Indian Institute of Chemical Technology, Dept.of Science and Technology, Hyderabad, Telagana.

Mr. Kulkarni HB on "Repealing the new Farm Laws - Repercussions faced by FPOs and FPCs"
Mr. Kulkarni HB is the President of Federation for Re-farming Societies in Bengaluru, Karnataka. To know more view https://bit.ly/3ByAKrA

Ms. Teena Elizabeth Alex on "Longan - exotic fruit cultivation, economics and post harvest management"
Ms. Teena Elizabeth Alex is a Microbiologist at Home Grown Biotech in Kottayam, Kerala. She says longan fruit has gained popularity now a days as an exotic fruit, and is priced on world markets with strong demand for its desirable flavor and semi-translucent to white aril. The fruit production has increased over recent decades because of great improvements in agronomic practices and other aspects.

Dr. Digvijay Singh Rathore on "Commercial cultivation of aloe vera and basil as an intercrop"
Dr. Digvijay Singh Rathore is a Project Advisor at Amritanjali Ayurved (Opc) Pvt. Ltd. in Udaipur, Rajasthan. To know more view https://bit.ly/38O0WRK

Dr. Sushant Shekhar on "Exotic varieties in mushroom - Economics & marketing"
Dr. Sushant Shekhar is the Founder & Director of Jayaa Agro Foods in Deoghar, Jharkhand. His interests are mushroom cultivation , manufacturing and value addition. To know more view https://bit.ly/39wZtiQ

Dr. Sheshagiri Gubbi on "Sustainable way for doubling the farmers returns"
Dr. Sheshagiri Gubbi is the Co-founder of Sirisamashti Krushi Pvt Ltd., Koppal, Karnataka. To know more view https://bit.ly/3zNd69v

Mr. E. Ashok Reddy on "Banana tissue culture "
Mr. E. Ashok Reddy is the Technical Incharge at Vigneshwara Biotech in MS Nagar, Bengaluru. His interest is on micropropagation of banana. During this meeting, Mr. E. Ashok Reddy will discuss about tissue culture, banana tissue culture, micropropagation, media preparation and hardening.

Dr. Shivalingam Elayabalan on "Importance of indoor air purifier plants"
Dr. Sivalingam Elayabalan is the Technical Director / Agriculture Scientist at Sankar Bio-Tech in Hosur, Tamilnadu. His interests are in Agricultural Biotechnology (Plant cell, Tissue culture and Molecular Plant Virology); AI technology for banana pest and disease detection; Mass production of bioinoculants and plant cell line development; Promotion of organic banana cultivation; Import and Export of planting materials ,fruits .

Mr. Surajit Sinha on "Climate-smart solution for mitigating crop production risk"
Mr. Surajit Sinha is the Head – Agritech at Farmsio in Chennai, Tamilnadu.
He is into
– Market linkage through digital technologies and a professional over more than 16 + years of success in achieving revenue, market expansion, profit and business growth.
– Reshaping agriculture through digitization and impact into a single platform to the millions of smallholders
– Worked on input marketplace integration, market linkage and direct advisory
To know more view https://bit.ly/2YnOovx

Mr. Ramana Rao on "Graviola fruit - Health benefits and marketing opportunities"
Mr. Ramana Rao KV is the CEO of Trisakthi Stevia Farms in Hyderabad, Telagana. To know more view https://bit.ly/3cKiIrc

Mr. Anil Kumar Sawhney on "Black cardamom - a high value crop in micro climate"
Mr. Anil Kumar Sawhney is the Proprietor of Godson Organic Farm in Bareilly District, Uttar Pradesh. To know more view https://bit.ly/3bkFi92

Mr. Minkal Bansal on "Business plan to set-up commercial vermicompost"
Mr. Minkal Bansal is the Promoter at Suman Vermicompost at Jalesar in Uttar Pradesh. To know more view https://bit.ly/3DhbVjI

Dr. Vidur Sahgal on "One Village - One Farm & From Farm to Fork"
Dr. Vidur Sahgal is the Proprietor of Original Mechanization & Data Integrated Consultancy (OMDIC) , New Delhi. To know more view https://bit.ly/3ndAauz

Mr. Mandar Vasudeo Athalekar on "Digitization of agri-food supply chains"
Mr. Mandar Vasudeo Athalekar is the Growth Leader – Technology, Stellar Value Chain Solutions in South Mumbai, Maharashtra. To know more view https://bit.ly/3ptQxCM

Dr. Anurag Saxena on "Cultivation and post harvest processing of apricot"
Dr. Anurag Saxena is the Principal Scientist & In charge at ICAR-National Dairy Research Institute in Karnal, Haryana. To know more view https://bit.ly/3cZQI2N

Mr. Yogesh G on "How to earn good income in rural areas by becoming an Entrepreneur"
Mr. Yogesh G is Manager at Sanjivanii Agro Machinary in Nagpur, Maharashtra. To know more view https://bit.ly/3FRyltg

Mr. Ramana Rao KV on "My experience in promoting stevia cultivation in India"
Mr. Ramana Rao KV is the CEO of Trisakthi Stevia Farms in Hyderabad, Telagana. To know more view https://bit.ly/3cKiIrc

Dr. C. Vaithilingam on "Role played by bio-solubilizes in reducing chemical fertilizers usage"
Dr. C. Vaithilingam is the Managing Director of Romvijay Biotech in Pondicherry. To know more view https://bit.ly/3nBw5QS

Dr. P. Naveen Kumar on "Commercial cultivation of bulbous flower crops – tuberose and gladiolus"
Dr. P. Naveen Kumar is a Principal Scientist at ICAR – Directorate of Floricultural Research, in Pune, Maharashtra. To know more view https://bit.ly/3HEGAKZ Dr. P. Naveen Kumar says Tuberose and gladiolus are bulbous flower crops which have good potential for commercial production in India. Tuberose is grown for loose and cut flowers and also for extraction of essential oils whereas gladiolus is grown

Mr. S. Vijay Kumar on "Micro irrigation - why it is absolutely necessary"
Mr. S. Vijay Kumar is an AGM – Technical Services at Premier Irrigation Adritec Pvt. Ltd., in Bengaluru, Karnataka. To know more view https://bit.ly/3nyicD3

Dr. A. Ramalingam on "Opportunities in seed production"
Dr. A. Ramalingam is a Principal S.Thangapazham Agricultural College in Vasudevanallur, Tenkasi District, Tamilnadu. To know https://bit.ly/3CtxInJ

Mr. Gorityala Vidyasagar on "Impact of climate change in Agriculture "
Mr. Gorityala Vidyasagar is the Assistant Director of Agriculture at Department of Agriculture, Govt. of Telangana, Hyderabad , Telagana. To know more view https://bit.ly/3yt9Cba

Dr. R. Venkattakumar on "Innovative marketing of fruits and vegetables during COVID 19 lockdown period"
Dr. R. Venkattakumar says during the lock down period phase 1 of COVID 19 pandemic, there was a difficulty in marketing of fruits and vegetables by the farmers due to lack of transport facilities and mobility restrictions. However, there were some initiatives by the development departments, KVKs, FPOs and private organizations to help the farmers to sell their produces. Such initiatives were documented for recommendation towards replication and drawing out some pointers as conclusions.

Mr. Abhishek Dasani on "Automation in farming – How these systems can help farmers in saving costs and producing better yields"
Mr. Abhishek Dasani a Partner of Revot Automation in Faridabad, Haryana. During this meeting, Mr. Abhishek Dasani will discuss on how IoT technologies can help farmers save on labour costs and effectively manage indoor environment conditions to improve on yields and do better produce management. Development of cost effective automation solutions that can today allow farmers to record and manage various input parameters (temperature, moisture , pH easily right from their phones.

Dr. BSR Reddy on "Jackfruit production and value addition"
Dr. BSR Reddy is a Senior Lead Scientist at ITC LIMITED in Rajahmundry, Andhra Pradesh. To know more view https://bit.ly/3krVl9Z

Mr. Sai Krishna on "Speed breeding, a promising approach to crop breeding"
Mr. Sai Krishna is Jr. Breeder at Mangal Murthi Seeds at East Godavari District in Andhra Pradesh. Mustard oil is intensely concentrated with anti-nutritional components like erucic acid and glucosinolates that makes the oil inedible for human consumption. Breeding is done to reduce the contents of these fatty acids ..

Dr. PK Shrivastava on "Dairy scenario in the world with current Indian status"
Dr. PK Shrivastava is a Dairy Business Consultant at M/s. Dairy Consultancy India in Bengaluru, Karnataka. To know more view https://bit.ly/2Sj19bn

Online meetings are available only for Premium Members

Talking to

Dr Digvijay Singh Rathore

Commercial cultivation of Black turmeric with Fig intercrop

Dr Digvijay Singh Rathore talks about Black turmeric and its benefits and ways to cultivate it through intercropping with dry fig fruit.

Dr Digvijay Singh Rathore has worked for the last 13 years as a project advisor at Amritanjali Ayurved OPC Private Limited in Udaipur, Rajasthan. He has a Doctorate of Philosophy PhD from Mohan Lal Sukhadia University. He has published sixteen of his research papers from 2015 to 2021 and is associated with several agriculture uni-versities all over India. He also provides training to the farmers regarding organic farming, livestock farming and Agri farming setup.

INTERCROPPING

Intercropping is a practice that involves the cultivation of two or more crops for mutual benefits of the different crops and for improving the fertility of the soil. Farmers earn more by cultivating two crops at a time and selling them. Intercropping mainly came to practice after 2008 and increased near 2018. It's practised primarily in Asia. Production all over the world through intercropping is nearly 1200 million tonnes as of 2018.

BLACK TURMERIC: CURCUMA CAESIA

Black turmeric is a perennial herb with bluish-black rhizome, native to North-East and Central India. The leaves have a deep violet-red patch that runs through the length of the lamina, and it appears to be similar to banana leaves but in an oval shape. Talking about its uses, Dr Digvijay Singh Rathore says it is used to cure cancer and other health problems like piles, leprosy, etc., Presently Black turmeric is on the verge of extinction.

ANJEER: FICUS CARICA (FIG)

Fig is an Asian species of flowering plant in the mulberry family. It is an essential crop in those areas where it is grown commercially; since ancient times, it has been cultivated native to the middle east and western Asia. The fruit and ornamental plants contain minerals and many beneficial nutrients like Vitamin A, B1, B2 etc.

INTERCROPPING BLACK TURMERIC WITH FIG INTERCROP

Black turmeric and fig, when intercropped, offer several mutual benefits. The farm will become to be termite free since black turmeric's root controls soil-borne fungus. Also, the larvae increase fertility. Black turmeric can be intercropped continuously for two years in fig cultivation. Usually, the fig is cultivated during February-April or June-oct, and black turmeric is grown in February-March or July-October periods. Initially, for 5-10 years, the production of fig increases and then is the same for 30-35 years, while black turmeric is a ten-month one-time crop. Black turmeric can be grown in hot temperatures and grows well in direct sunlight. It can tolerate 41 to 45 degrees Celsius. The fig tree grows best when the temperature range is between 15 to 21 degrees Celsius but can handle up to 48 degrees Celsius.

TECHNIQUES WHILE INTERCROPPING

Farmers can use external supplements with organic manures and fertilisers to provide soil nutri-ents and maximise the products. Vermicompost to give nutrition and earthworms to land, Gyp-sum is used as a soil conditioner that controls the pH value of soil, Neem cake to eradicate soil-borne insects, and Trichoderma destroys all harmful substances fungus.

While intercropping, there are ways to increase production and make intercropping more effec-tive, and one of them is by mulching. Covering the land with a plastic sheet, placed on the ground around plants that helps to suppress the weed growth, retain soil moister as the water tends to stay in the sheet and prevent the roots from freezing and also prevents insects from get-ting inside of the sheet which helps in the growth of crops better. Through mulching, it has been recorded that it increases yield up to 1.5 times.

Intercropping of Black turmeric and fig is an excellent way to get a greater yield of good quality products and increase income with less expenditure. Black turmeric can be cultivated in gardens as well. Fig fruit doesn't grow in coastal areas, while 150kms away from the coastal area is ideal for fig production.

EARNINGS

Investing 300KG x 700 RS PER KG of rhizome worth Rs 2,10,000 leads to income of 4000KG X 250 RS PER KG i.e. Rs 10,00,000. Investing 440 plants x 150 RS PER PLANT of fig worth Rs 66,000 leads to income of Rs 3,08,000 in 1st year and reaches up to Rs 25,20,000 in 5th year.

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Talking to

Dr. Sowmini Sunkara

Founder and Managing Director
Agrighar Services Pvt Ltd, Hyderabad, Telangana

Dr. Sowmini Sunkara has a Doctorate in Biotechnology (with Plant Biotechnology as specialisation) and 15+ years of research & grassroot level experience in handling national and international projects related to rural livelihoods, agri-value chains, FPOs and grassroot innovations. She explains in detail about need of agri -entrepreneurship in rural areas, its scope, and prospects.

Agriculture is an important sector in Indian economy contributing about 18%, and as it is basically concentrated in rural areas, we would like to establish enterprises there so that the population of rural areas can be benefited. Agrighar is focused on getting the economy back to rural areas to strengthen their capacities.

Basically we need to make the land fertile by starting with integrated farming to prevent soil erosion and help improve soil fertility. There is also a need to introduce mechanisation as we are facing labour issues. It depends on the cropping profile. In India farmers grow a variety of crops, major crops being rice and wheat and there is a huge need of crop diversification while focussing on small millets, mini millets etc. We also should get the forest areas regrown and insist on multi-cropping pattern.

The turning point to shift my career to social sector was when I heard a farmer saying he is not willing to retain his son or daughter to the rural areas because agriculture is not profitable. We have to have a shift in the paradigm and make sure it turns out profitable by entering into food processing and value addition industry. The government is also focusing on that through promoting formation of FPOs, and agriculture value chains to transfer the benefit to the farmer. With the growing population, there is always the requirement for food, and we have to make agriculture sustainable. To achieve long term benefits, we need to shift from green revolution. India being the largest producer of pulses and cereals has a great market all around. We should not go back at this juncture but work on producing more grains to meet the requirements of the world. The fast moving consumer goods sector will be at 100 billion $ by 2025 when it focuses on semi-rural areas. The rural FMCG is expected to expand at 17.41% which is a indeed a good scope for growth. Among the leading retailers Dabur, HUL, and some more are there, but there is always scope for small companies to enter and capture the market. We need to have an idea where we are, what is our strength, what to emphasise on, and what to concentrate on. India is an emerging sector where everyone is talking about start-ups and entrepreneurship. Without waiting to get employed, it is time to emphasise on entrepreneurship opportunities to catch up with the agriculture business in India and shift to modern agriculture. You can work in the environment you create, you love, face the challenges, and manage it. It will give a different perspective for yourself, make you evolve, and give an avenue to deal with different people and situations. Our concentration should be on opportunities that can be established in rural areas since > 60% Indian population is still looking for avenues to generate economy, and the government is in line to create a transmissional change in the ecosystem. We have to appreciate the policies which will help us to move ahead, and we should be happy to stay at rural areas.

The huge scope of agri-entrepreneurship in rural areas can benefit Indian economy by reducing burden on agriculture, generating employment opportunities, reducing the need for migration, and increasing individual and national income. Agri start-ups are emerging areas which have huge opportunity, and the success of cooperatives in India have proved that the few initiatives taken in farming sector can benefit the agricultural families and entrepreneurs from rural areas. It is the only developing alternative source of employment and will bring innovation to improve yields per hectare.

Smart farming is the need of the hour, use of mechanisation, and biotechnolo-

gy bioproducts, and other technologies are the solution, but it is not going to solve the problems fully. So agro based industries can flourish in rural sectors where manpower is available in abundance and also at low cost.

One of such sector which will boost up your energies is food processing sector. You can operate at the low level of value chain not to lose the income and production, and we can enhance by adding value to the same slowly. So we at Agrighar Services envisage that the food processing industry can be developed in the rural areas to improve income and employment.

A simple example is a mini rice mill can be set up at a cost of Rs. 1.5 to 2 lakhs where immediate conversion of paddy to rice can be done. The benefits of adding value addition are many. When paddy is converted to rice, it is sold in higher quantity in the market. When it is further processed to rice flour, this can get you more benefit. The consumption of rice flour may not be too high, but it can fetch you more money when converted into snacks which will you get good margin in the perspective of consumer. Even the husk can be used for rice bran oil and also to feed the cattle which will also contribute towards environment/ waste management .

To brief about cost economics, Paddy per kg is sold at Rs. 18, but when you convert it into rice, you will get minimum Rs. 30 to 40 per kg. We need to check if we can generate such small scale enterprises at rural areas everywhere in India which can give us more value to the produce. The machinery will not cost you much, and it will be feasible for farmers. Everybody need not invest on this, may be one in a village or one flock of farmers/ Farmer producer organisations (FPOs) can invest in the machinery. Young agriculture graduates can take this up as an opportunity and invest in this and see that the benefit goes to farmers too. You need not have the procurement cost also if you deal with farmers in a better way, and benefit by selling to another customer too. Same way pulses can be converted into dhals. The common MSP for red gram is about Rs. 50 per kg, but when processed into dhal, it can fetch you Rs. 75. So every crop has the benefit of value addition to your benefit. Similarly wet turmeric when converted to dry turmeric and then further value added to turmeric powder which has a huge value in these covid days.

Fruits and vegetables is another sector that needs intervention in food processing industry. They may look very appealing and delicious, but they can be started as rural enterprises. There is a possibility that you can have your own brand and sell or resort to white labelling. You can be the manufacturer at the rural area and supply to big companies because there is a huge gap in the supply chain that needs to be addressed by small players. When it comes to oil seeds, there is cold pressed oil which are in great requirement, and we are not able to address the supply and demand. If you can convert peanut into butter, you have better scope for export. Let the farmers handle the production, and you can establish the linkages to the farmers for mutual benefits. Confectionaries, pickles, dry powders, and dried vegetables have huge market. You have the possibility of exporting the dry vegetables as not much of fresh vegetables are available there in other countries. For landless people also agriculture can be a source of opportunities. Opportunities such as Farmer service centres have good scope. We also need to focus on soil conservation. Though the government emphasises on soil testing, not many farmers are aware of it. We have to work on the new aspects of managing pests and diseases. Bio-manure can be a solution for soil replenishment and revision of concepts with less intervention. Azolla has huge opportunity which is a low cost intervention and can be added to farmer service centre.

Similarly Custom hiring centres can be used when you will be lending the agricultural implements to farmers on rent basis and generate income. Thus you can reduce the pressure of investment for a farmer and you also can have your own enterprise to offer the service and earn from the rent out of it. You can help in procurement and collection centres at paddy/wheat/maize growing areas. You need to work out the investment required for a custom hiring centre and how much you can generate back. Role of a collection centre is not only collecting but to give a temporary storage for the farmers. You can grade the produce at different prices than selling the entire

lot at one price. You can help in transportation to the market and take care of postharvest management too. You can also do this as a social enterprise and share the benefits by offering some discounts to farmer friends.

Waste management is another area where there is a huge opportunity. Segregating the degradable and nondegradable matter is a very big opportunity. We should focus on recycle, reduce, reuse, and recycle in the regular order. You can reduce the material that are not biodegradable, or if forced to buy them reuse them, and make use of the recyclable matter. There is scope for converting the waste into manure where the waste from your farm itself can be treated as manure to your farm. So with small investments, you can generate an enterprise and give opportunity to your fellow farmers. Biogas is yet another opportunity that can convert the waste into renewable source. You can generate at your own step with whatever manure is available. Cost benefit analysis by KVIC can be used to establish detailed project report. There are lots of subsidies from the government to establish biogas plants. You can refer to your local district officials on where to connect to.

Lots of schemes are available from the government for an agri entrepreneurship. The full benefit can be achieved if they work on the technology staff on how they link with farmers. Some schemes are PMFBY, crop insurance, Bhim Yojana, and PMEGP, and self-employment generation program. Through internet you can collect all the details of the schemes. Development councils help in emphasising skill development of the existing people to evolve as excellent workers.

There are a few universities that train the students who are ready to serve the country. Stand-up/ Start-up India scheme encourages SC and ST, and women are given good opportunities to use minimum investment to establish good opportunity. They are not successfully implemented because of lack of awareness. Even the funds to transport vans and units are not used fully. Creating awareness should be the prime focus. Never give up your dream. At Agrighar Services We initiated an integrated training and manufacturing/production unit involving a combination of various small scale mini food processing models and want to establish holistic approach system to provide solutions to all the above concerns. We are establishing a multi mini food processing centre such as mini rice mill, mini dhal mill, millet processing unit, cold pressed oils unit, solar cold storage unit, solar dehydrator where no commodity produced by farmer should go waste. We will also hold skill development and entrepreneurship development programs on all these units and also provide incubation support to all aspiring entrepreneurs.

What do you feel about schemes for BPL people when we don't have people to work in the field anymore and about freebies?

We have to work on retaining the existing structure and show them the scope to increase income. Schemes are floated, and a few have reached out with good benefits from them. However, they have their own criteria to reach out for catering to the schemes. The freebies will in due course be converted in the form of schemes. Farmers want such technical support but not freebies. Hence, FPO is a good concept to address these issues. So farmers are being advised to go for collective farming to strengthen themselves. Students should understand that there is huge scope in agriculture. Scope for agriculture is higher than any other industry, and it is this sector that can feed the entire human life. There are lot of emotional and attitude change that needs to be addressed. No journey is easy to handle and you should be ready to face the hurdles. Everyone is working towards it, and there should be mutual support. It will be easy if you are conscious about contributing to society. It will not happen overnight. We need more hands to support and join our Agrighar Services journey

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Dr. Hema Yadav

Director, VAMNICOM

How is VAMNICOM playing an important role in the development of Cooperative Sector?

VAMNICOM, Pune is an apex institution at national level to serve the education and training needs for the development of strong and vibrant cooperative sector in the country. The institute engages in training, education research and consultancy work in important domains concerning cooperation and rural development. It organizes international and national level training programmes on various areas of cooperative management for all stakeholders in credit and non credit cooperative sectors.

Please share the details of different training programmes, whom it benefits.

VAMNICOM conducts four long duration programmes viz. (a) PGDM – Agri Business Management (ABM) which is equivalent to MBA degree for fresh graduates (b) PGDCBM programme for in-service officers working in cooperatives (c) Diploma in Management of Computer Operations for in service officers of cooperative organizations and (d) International Online programme on Agri-business Entrepreneurship

Besides this, the institute also conducts short term Management Development programmes, webinars and workshops to cater to training and education requirements of cooperative stakeholders. During the last academic year of 2019- 2020, VAMNICOM conducted 136 programmes and trained 4168 participants. A total of 255 participants from SAARC countries (Bangladesh, Bhutan, Maldives, Nepal, and Sri Lanka) also benefited from contemporary training programmes conducted at VAMNICOM.

You mentioned about PGDM-ABM, how has VAMNICOM become the preferred educational institute for ABM aspirants?

PGDM-ABM programme is one of the most preferred programme amongst young agricultural graduates. The programme is approved by AICTE, recognized by Association of Indian Universities as equivalent to MBA degree and it has got accredited by National Board of Accreditation (NBA), New Delhi. The graduates of VAMNICOM secure 100 percent campus placements and over the years the programme has got a high degree of industry acceptance.

VAMNICOM has a rich network of alumni who have attained successful positions in domestic as well as international arena and add value to ongoing batches in for academic as well as entrepreneurial learning. The alumni are placed at higher positions in Agri input companies as well as banking, microfinance and other sectors. The institute is very active on digital platforms in today's world which helps us connect with important stakeholders in the agribusiness domain.

As per the guidelines of AICTE, the institute accepts national level test scores such as CAT, XAT, CMAT & GMAT for taking admission in

PGDM-ABM programme.

On what basis do you VAMNICOM claims to be among the top-ranked Agri-Business schools in the country?

Agribusiness management is a very specialized domain. Very few programmes in the country have got National Board of Accreditation status for their programmes in Engineering, pharmaceutical and management subject areas. National Board of Accreditation, New Delhi has granted accreditation to the two year full-time residential Post Graduate Diploma in Management – Agri Business & Management programme from 1.7.2015. This has been regularly inspected and extended up till 30.6.2022. Association of Indian Universities (AIU) has granted MBA equivalence status to PGDM-ABM programme from the year 2001 onwards. Now MBA equivalence status of AIU is connected with NBA Accreditation status. The institute has robust industry academia interface in the form of summer internships, live projects, research partnerships as well as more that 100 career forum sessions with agribusiness experts. This adds immense value to courses as well as teaching learning process.

How has VAMNICOM leveraged institutional linkages through consultancy?

The Institute undertakes research projects sponsored by various ministries like Ministry of Consumer Affairs, Ministry of Corporate Affairs and also apex institutions like NCUI, NABARD and IFFFCO. The institute frequently engages in consultancy services for various sectors of cooperatives viz., banking, sugar and dairy for IT implementation, recruitment of qualified professional manpower, defining job responsibilities of manpower in IT departments. VAMNICOM has successfully completed manpower recruitment assignment for NAFED as well as many cooperative banks during the last academic year.

How is Post Graduate Diploma in Cooperative Business Management enhancing competencies of practicing managers of cooperatives?

This course enables participants from the Co-operative and allied areas to equip with the appropriate managerial know-how to meet the emerging challenges of today's business environment. The curriculum of the PGDCBM consists of the six modules with five weeks of intensive on-campus Teaching – Learning sessions and field visits.

In view of the current pandemic situation, the entire PGDCBM programme is offered in the virtual mode. The course has unique specializations in cooperative credit and banking as well as cooperative marketing along with field based dissertations to simulate business like situations and decision making skills amongst the managerial cadre.

What kind of research projects are currently being carried by the Institute?

VAMNICOM through its "Centre for Research and Publications" formulates policies to encourage quality research in the area of cooperation and agribusiness through a number of research projects. The institute also gives policy recommendations to the Ministry and apex stakeholders as and when required through Action Research Programmes. The institute has completed 18 research and consultancy projects in the area of collectives which includes Cooperatives, Micro Finance and Farmer Producer Organizations. The research projects have drawn important findings especially in the area of agribusiness competencies, FPO competiveness, use of bio fertilizers, governance of PACS, women in cooperatives, technology adoption by cooperative banks, financial inclusion etc.

The Savitribai Phule Pune University and Symbiosis International University, Pune have recognised VAMNICOM for undertaking research work leading to the award of Ph.D. degree in Management, in general, and Cooperative Management, in particular.

What has been the response received by the institute for the Memorandum of Understanding (MoU) signed with various Institutions in India and neighbouring countries for maximising organization of exchange training programmes pertaining to management and development of cooperatives?

VAMNICOM has entered into MoUs


Inauguration of PGDM-ABM 2021-23 batch


Inauguration - Cooperative week

with eight institutions during 2020. Some of the MoUs are as follows :

1. Kolhapur Urban Cooperative Banks Association for recruitment and training programmes
2. National Cooperative College, Mauritius for collaborative training, research & Consultancy services
3. National Institute of Cooperative Development, Polgolla, Sri Lanka to conduct collaborative training, student exchange programme and Research and consultancy projects.
4. Agricultural Development Bank Ltd., Nepal for conducting short and long term programmes, study visits/ exposure visits, collaborative programmes, Training of Trainers, Research and consultancy.
5. Banking Finance and Insurance Institute of Nepal Limited For conducting and coordinating in the areas of training, education, research and consultancy services, information technology and other allied services.
6. Charotar University of Science and Technology (CHARUSAT), Gujarat to collaborate and cooperate in the areas of training, education and 6 other knowledge based activities.
7. Yashvantrao Chavan School of Rural Development (YCSRD), Kolhapur for Research, training programmes, student exchange programmes
8. L J University, Ahmedabad to collaborate and cooperate in the areas of training, education and other knowledge based activities

Do you have any professional chair/association with the industry in your institute?

Yes, the institute has Indian Farmers Fertilizer Cooperative sponsored IFFCO chair which is functional for more than four decades.

What are the activities undertaken under IFFCO chair at VAMNICOM?

In order to promote agricultural research and cooperative education in the country, as part of their non-profit initiative, IFFCO has facilitated partnerships between scientific researchers from both industry and academia to drive innovation. IFFCO has established Professors' Chairs in Agricultural Universities and Cooperative Institutions. VAMNICOM has been part of the IFFCO chair since December 1981. Over the last 40 years, the collaboration between VAMNICOM and IFFCO has resulted in developments into practical applications that benefit their programmes and members through its research and training. The mutually beneficial partnership has produced groundbreaking research and innovation that solves complex problems, drives economic growth, and creates a more skilled workforce. Currently, under the chair, action research is being conducted for marketing strategies and market based development of fertilizers in Maharashtra. The research project aims to understand the marketing strategies employed by fertilizer dealers and retailers across the state and the constraints faced by them in selling fertilizer services and products.

How does VAMNICOM outreach Self Help Groups and Women producers group?

VAMNICOM is undertaking training, research and consultancy in various aspects relating to women development, SHG and micro finance. Institute has designed, planned and executed several programmes of training and research in various fields of gender budgeting, gender empowerment and self help groups. VAMNICOM has an MoU with Maharashtra State Rural Livelihoods Mission to develop the skills of SHG trainers in governance, financial management, business development and leadership. Some of the most notable programmes in this regard have been financial literacy programmes for women in development sector in collaboration with NABARD, leadership and governance programme for Maharashtra State Rural Livelihoods Mission and cooperative business management programme for Uttarakhand State Government Livelihood Collectives and Cooperative Societies (Supported by IFAD).

The institute also undertakes timely and contemporary research on women collectives and cooperatives to study the various issues of rural entrepreneurship.


Classroom

In terms of your faculty, what are some of the strong areas of capabilities available? What are the areas where you feel there is still a shortfall of capabilities?

The faculty at VAMNICOM are an assemblage of fine academicians with rich experience in the cooperative sector. The ability of the faculty members to work in synergy with a wide spectrum of collaborators in this field from local to international level makes them stand out.

There is not any shortfall necessarily but the faculty can be definitely encouraged to take their proficiency to new heights with innovative and diverse techniques in their training and research activities, contributing towards making the institute the Centre of Excellence. In addition to internal faculty members, experts are invited for offering special sessions.

What are the main challenges faced by the cooperative model today and how does this affect VAMNICOM?

The Covid-19 pandemic situation is having an unprecedented impact on the various cooperative models and the overall businesses as well. Lack of technological innovations and poor information dissemination system have adversely impacted the cooperative sector.

Amid these current circumstances, VAMNICOM feels there is a need of strengthening existing business models and exploring new and untapped opportunities for capacity building & technology transfer to the grass root levels of cooperative societies. Moreover, the institute has already been sensitizing people through its training programmes about the Information Technology sector and how it has become a necessity in the development of the agricultural cooperatives and rural financing institutions. VAMNICOM has outreached its stakeholders through webinars and online programmes.

In the wake of several reforms in Agriculture, Banking & coop sector how has VAMNICOM played an important role?

VAMNICOM has played an instrumental role in the ongoing reforms by facilitating development of skills, building market linkages, inculcation of cooperative entrepreneurship, and promoting innovation especially in financial & digital inclusion areas. The institute is a part of key policy formulations at the ministry level with in areas of cooperative education and training, promotion of cooperative brands, documentation of good practices and sound governance and management framework for PACS.

What is the roadmap of VAMNICOM for future pathways?

VAMNICOM, under the guidance of ministry will be spearheading many key activities related to the development of vibrant cooperative movement in the country. The operational excellence of an institute can be achieved through a proper academic and administrative environment. VAMNICOM which is engaged in the unique area of cooperation since its inception in 1947, has expanded its focus to the many important areas of rural development like Agribusiness. The institute makes a constant effort to engage in robust research will can yield the necessary policy inputs for all cooperative stakeholders. The institute also focuses on other forms of collectives like Self Help Groups and Farmer Producer Organizations by addressing some of their crtitical training needs in terms of governance and management. To meet the training mandate of the Government of India in the areas of FPOs, livelihood missions & skill/ entrepreneurship development, the Institute envisages further diversification of training programmes through the introduction of relevant certificate/ diploma programmes in the referred areas. In a nutshell, the vision is to make the Institute a “Centre of Excellence” for cooperatives in the country.

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Balkrishna Dhondiba Pansare

Proprietor, Pansare Nursery, Ahmednagar, Maharashtra.

Interested in cultivating pomegranates and dragon fruits. He gives the required details about the cultivation practices and economics of dragon fruits.

Dragon fruits are a new introduction to Indian markets since the last 3 years. It is the native crop of Thailand, Malaysia, Singapore, and to some extent China too. It is the main crop of Thailand and Malaysia. It is also grown in Mexico.

There are 3 varieties in dragon fruits - Red pulp, white pulp, and yellow pulp. The yellow pulp variety is yellow on the outside and has white pulp inside. It is not cultivated in India. People in India prefer red flesh with red skin. The red dragon fruit is sweeter than the white one, and it gives more yield than the white ones. Red fruits have higher rate in the market but less yield. White ones have bumper yield but fetch low price. So they both are almost same in the financial scenario per acre. People can decide which one they want to grow.

Dragon fruits are nutritious ones with many health benefits. Many doctors recommend dragon fruit because of the nutrients, and so the fruits are in great demand. In India, currently only 3 to 4% of dragon fruits are grown, and the rest are imported from other countries. There is plenty of scope to grow them in India. It is basically a cacti family. It can grow in any place. It does not require much water to grow. In high humid areas it gives bumper yield. So it is recommended to grow them in high humid areas such as coastal areas. It can also be grown in areas with less humidity, such as Pune. In places like Rajasthan where the humidity level is very poor, it does not grow.

About the land requirement, it does not grow like a tree. So you can grow it on normal soil. We have to ensure that there is no water logging. If there is water stagnation, plants will start rotting. The plants also require poles to grow which can be made of concrete. There should be a window on the top of the pole through which the plants grow and develop fruits.

We can make MS structure and at the top of the pole, we can put old tyres through which the plants can grow. It is more cost effective than cement windows. But we cannot make a MS structure fully because it gets hot during the summer which will damage the branches. So you can make the structure with cement or wood, but again wood has decomposing nature.

So it is not highly recommended. In South India, in places like Karnataka and Andhra Pradesh, they erect stone pillars which can be used. I have seen such stone pillars being used for fencing. The dragon fruit plants do not require fertilisers like pomegranate. In Dragon fruit even if you neglect the crop by not watering, it will give yield.

Many people want to know if we can export the fruits. As per my views, when India is importing the fruits

from other countries, there is no need to export. Anything excess only can be exported. We get good price for the dragon fruits in India. Based on the fruit size and period of the year, the price varies from Rs. 75 to 175 per kg. With drip irrigation, you can water the plants and control the supply. From outside both red and white fleshed ones are red only.

What is the economics of cultivating dragon fruits?
The initial investment for growing dragon fruits is Rs. 1 to 1.5 lakh per acre. Once the polls are installed and cultivation started, maintenance will be Rs. 5 thousand per acre. Since we install concrete polls, the cost is high when compared to other crops.

What is the yield per acre? What is the demand?
You can expect 12 tons per acre from the red ones. It varies from area to area. In Pune, where the humidity is less, we get 12 tons per acre. In a coastal area, we can expect 15 to 16 tons per acre per year. Initially the fruits were being sold in the metropolitan cities only. But now even in a local market people ask for it. Since it is a high source of antioxidants, people take it regularly for maintaining health.

What are the good varieties you can suggest for Karnataka?
The two varieties of dragon fruits are the red and white fleshed ones. There is no other specific varieties with genetic difference. The red ones yield less but the price is high. The white fruits have less rate, but the yield is very high. Both fetch the same income in terms of rupees per acre. You can grow as per the area requirements.

How many acreage in India have dragon fruit cultivation?
About 2 to 3% of the dragon fruits only are produced in India. The plant is being cultivated in India since 10 years, and we are into it since the last 7 to 8 years.

Where in India are these grown more?
The plants can be grown anywhere. In coastal areas it will do better. It is predominantly grown in Maharashtra. In my district about 100 acres have dragon fruit cultivation. In Maharashtra in 700 to 800 acres, dragon fruits are grown. Gujarat comes next in good dragon fruit cultivation.

Is it grown from seeds or seedlings?
It is a graft of 7 to 9 inches. We are exporting plants of around 1 to 1.5 ft height. They cannot be grown from seeds.

Are you a supplier of plants?
Yes, we supply all over India.

Any value added products from dragon fruits?
Yes. You can make sauces and wines. In India it is used for table purpose only. There is not enough production. Only when there is excess production, we can make value added products. In Thailand and Malaysia, they make wine out of dragon fruits.

What is the nutritional value?
The fruits contain antioxidants at a high level. So people who are health conscious, take it regularly to maintain their health.

Some unconfirmed sources say that they can be anti-cancerous too.

What is the spacing between plants?
There should be 9 to 12 ft space between poles. At one pole 4 plants are to be planted. Water requirement is very less. If fruits are grown in rainy season, plants can take water from the rain itself. In summer and winter, if you have sufficient water, you can give. I tried in the initial stages without giving water for 3.5 months in summer. Even then the plants survived and yielded fruits. The plants are very beneficial as they do not need much water.

Currently how many seedlings do you supply per month?
We supply about 15 to 20 thousand plants. We are exporting too considerably. Mauritius and Maldives do not have dragon fruit cultivation, and they are importing from us.

Since how many years is your nursery in existence?
Our nursery is functioning since 42 years. I am the 3rd generation working. We are exporting to 17 countries and domestically selling pan India.

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Dr. Praveen Singh

The Khetibadiwala is a hydroponic professional with hands-on experience on soilless, NFT and dutch bucket hydroponic growing system. He is from based in Delhi NCR, i.e. sector 110, Gurugram, Haryana. He is engaged in disseminating knowledge around hydroponic growing system and associated with around 4000 hydroponic aspirants through different platforms.

Hydroponics is a technique that people talk about now. There are three areas why this technique is becoming popular – agriculture output, resource, and expectation and requirement. In agriculture output, the quality is continuously deteriorating. We as consumers have no option to test or evaluate the quality and even, we have no idea of its source. But whenever agri-output is exported, there is a need to maintain a minimum standards. We as a citizen of India have equal right to know the quality of agri-output we are consuming. So, the option left for us is to grow our own crop and rest assured on the produce quality. Hydroponics is a such growing system which provide opportunity to grow most healthy produce. In this system you can grow your own crop within the scale and limited resources possible. People are becoming vigilant about the quality of products and are willing to pay for the quality products. So, everyone is viewing hydroponics as a commercial venture which is possible.

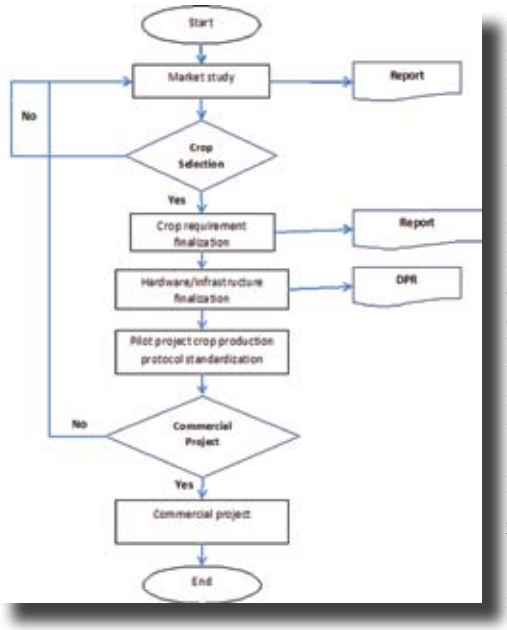
Agriculture resources include land, water, and air are becoming constraint. In metros the air quality is deteriorating and with landfills, we can't guess the quality of the soil where most of produce grown to meet the urban population's requirements. The growers, who is always worried for his profitability also are not even worried and are using sewage water to irrigate crops.

With the increasing pressure on land such as infrastructure development, buildings, and factories it is almost impossible to expand agriculture horizontally. The only option left is work on vertical expansion of agriculture production system. Hydroponics comes into picture to support in expanding vertically by opting vertical farming option. Not only this, hydroponics makes it possible to grow the products in our balcony or terrace. Food demand is increasing, and increasing demand is a matter of concern for the growers and consumers. This increasing pressure could be eased by growing parts of our own requirements in our own available space like balcony.

Hydroponics growing system is such, it needs less resources and produce more. But the high initial capital cost is a constraint. This growing system is also having a potential to deliver quick result, which is meeting the requirements of the young population who are looking for quick result. The entry of pandemic in our life has severely impacted the logistic arrangement for the agriculture output and most of the urban population were struggling. This has widened the gap between producers and consumers. This disruption is a potential threat for the urban population, so there is a need to adopt a growing system where the urban population could grow their partial requirements with their limited available resources.

The differences between traditional farming and hydroponic farming are: the traditional farming needs air, water, seed, soil, light and investment. For hydroponics all these are needed except soil. Traditional farming involves operations like tillage, seeding, irrigation, harvesting, storage. Again all these are there in hydroponics too except preparation and

weeding. Lower level of automation is found in traditional farming, and higher degree of automation is seen in hydroponics. Average level of skill is needed for traditional farming, but hydroponics need advanced skills. In traditional farming any mistake affects the crop and soil. Hydroponics does not have soil and no buffering agent. Traditional farming can yield best quality and quantity. In hydroponics, with proper knowledge and skill, you can get high quality and high yield. The resource use efficiency in hydroponic growing system is significantly higher than the traditional farming like the water requirement in hydroponics could be reduced to a level of 10% of the total water requirement in traditional growing system.



The traditional definition defines Hydroponics as "growing crop without soil", however there is a need to understand that this is technique is strictly associated to root and not having direct association on shoot. In plant there are two part one is growing green part (the shoot) and the raw material supply source (the root). So, the technical definition of hydroponics is "Hydroponics is a technique to crate ideal/better micro-climate around the root". This growing technique is such that it provides efficient control to the growers. Good hydroponics grower manages to create an ideal micro-climate around the root and the effects reflects on overall development of plant. Precise crop nutrition in the system ensures better nutrient absorption and use good raw material source, so the plants shows healthy growth.

Hydroponic growing system could be classified based on growing condition, nutrient circulation and light requirement. As per the growing conditions, hydroponics could be classified in to Soilless Hydroponics, Nutrient Film Technique (NFT) and Deep Water Culture (DWC)

Soilless hydroponic growing system is a system where the grower needs to use growing media like cocopeat, perlite, sand etc. The basic requirement of a growing media is that the media must be inert i.e. not having any potential to supply plant nutrition. Soilless hydroponic is practices un different growing systems. These systems are plastic growbags (single or pallets), rhyzobags, plastic trough, growing trench etc.

NFT growing system is a system where the plants are grown in grow channels. In this system only nutrient solution is used to feed the crops. In this system a thin layer of nutrient solution flows in the grow channels and the plant root absorb the nutrient from the running water. Some of the growers are using circular pvc pipe to grow their crop in NFT growing system. But as per the science, it is recommended that the commercial NFT project must use flat bottom NFT grow channels. As in the circular grow channels, most of the root tend to group at the lowest most part of the pipe. Due to tendency of grouping root at the lowest most part of the pipe, the total root surface area of contact to the running nutrient solution is always less. But if the NFT growing system is installed with flat bottom grow channels, the root will spread on the surface of grow channels and the surface area of root contact to the nutrient solution will increase significantly. Higher root surface area contact to nutrient solution helps in efficient nutrient absorption and finally better growth.

DWC growing system is almost same as NFT except the dept of flowing water is quite thick in this system as compared to NFT growing system. This is a common growing system in the area where the temperature variation is limited.

Identification of the most ideal hydroponic growing system is the key for ensuring success of the planned project. The criteria for identification of most suitable hydroponic growing systems are:

Types of crops – The duration of crop and total root area is the criteria for deciding the growing system. Crops with short crop cycle like leafy crops lettuce, spinach, rocket, arugula etc. are performing good in NFT/DWC growing system. However, the long duration crops like tomato, capsicum, cucumber etc. are performing god in soilless hydroponics growing system. The reason behind this is the oxygen requirement of the root. In short duration crops, the root system development is limited and the oxygen requirements could be met by the flowing water, but the long duration crops produce higher root area and it requires higher oxygen content to meet the respiration demand of the root and in soilless hydroponics growing system the trapped oxygen in the growing media ensures the availability of the oxygen requirements by the root.

Climate – Water temperature is the most critical factor for ensuring saucerful crop growth in NFT & DWC growing system. With the increase of water temperature, the dissolved oxygen content in water

reduces significantly. The reducing dissolved oxygen content in flowing water negatively impacts the root respiration. Using this principal, NFT growing system is good for the areas where atmospheric temperature variation is limited. Uniform temperature in the area will not impact much on the flowing water and will ensure constant water temperature. In the areas where the temperature variation is extreme, DWC growing system is better. The impact of temperature variation is always lower on higher volume of water.

The soilless hydroponics is growing plants in some inert media which play a major role in moisture holding and holding air in the root zone. In soilless hydroponics growing system, long duration crop with higher root volume performs good. Vine crops, like tomato, capsicum, cucumber etc are perform good in soilless hydroponics growing system. DWC and NFT hydroponics growing system are good for short term crops like lettuce, Kale, arugula, rocket, spinach etc. . Because roots of these crops require lower oxygen for root respiration.

Soilless hydroponics growing system are further categorised into plastic growbags, plastic growbag pallets, plastic troughs, tranches, and Dutch Baskets. The growing media used in soilless hydroponics must be inert in nature (substrate with no ability to supply plant nutrients). Cocopeat is one of the most widely used growing media in soilless hydroponics growing system.

In NFT, a thin layer of nutrient rich water flows in the grow channels and the root absorbs nutrient from the flowing water. As per the convenience of grower, NFT growing system is even used in the areas where both the temperature extremes are prevailing. The modification they are doing by introducing water cooling system i.e. chiller in the NFT growing system. Growers are opting for this option to overcome the challenge of addressing algae issue in DWC growing system.

Hydroponic growing system is also categorised based on the water circulation system. The system where nutrient water is run for waste i.e. excess leached water drain out of the system and absorbed by soil are known as open hydroponics system. In the other system is known as close hydroponic system where the excess nutrient water re-used in the system and it recirculate in the system.

Hydroponics growing system is also categorized based on the use of light. Some growers are using artificial light and growing their crop in indoor growing system, whereas some of the growers grow their crop in natural light. Based on this, hydroponics growing system are also categorized in to open hydroponics and indoor growing system.

A variety of crops can be grown in hydroponics growing system. These crops could be categorized into established crops, trial crops, potential crops and herbs. The established crops in hydroponics are the vine crops like tomato, capsicum, cucumber etc. leafy crops like lettuce, kale, arugula, rocket etc. Some of the crops are in trial to establish the growing protocol for the crops, these crops are herbs, flowers and saffron. There are crops having potential to be grown in hydroponics growing system, these crops are having high return potential like blue berry, turmeric etc.

Q&A

Where can we get the kit for hydroponic trial and hardware equipment?

There are different players are available in market who are selling ready to use hydroponics growing kits. These kits are a good option however it is advised to develop your own kit with the help of a local plumber. Developing own kits is a good option to enhance infrastructure designing skill.

Do you have the basic blueprint?

You can watch videos on YouTube and understand the hardware required. You need to find out what is the growing system for your target farm such as NFT, DWC or soilless. Then you can work out on how many plants are needed, the length of pipe needed, the growth channel which if you are doing for hobby you can go for circular else you need to go for flat bottom growth channel.

How do we convince the delta farmers to grow these types of crops?

It is not impossible to bridge the gap between the diversifying crop. But it is going to take a long time as the technology should be adaptable to the traditional growers. Lot of work needs to be done. We can try to contribute to reduce the load from the growers. It is good to bridge the productivity rate by field improvement. Working on it is possible but difficult to achieve.

Do you have any idea on how to obtain certification for hydroponics produce?

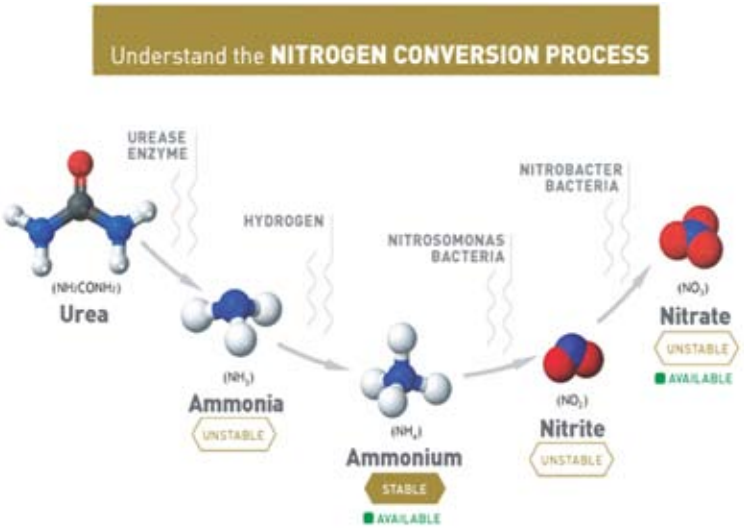
I feel why should we want to go for organic certification. The hydroponic products are the healthy produce. You can see in hypermarkets and big retail outlets they have hydroponic section. People are ready to pay and buy. We don't face any challenge when we sell our lettuce at Rs. 1000 a kg because we are fulfilling the customers' requirements. The customer can go for analysis and estimate the harmful agrochemicals residue level in hydroponic produce. We cannot produce certified organic produce in hydroponic growing system however we can claim that the hydroponic produce are one of the most healthy produce. In hydroponics you will have no contamination of soil, air, water, or land.

How will your suggestions reach the farmers?

I have a YouTube channel https://www.youtube.com/channel/UCMXWupKxFgkXrP3FVTTogZg , WhatsApp https://chat.whatsapp.com/G2ZRtUlV0HZ1DUQV5JD9Ln , and Telegram group https://t.me/+V8SMFLbj6_sz9k9J . I welcome anyone coming into these groups to get knowledge. My vision is to support or handhold those who want to ensure using the technology and achieve success. I am trying my bit to take it to the rural areas.

Will a certification for hydroponics alone will help to improve the market?

If you talk about commercial production, we should get certification as organic. We realised that we will not get more returns or premium by tagging it with organic. We have done a product innovation. We are selling in Delhi to Farm in Box. I agree that it is quite possible to do advocacy and get the certification for hydroponic produce.



Hydroponics is relatively a new technology for Indian growers. Over a period of time, there are a some myths developed around hydroponics growing system. These myths are:

• Growing crop in water is hydroponics – it is not just growing in water, there is also soilless growing in inert media. Supplying nutrients with water is hydroponics. So, it is a myth.

• Hydroponics can only be performed in protected structure – Hydroponics growing technique is only linked with the root i.e. creating better micro-climate around the root zone. There is no linkage of hydroponics with the micro-climate around the root. So, hydroponics could be practice in open environment. There is no mandatory need of protected cultivation structure for performing hydroponics growing. Protected cultivation structure is linked with ensuring off-season crop production. So, this is a myth.

• Hydroponics growing system is not a natural technique – As the plant are grown with supplying all the essential plant nutrients and grown with requited light spectrum, the growing crop in hydroponics is a natural way of growing crops. So, this a myth.

• Hydroponics degrades environment – In hydroponics the growers is having opportunity to accommodate a greater number of plants per meter. Growing more plant per meter is a direct indication of contributing more in air purification and ultimately helps in improving the environment. So, it is a myth.

• Hydroponics uses harmful lights – Plant absorbs only photosynthetically active radiation whether the crop is grown in traditional growing system or in hydroponics. So, the crop grown in hydroponics growing system are only utilizing photosynthetically active radiation and this only a myth around hydroponic technology.

• Hydroponics can only be practised indoor – Hydroponics growing system is such that the crops can be grown in any conditions like indoor, protected structures and in open environments.

• Expensive and difficult to practice – This is a myth in areas where hydroponics growing system is well established but in Indian scenario this is a reality and there is a need for indigenizing the system and develop skilled resources.

Hydroponics has witnessed a growth of around 7% per annum. This is an indication of growing demand of hydroponics produce. As per the population growth estimate, it is estimated to add another 3 billion people by 2050 with 80% of them are going to confined in urban areas. This urban centric population growth it is expected that the urban food demand will significantly increase. Hydroponics growing system is going to be one of the enablers in addressing the increasing food demand. Good number of hydroponic projects are installed in past decades, but most of them are at initial stage or at pilot projects stage, and most of them are struggling. These struggles are either because of hardware component of hydroponics or because of software component of hydroponics. Hardware component of hydroponics includes all the infrastructure required for the project and software includes all the aspects of growing crops i.e. crop production protocol. The contribution of these two component in success is 20:80 (hardware : software).

Hydroponic venture is a promising venture for the urban youth. It is advised to follow structured approach in starting hydroponic venture. Adopting structured approach in venturing hydroponics project will minimize the risk of failure. These steps are:

Return from any project depends on the marketing strategy. It is advised to follow a strategy of growing market led crops. The grower needs to develop a growing strategy to have a mix of unique crops/varieties on around 20% of the area and rest of the area should be under crops in demand. This will help the growers to retain their customer with them for longer duration.

Product innovation is one of the missing areas in any agriculture output business. Most of the growers are selling their produce as a commodity. There is a need to introduce product innovation in the system and develop customer-oriented product for generating better return. These innovations could be done either by introducing efficient packing or by doing product innovation.

Agriculture input is a crucial requirement. It is advised to hydroponics growers to use branded products only. Seed is a foundation for any growing system and it is required to procure seeds from companies like Monsanto, Clause, Syngenta International, Nunhems, Sakata Seed Corporation, and Advanta Seeds. A wide range of crop varieties are available with Johnny's seeds, the growers may explore the range on their website.

Among the source of crop nutrition, the growers need to use only water soluble fertiliser and that too from established fertilizer brands. There is a need to have automated fertigation system and adopt crop and stage specific fertilizer recipe. In hydroponics crop nutrition, efficient management of pH & EC is the heart of crop nutrition. One of the most commonly used water-soluble fertilizer i.e. 19:19:19 is not suitable for hydroponics growing system because the source of 19% is coming from urea. Urea is a soil grade fertilizer and it need hydrolysis before it converts into available form i.e. NH_4, NO_3.

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Ashwin Sawant

Head & Owner, Scientific Hydroponics

His interests lie in R and D in Hydroponic Fodder for the last 10 years and its effect on animal husbandry. He is passionately training people in hydroponic system since 2014 to run their units successfully. He elaborates on the effect of hydroponic fodder in animal husbandry.

We are working on providing nutritious green fodder to animals using hydroponic method. It is a technique of growing green fodder using water and nutrients without soil. Hydroponic fodder is not new to India. The western and gulf countries are working on the hydroponic fodder, and we are also doing consultations for Gulf countries. Everybody is working on vegetables and vertical farming, but very few think about how to manage animals. We have to work on how we are going to manage the fodder. The land is shrinking, becoming infertile, and the global warming, irregular rainfall, and many other things are going to affect this. When the choice of using the land for fodder or human food, people are going to opt only for growing human food and not about animals.

Today animals are not getting proper green fodder as the feeding fashion is changing every day. Everyone is switching to cattle feed and concentrates which are very expensive. Hence it is important to know how to grow your own fodder. Otherwise farmers will be left with very less profit. Even though people in India are trying to get into the fodder industry, they are failing because they do not know how to work on that. They work in a non-technical way. We are providing Online consultancy and help them in setting up the units.

Hydroponic fodder is grown in a vertical farming method in close enclosures by controlling parameters. Based on the number of cattle you have, you should work on it. If you use 1 kg of maize or barely seeds, you will get 7 to 8 kg of green fodder from that within one week. In hydroponic green fodder, animals can be fed every part of the plant. In conventional method, roots and seeds disintegrate in soil, whereas in hydroponic method, roots and seeds are part of the fodder.

It is very important to know what you are feeding the animals. You should calculate the nutrient density and what nutrition it has. Nobody thinks of it, and just keep feeding the animals with fodder. Farmers adapt this technique because only 10 to 15% water is required compared to conventional method where you will need 200 to 500 litres of water to grow 1 kg of green fodder, and the harvesting period is 60 to 90 days. To grow 7 to 8 kg of fodder, you just need 500 sq ft. In a month you will get 15 tons of green fodder and in a year 180 tons. If you plant Napier or alfalfa, you will not get much yield. To get the same amount of fodder, you need 2 to 4 acres of land. You do not need any fertile land. You can grow on terrace also. In today's scenario, nobody can think of buying 10 to 15 acres of land to grow green fodder when they plan for a 200 to 300 cow project. Hydroponic fodder will save you water, land cost, labour, and fertiliser requirement. The operational cost is also very low.

In hydroponic fodder, the four parts, root, seed, stem, and leaf are used, while in conventional method, only stem and leaf are used. The major nutrition in the root parts can be fed to the animals when you opt for hydroponic fodder. The readymade feed and concentrates that we feed the cattle with now induces acidosis in them. You can also sprout the seeds and feed the animals, thus

increasing the nutrition, protein, and fat. The yield will increase. They get digestible protein. We have to feed the animals with grass which is their major requirement. Farmers pay heavily for the feed they get from outside, and the health of animals is also affected.

To grow 1 kg of fodder you need 1 to 1.5 litre of water only which is far less compared to the conventional method. If the soil is not good when you go for conventional method, you may need 1000 litres of water to grow 1 kg of green fodder, which is a waste of water, and this needs to be seriously considered. 0.25% land is needed when you go for hydroponic fodder method. You can grow more fodder in a hydroponic method as you grow them vertically. We give minerals by adjusting the pH. So the plants do not struggle to get minerals and nutrients.

The conventional method does not give enough minerals to plants, which the farmers may or may not know. The growth rate in a hydroponic system is very high. In India, people are misguided through articles and videos on YouTube. We in India are not following proper parameters. Farmers should check the pH of water and other technical issues. You will get good result if you follow the techniques.

In a hydroponic method, we can get the fodder in maximum of 9 to 10 days, 2 days for cleaning, sprouting, and soaking, and 7 to 8 days for drying. The conventional method takes at least 25 days to grow green fodder and 90 days to harvest. You have to plan in such a way to get 100 kg fodder. You can calculate the seeds, sprout, soak, and put them on trays. Once you get tuned to the system, you will have the planned quantity of fodder. We are arranging for getting good quality seeds from good companies.

To harvest 500 kg fodder per unit per day, you need 2 to 3 manhours only as the whole system is automated. We will have water rinsing system, pooling, pH controlling, and air circulation automated. You will need labour for the initial parts such as sprouting. In a conventional method to grow 500 kg of fodder every day, you will need 300 to 400 acres of land and 3 to 4 employees to cut it, bring to the platform, and chop it, and feed the animals. The cost of labour increases.

You can have at least 150 to 200 goats in a project of 500 kg unit. You can manage 50 to 70 cattle depending on their milk yield proportion. A single cow needs 15 to 20 kg, and in case of goats it depends on the breed and age. Maybe 2 to 6 kgs per day. We have to offer leafy fodder to the animals. It should be in the form of leaves or grass with enzymes to help in digestion as their intestines are designed in that way, and they are ruminant animals that can digest living green fodder. Our need for milk, meat, and other products is increasing manifold. So we need to manage the feeding system also accordingly.

The cost for growing hydroponic green fodder will be Rs. 2.50 to 3.00 only. Today people have to know what amount of nutrients they are feeding the animals so that no deficiency arises. When you produce on your own, it works out cheaper, and purchasing is very expensive. Animals can digest only 30-40%, and the rest goes waste. You can give the fodder in dry stage also, or whichever is the palatable form of digestion for the animals.

The digestibility of hydroponic fodder is 90-95%, and the conventional fodder it will be 70-95%. Since the cultivable land is getting reduced every day, with water shortage in many parts of the world and non-fertility of land, people have started using NPK. Nobody is using micronutrients. Any heavy usage of urea also damages the soil.

For 50-70 cows, you may need 1000 kg of fodder per day. The cost of the unit for this will be Rs. 14 lakhs. You can get 7 kg fodder from 1 kg seeds. The cost of the 1 kg green fodder will be Rs. 2.14. Operational costs such as electricity, nutrients, labour, and cleaning cost will be Rs. 0.75. So approximately one kg of fodder will cost less than Rs. 3. Purchasing the same will be more than Rs. 10 as it includes transportation, loading, unloading, and other expenses. You can thus save Rs. 7 per kg in this way and Rs. 25 lakhs per year. When you buy, you have to purchase at the rate of Rs. 25 per kg which is very expensive and will erode your profit. You may occasionally face problems like fungus etc.,

but you can correct the parameters. You will get the return on investment within 7 to 9 months. You can also sell the fodder and make money.

We also do turnkey projects and training programs apart from consultations. When you want to invest in cattle industry, you have to seriously think about growing your own green fodder too, and thus save about 50% of your money.

Could you please tell us where we can get the material and the initial cost for 50 cows?

You will need 1 ton per day unit for 50 cows. The material cost will be Rs. 5-6

lakhs as you need automation, building according to design, trays, cooling system, housing. The land requirement will be 1000 sq ft built up area which will cost Rs. 1.75 to 2 lakhs. The cooling system and automation will cost Rs. 8 to 9 lakhs. We don't suggest anybody to make it in a puff panel.

The temperature should be 25 to 30 degrees Celsius. You can use fan pad cooling system, and if you grow wheat or barley you need air condition. All the materials are available with me.

What should be the pH? What is the procedure to clean the trays so that it can be used the next time without any contamination?

pH should be about 7 for hydroponic fodder. We should use the proper cleaning solution for the trays. We can use cotton cloth also. It is just not enough if we maintain the hygiene, we should also use good quality seeds.

If it is a coastal area, humidity will be high, and you should have good ventilation. You have to do case studies, understand the system of the location, and then you will be confident enough to run the system. Maintenance of pH by automation will be expensive. By adding some chemicals in the tank, you can maintain the pH. You can use well water or bore water. You need to check the TDS of the water, and you should have filters If the TDS is more than 400 ppm.

Is the hydroponic fodder enough for the nutrition of the animals?

For nutrition, it is enough, but for fibre it is not. We have to provide dry fodder also as they may get protein, fat, and carbohydrates from the hydroponic fodder but not fibre. You can also give calcium as an extra measure depending on their milking capacity. You can adjust the fodder accordingly. There is no need for any other nutrient.

How long can we keep the fodder?

It is a green fodder. Keeping it for a long time is not possible as it contains enzymes. It will develop infections like fungus. You can manage for 12 to 14 hours maximum. You cannot stock. You have to dry and remove the moisture to store it. You can also make silage from this. Keeping in cold storage will be very expensive. It is better to get the fresh fodder for the animals.

Apart from fodder what else can be grown on this system?

In some places, they grow vegetables and wheatgrass that has a premium value. You can grow maize and wheatgrass. The roots are important.

Can we make pellets from the green fodder for longer shelf life? What about your training program?

We are working on that. We are planning to make pellets and silage. There will be no loss of nutrition. Only the moisture will be removed. Sometimes, the enzymes will drop but not the nutrition. The economics has to be worked out.

What is the time required for installing 1 mt unit?

Time needed for installation is about 15 to 20 days as we have to arrange for the material. We have to understand the design and building within your scope. If you give the entire project to us, it may take about 20 days. The cost will be Rs. 7 to 8 lakhs depending on the criteria.

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Ajit Sarangi

Co-founder, GreenOvations. Bhubaneswar, Odisha

Ajit Sarangi interests are agriculture and urban gardening. The company is revolutionising organic farming with soilless farming system. He discusses at length on doing farming in urban environment.

Taking into consideration the facts about urban growth, agriculture development, and how to connect farming to urban life, we understand that we are moving at a very fast pace and forget that time plays its role. We are quite aggressive and love achieving goals at a shorter time, but things will not fall into place then. The younger generation has to understand the importance of life, and plantation, gardening, and agriculture are the best way to make them realize the value of life. We need to make them understand that everything has its own timeframe.

We are staying in a concrete jungle in urban areas with no space for gardening or farming. The pandemic gave a break to the speed at which we were traveling for many years. Urban farming is something that will help the farmers to grow as well. GreenOvations believes that farmers need our support. Indian farmers are poorer than the ones in other countries. It is surely the mistake of the urban dwellers somewhere down the lane. GreenOvations has started redefining farming.

We should focus on urban farming, bringing all the urban people on one platform with all opportunities and inputs in an eco-friendly manner, in an organic way to produce their own veggies, fruits, and flowers to understand the importance of farming. They will understand the pain of agriculture when they cultivate their produce. That is the reason GreenOvations wants to work with urban people. We provide all organic inputs, manure, growbags, seeds, nutrition, and medicine. They understand how the seed germinates, grows, what manure to apply, how much water to provide, and how to cure the disease. We at GreenOvations believe in brand sales as we are a brand who believes in quality and transparency in pricing and are optimistic and expanding to other places.

The main aim of GreenOvations is to help farmers with whatever available space. If people are not willing to pay, we cannot force them to grow organic produce. First we will be focusing on urban people by coaching and training them, and then we will get into contract farming model for the farmers to grow organic produce to be sold at the market we create for them. We buy it from them at retail price and sell to buyers. We want to be one complete platform selling everything from agri inputs to outputs. We want to understand the buyers why they do not want to pay some good amount for the organic produce. We need to make them understand the value of the produce and agriculture. Then farmers will have some prosperity.

Urban farming has many advantages such as psychological benefits, freshness to daily life, shaping future generation, fuelling mother earth, and feeling the art of a real time farmer. Many will accept plants give a different kind of relaxation when they are in the garden. The plants energise, boost you, psychologically support you, and give you a different energy.

The flowers in the garden soothe your eyes for some time, especially in the stressful time we are all undergoing now. When you plant a tree or a plant in front of your kids, they start learning about it. They will understand that plants take time to grow and bloom, and everything has timeframe. It cannot be rushed through. On fuelling the mother earth, during covid times, our mother earth has been given a break which it very much needed. It asks us to plant more trees. GreenOvations feels that a farmer is a real artist behind all the food we take, but we do not realise the pain the farmers undergo.

There are many interesting factors in gardening. A sunflower is not just one flower. The black one in the centre is held by 800 to 1000 flowers. There are more microorganisms in

one teaspoon of soil than the number of people on earth. Some of our favourite fruits are from the rose family. The right orchid combination can smell like a favourite dessert. With such amazing facts, we have to respect mother earth.

GreenOvations has products like smart organic manure, fab grow pots, kitchen garden seeds, the shanti sabai pots, organic plant nutrition, and microgreen kits. We have our presence in Amazon, Indiamart, and our own website. Our organic manure is the rich cocopeat organic manure.

You just need to use half the quantity for the plants. The pH level of our manure is 6.5 to 7, EC less than 0.25, organic carbon 13.9%, total nitrogen 1.29, potash 0.8, phosphorous 1.24% and CN ratio is 10.8:1. We have grown on my terrace plants like palak, eggplants, carrots, bitter gourd, broccoli, cauliflower, sweet corn, and flowers like lilium using our manure.

Fab grow pot is based on growbag concept and is made of geofabric, available in various sizes, to facilitate easy flow of air, and light weight. You can fill microgreen kits with organic manure, sow seeds of macro greens like palak, and harvest in 7 days. We have various colours and sizes for flowering pots which are easy to carry and move. We have green and maroon colours and soon will be coming up with black too. The fabric pots help in aeration as they are made of fabric, helping the roots to remain in the soil the way it should be, and help in growing better.

Organic plant nutrition and microgreen kits will be available soon. We understand we cannot completely eradicate plastic from our lives, but we can replace to some extent. Many people feel there is water leakage in indoor plants pot. Sabai grass pots are made of a grass called sabai, grown in Odisha. We are the sole seller of this product.

They are cheaper than plastic ones giving a different look to your décor. Coir pots can be painted over with colours of your choice, and the quality is very strong. We can prevent use of plastic by using these.

We have sold 7 tons of organic manure and 1000 pieces of fabric grow bags in 7 months. The positive feedback shows that soil does not get hard. The pots do not break even if they fall.

Once the harvest is over, you can clean it and reuse. They do not occupy space. We at GreenOvations are planning to go biggest one stop solution in India with untreated seeds, manure, saplings, nutrition, growbags, medicines in one segment, chemical free and healthier way. By doing this, the confidence of the farmers will increase. The demand for organic produce and gardening is increasing. Once we take up the responsibility, the change will occur soon.

Can you throw some light on home composting technique and benefits? What is the shelf life of the growbags you supply?

Putting a chemical supplement to the kitchen waste and getting faster is not a correct one. We have to wait. Everything has a time to ripen. Vegetable compost can be a supplement, but we cannot fully depend on it.

The life of growbag is high as it is made of recycled pet bottles. They have a lifecycle of minimum 5 to 6 years. We at GreenOvations provide a guarantee of 3 years on our fabric growbags.

How are the sabai grass pots made, what is their weight and life?

Sabai is a traditional grass grown largely in Odisha. Many things such as sofa and hot cases are made out of this grass. The lifespan of the grass is not less than 3 to 4 years. It is a bit costly. The weight is not much when compared to a fibre or plastic pot. It is cheaper and weigh less than these. There are many designs on the sabai pots. You can check on our website and Amazon.

In Canada, they grow lot of microgreens at home. Are you also making microgreen kits for indoor growing?

Yes. We are coming up with that too. The team is working on it. You need only the manure to fill in and no soil. We provide the seeds in a pouch to be put in the pot and wait for 7 days. Not much of outdoor light is needed.

Do you have your presence in Hyderabad?

We are just 7 months old. We are now expanding to Pune. Once we have established in Pune, we are planning in Bangalore and Hyderabad. We are also coming up with franchise model soon because we are coming up with agri inputs like seeds, manure, growbags, and vertical enhancers.

May we know the prices?

A 12 inch growbag costs Rs. 90. Microgreen bags of 16 inches width and 6 inches height will cost Rs. 115 per piece. The bag of 7 inches height and 8 inches width for flowering plants will be Rs. 90 per piece. 10 inches height and 12 inches width generic grow bag for all medium size plants will be Rs. 120 per piece.

Bags of 24 inches width and 20 inches height designed for large plants of dwarf varieties of mango and orange are also available. This will cost Rs. 300 per piece.

Do the bags or containers leak water when we apply water to plants?

Yes, the manure or the soil will hold some amount of water, and the excess water will immediately come out of the bag to provide 360 degrees aeration.

How long can we cultivate mango in the bag? Mango has to grow 2 to 3 years before fruiting. Can we grow till that time in the bag?

The life of the growbags is not less than 5 to 6 years because they are made of the best recycled waste plastics. It won't get destroyed easily unless you throw into fire. We at GreenOvations can give 3 years warranty. Yes, the only condition is it should be a hybrid dwarf variety mango plant. Otherwise, it has to be planted in soil only.

How about plants like brinjal where you have to remove the plant after some time? Can we use the same bag and manure?

Yes, the life of manure is 2 years.

Microgreens are grown vertically at homes. Do you have some vertical structure designs?

Yes. We have some excellent designs for vertical plantation. It is a waterproof structure, drilled to your wall, and water will not soak into the wall because they are waterproof canvas behind the frame.

This is a complete fabric frame supporting plants as researched by vertical planters. Our pots are of 8 inch height and 8 inch width, bigger vertical planter with pots arranged in good space and depth so that roots can grow, and manure can be used. The plants can grow vertically as the pots have minimum 4 inches of distance. We have designed the vertical planter to let the plants have the space to grow. We, being the manufacturers, have the customisation rights with us. We can design according to the requirements.

What will be the varieties of vegetable seeds and cost, are they organic, and do you supply seeds or seedlings?

We have not yet started supplying seeds. We are in the testing phase because GreenOvations wants to test, get satisfied, look for more improvement before supplying to the customers. We will be supplying nontreated seeds from April. It is a completely organic stuff from the seed to sapling stage. We are planning to tie up with bigger names in the industry for best quality nontreated seeds.

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Dharmendra N Rai

Country Director - Association for Vertical Farming - Germany

Association for Vertical Farming (AVF) Germany a nonprofit organization which began its chapter in India and appointed Mr. Dharmendra N Rai as the Country Director. AVF's area of interests is to promote vertical farming, urban agriculture and support for the rural farming community with new technologies so they can get a better return and a better cash crop with a buy back. He says we should know the system operation with required inputs for a good growth when we opt for vertical farming in India. Right automation solution with tailored accessories will help.

In the foreseeable future, vertical agriculture will experience strong growth, where people cultivate crops for themselves at home and elsewhere, and also for business. We would like to bring sustainable crops and the development of vertical farming movements in India and globally to promote the healthy food, green globe, environment protection, and climate change. The production in vertical farming is between 8-10 times more than that of traditional farming using very limited space for cultivation. People are opting for exotic vegetables, but we believe it is not desirable given the market trend as a result of the COVID-19 outbreak.

There are several methods for Vertical Farming like Nutrient film techniques (NFT), Dutch bucket system, and Strawberry system. NFT involves layers ranging between 8-22 layers, depending on the height of the building. More plants can be grown in small areas. This is, in 1 sq ft area we can grow 4 plants, resulting in more productivity. For example, if you can grow 20,000 plants in 1 acre, however in vertical farming you can grow 16000 plants in 5000 sq ft. Vertical farming yields 8 times more than traditional farming. Also, there is more control over climate, water, nutrients, taste etc. as per crop.

Vertical farming can be done by anyone like individuals, corporations, religious groups, property developers. Even commercial spaces can grow their own crop for their food courts. This can be done in under climate-controlled area in different places like warehouse, balcony, terrace, basement etc. This type of farming is synonymous with Hydroponic technology, where we use only water for cultivation. The vertical cultivation we use only water and harvest time is as short as 35 days, whereas in traditional farming, it can take up to 3 to 4 months, as it has several steps like soil preparation among other things.

It is interesting to know that this is not a new way of farming. It has been in practice since 600 BC, like Hanging Gardens of Babylon. There are many important points in favor of vertical gardening: small space, conserved manner of water usage, no weeds or pests, time saving, and a controlled system and environment. We can grow leafy crops, fruity crops like strawberries and NOT any produce that grows in trees. As the plants use only water, the produce is clean and fresh and can easily meet the market demand. We can grow crops unaffected by diseases, and nature of biological control can be employed. In vertical farming, water usage is minimized as it will be recycled, and nutrient supply is as per the need. Mineral wastage is also reduced to a great extent. The mineral content in the water can be monitored daily and can be supplied with only the minerals that are needed.

Several aspects of Vertical Farming led to cost saving.

- Water savings up to 95%;
- pests and diseases can be controlled and no requirement of harsh pesticides;
- carbon footprint is reduced by up to 35%;
- manual labor is very limited and thus labor costs are reduced as they can be automated;
- 30% more production than traditional farming;
- Cost of transportation is reduced as many urban areas will start cultivating their own crops;

• Reduce health risk associated, growing inside a climate-controlled environment will have hydroponic and vertical farming;

• Nutrients for the hydroponic system are not needed as in traditional farming as they are found in the water we use.

YIELD PER HECTARE IN TONNES		
	Traditional	Vertical
Lettuce	50	300
Tomatoes	80	350
Cucumber	10	700

Vertical farming can be implemented anywhere such as in school and large food courts, and they can teach the techniques there. Small scale farmers benefit more here as the output is multiple times more than traditional farming. The target for this is local markets, retail vegetable shops, restaurants, hotels, and direct selling to consumers. The techniques can be easily learnt even by senior citizens, as this is not labor intensive.

The equipment required for this is very simple and can be easily sourced. One of the important things that is needed for vertical farming is grow-light. In a place like India, even in a climate-controlled system, use of artificial lighting can be drastically reduced, and natural sunlight can be used. As this type of farming has sustainable development goals, this can very well be a part of urban agriculture and also ending "Poverty and Hunger". This can enable food and nutrition security. Promote sustainable agriculture in urban centers. Helps to protect, restore, and promote a sustainable ecosystem by establishing deforestation for agriculture and holding biodiversity.

This empowers low-income individuals in creating sustainable food patterns. Currently this type of farming is cultivating medicinal plants along with regular plants. In the near future, Vertical Farming will be a part of the urban economy and ecosystem. There are different types of systems that need to be implemented for vertical farming, depending on the requirement, and Association of Vertical Farming (AVF) – Germany can help in building the systems as per requirement and also will train the people who are interested in venturing into vertical farming. AVF will assist in obtain subsidies and financial arrangement toward the project.

One has to look at the way the system works before they venture into vertical farming.

• Production planning, Budget preparation, Cost Monitoring;
• Labor and task management;
• Artificial light planning;
• Yield Forecast;
• Fertilizer planning and tracking;
• Plant protection;
• Inventory management;

Vertical Farming

- Climate data tracking;
- Post-harvest / pack housing tracking;
- Variety / performance;

Growing in not only about the right hardware but also technical knowledge, crop support and packaging, and marketing of the produce. The idea is to enable small farmers to have their own vertical farming business; where they can grow and market their produce. We at AVF will help by offering services in setting up fertilizer formulas, helping to grow the right crops, good market value, training programs, and assisting in project development.

Can vertical farming be adopted in residence also?

Yes. It can be practiced on the balcony or terrace. A tomato plant will grow up to 4 feet in traditional cultivation giving a yield of 3-4 kgs of the tomato per plant. However, in vertical farming we can grow up to 40 ft giving yield of around 25 kg.

What is the infrastructure required in residences?

This depends on what type of plant that we want to cultivate. As there will be no soil, we can have NFT pipe systems for leafy produce lettuce, spinach, or coriander etc. Dutch bucket system for growing fruity products like tomato, cucumber, and capsicum.

For a specifics of 30 ft height and 20 ft width what will be the investment?

Rs. 1800 – 2000 per sq ft. This total system cost includes Dutch green glass house, system cost, controlled environment system, dosing system, plumbing works, startup material that is seedlings and nutrient supply.

Is vertical farming a threat to a traditional farmer?

It is not going to be a threat to the traditional farmer? NO. It is going threat but very helpful to adopt to vertical farming, as they are going to have mass production from a small area and with more yield than in conventional farming Now, farmers are looking to diversify to cash crops whereby get regular income from their produce. The government is supporting such efforts and facilitating the famers by assisting with funding through financial institutions (commercial banks) at low rate of interest with a EMI moratorium period. Farmers are facelifted with KISHAN Card system, assisting with technical support during cultivation, supply of seedling at concessional rate. The Ministry of Ayurveda, Yoga, Naturopathy, Unani, Siddhi, Sowa-Rigpa and Homoeopathy (AYUSH) are promoting 240 medicinal plants through its National Medicinal Plant Board (NMPB) offering subsides between 30 to 70%. Stevia a medicinal plant and substitute of sugar in high demand due to its health benefits. The NMPB is providing subsidy of up-to 30% on cultivation of stevia and AVF supports towards buy back of the produce.

What is the kind of land that you are using for vertical farming right now?

The type of land required is not a constrain in Vertical Farming any sort of land area from terrace to dry land area, build-up area like warehouse, rooftops, basements etc. of a textile mill. People have been doing in shipping containers. To have better yield, fast growth and total climate-controlled environment people should adopt Dutch Glass Greenhouse superior to polyhouse setup.

What should be the minimum size for a commercial unit?

You can start off for 5000 sq ft. For non-commercial from 300 sq.ft

Is there any minimum size for availing the subsidy?

Subsidy for a poly house or a greenhouse can be availed for a minimum of 5000 sq ft. All the states in India have different rating of subsidies towards development of greenhouse.

Which system is most recommended – Aeroponics or Hydroponics?

It depends on the produce, however, NFT gives much more returns, less usage of water, nutrients and easy to handle.

What are the biggest challenges being faced?

Investment cost and marketing of produce. Need a properly planned business that will be ideal for vertical farming.

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Ankur Agarwal

CEO,
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Mr Ankur Agarwal is the CEO of Aruti Agritech India Pvt Ltd, Agra. He is very much focused on seed development using modern technologies, innovations, and engineering. He wants to help farmers by spreading awareness about the right seed quality and marketing of seeds through a proper distribution network. He gives suggestions and details on how to select good seeds and their characteristics in an interview.

Seeds are very important for human civilisation. When you use best seeds, you get good crop. We need to understand what is good seed and select them. It is part of a plant having living embryo and capacity to produce identical plant. It is used for raising seed crop and carrier of new technology.

Yield improves significantly when quality seeds of new varieties are combined with other inputs. A seed has 3 basic parts: embryo, supply of nutrients to the embryo, and seed coat. It is a living organism embedded in supporting or food storage tissue for food existence, and in grain, the supporting tissue is important for economic produce.

A seed can be defined as one containing embryo developed after fertilisation. It is a part of the plant that has the capacity to regenerate into a new plant. It is also responsible for maintaining the genetic quality of the variety of the hybrid. The embryo inside the seed is a living organism to support food storage tissue and protective coat. It is a link between two generations and carry generative part of a plant that develops into a new plant.

Physical quality – we have to check the characteristics of the seeds, such as physical storability, physiological, and genetic purity before buying. The seed quality is what contributes to seed performance. It can decide if a farmer's crop will be of good quality or bad or indifferent. The characteristics that determine the quality of the seeds are:

- Physical attributes
- Physiological attributes
- Genetic attributes
- Storability

These features help in determining and identifying a seed and to avoid low yielding seeds. The good quality seeds increase the yield and profit of the farmers. The possession of the seeds which has genetical and physical purity add to the physiological soundness and health status.

The major seed quality characters are:

Physical quality – cleanliness. There should be no debris, disease, or insect damage on the seeds. It should have uniform size, weight, and colour. They should be free from stones, dust, leaves, twigs, stems, flowers, and without other crop seeds.

They should not be shrivelled, discoloured, damaged, or empty. They should be identifiable as a species of a specific category of specific species. These aspects will influence the field establishment and planting value of seeds. They can be obtained by proper cleaning and grading of seeds after collection and before sowing, or storage.

Physical purity testing – the proportion of pure seed component in the seed lot and proportion of other crop seed, weed seed and inert matter by weight in percentage for which seed standards are prescribed. It helps in improving plant standard, raising pure crop, raising disease-free crop and in the use of seed drill.

Genetic purity – true to type nature of seed, the seedling plant from the seed should resemble its mother in all aspects. The quality is important for raising the crop or for getting desired quality factors. They are true to type plants or seeds confirming the features of the va-

riety as described breeders.

Principle – the generic purity and genuineness of cultivar is tested by heritable characters. Control of seed source, preceding crop requirement, and isolation may differ from crop to crop, and roging of seed field, seed certification and grow out test are helpful in safeguarding genetic purity.

Physiological quality – actual expression of the seed in further generation, multiplication. It comprises of seed germination and vigour. Liveliness of seed is called viability. The extent of liveliness for production of good seedling, and ability of seed for production of seedling with normal root and shoot under favourable conditions is germinability. Seed vigour is the energy or stamina of the seed in producing elite seedlings. The sum total of all seed attributes tht enables its regeneration under any given conditions. Seed vigour determines the level of performance of seed or seed lot during germination and seedling emergence.

Seed health – absence of any insect infestation and fungal infection in or on the seed. It should not be infected with fungi or insect or pest as these will reduce the physiological qualities of the seed and physical quality of seeds in long term storage. The health status of seed includes the deterioration status of seeds which also expresses through low vigour status of seed. The health status of seeds influences the seed quality and character directly and warrants their soundness in seed for the production of elite seedlings at nursery or fields.

Characteristics of good quality seeds

- High generic purity – for 3 types of seeds breeder/nucleus 100%, foundation seeds 99.5% and certified seeds 99%. This may vary from seed to seed of different crops.
- High pure seed percentage
- High germinability
- High vigour
- Higher field establishment
- No pest or disease
- Good shape, size, and colour
- Higher longevity and shelf life
- Optimum moisture content for storage
- High market value

How to select good quality seeds - Good quality seeds are essential to grow a healthy and strong crop, and selection is aimed at getting healthy and good quality seeds. Homeowners, seed producers, and farmers can understand the role the good quality seeds play in getting superior crops, landscape plants, and lawns. Good quality seeds have a vital role in producing agronomic and horticultural crops. Features such as trueness to variety, germination percentage, purity, vigour, and appearance are important to select good quality seeds for the farmers and homeowners. Without a steady of high quality seeds yield and crop quality would be greatly decreased or compromised.

Benefits of high quality seeds – money is saved when plants produce more seeds, strong and uniform crop, faster growth of plants to save time, better immunity to disease and distress, greater returns, resistance to weeds, robust yield to fetch higher price, fast reproduction, generical prowess, and better seed vigour.

Test conducted to determine quality – Standard germination test can be conduced anywhere as per the rules set by the seed analysts and from the books. Standard germination seed test measures the number of normal seedlings produced by sample of seed under optimal conditions. Germination is percentage of seed producing normal seedlings which are used for producing vigorous set of primary and secondary roots, healthy hypocotyl, epicotyl, and cotyledon apart from healthy shoot meristem. Abnormal ones are non-germinative and would not be counted in the total percent germination for the sample.

Some seed producers use tetrazolium, cold test, growth rate or other testing techniques to assess the seed vigour designed to evaluate the seeds ability to germinate and grow under less than favourable conditions.

Quality control program helps in controlling quality of seeds during seed production, crop harvest seed drying before reaching storage, seed processing by separated based on weight and boldness, seed treatment with fungicides, and seed storage in a proper manner. We can say that we will have good quality seeds that enable good crop and good return to the farmers.

How to check the dormancy of groundnut seeds and how to store?

I am into wheat and paddy. I have no idea about groundnut. Different crops have different dormancy period.

In the rural areas, they follow traditional methods to safeguard desi varieties of seeds. Can we follow the same or is there any technology to be adopted?

You have to follow the local methods only to safeguard the seeds as such methods only suit the local varieties of seeds.

Can you elaborate on seed propagation? How can a beginner, a medium educated farmer choose seeds? What are the practices he should look into?

When a new farmer goes to buy seeds for farming, he should check if the company supplying the seeds is good. Usually in order to maintain the reputation, companies supply good seeds and follow the standards if they have been supplying seeds in the local area for many years. He can also enquire from other farmers about the company from where they get seeds. It is not advisable

to go for new seeds. He should use 80% for seeds from company recommended by fellow farmers for giving good results. 20% he can go for new company seeds. About the physical appearance, the seeds should be bold ones. The next step is he has to germinate a few seeds in a paper or bag, and when it comes out, he has to plant it in his field to select good quality seeds.

What do you call good germination percentage if you want to call a seed a good one?

It depends and differs from seed to seed and each crop. The pocket containing the seeds will have the details of the percentage of germination of the crop.

Are details on the packets reliable?

Yes, they are. Only after the company conducts tests, it can put the details about the germination of the seeds.

Once the farmer picks good seeds from a local company and goes for germination, at the farm level, what special procedure he has to follow for production?

He should follow good farming practices to get good crop yield. Selection of good seeds, best farming practices that crop would need, water and fertiliser application at the right time, use of good organic plant growth regulation, and right dose of pesticide if infested by particular pests so that the other plants are not affected are some of the procedures he should follow.

How can the farmers preserve seeds at the farm level? For example wheat and paddy?

The farmers should not keep the seeds in the open field. They should keep them in some covered space. If they are unable to do so, at least in gunny bags they should put the seeds and keep the bags on a wooden frame to allow air pass through from bottom to top. They should cover the bags with tarpaulin and close the seeds. By doing so, the seeds will not be affected by external factors and will be preserved. There is no need for any chemicals to preserve them.

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Managing Director & Co-founder of Environment Conservation Society (SwitchON Foundation), Kolkata.

He is interested in renewable energy access, agriculture, skilling and education and Environment and Climate Change. He has led projects in partnership with various ministries of government of India and agencies like US Embassy, GIZ, UNDP, GE, WWF etc. He narrates his experience with 3000 flower cultivating farmers and Farmer Producer Organisation.

We are a not for profit set up since 2008. We work in 4 key areas – Clean energy technology, Climate Smart sustainable agriculture, Skills and livelihood, and Environment and Climate Change. We are working on creating FPOs from the vertical of agriculture, especially sustainable agriculture. We are operating on multiple projects and initiatives. We have set up organic companies to sell organic produce of farmers. We work with government, international foundations, and bilateral agencies on multiple issues. We work towards sustainability and equity livelihoods of marginal farmers.

We have impacted 10 lakhs lives, 5000 villages in East and Northeast of India and have trained 5 thousand people. We have a team of 100 members and have been recognised for our work nationally and internationally. We have professionals from Agri business, space, and wide range of experience in creating FPOs. We follow triple IS model, ideate, initiate, incubate, and scale up, to see where there is a problem. We identify the problem and based on that we generate an idea to solve the problems. We have worked on how the project becomes an enterprise or initiative by itself, not to be dependent for funding money or support from SwitchON Foundation. It then moves into incubation stage. At this stage the company or organisation goes to develop around it to scale up and solve the issues.

When we start to look at the problem of small holders as in East India, having small land is typically unsustainable and not economical. These farmers do not get access to common program, credit, and markets because they work in such small places, they do not have capacity, knowledge and are mostly busy with their farming activities. It is here that FPOs make a lot of sense. In the next 4 to 5 years, the government plans to create 10 thousand FPOs. We wanted to address the problems of food wastage, particularly fruits and vegetables.

We are associated with institutes like NABARD, SFAC and NCDC. We have a fairly good experience of creating enterprises to do skill development and capacity of farmers. Some of the companies that we incubated are ONganic Foods which sells organic produce of farmers, ONergy Solar for setting our solar systems, and ONskills. We have incubated about 1200 rural entrepreneurs. With the help of NABARD and SFAC, we have gone on to set up FPOs

so far and worked with multiple farmer groups.

The small and marginal landholding farmers do not get access to government programs, credit, or other farmers. It is a vicious cycle of poverty. That is why we created FPO, collectivised the farmers with the objective that they can benefit economically by bringing them together, so that government will start recognising them, and banks will have trust in them. The ultimate aim is to double farmers' income. It is a profession that has no aspiration at all, with farmers not wanting their children to become farmers. There is no surety of sustainable income and involves much hard work. So, it is important to double their income.

The role of FPOs is tremendous. By collectivising farmers, if we can combine produce of 3 to 4 acres of land, the market starts showing interest. Contract farming is also possible. Collective produce, booking van, and taking to the market become possible. If we want to start a processing unit, it is not possible with a small farmer's produce, but when done collective processing, packaging, and value addition, it increases the income. Their knowledge increases which ensures quality. When farmers go to a local mandi and sell the produce, they get whatever price is offered there. If they can increase the quality, they can get a better price.

When farmers become members of FPCs, they can become shareholders of the companies and learn guidelines, package of practices such as growing the produce and how to sell in the market. So, they are financially benefitted. FPOs when registered in the Company's Act, become FPC. There are certain guidelines to be followed. There should be minimum of 5 directors, and only farmers can become shareholders of the company. All the money invested should be given in the form of shares. Now the minimum share investment is Rs. 2000. They have voting rights. There is a management team, a CEO, and a professional team to run the company.

Identification – identifying a cluster where you want to set up the company where the villages and farmers are close to each other. We identified belts where farmers were growing flowers in small patches of land. Some of these clusters are already in collaboration with Block officers, district administration, and block level directors, ADAs, and DDAs.

Collectivisation – we need to tell them the benefits of coming under one FPO, but to become shareholders they have to pay money. This is the most challenging part of creating FPC. You need to convince them about the benefits. Then it forms into Farmer Interest Group. The farmers come together, and they have to open a bank account under the FIG name, collect the shareholding money, and it is invested in the name of the FIG.

They then start the activities. Market linkage is the most important activity because farmers come with an idea that they will start getting financial benefits from their practices. The FPO composition in hilly region and plains is: the FIG members is 7 to 8 in hilly region and 15 to 20 in plains, minimum farmer base in hilly regions is 100, in plain regions it is 300 and average member size is 200 in hills and 500 in plains.

Multiple agencies such as National Project Management agency which is at the central level, and private agencies such as NCDC, SFAC, and NABARD are involved. NPMA is technical supporting agency, and CBBOs are cluster-based business organisations who form the clusters and work with registering, enrolling, and supporting them from step by step. It is a 5-year program where CBBOs support the FPOs and other important things like setting up, giving equity grant.

All the funding that the farmers collect as equity is given as equity grants by the government. The 300 farmers pay Rs. 2 thousand each, which is the equity for the FPO to start the business. The government of India will give Rs. 6 lakhs as grant money to the FPOs. So the amount Rs. 12 lakhs can be used to start the business activities such as working capital, machinery, and applying for credit. The government also provides Rs. 1 crore credit guarantee cover to the bank. They provide credit linkage, marketing linkage, training, development, and agriculture training activities.

It is like any other business start-up. It has to undergo lots of financial regulations that the company is required to be a part of. The program management is very important as there will be review process, planning process, reporting, and assessment because without these FPC cannot sustain and succeed.

We are working with FPOs in the floriculture and horticulture sector. 4 FPOs were formed in West Bengal, Rs. 25 lakhs mobilised, 4 FPOs had applied for equity grant, and there are

3500 shareholders and Rs. 1.09 crores turnover of the FPCs. We help them access horticulture schemes and agriculture schemes. There are 3 FPOs on flower cultivation and 1 on cashews. We are connecting farmers with cut flower schemes and orchard plantation distribution schemes. Under RKYV, we are working on low-cost polyhouses and shade nets, PMKSY for drip irrigation for flower based FPOs to access, and FSSM scheme for farm mechanisation. Many machineries are given to farmers at subsidised cost. Under ATMA, West Bengal, scheme linkage, trainings and demonstrations are provided to farmers.

We help farmers to set up processing units. We have collaborated with SYMBIOSIS for their Agri Processing and Agri Business Management program. Their students train the farmers to make gulkhand and to made dry flowers to sell by processing. We help in getting cotton seed selling license, seed production license, and fertiliser licence.

They learn about multi-cropping, and government is procuring paddy and potato from FPOs than from other traders. A company, Foodies Agro wanted to export dry flowers and wanted 45 farmers to dedicate to grow aprajitha. FPOs bought flowers from farmers on contract basis, dried them and sold to Foodies Agro. The turnover has increased 3 times in the second year. The farmers get trained on making jam and jelly, and cashew processing. They can process 50 kgs now per day and are connected to local KVK for technical knowhow.

What is the initial investment for a director?

He has to bring in Rs. 2 thousand.

What is the total money required to start an FPO?

5 directors are needed to come on board with investment of Rs. 2000 each. We should create FIG first and will have 20 members depending on hills or plains. Each member will pay Rs. 2000. Then the FPO should be registered under Companies Act.

What is your arrangement for floriculture and horticulture produce?

Typically, a start-up would identify what their strength is, such as technology, marketing, or network. But with FPO people want to create a business around with horticulture. They form a kind of value chain in that area, and we identify that there is a cluster. With farmers sticking with the FPO, it should be understood what area they want to work and their aspiration. FPO can help in selling with the farmer base, they can multiply things, sell it to local mandi bypassing one chain or to another mandi where the farmers don't have access, but here margins will be low. To create a value chain, it is difficult as there are many challenges, traders, companies, and businesses doing the same work.

Through CBBPs, we can connect the FPOs to better customers and give training. We have to train FPOs if they don't have knowledge about how to negotiate with customers and quote price to them, and if it should be from the field or doing value addition. We come in with the idea to help farmers get better price, but you need to be very patient in the whole process.

Have you worked on organic produce?

We have one of our FPOs converted to organic. We got them certified to organic and help in selling their produce for better price from the market. Since many farmers expressed willingness to go organic, even if the investment is high, with the cost of input in traditional farming growing manifold, they were happy to switch to organic. Their only concern was if there is a drop in production of price how they will be compensated.

So, we started Organic Foods which gave them confidence, but there was a long relation building exercise for many years. With flowers it was quite challenging. It is difficult to take out the traditional farming from their mind in a short time. Farmers in remote areas were willing to look at sustainable practices.

Do you operate in South India?

We don't have operations in South India due to various reasons such as language and culture. We know many good organisations working on FPOs. We will be happy to share our experience and contacts with you. NABARD is the key agency who can help you.

Is there any bulk product we can buy from your FPO?

Our FPO grows wide range of products, right from oil seeds to field crops, rice, horticulture crops etc. Since Sikkim is an organic state, we plant to start FPOs there. We have access to spices from Northeast. Please let me know the quality, produce, quantity, and price range. We will help you.

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SaladStop aims to be 'Asia's leading personalized nutrition company' after $8.9m raise

Singapore-based food and beverage chain SaladStop has raised S$12 million ($8.88 million) in VC funding with a view to "fostering more tech-enabled growth," it announced recently. The Series B round was led by Singaporean sovereign fund Temasek, with Indonesian VC East Ventures, Singapore's K3 Ventures, and US-based Vulcan Capital – the investment arm of the estate of Microsoft co-founder and philanthropist Paul Allen – among the new investors to participate. Existing investor DSG Consumer Partners also participated in the raise. The 'grab n' go' salad chain was founded in 2009 by father-and-son team Daniel and Adrien Desbaillets, with the aim of creating a 'healthy' fast food option for busy urban consumers in Singapore. SaladStop has since evolved into a hybrid offline-online retailer. Digitalization was a gradual process, but was accelerated by the Covid-19 pandemic; today, more than half of the company's sales come from online channels. Now, the company's ambitious goal is "to become the leading personalized nutrition company in Asia" through tech adoption and development. "Our mission is to shape the future of food in Asia, and to ensure that healthy food is convenient and accessible to everyone," CEO Adrien said in a statement.

To do it, SaladStop is being "fuelled by innovative and proprietary technologies, a network of cloud kitchens, and a new generation of transparent, tech-enabled, and scalable health food brands," he added. Those additional health food brands include sushi and poke chain Wooshi, plant-based protein e-grocer Good Food People, and Heybo, which sells takeout bowls focused on grains. Beyond launching these new concepts, the SaladStop Group has also used the past few years to expand to 69 locations across Singapore, Hong Kong, Indonesia, Japan, South Korea, Vietnam, the Philippines, and Spain.

Some of the Series B funding will be used for further geographical expansion; the company plans to launch in four further Asian countries by 2025, while growing its presence in the region's "second-tier cities" by building more cloud kitchens.

"We have built an extensive infrastructure across the region over the past few years and will continue to leverage our technological capabilities and proprietary cloud kitchen operating model to accelerate our growth in emerging markets.

Read full @ https://bit.ly/30K3QH5 / Source : agfundernews.com

Arya.ag introduces buy now pay later facility

Agritech firm, Arya.ag has come up with a buy now pay later (BNPL) facility for those buyers who buy roughly 150-200 tonnes of agri produce (grains/oilseeds/pulses traded annually). This will help mitigate the age-old challenges of finance in the commodity buying space.

Buyers on the Arya.ag platform can currently receive a credit of up to Rs 25 lakhs with a 0% interest rate for 14 days. This amount will shortly go up to 2 crores. To avail the BNPL, buyers need to upload their basic KYC and financial details. Once onboarded, they can avail credit quickly. As a platform, Arya.ag is bringing together multiple players offering BNPL services and plans to extend these financial solutions to warehouse rent, loan repayment, etc.

Speaking on the launch of BNPL, Prasanna Rao, CEO Arya.ag said, "There is always a need for simple and innovative financial solutions in every sector. BNPL, which is mostly available in the retail space will now be made available for people in the B2B trade of agri commodities. Through the BNPL service, Arya.ag will bring in more ease and trust in commerce and the market linkage transactions. It will mitigate payment risk for the supplier and add assurances for the buyer which will benefit farmers, FPOs and small agri businesses selling on the platform."

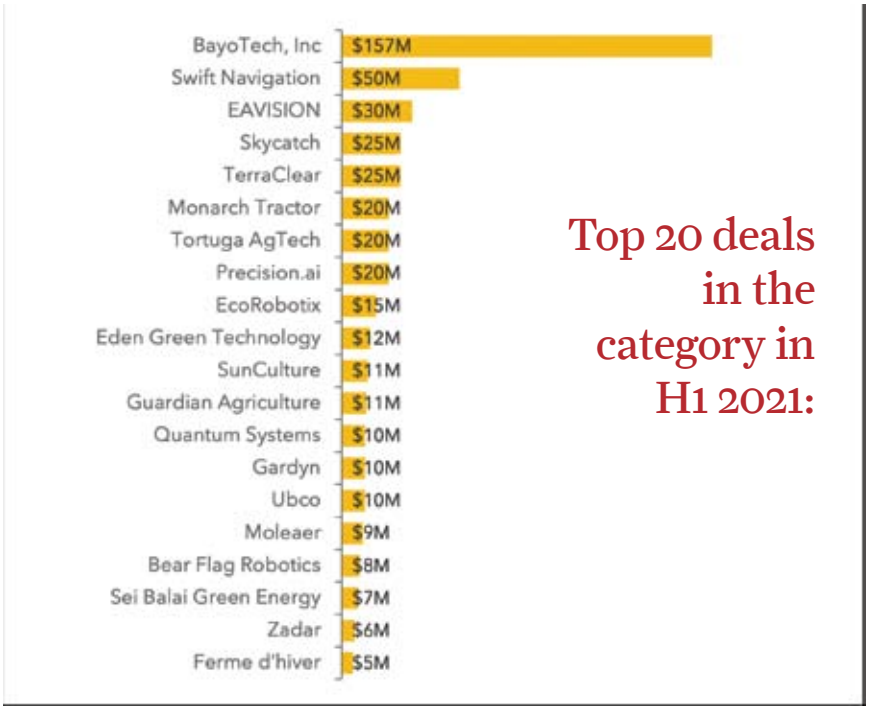
In the $370 billion markets of non-perishable agriculture, this is a one-of-a-kind service. Trade financing already happens in the agribusiness in a secured manner; however, this is a first for unsecured finance. With BNPL, the seller gets paid upfront, the lender benefits from picking up cash discounts for early payment and the buyer gets to pay later without paying interest making it a win for all the stakeholders of the transaction.

Source: economictimes.indiatimes.com

Data Snapshot: Farm robotics startups raised $491m in H1 2021 to automate the basics

Data Snapshot is a regular AFN feature in which we analyze agrifoodtech market investment data provided by our parent company, AgFunder. Farm robotics ventures raked in a total of $491 million in investment during H1 2021, a 40% increase on the same period in 2020, and a similar jump on the second half of 2020 too, according to AgFunder data.

Many of the noteworthy deals during the period went to startups using robotics to automate everyday on-farm tasks usually performed by individuals, rather than complex agricultural operations. Autonomous equipment will be as transformative as mechanized agriculture. It'll be the platform that will fulfill the promise of digital farming, which has struggled to drive value from insights alone," AgFunder founding partner Rob Leclerc wrote recently following John Deere's $250 million acquisition of his firm's portfolio company Blue Flag Robotics. Farm Robotics, Mechanization & Equipment is an AgFunder-defined category which covers on-farm machinery, automation, drone manufacturers, and grow equipment, among other areas.



Top H1 deals for Farm Robotics, Mechanization & Equipment

The largest deal in the category, by far, was US-based energy solutions company BayoTech's $157 million equity investment for its green hydrogen production systems. Swift Navigation, which develops global navigation satellite system and positioning technology for autonomous vehicles, raised the next highest amount with its $50 million Series C raise. Another substantial Series C haul went to China's EAVision, which specializes in building drones for challenging agricultural areas like hillsides.

Automating the basics

Again, many of the major deals of H1 2021 were for companies bringing more autonomy to mundane, dirty, and dangerous tasks tasks around the farm.

TerraClear, which closed a $25 million Series A round in H1, is a case in point with its Rock Picker machine that automates the process of removing unwanted stones from the soil. Tortuga AgTech makes harvesting robots and raised a $20 million Series A round in H1; while autonomous weeding startup Ecorobotix scored $15 million. Separate from VC deals, AgFunder portfolio company Root AI, which makes harvesting robots, was acquired by controlled environment agriculture company AppHarvest earlier this year. Not to be forgotten are tractors. Both Monarch Tractor and Bear Flag Robotics raised significant rounds in H1, at $20 million and $8 million, respectively.

Both have also achieved additional milestones since the close of H1. Monarch raised a $61 million Series B round this month. Bear Flag Robotics was acquired by John Deere for $250 million in August, making it the second robotics acquisition for an AgFunder portfolio company in 2021 after Root AI.

Source : agfundernews.com

Climate-friendly farming: Greenland's melting glaciers offer an answer

On a shore near Greenland's capital Nuuk, a local scientist points to a paradox emerging as the island's glaciers retreat: one of the most alarming consequences of global warming could deliver a way to limit its effects.

"It's a kind of wonder material," says Minik Rosing, a native Greenlander, referring to the ultra-fine silt deposited as the glaciers melt.

Known as glacial rock flour, the silt is crushed to nano-particles by the weight of the retreating ice sheet, which deposits roughly one billion tonnes of it on the world's largest island per year.

Professor Minik Rosing and his team at the University of Copenhagen have established the nutrient-rich mud boosts agricultural output when applied to farmland and absorbs carbon dioxide from the air in the process.

Scientists at multinational brewer Carlsberg (CARLb.CO) are also investigating and have found that adding 25 tonnes of glacial rock flour per hectare increased crop yield on barley fields in Denmark by 30%. Similarly, researchers from the University of Ghana, managed to increase maize yields by 30% using glacial rock flour to offset the impact of rain and heat on poor farmland.

The nano size of the silt's particles is what allows plants more access to nutrients including potassium, calcium and silicon compared to normal rocky farmland.

“We are the stage in this project where we definitely know that it works,” Rosing says. “There are many barriers between this and a big scale industry, but the potential is definitely there.”

- Glacial rock flour, the ultra-fine silt deposited as the glaciers melt, could help boost farm yields around the world.
- The nano-sized particles allow plants more access to nutrients including potassium, calcium and silicon compared to normal rocky farmland.
- 25 tonnes of glacial rock flour per hectare increased crop yield on barley fields in Denmark by 30% according to research by brewer Carlsberg.
- Researchers from Ghana University managed to increase maize yields by 30% using glacial rock flour to offset the impact of rain and heat on poor farmland.

His team has asked Novo Nordisk Foundation, owner of drug-maker Novo Nordisk (NOVOb.CO), to extend its financing of the project.

Following on from the small tests, over the coming three years, larger-scale field tests are planned in Denmark and Ghana to assess whether it makes economic sense to ship the material to farmers around the world.

The scientists also plan to begin testing the material on other soil types in Australia, France, Italy and the United States next year.

ABSORBING CO2

The tiny size of the silt’s particles also helps speed up a natural process whereby rocks absorb CO2.

When the silt dissolves in rainwater and releases its nutrients, it undergoes a chemical reaction that locks in carbon dioxide from the atmosphere. The solution is then washed out with drainage water and eventually deposited on the seabed as carbonate minerals. The idea of applying finely-grained rock to farmland is not new and several studies have shown that by-products from mines or quarries can improve soil quality. But the method has gained interest due to the added benefit of absorbing CO2.

"That realisation has been a catalyst for a lot more research in this area," David Beerling, professor at the University of Sheffield and lead author of a study on crushed basalt, said.

The study found that spreading finely crushed basalt on fields, as well as helping crops to grow, removes CO_2 from the atmosphere at a cost comparable to other methods of carbon capture. Such detailed calculations have yet to be made for glacial rock flour, but tests by the scientists in Copenhagen indicated that one tonne of glacial rock flour would absorb between 250 and 300 kilograms of CO_2 when applied to fields, potentially allowing farmers to sell that as carbon credits.

With vast amounts easily available on Greenland's shores, Rosing says it could be an alternative to sourcing rock dust from mines or mechanically crushing it. The scientists at Carlsberg see it as potentially a more sustainable alternative to conventional fertiliser.

"It would be good to be able to use it as substitute for nutrients such as phosphorus that are expected to run out in 50 to 100 years," Pai Rosager Pedas, senior scientist at the brewer's research laboratory. Glacial rock flour has potential to replace phosphorus, mainly mined in China, Morocco and the United States, or potassium, mined in Canada and Russia. However, nitrogen, which is made from ammonia through an energy-intensive process, still needs to be added.

EARLY DAYS

Canadian fertiliser company Nutrien (NTR.TO) says it has looked into mining and shipping silt from deposits outside Greenland, but found that it was not economically viable.
"The stage of development of glacial rock flour in Greenland is very early indeed and we cannot speculate on its potential at this point," a spokesperson said. Greenland's new government, which has taken a more careful approach to developing the country's natural resources, hopes the mud can one day can bring much-needed revenue as an alternative to dirtier forms of mining. "This is a really interesting resource and part of a positive narrative that we want to tell the world," Resources Minister Naaja Nathanielsen told Reuters.

"We don't need to blast off the top of a mountain or build a processing plant," she told potential investors at a presentation in Nuuk in September. Government officials will present the mineral at a mining conference in Vancouver early next year, although they say commercial mining and use could be years away.

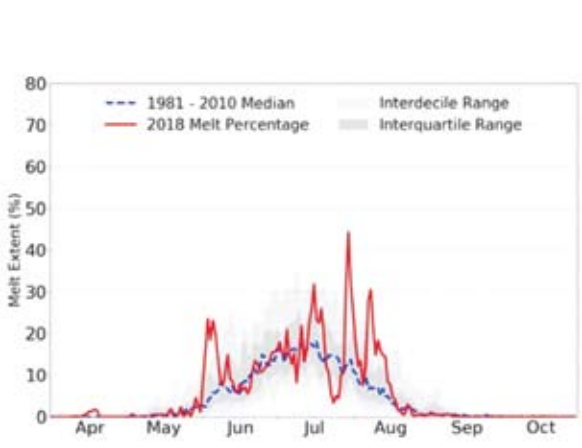
The ministry has received an enquiry from a group of local entrepreneurs who aim to apply for an exploration permit, a preliminary stage. The more onerous process of securing a mining licence would require detailed studies on the impact on the environment and local society. "Glacier flour is incredibly interesting, also because of the volumes. It can easily be shipped to the farmers in containers," Verner Hammeken, CEO of Greenland's state-owned shipping company Royal Arctic Line, said.

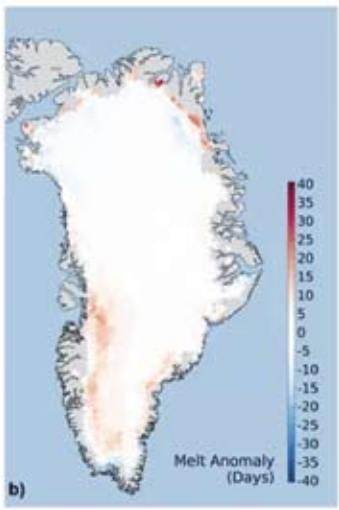
The scientists at the University of Copenhagen and the University of Ghana say success at scale could improve food security and economic imbalances partly caused by an uneven distribution of good quality farmland across the world.

Geological surveys show that the best farmland, which stretches across parts of North America and Europe, was covered by ice during the last ice age. As is happening in Greenland today, the thick layer of ice ground and revitalised the soil.

"In Northern Europe, we think the reason we're better off than the rest of the world is that we are so much smarter than everyone else. In fact, we just have better soil under our rubber boots," Rosing said.

Source : World Economic Forum





Artificial intelligence has helped scientists to create the 'ultimate' chickpea

Using artificial intelligence, researchers have developed a genetic model for the "ultimate" chickpea, with the potential to lift crop yields by up to 12%. Researchers genetically mapped thousands of chickpea varieties, and then used this information to identify the most valuable gene combinations using artificial intelligence (AI).

Researchers wanted to to develop a "haplotype" genomic prediction crop breeding strategy, for enhanced performance for seed weight. "Most crop species only have a few varieties sequenced, so it was a massive undertaking by the international team to analyze more than 3,000 cultivated and wild varieties," says Ben Hayes, professor at the University of Queensland. The study confirms chickpea's origin in the Fertile Crescent and provides a complete picture of genetic variation within chickpea.

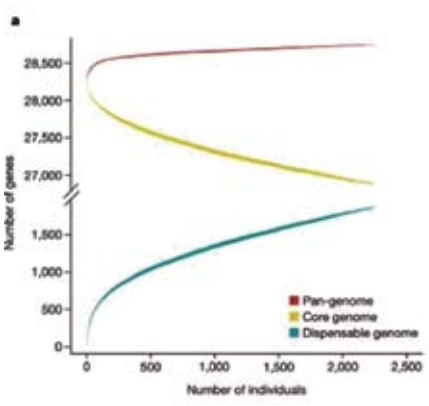
- Researchers have created a model of the optimal variety of chickpea, which could increase crop yields by up to 12%.
- They did this using the tool FastStack, which combines 'AI with genomic prediction technology to identify the combinations of genes most likely to improve crop performance'.
- Since the global demand for protein-rich pulses is increasing, this offers opportunities for Australian farmers to supply local food industries and export markets.
- While there are challenges associated with applying this model to the field, technologies such as 'speed breeding' can help.

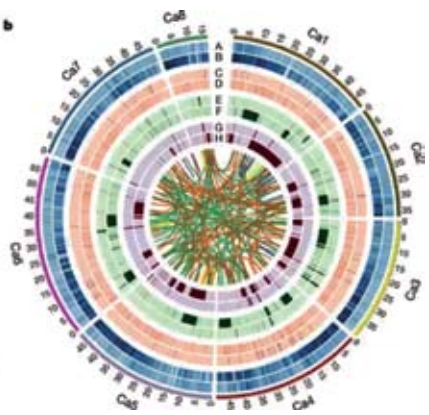
"We identified 1,582 novel genes and established the pan-genome of chickpea, which will serve as a foundation for breeding superior chickpea varieties with enhanced yield, higher resistance to drought, heat, and diseases," says Rajeev Varshney from the International Crops Research Institute for the Semi-Arid Tropics in Hyderabad, India. Varshney is lead author of the paper in Nature.

Researchers used the data to model a chickpea with perfect genetics for seed weight, a trait linked to yield, Hayes says. "This additional data led to the increase in yield predicted by our model, which is still being fine-tuned." "We are using our AI 'FastStack' technology platform to design a chickpea with the ultimate genetics for maximum seed weight, and we think this will ultimately be a valuable tool for chickpea breeders." FastStack combines AI with genomic prediction technology to identify the combinations of genes most likely to improve crop performance. Chickpea is the largest pulse crop in Australia after lupin, both in terms of planting area and production. It ranks second in area and third in production among the pulses worldwide. The global demand for protein-rich pulses was increasing, says Lee Hickey, associate professor, plant breeder, and crop geneticist at the University of Queensland. "Improving the productivity of chickpea for Australia offers opportunities for our farmers to supply local food industries and export markets," he says.

"Using this AI-generated chickpea model for increased seed weight in the field will be challenging, given the number of generations it will take in cross-breeding for optimal chickpea genetics, and the impact of different environments and management practices on crop growth. "But we do have tools like speed breeding that can speed this process up and allows us to test and put into practice these theoretical scenarios." New genomic breeding approaches, including the haplotype model, are expected to redefine chickpea breeding strategies for developing high-yielding and nutritious chickpea varieties, Hayes says.

Source : World Economic Forum





Question

Q&A

Answer

01 VERTICAL FARMING - GUIDANCE

aditya raj : *Sir, I want to start Vertical Farming in NCR region. Can you help in advising the best place to get some training on this and also who can provide me a Project Report on this. Regards. Avinash*

Answer 1 -- garao56 : What type of plants to be grown under vertical farming .

02 MULTILAYER ORGANIC FARMING IN COASTAL AREA.

TS: *Hello All, The location of the land is near Bhubaneswar, Odisha within 30-35 km from the coast. The area of the land is ~10 acres, soil is very fertile with access to plenty of water resources; major markets are also very nearby. Current plan is to do multilayer organic farming. However, the major issue is at least once in every two years a severe cyclone hit the coast (wind speed reaching 200-250 km/hr) damaging all agricultural crops in the area. Is there any suggestion on types of agricultures or kind of crops that can be grown to provide good returns? Any suggestions on live fence trees that can act as solid wind breakers? Thanks,*

Answer 1 -- garao56 : Generally wind breaks can be planted in and around the field

03 HOW TO GET THE POTENTIAL YIELD OF TURMERIC IN ORGANIC FARMING?

infiniteg: *How to get the potential yield of Turmeric in organic farming?*
Can we use any biostimulant for increasing yield?

Answer 1 -- garao56 : First of all convert your land into Organic farm by proper cultural practices, it will take atleast 3 years for getting standard yield. Get organic certification for quoting higher price for the produce.

Answer 2 -- yogikm : Strictly increase the aeration and micro nutrients content of soil.Use only organic manure from your own land. Never uses chemical ,use drip irrgation for soil to retain moisture content.

Answer 3 -- garao56: Abundant manuring (FYM - 10 tons per acre) and other organic growth stimulants and with timely irrigation yields can be maximized

04 NEED SUGGESTIONS- PERMACULTURE?

kashwee: *Hello, This is my first post here, requesting help with ideas and suggestions, I don't know if I am posting it in the right topic section. we have a history of farming, traditionally paddy is grown. however want to experiment with permaculture kind of farming in a land of about 5000 sq ft to start with. The plots are separated by 30 ft road, a residential land in a village. Plan is to get returns all round the year, quarterly or twice a yr from interplantatation, and returns after 7-10 yrs for main plantation, to be noted, experimenting only. Please share your valuable suggestions.*
Main factors - Water isn't an issue, at any time of the year, hopefully we preserve it.
We need low maintenance kind of ideas, since we are on and off the village and an extended family member of ours could keep a watch on it.
Monkeys are frequent visitors
Red to black soil
finance isn't a concern at all
Main plantation : melia Dubia or sandal wood or bamboo
inter plantation; lemon, sweet lime, oranges what else can we opt considering monkeys
third plantation ideas please?
i would be very grateful to hear out all suggestions to take this project forward.

Answer 1 -- rajurajan: Are you looking for commercial income? Or enjoyment?
If commercial income, ask what you can sell in small quantities in your area, and what the prices are.
Melia Dubia is a good idea. If you plant sandalwood, you would


Photo courtesy : grocycle.com

also have to factor in security -- otherwise, you will water it for 20 years and then find it gone one morning.
You could also look at some vines that can climb on the timber trees ... e.g.. pepper or vanilla.
You could look at some shade tolerant species like nutmeg or cocoa for the understorey.
Also medicinal herbs or spices like turmeric.
They all work together well.

Answer 2 –garao56: The following is a list of seven different functions that a Permaculture tries to include:
1. Food Staples, legumes, fruits, vegetables, and fats
2. Food for the soil Legumes and organic matter that provide nutrients to the soil
3. Climbers Important for making the most of vertical space
4. Supporters Plants that provide support to climbers
5. Miners or diggers Deep roots or tubers that open the soil and bring up nutrients from deep
6. Groundcovers Protects soil, provides shade, holds moisture, and suppresses weeds
7. Protectors Protection for others in the system (Repellents, attractors, live fencing, etc.)

shri khadag: *Need your assistance for the same, your contact please.*

Answer 3 –maitys: 1970s by David Holmren and Bill Mollison, two Australians conceptualized to utilized a piece of land in a holistic manner, integrating every animal and plant living on it, and combining that with social structures designed to foster long-lasting agri-

Question

Q&A

Answer

culture as well. A few principles of Permaculture as described by David Holmgren.

1.Observe and interact – by taking the time to engage with nature we can design solutions that suit our particular situation

2.Catch and store energy – by developing systems that collect resources when they are abundant, we can use them in times of need

3.Obtain a yield – ensure that you are getting truly useful rewards as part of the working you are doing

4.Apply self regulation and accept feedback – we need to discourage inappropriate activity to ensure that systems can continue to function well

5.Use and value renewable resources and services – make the best use of nature's abundance to reduce our consumptive behavior and dependence on non-renewable resources

6.Produce no waste – by valuing and making use of all the resources that are available to us, nothing goes to waste

7.Integrate rather than segregate – by putting the right things in the right place, relationships develop between those things and they work together to support each other

8.Use and value diversity – diversity reduces vulnerability to a variety of threats and takes advantage of the unique nature of the environment in which it resides

In brief –

Permaculture is lifestyle rather than just a homestead garden,philosophy of sustainable and holistic lifestyle.

Hügelkultur another homestead garden concept introduced by Herrman Andrä in Germany in 1962 just by observation of the diversity and flourishing plants growing in a pile of woody debris- he chalked out the concept of "mound culture" !

Dr. Rudolf Steiner is considered as a father of Biodynamic farming- is a form of alternative agriculture that takes an ecological and ethical approach to farming, food, and gardening.

Masanabu Fukuoka a farmer and philosopher in Japan conceptualized No-till or Natural Farming

Q05 LEMON GRASS CULTIVATION AND DISTILLERIES - SALE AND BUY BACK

roopanrk: *Hi there,We are looking to have a Lemon Grass Distillation Unit in Karnataka.We are looking for Information on*

1. How lemon grass can be grown and have netwrok of farmers

2.Who are the machinery providers for Distilling Unit?.

3.Where can we find the subsidy information on Lemon grass and such investment

4. How to contact AYUSH department on lemon grass oil buy back?.

5. Is there anyone around who have such distillation plant so that we can have a visit and see around?

Answer 1 -- empero: Hello, I am manufacturers of essential oil distillation plant, capacity 1 ton (potstill) cost Rs.12 lac and yield% of oil from lemongrass 7%approx.I can provide a sound cultivation network in Karnataka and project report,plant machinery and buyers in Karnataka.

Answer 2 -- garao56: Please avail services and technology from Empero, If any financial assistance is required from banks please consult us for project report.

darshanprabhu: *We are interested in taking your services, kindly contact.*

Answer 3 -- vermaaditya: Hi, I am interested. Please contact me. I am at Kolhapur

Answer 4 -- mhammedal: Hiya, I am producers of essential oil distillation Tutuapp 9Apps Showbox plant, capability 1 ton (potstill) fee Rs.12 lac and yield% of oil from lemongrass 7 percent approx. I will provide a valid cultivation network in Karnataka and mission document, plant machinery and customers in Karnataka.

Photo c
5.imimg

Q06 MULTIPURPOSE HERBAL EXTRACTION UNIT ON AGRICULTURAL LAND

abhijeetk: *Please note I need guidance on multipurpose herbal extraction unit. Processing capacity 75 kg herbal input per day (24 hrs. working) (25kg. per batch X 3 batches) Maharashtra state. thank you in advance*

Answer 1 -- garao56: Please send what type herbal plants are processed

Answer 2 -- abhijeetk: Thank you for the response. we would like to work on Green Tea extract powder and Liquid, Neem, Tulsi, Boswellia, Ashwagandha. I am wondering if i can do a pilot plant in my agriculture land. The pilot plant would be like 25 kg per day output for Green tea as a design.

Answer 3 -- garao56: Extraction plant can be set up on the farm land itself. Please approach us for any project report for availing bank finance

Answer 4 -- shri khadag: Bank Finance for Distillation unit in Assam

Answer 5 -- garao56: Please approach us for project report

Photo co
gardeningkn

Q07 OYSTER AND MILKY MUSHROOM FARMING

ravi41977: *I want to start oyster and Milky mushroom farming. But core issue is about marketing of that. My location is distt Ghazipur. It's 90 km far from holy City Varanasi on Patna route. Iam looking for buyers of these mushrooms. Any suggestions/feedback/buying interest . Kindly contact me directly. Thanks*

Answer 1 -- garao56: Generally mushrooms have to be marketed locally ie., in near by cities and markets

Answer 2 -- pra9626: Hi, We required huge quantity of milky mushroom in urgent.per day asking qty of 50kgs.

Answer 3 -- rohitcj: Hi,We are cultivating Organic milky/ oyster mushrooms in Chennai. Our mushrooms are made in extreme hygiene condition with no chemicals involved.

Photo
indiam

ourtesy :
.com

GUIDANCE FOR GINGER ESSENCE OIL EXTRACTION AND GINGER POWDER EXTRACTING UNIT

Q 08

arpitajit: *There is a lot of production of ginger in our place, bit there is no processing unit here. So, i want to set up a production unit for the same. So, for that i have few questions:*

**Where can i get a PROJECT REPORT for that said project*
**Where can i get machinery*
**What are the tax benefit and subsidy from the govt.*
** What is the cost of total machinery*

Answer 1 -- intertrade: Talk to me for details.

Answer 2 -- garao56: Please conact us for project report an guidance. G.Anandarao B.Sc (Ag)

Answer 3 --regina : Please contact Herbal extract consultant S.Veerasamy,

INTERCROP FOR COCONUT TREES

Q 09

nprabhs ; *Hi, We have a coconut farm with 1 year old and our area is dry during summer situated in westernghats belt. We are looking for intercrop like trees which also shouldnt harm our coconut trees. We thought of papaya trees, but white insect will harm our small coconut trees as well. So dropped papaya trees. Any other suggestions on this? Also we do like to try exotic fruit trees if possible. Please guide.*

urtesy :
owhow.com

Answer 1 -- garao56 : Generally arecanut trees are planted in coconut . Cocoa can be planted. Other crops like pine apple , zinger, tapioka, banana, Yam etc can be planted in the coconut orchards . In AP Citrus plants (lime) also planted . G.Anandarao B.Sc(Ag)

Answer 2 -- tomvia: You can plant banana for three years or any seasonal veggies or fruits as mentioned by Anandarao

Answer 3 -- gounder28: Hello nprabhs, Try Taiwan Pink Koya as udupayir between coconut trees. Yields in 6-8 months of plantation and produces through out the year. The buyer comes to your farm for harvest and pickup and they pay about Rs. 45-50/KG. The plant will yield to 6-7 years and NOT much maintenance require other than pruning often.

Answer 4 -- shajathali: The first mistake you did was selection of crop. Coconut is a plant of high water area lie delta, river banks. You need to give 50 ltrs of water per day now and upto 80 ltrs in future. If you give less water, you wan grow only coconut trees not coconut. Just remove it, it is only one year old. Its my personal experience. When you don't have water to coconut itself, how you are planning for intercrop.

courtesy :
art.com

WHICH HERBAL PLANTS TO GROW IN MUMBAI AGRICULTURE LAND.

Q 10

kamilmask: *Have a sma2ll agricultural land in Bhiwandi area in Mumbai approx. half acre, want to know which herbs to grow so that we have a steady income on it? Kindly contact me*

Answer 1 -- garao56: If you want study income on the 0.50 acre land take up plantation of Taiwan Guava , you will be getting study income , 320 plants can be accommodated (high density) , provide drip system, at least 5 tons of guava fruits can be harvested which will fetch 1.50 Lakhs , expenditure is 0.50 Lakhs , you will get Rs.1.00 Lakhs profit. No other type herbal plant will fetch income on a small plot for which there may not be any demand.

kamilmask:Is there a market for Noni fruit and can we plant and fetch enough on half acre land?

Answer 2 -- garao56: Not so sir somewhat large scale plantation is required , Noni is known to be prepared healthy tonic, but cultivation not much popular in south India

START DAIRY FARM BUISNESS

Q 11

vraj2222: *Hello Friends, My Name is Jignesh Parekh & I am planning to start My Dairy Farming Near to Vadodara, Gujarat.*
Current Planning with 10/15 Gir Cow + Land on Lease / Sell.
Can anyone Guide me in that business?
I am also looking for Partner.
I am also looking for some consultant
My Land Requirement is shown below-
1 - Land Should be within 40km from Vadodara
2 - Land should be as much as near to Road
3 - Land must be an Agriculture & Water Facility should be there.

Answer 1 -- garao56: After getting partner please approach us for project report and guidance . There will be subsidy of 25% for 10 animal unit under DED scheme of NABARD which will be renewed in this month generally. G.Anandarao B,Sc(Ag)

abinand20:Dear Mr Anandarao, My name is Rajiv Iohi. We would like to start a diary project in kerala .we would like to know more about the feasibility and consultancy.

CONSULTANCY REQUIRED

hanifkasu: *I am from Ratnagiri. I am having vacant agricultural land of almost 5-acre and now I am planning for the cultivation of that land. In this regard, I need a consultant to develop this land for Agriculture.*

Answer 1 -- garao56: If you are planning for any horticultural crops please go for fruit crops or any plantation crops . If the land is more than five acres such as 5.25 or 5.75 or above 5 five acres you are eligible for getting 35% subsidy for development of commercial horticulture from National Horticulture Board.
If you want any land development loan for general cultivation please contact us for project reports and for technical guidance.

Answer 2 -- vanij5569 : You can benefit from us based in Mumbai, a doctor into A 2 milk and agriculture farming

Answer 3 -- muraly menon : Some vacant land and an idea will not sufficiant to get subsidy and bank loan. Before applying finance aid, you have to fulfill infrastructure works and invest your share in business. You are qualified 70% finance as subsidy and bank loan, after you are invested your share of 30%. You must have find out buyer for your product before planting any thing in your farm.

Answer 4 -- happirehabcenter: Hello Hanifkasu, We are consultants to guide you for integrated agriculture ranging from timber to medicinal plants to Aquaculture. If you are interested to venture into value added crops, then do call us.

Sustainable Agriculture and what else?

This will be the new column. Concentrating off and on the ground level realities of Indian agriculture and also of the Indian rural realities. After having run this journal for over a few decades we have come to the conclusion that we have all along been talking of agriculture as if it is a heaven-born field and only those far removed from the ground level realities, in far off Delhi and there has come about a sort of formal protocols to talk of agriculture. Thus we see that even the most fanciful theories and formulations carry much favor in the posh Lytton bungalow zone.

How to sustain agriculture in all its glorious formulations.

The use and deployment of fanciful phrases like the Green Revolution was extended to 'ever-green revolution' which todays' latest circumstances of planetary disaster stories, Climate Change and Methane Gas leaks etc. we seem to be very comfortable in such superlative descriptions of what is a harsh reality.

Somehow the urban readers are carried away by such clever formulations that what we see in the other pages of the mainstream pages of the newspaper, the rim surveys and latest stories of population status and the poverty the gender divides and the nutrition deficiencies etc don't seem to make a comprehensive picture of the total picture of crime and much other discomfortable state of affairs.

One of the latest stories is the sustainable agriculture. Yes, this all time favorite is bandied about by everyone interested the subject.

There are elaborate explanations and there are various stages of how to reach the sustainable state of promoting agriculture. There are also other fanciful theories of how to promote sustainability in agriculture. Two formulations are, one organic farming and the other one is the zero-budget agriculture. There was much enthusiasm and even societies and groups in which the big wig of the local farmers gathered the crowds. Now, it looks there is back to inaction and almost dead silence if you open your mouth on this topic!

Why?

Simply because there has not been concrete results. In many of the local language agri prints you see often film actors, as one did recently in Tamil Nadu. A prominent film actor, the U Tube video showed some 15 acres and also with the land many other fancy additions like dogs and goats besides other fancy items.

The coconut saplings must have been planted some few days ago, from the pictures of the plants we saw they didn't even give a new leave when shown and the actor was holding forth on the virtues of organic crops and foods etc.

May be he is justified with his enthusiasm for every other new entrants into agriculture, we have carried many such enthusiasts' stories in our magazines and we can appreciate their dreamy imaginations and what the poor young souls don't know is that.

Agriculture is a long-drawn out process of much struggle and strain and also the path is strewn with so much uncertainty, weather's unpredictable current fickleness of the weather pattern. Itself an example and at the end of the floods and whether change, who knows our actor friend's crops are not driven away in the floods there about.

So, in the Glasgow summit we have pledged our country's resolve to reach a zero emission in the far off date of 2070.

As Lord Keynes said famously that in the long run we would all be dead and gone! So, it is better we stick to a short term date and see whether we are sincere and serious. It is also pertinent to say that we are also taking a political stand and in politics it is much more difficult. The minds of politicians these days, they have their own maneuvers to reach their other goals by making grand gestures and rhetorical pronouncements on world stages.

So, first let us recognize the crucial role and priority of agriculture as the largest employer of the landless labor, nearly 51 per cent. Also, the landless labour's dependency on the farming sector.

Our memories are still fresh on the state of the migrant landless labour who travelled long through the length and breath of the country during the break of the Corona virus, the trauma hasn't still gone away.

The return of the migrant labor has also now created a crisis for the farmers who trekked long to their original villages are reluctant today to return to the old jobs with farmers are also caught up with their agitations and the Corona's further fresco at present is becoming more unpredictable.

Farmers in other parts of the country outside the three agitating states, Punjab, Haryana and Western UP, are no less free from the ills that are common to all the farmers in other parts of India. The average Indian farmer is a small and micro farmer only owning less than one hectare and as we say the Indian farmers can be defined otherwise as a debtor or a litigant.

This reality must make the urban-based columnists who write fancy theories and fanciful formulations and become more humble and modest in their writings on Indian agriculture.

Photo Courtesy : bakingbusiness.com

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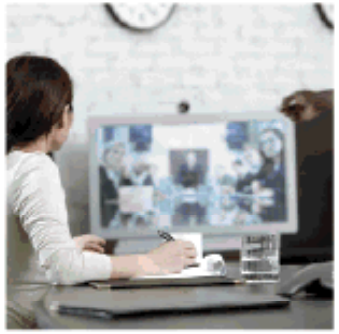

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