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Agriculture & Industry Survey

India's Leading Business Magazine for Agriculture

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Creating and supporting ecosystems, brand building, and marketing support to farmers and agri-entrepreneurs.

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Various nuances of producing unifloral and multifloral honey and about the analysis of the same.

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22

Dr. H.R. Bhargava
Director and CEO
Sri Annapoorneshwari Naturals

18

Ms. Jyotsna Kaur Habibullah
Founder and CEO
Lucknow Farmers' Market

33

Sanjay Bhattacharji
Founder and Director,
Teplu Learning Pvt Ltd,

CONTENTS

SUSTAINABLE AGRICULTURE, THE ONLY FUTURE?

An action agenda is drawn up at the Glasgow climate change international summit! Yes, it looks to be the only hope for standing up to the Climate Change Challenge facing the world. The stark message from the world leaders from the COP 26 Summit the just concluded Glasgow summit of climate change meet gives hope and raises expectations of the world leaders who assembled for the G-26 nation's summit during the October-November dates in a sense historical and timely.

The unasked question is whether the world leaders are ready to do the near-impossible targets. After all the cynical reality is that the big powers are the big polluters also. And there would be heavy resistance from the big corporates and other vested interests. We have been living beyond our means and this reality hit the big powers more than the other nations.

One happy outcome of the summit is the new emphasis on agriculture. We now seem to realize and wake up for the climate change threat and also the pollution and other threats to our living environment. The summit has had another important message. It is for the future of agriculture in almost every other small and middle-level country across all continents.

Farming, as everyone knows, constitutes. 14 percent of our economy. The annual greenhouse gas (GHG) emissions come from agriculture and agri-related activities like livestock. 55 percent of this harmful gas comes from the livestock sector.

The agri experts who met at the summit have put forward many suggestions for agri reforms. Like Conservation farming and zero budget farming and many more suggestions. The new suggestions are in fact not anymore new but some reiteration of old suggestions only like climate resistance seeds etc.

The many international centers engaged in agriculture and also various branches of farming in various climate zones are all doing very constructive research and also new ideas like the latest rice research institutes. rice seeds etc give hope. But here we like to draw one critical aspect of farming in the new century.

Farming has many agendas. One is the feeding of the world's poor. Hunger and poverty are also great realities in many parts of the world. So how to balance the conflicting targets, feeding the poor and towards this goal we have to produce and distribute and trade in agricultural fields on an equitable basis. Towards this goal we have to work with the UN organizations and the UN itself has to be strengthened and big power politics won't be of much help.

More and innovative research in agri field is also a crying goal. Big agri economies like India and other countries have to turn their attention. For more and bigger research budgets. In the end, there must be bigger publicity and propaganda. For wider awareness on the high priority for agriculture in the countries. Development agenda, agriculture and its future hold such a critical priority that we have to concentrate on rural development issues too.

Climate change, it is said has a political agenda. From the 1648 Peace of Westphalia to this day the concept of sovereignty almost limited the states' Powers. Yet wars didn't go away.

Today the climate change has disrupted the states' powers and anyone can enter into other territories and cause wars. This, anyone, can't do, thanks to the climate threat. This realization must be fed through the countries only through UN agencies.

New ideas and new strategies must be welcomed by the wider world. Let us hope this realization can be brought about in our generation. That would be a great day, indeed!

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Farmers protests prolonged for too long!

Neither good for farmers nor for the country!'

India's profile is rising internationally. India was earning some good grades in the International diplomatic circuit.

The time has come to heal some wounds that are troubling.

One major irritant is the prolonged farmer's agitation that has caused so much destruction and much violence. We refer to the Punjab and Haryana farmer issues. Of course, the Prime Minister has the prime responsibility to resolve this already complicated political, social and economic sector.

Yes, farming and agriculture are the very basic economic issue of India. India as we have always been saying that India is basically an agricultural economy, though as such we are already a strong economy. With a widening manufacturing country, now the defense and strategic sector also receiving high priority, the world has changed.

And India is no exception to this international trend. India politically is a big democracy, why the world's big democracy and this gives India multifaceted advantages to take our place and play our role with extraordinary responsibility.

So far so forth. Yes, the country under the dynamic leadership of Prime Minister Narendra Modi has acquitted well all through his tumultuous days. Having displaced the long-ruling Indian National Congress is of course not easy for many sections accustomed to the rather a sort of laidback "politics as usual" type of all contradictory politics with no democratically elected Congress president nor an electorally elected Prime Minister, we thought that this was the type of Indian dynastic politics that India has evolved.

Came Mr.Modi from Gujarat like thunder and he shook up the old edifice and replace it with an elected alternative democratically elected government that was a novelty in so many senses.

Here is a replaced government that has both elected party president and also an elected Prime Minister. This must-have become a new norm and it has. This novelty is troubling so many sections of people, more importantly even the progressive sections.

But difficult to consume the environment which of course lacks some other internal democratic features and yet we have a government on the go.

So far taking a broad view and even with a sympathetic view, we have to concede that, India under the leadership of Modi has performed well both on the domestic and international front. The recent international opinion poll has put Modi on the top of 13 international leaders including Joe Biden, the American President and it is a great honour and recognition for India and in this day and time, we have to shed whatever reservation we may have on Modi rule.
Now, coming to some basic issues, the farmers' agitation is prolonging for long and it is no good for anybody to let it go on indefinitely.

It has now become Mr.Modi's personal predilections. That is holding the issue live!

The PM by one stroke can withdraw the controversial laws for another day, right?

Why not? What is preventing Modi to hold on? A sector of people who are India's brave farmers who are looked at in a dispassionate manner is after all have no vested interest in politics and that too in any narrow party politics.

The authorities have stayed the farm laws. For the time being and that means for the indefinite future.

So the Prime Minister can declare openly that his government doesn't take any particular view and in the so long pending issues the government needn't stand any issue of prestige and only in the larger interest of the well-being and future of Indian agriculture the government must withdraw the laws and inviter the farmers for a final face-to-face. Goodbye to all the ugly past and a hopefully bright future.

Such a magnanimous gesture from the PM would surely find a positive response from the faint community as well.

Let us hope such gesture and a breakthrough put an end to this very sad and tragic past which saw so many s deaths and destructions and also the shameful conduct of the agitators, of course only the very misguided ones, who indulged in hoisting the flag on the historic Red Fort.

The Indian PM's role now has widened on the international front and India's many enemies would be only disappointed by the PM's timely gesture on the farmers' prolonged agitation and the ugly memories.

We have to call an end to this bad chapter and give a real moral boost to our brave farmers everywhere in all parts of the country.

India's pulses problem: We need real reform

The government needs to revise its pricing policy to incentivise pulses production

India is the largest producer and consumer of pulses in the world. The strange irony is that pulses have to be imported to meet demand, and the general public suffers due to the unusually high prices. The main reason for this imbalance is the half-hearted and ad-hoc price policy of the government.

The Agricultural Costs and Prices Commission, established under the Union Ministry of Agriculture, fixes the minimum support price (MSP) of all agricultural products, including pulses. The MSP is set on the basis of cost of production, position of supply, demand and prices in markets, position of prices relative to other commodities, proper use of natural resources like land and water, economy of the country, and 50 per cent profit on cost of production.

There are several inconsistencies in this arrangement. First, the commission is by status a department whose recommendations are only advisory. Representation of farmers is minimal. The so-called 50 per cent profit to the farmer is not per the government's intended formula, and so it is relatively low. The farmers do not even get the declared MSP.

What's most bizarre is that consumers have to buy pulses at 150 to 200 per cent of MSP. This increases inflation and puts an unbearable burden on the weaker section.

Even more astonishing is that pulses are imported at prices lower than the domestic ones. In order to check consumer prices, the government takes ineffective measures like reducing the storage limit of pulses under the Essential Commodities Act.

For genuine reform, first of all, the MSP formula should be revised and the purchase of each crop in the entire country should be ensured at that declared price. Next, the commission should be given constitutional status, so that its recommendations are binding. A maximum retail price for consumers should be fixed by adding a reasonable profit of 50-60 per cent over MSP to the farmer.
All restrictions on transport, storage, trade, processing and export of all agricultural products should be abolished. In case of low domestic production, imports and taxes should be decided after the harvest. All these points are also in the commission's reports.

By Sompal Shastri , Source : www.downtoearth.org

'Kumkum Bhindi': UP's new wonder crop

When ladyfinger goes 'red', it also becomes beneficial and nutritious. The new red variety of ladyfinger, aptly known as 'Kumkum Bhindi', is a wonder crop grown in Uttar Pradesh that will also double farmers' income.

According to agriculture experts, 'Kumkum Bhindi' has 94 per cent polyunsaturated fat which reduces bad cholesterol. Along with it, its 66 per cent sodium content is helpful in controlling high blood pressure, while its 21 per cent iron reduces the chances of anaemia and 5 per cent amount of protein keeps the body's metabolic system in order.

Umesh Saini, a resident of Anwarpur in Hapur, and Murli from Rampurbeh in Sitapur are happy with the cultivation of red ladyfinger.

"Everyone in the village is now thinking about increasing the area under its cultivation this season," Saini said.

According to Bijendra Singh, Vice Chancellor of Acharya Narendra Dev University of Agriculture and Technology, Kumarganj, Ayodhya, this red variety of ladyfinger contains anthocyanins and phenolics that increase its nutritional value.

The crude fibre present in it controls sugar. It also contains a large amount of vitamin B complex.

The ideal time for sowing Kumkum Bhindi starts from February to the second week of April. It can also be sown somewhere around November, the growth will be less in December-January, but fruits will start coming from February, which will be available till November. The prices of early crops are also good.

In the wholesale market, the price of green ladyfinger ranges between Rs 12 to 15 per kg, while red ladyfinger is sold at the rate of Rs 45 to Rs 80 per kg since people are looking at it like a superfood.

Source: economictimes.indiatimes.com

Suicides among farm workers rose 18% in 2020

The number of agricultural labourers who died by suicide in 2020 was 18% higher than the previous year, according to the National Crime Records Bureau (NCRB) report released on Thursday. However, suicides among landowning farmers dropped slightly during the pandemic year.

The NCRB omitted a chapter on Central Armed Police Forces (CAPFs) in the 2020 edition of its Accidental Deaths and Suicides report, without stating any reason. According to the 2019 report, a total of 104 CAPF personnel had lost their lives in various accidents and 36 died by suicide. The cause-wise analysis of suicidal deaths of CAPF personnel in 2019 had shown that 14 were due to family problems and three were due to service related issues. A senior government official said that the 2020 report also planned to include the effect of COVID-19 (infected, recovered and succumbed) on police personnel, but even that was not included in the published version.

The farm sector was one of the few bright spots in the Indian economy last year, recording growth on the back of a healthy monsoon and the continuation of agricultural activities during a lockdown that crippled other sectors. However, landless agricultural labourers who did not benefit from income support schemes such as PM Kisan may have faced higher levels of distress during the pandemic. The NCRB report does not include any indication of the specific causes of suicide among the farm community. Overall, 10,677 people engaged in the farm sector died by suicide in 2020, slightly higher than the 10,281 who died in 2019. They made up 7% of all suicides in the country. Most of these deaths were among those whose primary work and main source of income comes from labour activities in agriculture or horticulture. In 2020, 5,098 of these agricultural labourers died by suicide, an 18% rise from the 4,324 who died last year.

However, among farmers who cultivate their own land, with or without the help of other workers, the number of suicides dropped 3.7% from 5,129 to 4,940. Among tenant farmers who cultivate leased land, there was a 23% drop in suicides from 828 to 639.

The worst among States continues to be Maharashtra, with 4,006 suicides in the farm sector, including a 15% increase in farm worker suicides.

Read full @ https://bit.ly/3FltUqx

Source : www.thehindu.com

Farmers hit as Seed Act silent on compensation

Several instances of farmers suffering the loss of yield, allegedly due to the poor quality of seeds, have been reported in the district. But the affected farmers stand no chance of getting relief because the Seed Act of 1966 and Seed rules and Seed control order 1983 do not have a compensation clause. As a result, no appellate or nodal authority could be created to determine the right amount of compensation in cases arising out of seed quality.

A section of farmers in Mantripalayam, Kulampalayam, Kallipalayam and Koradamuthur bought shallot seeds from a trader in Kallipalayam. After the harvest in August (2021), they were in for a shock since the yield was the big onion (Bellary variety) and they could not sell it because of poor returns. Similarly, another set of farmers from Kundadam, Pallampatti, Nandavanapalayam in Dharapuram Taluk faced similar issues in July 2021.

Speaking to TNIE, Prakash a farmer from Palladam, "Around 60-70 farmers bought onion seeds for a price ranging from Rs 6,000-7000 a kilo and spent more than Rs 50,000 to Rs 60,000 per acre on fertilizers, insecticides and labour. But the crops failed due to substandard seeds. Most of the farmers bought from middlemen and others from seed dealers. The affected farmers staged protests and after intervention from the agriculture department, they were able to trace the seeds from the distributor from Dindigul and got compensation of ` 25,000 per acre from him. But, this is very little. Neither the agriculture department nor seed inspection department arranged fair compensation."

Elaborating, Tamil Nadu Farmers' Protection Association President A Esan said, "Sub-standard seeds are causing huge losses for farmers for the past several months now. Private individuals have allegedly been selling onion seeds mixed with substandard onion seeds to the farmers. It is difficult to trace them. In order to regulate seed selling, the seed act 1966 and Seed control order 1983 are enforced. Though the Act has a criminal clause to check wrong or false selling, which offer a heavy fine and six months imprisonment,...

Read full @ https://bit.ly/3Ho2lyF

Source : newindianexpress.com

Rise of precision farming driving agriculture drone market growth

The Agriculture Ministry of India has obtained permission from the aviation regulator DGCA to fly drones over rice and wheat fields in 100 districts in order to estimate crop yields at the gram panchayat level under the Pradhan Mantri Fasal Bima Yojana (PMFBY). This is the country's first large-scale pilot project using remote sensing technology for agricultural production estimation.

Apart from drone-based photos, the large scale pilot project will also utilise high spatial resolution satellite data, biophysical models, smart sampling, and artificial intelligence.

India is the world's agricultural superpower. Agriculture accounts for around 18% of India's total GDP (Gross Domestic Product). Lack of access to new agricultural technologies such as drones has proven to be a constraint on the sector's progress. The approval mentioned above could suggest that drones can now be utilised more extensively for agricultural purposes in India.

The Agricultural Benefits of Drones

For many years, drones have found a place in private industrial use; their commercial applications continue to expand as quickly as inventors come up with new ideas. Drones have proven to be an indispensable tool for farmers globally, particularly in the agriculture industry. Drone technology is advantageous for a variety of uses, including remote monitoring of tiny areas of crops and entire fields. Drones assist farmers in addressing the agriculture industry's numerous emerging difficulties. The agriculture drone market is therefore expanding exponentially. According to Reports and Data, the agriculture drone industry size was USD 1.37 billion in 2020 and is expected to register a massive CAGR of 34.5% over 2021-2028.

Contributes To Increased Productivity

One advantage of drones in agriculture is their capacity to meet the expanding demands of the population. Drone technology has aided farmers in overcoming hurdles encountered while inspecting crops in the field. Satellite imaging is the most advanced method of crop monitoring available to date. Nonetheless, this technology has a number of disadvantages, prompting farmers to choose drones instead. Precision is lacking in satellite imagery, as photos are retrieved only once a day, which is insufficient for farmers. Drone technology, on the other hand, can provide a live feed or as many images as necessary, making them significantly more precise and efficient and aiding in precision farming.

Contributes To Pollution Reduction

Precision agriculture practises, which assist farmers in making more informed decisions, have advanced dramatically in recent years. While drones, also known as unmanned aerial vehicles (UAVs), have not yet penetrated the mainstream agriculture space, they are increasingly important in precision farming, assisting agriculture professionals in setting the standard for sustainable farming practises while also protecting and increasing profitability.

Pesticide application to fields can be inconsistent. Drones in agriculture can assist farmers in determining where to spray pesticides evenly, as too much can cause a variety of health problems. There is an option in which drones are equipped with the appropriate equipment that enables them to scan the ground and evenly spray the chemical, hence reducing the amount of chemical needed by agricultural producers.

Cost Savings Associated With Analysis

Drones in agriculture enable farmers to scan large areas in a single trip and deliver significantly more information than satellite imaging. Satellite photography is too expensive, prompting farmers to turn to drones, which are substantially less expensive, faster, and more efficient. Drones are advantageous in agriculture because they enable farmers to monitor their farms precisely.

Precision agricultural practises rely heavily on the use of global positioning system (GPS) technology and geographic information system (GIS) tools, which enable fine-scale monitoring and mapping of yield and crop parameter data within fields.

These methods allow for more intensive and efficient cultivation, which can aid farmers in adjusting fertiliser prescriptions and identifying crop illnesses before they spread. Farmers can now make economic and environmental decisions based on more data – for example, by improving fertiliser treatment and applying the correct amount at the right time, significant cost and environmental savings can be realised.

Enhances Employment Prospects

Drone technology also creates several employment prospects for rural residents, ranging from computer engineering professions to drone operators who contribute to the professionalism of agricultural services. Agriculture is the principal source of income for a sizable portion of India's rural population, and increasing agricultural output increases employment options for them.

Read full article @ https://bit.ly/3kFKt8Q

Source : techbullion.com

How climate change is impacting India's agricultural landscape

Aggressive adoption of sustainable farming solutions is vital to address the challenges of food security and ecological imbalance.

The recent findings of the Intergovernmental Panel on Climate Change (IPCC) are a clarion call for the entire humankind. The sober assessment of our planet's future compelled UN secretary-general, António Guterres, to describe the IPCC report as a "code red for humanity", which means we are reaching a point of no return; it's a do or die situation for us. The impact of climate change is evident on the Indian monsoon, which has become more erratic and violent over the last few years. The increasing variability in precipitation has resulted in prolonged dry spells followed by a heavy downpour.

A more chaotic monsoon will have a grave bearing on Indian agriculture and food production. The below-normal rainfall has sparked concerns over the output of summer-sown crops such as cotton, soybean, corn and rice. Being the largest exporter of rice and the top importer of edible oils, a drop in production could only put pressure on the country's burgeoning trade deficit.

The IPCC's warning is consistent with the findings of a study conducted by a group of German researchers who compared the Indian monsoon with more than 30 state-of-the-art climate models from all around the world. The report said, "For every degree Celsius of warming, monsoon rains will likely increase by about 5 per cent". There is no escaping this unless policymakers across the world make concerted efforts to reduce greenhouse emissions.

Cost of Inaction

Looking at the economic costs of the climate emergency, India was singled out in a 2020 report by Oxford Economics, a global forecasting firm, which predicted that the country's GDP could fall 90% by the end of the century if it doesn't improve on current policies.

Crop failures and increased infestation of pests and insects have become rampant. It will not be an exaggeration if we link these extreme climate events to farmers' suicides. The rising temperature, if left unchecked, would not only jeopardise food security but also make India dependent on food imports.

To understand the impact of climate change on Indian Agriculture and develop strategies for possible mitigation, the union agriculture ministry formed National Innovations on Climate Resilient Agriculture (NICRA) in 2011. The study, conducted to analyse the impact of rising temperatures on crops, livestock and fisheries, identified 151 climatically vulnerable districts across India. The findings suggested that rice and wheat in Indo-Gangetic plains, sorghum and potato in West Bengal and sorghum, potato and maise in the southern plateau could see reduced productivity.

Dynamics of Celsius

A 1-2 degrees Celsius rise could potentially decrease rice production by about 0.75 tonnes per hectare (t/ ha) in inland zones and 0.06 t/ha in coastal regions. At the same time, a 0.5?C increase in winter temperatures is projected to reduce wheat yields by 0.45 t/ha. Similarly, research by National Dairy Research Institute, Karnal, also found that heat stress could adversely impact the fertility of cows and buffaloes.

Moreover, the whimsical climate pattern is reducing the number of fishing days as well as fishing stock. Ocean warming has wiped out much commonly eaten fish and forced several species to move poleward or towards deeper waters to stay at the ideal temperature. Another concern is the decrease in the nutritional value of significant crops due to the rising CO_2 levels. The lower concentrations of important dietary micronutrients like zinc and iron in major food crops could be attributed to a sharp increase in carbon emissions.

Rising CO_2 could also reduce access to adequate levels of important vitamins in rice. The IPCC report also warned that the protein content of rice, wheat, barley and potatoes could fall by 6 to 14%, putting close to 15 crore more people at risk of protein deficiency. With reduced yield, food prices could rise as much as a third by 2050, bringing an additional 18 crore people in low-income households.

Can't hit snooze anymore

The writing is on the wall, and we are on the verge of facing the harshest consequences of a warming planet. And our only way out is to limit the impact of climate shock through evidence-based policy actions. Aggressive adoption of sustainable farming solutions is vital to address the challenges of food security and ecological imbalance.

Read full @ https://bit.ly/3FAP58n

Source : businesstoday.in

News

Misconceptions about Agriculture

Corporate encroachment on peasant agriculture does not just mean corporates taking away a part of peasants' income

There are a number of misconceptions about Indian agriculture which, if not removed forthwith, can have potentially adverse effects on the ongoing kisan agitation against the three farm laws. The first of these is the belief that corporate encroachment on peasant agriculture is a matter concerning only the corporate encroachers and the peasants.

This is wrong: corporate encroachment on peasant agriculture is a matter that affects the economy as a whole; it concerns everybody. This is not a rhetorical statement; it is literally true. In this sense the kisan agitation against corporate encroachment is not a bilateral issue like industrial action in a particular factory; in the process of fighting against corporate encroachment the kisans are fighting objectively for society as a whole, against subjecting India to "food imperialism". The reason is the following.

Corporate encroachment on peasant agriculture does not just mean corporates taking away a part of peasants' income, either directly via simply squeezing the peasants' share, or indirectly via passing on price falls to peasants but not price rises; it necessarily entails a change in land-use, from producing foodgrains of which the advanced capitalist countries have a surplus that they wish to sell to the third world, to producing such crops as they need, either tropical non-food crops which they cannot grow, or crops that they can grow, but only seasonally.

Corporate encroachment on peasant agriculture therefore necessarily entails a reduction in foodgrains output and a diversion of acreage from foodgrains to other crops needed by the metropolis. In fact, to push the economy further in this direction, an additional weapon is being used: the regime of minimum support prices, which applies mainly to foodgrains in India at present, is being jettisoned. The government may protest a thousand times that MSPs will continue, but, significantly, it has never promised to amend the farm laws to give this assurance a legal form. Its intention is clear: to do away with the MSP regime altogether, which would greatly increase the kisans' risks from foodgrain cultivation and lower the profitability of such cultivation net of risk. This would necessarily reduce foodgrain cultivation, since the farmers, being too poor to bear risks, are highly risk-averse. Thus, from both sides, from the side of

the corporates which would thrust non-foodgrain production on them, and from the side of the government which would withdraw from providing MSP on foodgrain production, the farmers will be under pressure to abandon foodgrain production.

But then it may be asked: what is wrong if countries like India withdraw from producing foodgrains and resort to food imports instead for which they pay by exporting other crops? First of all, for the ability to import foodgrains there must be sufficient foreign exchange, which may not be always available with a country. Apart from the problem of non-synchronous movements in foodgrain and other crop prices, so that a relative fall in the latter may leave too little foreign exchange for the former, we must also remember that when a country of India's size approaches the world market for foodgrains, world foodgrain prices shoot up immediately, requiring even more foreign exchange for importing a given amount of grains.

Secondly, however, even if the requisite foreign exchange is available with the country for importing foodgrains, the people must also have the purchasing power for buying foodgrains; and purchasing power typically shrinks when a country moves away from producing foodgrains Many of the substitute crops that would be grown in lieu of foodgrains are in fact much less employment-intensive than foodgrains, so that growing them means a reduction in agricultural employment, and hence in purchasing power with the people. They cannot afford to buy the imported grains as a result.

In addition to these factors there is also imperialist arm-twisting. Since metropolitan countries are the ones from which foodgrains would be getting purchased, in the event of India not toeing their line on any issue, they would simply refuse to sell foodgrains to India. Hence, becoming dependent on imports of foodgrains from metropolitan economies involves a serious loss of sovereignty. It is the realisation of this simple truth that had prompted the Indira Gandhi government to go in for the Green Revolution as a means of achieving food self-sufficiency. To put the clock back and destroy that self-sufficiency (even though it is self-sufficiency at a low level of purchasing power of the people) is what the government's farm laws are forcing on the country. Imperialism has been wanting this for a very long time, and the this government is spineless enough to give in.

The kisan agitation is a stand against this giving in. To accede to the introduction of corporate agriculture and to bargain only on how much should be the share of the farmers and how much of the corporates, is to miss this point altogether. It amounts to selling whatever remains of the country's sovereignty to imperialism.

Read full @ https://bit.ly/30lIzTr

Source : www.greaterkashmir.com

Online Meetings @

www.agricultureinformation.com

Upcoming events

DECEMBER 1, 2021
3:00 pm
Dr. A. Ramalingam on "Opportunities in seed production"
To know https://bit.ly/3CtxInJ

05.00 PM
Dr. P. Naveen Kumar on "Commercial cultivation of bulbous flower crops – tuberose and gladiolus"
To know more view https://bit.ly/3HEGAKZ

DECEMBER 2, 2021
3.00 PM
Mr. Gorityala Vidyasagar on "Impact of climate change in Agriculture "
To know more view https://bit.ly/3yt9Cba

05.00 PM
Mr. T. S. Chelliah on "Vanilla tissue culture plants- cultivation, marketing & economics"
To know more view https://bit.ly/3nzWzlO

DECEMBER 3, 2021
3:00 pm
Mr. S. Vijay Kumar on "Micro irrigation – why it is absolutely necessary"
To know more view https://bit.ly/3nyicD3

DECEMBER 6, 2021
3:00 pm
Dr. C. Vaithilingam on "Role played by bio-solubilizes in reducing chemical fertilizers usage"
To know more view htts://bit.ly/3nBw5QS

DECEMBER 10, 2021
05.00 PM
Mr. Abhishek Dasani on "Automation in farming – How these systems can help farmers in saving costs and producing be1er yields" -- 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 beer produce management. Development of cost effective automation solutions that can today allow farmers to record etc..

DECEMBER 21, 2021
3:00 pm
Dr. K. T. Chandrashekar on "Sandalwood cultivation – From nursery till marketing problems and opportunities"

DECEMBER 24, 2021
3:00 pm
Dr. Vinod Singh on "Sericulture: An opportunity for small and marginal farmers" -- Dr. Vinod Singh is a Scientist at Central Silk Board in Jammu. He says sericulture is very good occupation for small and marginal farmers specially from hilly areas. It is total one month crop with low cost and high benefit and highly subsidized by government. Cost of 1kg cocoon is about Rs.1,000/-. Any small farmers can produce 20 to 30kg cocoon in one month.

DECEMBER 28, 2021
3:00 pm
Dr. V K Jayaraghavendra Rao on "Unconventional strategies in agriculture for increasing farmers income" -- Dr. V K Jayaraghavendra Rao says income of farmers and productivity often cannot be related. With 330 million tones of horticultural production and 300+ million tones of agricultural production, farmers fail to get a fair price and the incomeis abysmally low. During this meeting, Dr. V K Jayaraghavendra Rao proposes to addresses this issue.

DECEMBER 30, 2021
3:00 pm
Mr. Akash Baburao Mule on "Shrimp farming practices and features of aqua-connect application" -- Mr. Akash Baburao Mule is a Senior Aquaculture Officer at Aquaconnect in Navsari, Gujarat. He says shrimp farming is concentrated mostly in costal states from Gujarat to West Bengal. Majority of critical inputs like seed, feed etc are produced in AP & TN and transported to all the shrimp farming States.

DECEMBER 31, 2021
3.00 PM
Dr. Ashutosh Gautam on "Quality assurance and certification in organic farming" -- Dr. Ashutosh Gautam is a Scientist at Spices Board, Ministry of Commerce and Industry, Govt of India in Srinagar (Jammu and Kashmir). His interest is on general view of organic farming, cultivation practices, prerequisite for organic certification and process of same.

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Recently Completed Meetings

Dr. Ashutosh Gautam on "Quality assurance and certification in organic farming"
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Dr. R. Venkattakumar on "Innovative marketing of fruits and vegetables during COVID 19 lockdown period"
Dr. R. Venkattakumar Principal Scientist and Head, Division of Social Sciences and Training, ICAR-Indain Institute of Horticulture in Bengaluru, Karnataka. 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.

Mr. Abhishek Dasani on "Automation in farming – How these systems can help farmers in saving costs and producing better yields"
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. K. T. Chandrashekar on "Sandalwood cultivation - From nursery till marketing problems and opportunities"
Dr. K. T. Chandrashekar is an Executive Director of Sandalwood Society of India in Bengaluru, Karnataka. Indian sandalwood is highly priced due to its fragrant wood and oil. It is used as a fixative in world class perfumes, aromatherapy, various pharmaceutical preparations and cosmetics.

Mr. Kalle Sreenivasulu on "Date tissue culture plants"
Mr. Kalle Sreenivasulu is the Managing Director of Vikas Biosciences Pvt. Ltd. in Hyderabad, Telagana. His interest is Date Palm (Khajoor) Cultivation. To know more https://bit.ly/39JPFDd

Dr. P Manivel on "Everything about ashwagandha"
Dr. P Manivel, Principal Scientist and Head, ICAR-CTRI Research Station, Vedasandur, Dindigul District, Tamil Nadu.

Dr. Vani on "Processing and value addition of moringa"
Dr. V. Vani is the Assistant Professor at Horticultural College and Research Institute in Periyakulam, TN. Her interests are Food processing and preservation; Nutrition; Post harvest technology of fruit & vegetables and Quality control of processed products.

Mr. Kiran Bhaskaran on "Sustainable agricultural practices for saving money in agriculture"
Mr. Kiran Bhaskaran is the Founder and Chief Consultant at Indian Farm School in Ramanagara, Karnataka. https://bit.ly/2T8RKDp

Mr. Mallinath Hemadi on "Small Scale Industry that would double farmer's income"
Mr. Mallinath Hemadi is a Consultant at Numratha Agro Farm Foods Pvt. Ltd., in Kalaburgi in Karnataka. He is an agricultural graduate , organic farmer by passion and has experimented the uses of Desi cow's – urine, dung, buttermilk etc., on crop growth development.

Mr. Satish Babu Gadde on "Cattle based agriculture - India's century old traditional agriculture"
Mr. Satish Babu Gadde is the Secretary of Lakshya in Eluru, West Godavari District, Andhra Pradesh. To know more https://bit.ly/3ep0xqL

Mr. Vasim Shaikh on "Role played by APEDA and other export councils to promote agri exports from India"
Mr. Vasim Shaikh is an Export Manager at AVS International in Ahmednagar in Maharashtra. To know more view https://bit.ly/3BPS1LV

Mr. Tanmoy Mondal on "Pre-harvest fruit bagging - Useful approach for quality fruit production"
Mr. Tanmoy Mondal says fruit bagging is a useful technique to improve the yield, appearance, quality of the fruit and prevent disease and pest infestation. It increase awareness towards reducing the use of pesticide to ensure consumer health, work safety and environmental protection.

Dr. Priya on "Improved agronomic practices in wheat"
wheat is an important rabi crop grown in many parts of India. The improved agronomic practices such use of high yielding varieties, soil test based nutrient management , irrigation management and Integrated weed management helps to get higher yield in wheat.

Dr. Anandkumar Naorem on "Why farmers should test their soil?"
Dr. Anandkumar Naorem will highlight how we can collect soil samples before sending to soil laboratory. He will also discuss what does soil test report mean and its interpretations.

Mr. Sudhakar on "My experience with installing drip irrigation on many farms in Tamil Nadu"
Mr. Sudhakar says drip irrigation system is the method of irrigating plant by PVC pipe and lateral without any manual work. The purpose of drip irrigation is to irrigate plants in a proper manner with minimum usage of water.

Mr. Altaf Aijaz Andrabi on "How to market agri products"

Mr. Altaf Aijaz Andrabi is the Former Director at Department of Agriculture Kashmir in Srinagar, Jammu & Kashmir. He is presently working as Advisor at Laxman Roa Inamdar National Academy with NCDC ministry of Agriculture and Farmers Welfare Govt of India.

Mr. Ashok Hasanda Manwani and Ms. Kulanjan Manwani on "Integrated pearl farming"

Mr. Ashok Hasanda Manwani and Ms. Kulanjan Manwani , Directors of Indian Pearl Culture, Ulhasnagar, Thane Maharashtra are engaged in doing pearl farming since 15 years. They are the only farmers who have done design Pearl Culture (farming) in states like Thane (Maharashtra), Bharuch (Gujarat), Bangalore (Karnataka), Begusarai (Bihar), Chitrakoot (Madhya Pradesh), Allahabad (Uttar Pradesh), & Raipur (Chhattishgarh). To know more view https://bit.ly/2YeAb43

Dr. S.J. Ankegowda on "Nutmeg cultivation"

Dr. S.J. Ankegowda is the Principal Scientist and Head at ICAR-Indian Institute of Spice Research in Madikeri, Karnataka. His interest is production physiology of Spices; Black pepper, Cardamom. To know more view https://bit.ly/3rIIRwl

Mr. Rajender Kumar on "Potential greenhouse crops for Indian market"

Mr. Rajender Kumar, Business Development Manager-South & East Asia, Cravo Equipment Ltd., Canada. The retractable roof production system or RRPS has been developed by Cravo over the last 35 years, to help growers create superior results using a system that combines the benefits of climate optimization, nature and protection. To know more view https://bit.ly/3kJeymi

Mr. Vimal Panjwani on "Rural household savings improves using renewable energy"

Mr. Vimal Panjwani is the Founder & CEO of AgriVijay in Pune, Maharashtra. To know more view https://bit.ly/3i5obwL

Mr. Kulkarni HB on "Organic Certification - Cultivation problems & solutions"

Mr. Kulkarni HB is the President of Federation for Re-farming Societies in Bengaluru, Karnataka. To know more view https://bit.ly/3ByAKrA

Ms. Ruchi Bishnoi on "Introduction to PPV & FR Act, 2001 and Farmer's Right"

Ms. Ruchi Bishnoi says that Government of India enacted "The Protection of Plant Varieties and Farmers' Rights (PPV &FR) Act, 2001" adopting Sui Generis System. The legislation recognizes the contributions of both commercial plant breeders and farmers in plant breeding activity and also provides to implement.

Dr. Sakamuri Sreenivasulu on "Mandates and achievements of KVK, with special emphasis to paddy & groundnut"

Dr. Sakamuri Sreenivasulu is the Sr.Scientist & Head at Rashtriya Seva Samithi (RASS) – Krishi Vigyan Kendra (KVK) in Tirupati, Chittoor District. His interest is on mandates and achievements of KVK, improved varieties, field preparation, seed treatment, sowing / different crop establishment methods, nutrient management, weed management, pest and disease management in paddy and groundnut crops.

Dr. Chirasree Gangopadhyay on "The integrated rice insect pest management for the farmers across India"

Dr. Chirasree Gangopadhyay from New Barrakpur in Kolkata is Grade A, Gazetted officer, WBAS, Government of West Bengal. She says West Bengal is the rice bowl of India, having highest production of rice. Dr. Chirasree Gangopadhyay has chosen this topic for discussion to give a thorough idea about the major pest management practices of the rice insect pest to the participants across India.

Dr. Shruthi Belliappa on "Climate-resilient pigeonpea cultivation"

Dr. Shruthi Belliappa says India's population is projected to be 1.64 billion by 2050 and the food production of 492 million tonnes. The current 25 million tonnes of pulses need to be escalated to 50 million tonnes by 2050 with a growth rate of 4.25 every passing year. In this context, the role of pigeonpea breeding is highlighted for achieving the vision 2050.

Mr. Goutam Roy on "Sustainable aquaculture and fisheries management"

Mr. Goutam Roy says fish is crucial to a nutritious diet in many parts of the world. It is recognized not only as some of the healthiest foods on the planet but also as some of the least impactful on the natural environment. For these reasons, they are vital for national and regional nutrition strategies and have a big part to play in eliminating hunger and malnutrition.

Mr. Tejram Nagar on "Soilless cucumber cultivation - economics and marketing"

Mr. Tejram Nagar is an Agronomist at My Crop in Ujjain, Madhya Pradesh. During this meeting, he will discuss
– How to grow cucumber under protective structures. – Cucumber growing in soilless systems substrate hydrophobic aeroponic.– What is Benefits of soilless growing media.

Mr. Mukesh Ramagoni on "Creating a value through Agripreneurship in rural India"

Mr. Mukesh Ramagoni says, Agripreneurship or Entreprenuership in agriculture is now vividly explored subject and is been the talk of town in entrepreneurial ecosystem. But is this really creating a value at gross root level or is it becoming successful in the last mile delivery of innovation and technology which can up bring and impact the rural community ?

Dr. Chandra Kiran Sant on "Process optimization in dairy farming"

Dr. Chandra Kiran Sant is the Dairy Advisor at Livestock Management Centre in Mumbai, Maharashtra. He is also associated with
1) Gomati Cooperative Milk Producers Union, Tripura as Expert Dairy Development for improving the milk quality & quantity as well as oversee installation of 40000 LPD Dairy Processing Plant.
2) Trainer (for Dairy Farming) in Indian Dairy Association – West Zone: covering Maharashtra, Gujarat, Goa, Madhya Pradesh, Daman and D. Nagar Haveli since 2010.
3) Technical Advisor (Dairy) in Paragaon Enterprise Industries in Vadodara,(Gujarat) since 1992 ; a Company engaged in manufacture of cattle feed plants & equipments ministry of Agriculture and Farmers Welfare Govt of India.

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Guest Column

NEW FARM BILLS 2020

The Farm bills 2020 enacted , by the Lok Sabha on 17th September 2020 and by the Rajya Sabha on 20th September 2020. As per Third Advance Estimates for 2019-20, total Food grain production in the country is estimated at record 295.67 million tonnes which is higher by 10.46 million tonnes than the production of food grain of 285.21 million tonnes achieved during 2018-19. Total horticulture production in 2019-20 is expected to be 313.35 million tonnes (MT), about 0.84 per cent higher than 2018-19, according to first advance estimates. All these were possible with the advancement of technologies and commercialising the technologies through premier institutes of ICAR like the IIHR- Bengaluru which has commercialised around 300 technologies and created a battalion of Hortipreuners in India, thereby signalling the transformation of a farmer from a mere producer to that of an entrepreneur with business skills embedded in the start-up and stand up culture of the ATMANIRBHAR Bharat envisaged in the new farm bills of 2020

During the Green revolution IADP(intensive Agricultural District Programme) and IAAP(Intensive Agricultural Area Programme) the subsidy and procurement was introduced to attain self- sufficiency in food production. From a begging bowl India emerged self-reliant, self-sustainable . The slogans JAI JAWAN and JAI Kisan was promulgated. The main intention was a sustainable India which could protect its borders and produce food for its population. The Globalisation and liberalisation around 30 years back changed the direction of the country from Agricultural production systems to Market led Production system. This was made possible through ICAR and its innovative projects NARP(National Agricultural Research project)-NATP(National Agricultural Technology Project)-NAIP(National Agricultural Innovation Project) which transformed farming as an enterprise. These innovations are aimed at farmers earn meaningful incomes, and move from sustenance to sustainability to commercial and viable ventures. In this direction the new farm bills 2020 gives ample scope and opportunities to realise opportunity. Complacency and protection on a continual basis , slows down the transformation, and if doubling farmers income has to happen, The new farm bills 2020 has to be adopted in letter and spirit. This liberates the farmers from the money lenders, and mono cropping.

The New farm Bills 2020 gives ample scope and plethora of opportunities for the farmers to produce and sell. The markets are bound to become volatile, therefore market intervention to reduce volatility in the market to protect farmers is envisaged in the new farm bills in the form of insurance, arbitration, MOU, contract farming, contracts, A smoother transition into a demand-supply market, through controlled volatility like supplier and buyer contracts, stronger value chains, cold chains, and processing and hedging to reduce volatility is contemplated in the new farm bills but purposefully less understood for political gains it could be argued.

So, instruments of financial hedging like insurance, forward and future contracts, facilitating remunerative prices through competitive alternative trading channels. This proposed legislation seeks to give farmers the right to enter into a contract with agribusiness firms, processors, wholesalers, exporters, or large retailers for the sale of future farming produce at a pre-agreed price. Is contemplated on a real time situation in aspirational and pilot districts before it can be upscaled in real-time situations.

After 30 years post liberalisation, the protection for farmers has to be phased on to empower, reskill, and upskill the farmers to be self-sufficient and produce market demanded crops and products and increase their incomes through diversification, rather than subsidy and MSP based protection. In order to metamorphosise into the protection oriented production system the change is contemplated to Market driven production system through the introduction of the new Farm bills 2020, wherein the farmers get opportunities to empower themselves and become global, competitive, remunerative , self-sufficient instead of monocropping of rice and wheat, and recurring dependant on government for subsidies and protection through MSPs.

The country has enough buffer stocks which keys in the food security along with nutritional security coming from around 313.35 million tonnes (MT), of horticultural production on all fronts., Therefore imposition of stock holding limits on such items except under 'extraordinary circumstances' like war, famine, extraordinary price rise and natural calamity, is in the back end for emergency, The apprehension of high price volatility for new products is the fear which is triggered artificially and misconstrued among opportunists who are discouraging gullible and innocent farmers to take advantage of the new Farm bill 2020.

Change is imminent, change is difficult, there is resistance for change, and finally and obviously one embraces change don't resist change because you require 3 times the energy, first you resist, 2nd you have to overcome the resistance, 3rd energy is you have to change and that is versatility, which is needed for a vibrant production system .

A production system may be efficient by producing more crop per drop with latest technologies, but it needs to be effective in catering to the needs and aspirations of the buyers' market, until

Panacea for assured income and market driven Agriculture - Volatility approach

and unless we do it, incomes cannot be increased at farmers side, production aggregation, value addition, and diversification holds the key for increasing farmers' income. Post liberalisation today's consumer is demanding and accessing farm products across the globe, and our farmers have the opportunity to produce those, like avocado, dragon fruit etc., and the new farm bills 2020, gives opportunities for that, to be competitive, remunerative and global.

Due to the vicious circle of debt traps, the present marketing system is predatory in nature at times, because rice after rice and wheat after wheat, a glut type of situation, wholly dependent on input subsidy and MSP based procurements as triggers, made our farmers complacent, protected and resistant to change, with huge dependency on governments.

While the change from the comfort zones to a higher volatile zones can trigger demands in the market, at the same time the apprehension that a farmer can lose in the high volatile markets cannot be discounted, in order to transform, it has to be gradual from an incompetent ,glut oriented rice and wheat production system to the more competitive remunerative production system. In the same direction RKVY-RAFTAAR puts remunerative and market oriented Agriculture enterprises as drivers of change to become market led, and not subsidy or MSP led.

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When crops like rice and wheat are surplus, it is uneconomical for the governments to farmers but enhances the GDP of the country. Therefore the new farm bills are in the right direction, Lack of awareness among farmers, and opportunistic tendencies and misunderstandings has led to chaos and confusion which is being clarified by this article. Therefore, imposition of stock holding limits comes only under 'extraordinary circumstances' like war, famine, extraordinary price rise and natural.calamity, this imposition is only a safe guard and not a rule. There is enough scope of market liberalisation and restriction and now farmers have scope to experiment and grow.

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Dr. D. Pari Naidu

Founder & Chief Advisor
Jattu Trust, Parvathipuram, Andhra Pradesh

Very much interested in food security and natural farming. He explains in detail about integrated crop model to increase farm income.

Annapurna Integrated Crop Model helps to increase the farm income, year long family food and nutritional security in half an acre. Andhra Pradesh is known as the Annapurna because of the surplus food grains in the state. But the scenario is changing since agriculture has become a least preferred profession due to ever increasing cost of agricultural inputs, relatively low yield, market fluctuations, and vagaries of climate. Rural population is migrating to cities in search of alternate livelihoods, and this raises serious concerns on the future of the farming sector.

Search for a solution – We are all searching for a solution to overcome the problem. In this situation inventing a system of cultivation with low cost of agricultural inputs, increased yield, and high income even in small holdings is the only solution. Annapurna model is one such system of crop cultivation.

Initial experiments at ground level – An experimental trial was made in the year 2010. After the encouraging results, the model was tried in 40 farmers' field in Biyyalavalasa village of Kurupam mandal. Maa Thota program was tried in 500 acres of land with the support of NABARD which is a combination of trees resembling Annapurna model.

Support received –NABARD supports in printing books on the model and producing videos. NRLM under ministry of RD, Government of India supported directly in Vizianagaram and Vishakapatnam districts in 3000 models in tribal villages. RySS and Government of Andhra Pradesh supported for imparting trainings.

Benefits to small and marginal farmers – It ensures food security to marginal and tenant farmers and aims to alleviate the problem of hunger. Family labour is enough since labour requirement is spread over the year. After completion of 3rd year of plantation, it will fetch Rs. 50 thousand to Rs. 1 lakh per year in irrigated fields and Rs. 30 to 50 thousand per year in rainfed areas in half an acre of land.

Field preparation of Annapurna crop model – A trench of 3 ft width and 3 ft depth needs to be dug along the half acre boundary. Beds of 4 ft width have to be made followed by a furrow water canal of 2 ft width and 1 ft depth. The furrows and trenches covered with agriculture waste protect moisture and stop growing of weeds. The soil taken out from the trenches and furrows is to be spread evenly on the bed. The height of the bed is slightly raised. To make it more fertile some organic manure and tank silt are added to the bed. The plot is ready with rich microbial culture and nutrients.

Cropping pattern – Based on the family needs within the half acre, 50% of the land needs to be allocated to cereals and millets in Kharif season and the remaining for creeper crops, vegetables, border and trap crops such as marigold, red gram, sunflower etc. Fruit plants will be planted vertically with distance of 9, 18, 27, and 36 ft respectively. They are sown east to west or west to east to avoid shadow on the beds. When planting fruit bearing varieties such as mango or jackfruit, we should remember that the canopy of trees fall within our own field.

They should be planted at 6 ft within the boundaries, and branches should be pruned as they grow bigger. System of rice intensification can be adapted for paddy, wheat, ragi, maize, and millets. Vegetable crops can be grown with proper spacing using de-weeder that makes farming less labour intensive.

Spacing between crops – Big trees like mango, jackfruit, or jamun should be planted 36 ft apart. Guava, sapota, lemon, and pomegranate should be planted between mango plants at a distance of 18 ft. Papaya, drumstick, and banana with a space of 9 ft between the second list should be planted. The above plants should be planted along the same row of plot leaving space to cultivate veg, pulses, and millets. Alternate cropping and crop rotation should be followed.

Weed management –As the crops grow, weeds will also grow because of less water in the field. Because of the trenches, water can be given only when needed to keep the soil moist. Weeds need to be removed manually. The weed is also used as manure. Any of the family members should work for at least 2 hours in the farm which is enough for weed and water management.

Natural farming practices – We need native cattles for organic farming to use their dung and urine to get better yield. We can prepare bijamrutham to treat seeds and jivamrutham for enhancing soil fertility. Regular use of ghanajivamrutham and dravajivamrutham ensures healthy crop.

Natural methods to control pests and diseases – Excessive use of insecticide and pesticide create problems in managing pests. Integrated pest management is gaining popularity. To control pests, in the farm border and boundaries, marigold, red gram, maize, and sunflower are grown. Marigold is well known for repelling insects, spider, mites, and snails. Neem oil, neemasthram, bitter leaf extraction and spray can also be used.

Harvesting and marketing – Planting and cropping in the half acre of land are not done at the same time. With different maturity times for each crop, one crop will be ready for harvest and the next plant will be done in a sequence. Not many labourers are needed at the same time. Distress sale of the produce can be avoided.

Fishpond and poultry birds – Farm pond is built to store the excess water to prevent soil erosion, nutrients depletion, and damage to crops. Aquaculture helps farmers get extra food and income. In another part of the farm, poultry birds can be reared. The droppings of the birds will serve as food for fish. Shade net can be put to cover fishpond to protect the fish from direct sunlight. Ridge gourd and bottle gourd creepers can be grown to provide natural shade. These enhance the income of the households by Rs. 10 to 20 thousand.

Success stories – Biddika Arudra from Kurupam mandal is with us since 4 years and earning more than Rs. 1 lakh per year in one acre of land. Rajamma started cultivating 4 years back and is getting Rs. 1.51 lakhs per acre. She grows vegetables in a rainfed area. Since the land is under green cover all through the year, it gets microbials and nutrients. She grows 13-17 varieties in kharif, 15-19 varieties in pre monsoon, and 10-13 varieties in rabi in organic way.

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Talking to

Any challenges you ha
Scarcity of rain is the c But furrows, trenches and mulching reduce need of irrigation. As it is only half an acre of land, so there is no labour problem. Since it is a mixed cropping pattern if one fails the other one succeeds.

You would have expected some profit but disappointed. What do you do in such a case?
We get income from sapota, amla, tamarind, and mango. During Kharif & Rabi vegetables are grown, and so there is no loss.

How long will the teak take to grow and any statutory permission to be taken for the teak?
Most of the farmers grown teak along the border are give one time profit at the age of 15 years, so in the long run, they will get income. It will take 15 years to grow. During harvest we need to take permission from forest / revenue department.

How many are following this model?
About 3 thousand people are following, and all of them have been successful with half acre.

Will each model have diversified crop categories and not the same variety?
Yes. It is up to the farmers to make the choice. We advocate marigold for plant protection. Otherwise all the vegetables are chosen by them.

What is your hold with the partners who follow the model you have created?
We are giving technical support for the farmers / organizers who are showing interest in replicating this model of cultivation.

Are these people who follow your model members of your trust?
Not necessary.

Can we get the print of the document on the complete model?
We have shared the links. You can take print outs of the same.

Will you be able to help any farmer who wants to follow your model of farming?
Yes. We can help them.

Any plans to improve the model and increase the income?
Yes, we are trying to integrate fisheries, poultry and cattles in all of the grounding models.

What should be the size of the fishpond?
The fishpond should be 10 metres length, 10 metres width, 2.5 metres depth.

Talking to

Ms. Jyotsna Kaur Habibullah

Founder and CEO
Lucknow Farmers' Market, Lucknow

First of its kind, online sustainable platform that supports Farmers, Artisans and Entrepreneurs at all levels, aims at sustainable living and a greener environment. She is interested in connecting farmers and start-up entrepreneurs to customers, brand building, and marketing support to farmers and entrepreneurs. She talks about creating and supporting ecosystems, brand building, and marketing support to farmers and agri-entrepreneurs.

We have a mango orchard outside Lucknow, and I have been working on supporting entrepreneurs related to rural farming and agri-entrepreneurs.

I conceptualised a mango festival, Farmers Market and Growers Association. For the first time in UP I brought together the state horticulture and tourism department with local entrepreneurs, Hotel Restaurant Association and initiated a public private partnership to popularise our main produce Mangoes. I collaborated with ICAR here to do that as well. We organise farmers' markets to create conscious consumers and producers, as well as connect with consumers who are aware of natural products, want to buy them but do not know where to get them. It is an opportunity to collaborate with likeminded farmers, brands, and other collaborators to help everybody grow and create a network of those working in the sustainable space.

You get to promote local agriculture, encourage community members to interact, conserve craft and indigenous activities and promote local specialties such as Karonda, a seasonal berry rich in vitamin C. In every state you have such agricultural produce which is not sold in the market as there is no demand for them. When we reintroduce them, its boosts immunity and we retain the local indigenous things that are very important to agriculture and the ecosystem.

Through the farmers market, mango festivals we propagate a farm experience and promote rural tourism. People from cities want to visit farms as they are often disconnected from their roots. You can arrange for it with a meal, or you can arrange the visit during the fruiting season or for instance the mango festival. In UP, there is a story telling tradition which is slowly getting lost.

We have revived this, promote local handicrafts and entrepreneurship in the region by encouraging the small entrepreneurs with fresh produce and market linkage. It helps those interested in building your own brand, and when associated with other products and collaborators, it will help you to receive testimonials from people when they visit your farm for tourism based activities. We promote local farms where people can visit, enjoy local music, and crafts. Children are taught how to appreciate the crops the farmers grow. Visitors are fascinated by the local food made from the produce of the farm, which also boosts the local economy.

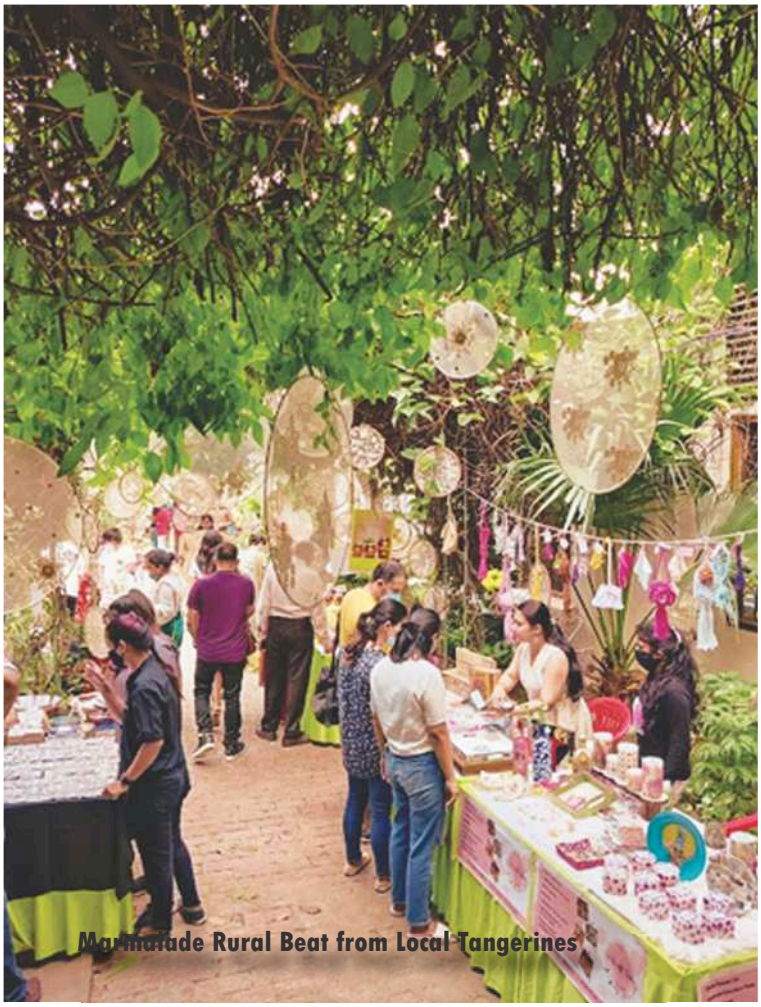
We have in the past collaborated with the tourism department and also promote local farms and plan to do this

around the country. For the Mango Festival we focus on different farms every year. People come and enjoy a traditional experience. We tell people why we get mangoes at the hottest part of the year, stories on how emperors travelled in hot summer months when mangoes were available, poems, and shayari, and keep the tradition alive. There are activities to engage children like mango eating, story writing for children about fruits and vegetables and drawing contests too. We get sponsors and collaborators to promote the festivities and engage them in the local economy too.

For the Mango festival, we have involved well known chefs and culinary academies like the Pankaj Bhadouria Academy who conduct a cooking contest. Hundreds of people apply online for this. It helps to conserve the local specialities involving mangoes and jaggery, and raw mangoes in different types of sweets and savouries. We buy mangoes from the local farmers for the festival and encourage the restaurants and hotels to do the same. Its a fabulous experience for everyone and we also showcase in many restaurants the different mango based international and national dishes to create interest among people. The festival helps us to promote local handicrafts, potteries, and crafts. It is an opportunity for industries to come up with different food-based items. Children learn how to grow trees from saplings. The mango motif is famous all over the world and is used in block printing and embroidery.

There are many other entrepreneurs who launched Mango based products such as Mitti Se that produces non-toxic skin and hair care products, raw mango dishwash, and Mystique Artisans who launched their products like shampoos and soaps etc. Bakers like Sweet Nothings launched a whole range of sweet and savoury products with Mango. Other products like mango tea and mango and aloe based soaps are sold here.

The aim of the farmers markets and festival is to link the suppliers with institutional buyers and connect to big industries like Safal, Spencers, and Nature Basket in different states. The PG students of vocational training department in Nutrition PG College in



Marmalade Rural Beat from Local Tangerines

Lucknow started the app Mango Baba, and ICAR launched it for mango farmers to connect to consumers. Since the last 8 years we are promoting mango tourism in UP. We plan to attract tourists in summer holidays for the festival to create a linkage with producers. We have opportunity to create infrastructure and value for the products. We interact with specialists and scientists to ensure the farmers get input and interact with farmers and consumers who will understand where the food is coming from. The purpose of the festival is to enable farmers sell directly at good retail price instead of losing out to middle men and the mandi.

Every year we get around 100 student volunteers who help us organise the festival and enjoy being involved in interacting with farmers. They help promote the festival through social media and conduct live events to raise awareness like flash mobs.

The Chief Minister, Governor and Mayor have been visiting the festival for many years. People come from all over the country contact us in advance to plan their visits. After the pandemic, we hope to have more people in small groups visiting orchards across the country. We bring in many collaborators to promote the Mango Festival, farmers market and be eco conscious, like Fab India, Accord hotels, banks, and local farms. The foodie groups in social media can also help to promote the farmers online. In UP, we have tied up with government associations, local colleges, radio and Uber in the past to send messages to prospective customers. It is a great opportunity.

We have organic teas from Hariyali Organics, consultations from naturopaths to help live a natural lifestyle and ecosystem. There are companies that sell squashes, jams, and jellies without any preservatives or colours. We have associated with a hydroponics company that grows microgreens. We collaborate with self help groups and Rural Beat in Sultanpur to help people in villages to be sustainable. There are a few companies that sell garden accessories, and others making flowers out of tin cans. We have bee society in Faizabad with 700 hives who produce honey, bee products and soap with bee wax. We would like to connect farmers with consumers to sell their products in advance by getting subscription at the beginning of the year to get better prices.

We also focus on connecting consumers to farm stays to enjoy the authentic farm experience. We currently list Vintage Village, a beautiful farm stay in Sitapur and Foothills Himalaya an experiential farm stay in Corbett and would like to connect to farm stays across the country. Lucknow farmersmarket.com also shares talks and a blog about different methods to improve your health, live sustainable, creating awareness about natural food, herbal teas.

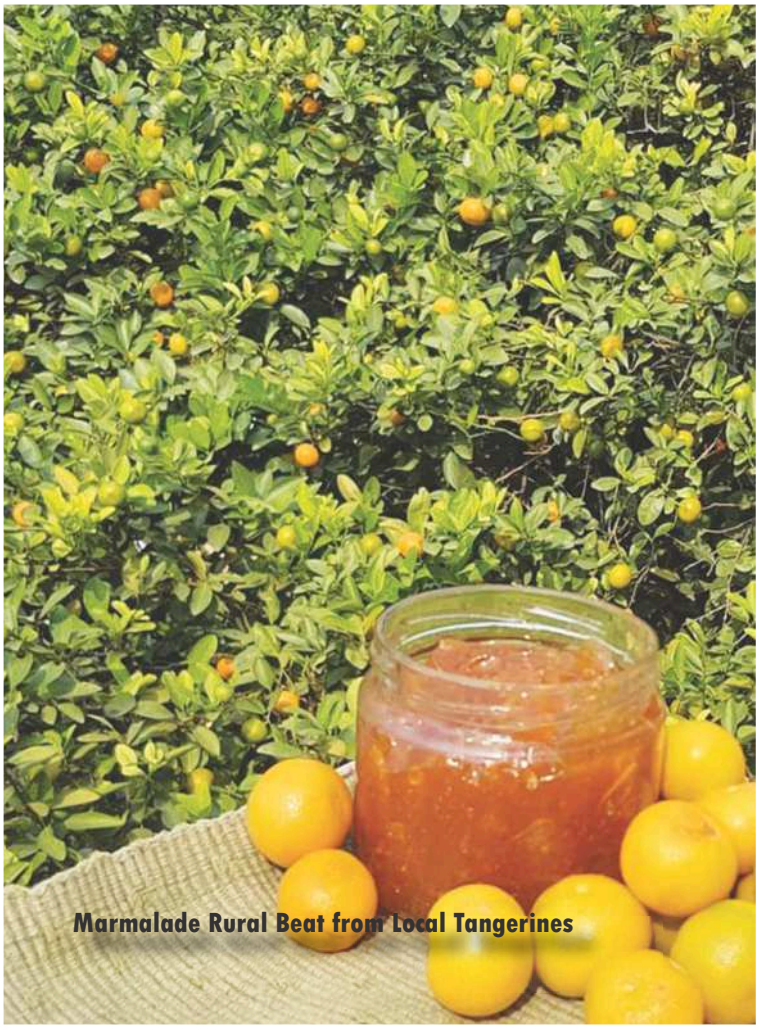
We offer those working in this space the opportunity to have their own website and interact with the people who are their target audience. If you would like to list your product or service with us connect on https://www.sell.lucknowfarmersmarket.com/

Can our products from South India be marketed there by linking so that we can transport our produce to your place to get good price?

Yes. With the online farmers market, there is opportunity pan India. We can supply from Bangalore or any other city when someone orders online. We have collaborated with Delhivery and are also tying up with India Post so that delivery can happen from anywhere. People can go online and see all such opportunities, visit, buy products and by-products through collaborations. We will also help in marketing and providing suggestions in developing orchards, an ecosystem to help farmers improve their offering.

When somebody wants to develop an ecosystem like yours, will you give advice and help?

If a farmer produces ghee, and if he wants to link to our website, we give him the knowhow, how to see online, and guidelines for certifications needed. Eco-friendly packaging is required. He has to reduce the plastic and other nonrecy-



Marmalade Rural Beat from Local Tangerines

clable products and know how to make the packaging using products that are eco-friendly. We can help him connect to people to work on, his brand, his logo, and develop a strong way to communicate his brand. We also help on how to communicate and connect through online.

Is it only for mango or for other produce too?

It is a farmers market. It has a website now, and we list different products and services.

Will you help in getting certification and logo?

We can help you in this. We help with your brand, logo, and communication strategy to connect with others.

Can you reach Bangalore and South India since you are pan India?

Lucknowfarmersmarket.com is now live and delivering pan India

Talking to

How do you handle organic produce demand?

When we started the farmers market, we had to convince everyone that it was worthwhile buying organic produce. Persuading the buyers and consumers was an uphill task and many time products were left over and had to be gifted. Now people know the benefit of using natural resources. With the pandemic a focus is back on health and there is a huge change in consumer awareness and realisation that we need to eat healthy and live sustainably. We have to continue the drive and create more awareness.

Will you help us to sell our produce with hospital industries?

We can definitely connect different industries including hospitals. A B2B offering is next on our platform and we are currently working on this.

How big is your orchard? What is the duration of the festival?

We have one orchard, but the idea is to promote local orchards everywhere so in the past I have tied up with other orchards for the festival. Now on the website we want to promote as many orchards as possible to enable the consumers to visit orchards wherever they are. We have 1 day for orchard visit, 2 days for farm visit where we have display of mangoes and mango-based productions. We have opportunity to do online. We can tie up with mango farmers from various places so that people can visit the farmers throughout the season. We can also extend this to other fruit other than Mangoes.

Are you tied up with any IT companies to promote the products?

We have a WIX based website and are working with IT specialists to ensure we have cutting edge technology.

Is the festival conducted in one venue only?

We keep changing the venues where farmers display their products. Entrepreneurs come up with mango-based products. We can promote a lot of orchards on our website, we urge Bangalore, Hyderabad and other farms to connect on our site

Do you have any control over the prices of mango growers?

We encourage them to fix prices based on market prices. If they sell in mandis they get low price. If they sell directly to consumers, they get a much better price.

What are the norms to enrol the farmers prior to festivals?

We have MoU with the orchard owners and a written agreement. In the past the Horticulture department connects those who are in need of help, now we urge FPOs and Farmers Groups to connect with us. It is an opportunity to build a large network of farmers and agriculture based products, natural and organic products, and to show how to live natural way. We look for more people to join the board.

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Dr. H.R. Bhargava

Director and CEO
Sri Annapoorneshwari Naturals, Bangalore

Dr. H.R. Bhargava is the Director and CEO of Sri Annapoorneshwari Naturals, Bangalore. He explains the various nuances of producing unifloral and multifloral honey and about the analysis of the same. His interests are anti-oxidative properties of honey and detection of adulterants in honey and honey analysis.

We come under the Khadi and Village Industries Commission and supply bee boxes to beneficiaries. The prime motive behind this is to enhance the honey production and pollination of crops as desired by our Hon'ble Prime Minister. We supply bee boxes to beekeepers and give training to them. When they produce honey and sell in the market, it gives a traceability of where the honey is produced from, authenticity of the produce, and the floral source.

Honey is the nectar from the base of flowers, and it has good market and nutritional benefits. It is used as an ingredient in most of the festivals and ceremonies. Bees forage for the flowers as they need carbohydrate and protein sources. The nectar is the carbohydrate part, and the pollen is the protein component. The nectar that has the properties of honeybee, when mixed with the enzyme called invertase in the bee's body, converts the nectar into a sweet material which is later converted into honey. The bee starts storing the nectar into the cell within the comb. When the bee goes near the flowers, the hair follicle on its body has magnetic attraction which attracts the pollen leading to pollination, and pollen stored in cells to be consumed by the bees.

When the bee brings back the nectar, the honey has to be ripened. For the process, honey should have moisture. The bees start fanning when they go near the cell. This process makes the moisture content in honey reduced, and it becomes thicker. This is called ripening of honey. We should never harvest unripened honey. We can differentiate the two by identifying the wax that seals the ripened honey. Only the ripened honey is good for consumption and for storing for a longer duration. Nectar contains 20-40% sucrose. Invertase present in the nectar converts sucrose to dextrose and levulose when mixed with saliva of the, and chemical action happens.

Composition of ripened honey: Levulose 41%, dextrose 35%, sucrose 1.9%, dextrin 1.5%, minerals 2%, and water 17%, apart from vitamins and pigments 1.6%, carotene, chlorophyll, and xanthophyll to give colour to honey. Minerals such as potassium, calcium, phosphorous, sodium, magnesium, manganese, copper, sulphur, silica, and iron, and vitamins such as nicotinic acid, Vitamin K, folic acid, ascorbic acid and pantothenic acid are also present.

When we check the authenticity of the honey, we need to see if the honey has all these components. Many beekeepers don't give food to bees, and so the bees migrate to pollinate according to the season and extract honey that can be unifloral or multifloral. Unethical practice such as feeding sugar syrup to bees are also followed. Once the bees get used to the sugar syrup, they do not go out to find food. Foraging practice of bees is very important. The bees need honey to get energy for the travel.

Benefits of honey- it is more nutritional compared to other sweeteners. It has good anti-oxidative capacity and prevents chronic degenerative diseases. The anti-oxidative power and phenolic content give nutritional benefit. Consumption of honey eliminates malnutrition, and many organizations recommend using honey for children to enhance the nutritional value for them.

Energy value-1 kg honey is equivalent to 65 eggs, 13 litres of milk, 8 kg plum, 19 kg green peas, 12 kg apples, and 20 kg carrots. The suggested per day intake for children 10-15 g, youth 30-35 g, healthy individuals 30-50 g, old people 20-30 g, and chronic diabetic patients should not take honey.

Classifying honey by floral source – there are 2 types, mono-floral which is honey collected from single source of particular flowers, and poly-floral when a wide variety of flowers contributing to the nectar. Blended Honey-can be from specific type of flowers, from many origins blended after collection. This is for commercial purpose. They procure honey from various sources,

heat and mix together. Mustard honey is white in colour, and if temperature is reduced, turns crystalline. It cannot be stored for a long time. It has a specific smell. Many people will not prefer this. Sunflower honey is golden in colour and has no long shelf life. So these two can be mixed to improve the shelf life, composition, aroma, colour, and is very economical.

Pasteurised honey- to reduce the moisture levels and destroy the yeast cells since the bee boxes are kept in

open space and will be contaminated. It will affect the quality of honey during extraction and cannot be stored for long time. We pasteurise the honey in water bath to ensure the enzymes are not destroyed, remove the froth, cool it, and then pack.

Multi-floral or poly-floral honey-if we keep the bee boxes near the forest area, it contributes to 2 or more floral type nectar. This nectar has a specific intense aroma and depends on the blooming prevalent. When we analyse the Melittopalynological, we determine the composition of pollen type contributing to multi-floral honey.

Unifloral honey-it is taken from a particular floral type. When we kept the boxes near coriander farm, we could get coriander honey. The predominant nectar and pollen contributing to the honey formation is called unifloral honey.

Honeydew honey- unifloral and seasonal, this is taken from the sweet secretions of the aphids or plant sap sucking insects. It is dark in colour with rich fragrance, not sweet like nectar honey. The production is more complicated and dangerous. There is not much demand for this.

Comb honey-authentic source of honey. We can find out if any adulterants have been mixed or if it is from a genuine source. Portion of the frame in the super chamber of bee box is cut into a slice, dipped in honey, and sell in market.

Organic honey-the difference in organic honey is it is processed and packed as per CODEX standards, SSI or Agmark certified agencies or by the organic farming certification organisations. Not much of difference.

Raw honey-directly taken from the hive and put into the bottle for selling

Packaging- Mostly honey is packed in plastic bottles. The acids in the honey may reduce the pH of the honey to 2.5 and in case of stingless honey, and in case of cerana and mellifera honey 4.5 to 6. Due to the possible chemical reaction, honey should be stored in glass bottles. From my farm, we have 3 types of honey coriander, ajwain, and tulsi under the brand name Swarna Madhu. They are collected from particular plants and based on that we categorise them as unifloral honey. Melittopalynological pollen analysis of honey is done to determine the botanical origin. We collect the honey, centrifuge it, spread the sediment on a glass slide, and we can see different pollen types. They are counted called absolute pollen count and determine if the honey is uni or multi floral.

Analysis-we find that these days honey is adulterated. When you taste the honey, the aromatic nature of the honey would irritate your throat, and you will get a cough. The taste, floral aroma of the honey lingers on your tongue for a minute or two. This determines the natural quality of honey.

Honey testing- we are testing the honey, and there are laboratories that give the information about the traceability and genuineness of the honey. Honey has sugar, water, saccharides, amino acids, proteins, organic acids, vitamins, minerals, enzymes, polyphenols, and pollen. There are many methods to check the presence of sugar in the honey, but it is found that the techniques remove the markers. Relying on the tests EA-IRMS to check the purity of honey leads to acceptance of adulterated honey. We track from the beekeeper, to production, and distributors and customers to ensure it goes without any adulteration. We use QR code to find out the geolocation of the bee boxes.

How many boxes can you keep in 10 acres?

We can place 100 boxes. You should ensure proper food is provided to the bees. If we determine the floral sources within the 10 acres, it will be sufficient for the bees and to give us too.

What is the cost of bee box? How many have you supplied?

We have supplied 3000 boxes in Maharashtra and 300 in Vijayawada. The price is Rs. 4000 but if ordered in bulk we can give at Rs, 3500.

In Karnataka, can we go for mellifera or cerana? What if we don't

want to migrate?
Cerana needs migration. If it is not done, mellifera is sustainable in Karnataka too. Without migration also we can do.

What is the best output you have got? What is the price of 1 kg honey? Do you offer training?
We get minimum 14 kg in each box within each crop of 4 months. If you have coriander, you can go for crop rotation. We sell at Rs. 600 per kg. The cost of production is Rs. 250 per kg. Yes. I give training to beekeepers too.

Is it possible in horticulture? Which flowers have both? What about sunflower or marigold?
The flora should be a nectareous or of pollen source. You can complement with each other. We need to identify the flowers with either of the sources. Coriander, ajwain, tulsi, jamoon, cedar, and eucalyptus are unifloral varieties. Marigold does not fetch nectar or pollen. Sunflower during the season is a good source of nectar.

Which can give both round the year?
Coriander or ajwain can get you nectar source with 10 boxes in 1 acre all through the year on a crop rotation.

Why sugar syrup should not be given?
Beekeepers give sugar syrup and make bees as machines. They feed sugar syrup which is converted into honey and extracted.

In sugar cane crop, is it possible to keep bee boxes? How to prevent pesticide spray in neighbouring fields having intercropping?
With sugarcane, it is not possible. You can go with intercropping vegetables. When pesticide is sprayed in neighbouring fields, you need to shift the boxes to another place for at least 2 days.

Can we have bee boxes in greenhouses where gerbera and carnation are grown?
Yes, you can grow flowers and take advantage.

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Mohan Urs

COO, Triangle Farms Pvt Ltd, Zaheerabad, Telangana

Mr Mohan Urs is the COO of Triangle Farms Pvt Ltd in Zaheerabad, Telangana. He is very much interested in operation and implementation of new generation technologies in agriculture sector. He talks on how to make greenhouse farming 100% successful in an interview.

I have been observing about 90% of the greenhouses in India are failing. There are several factors:

Subsidy – there are many challenges farmers face when they go for subsidy from government for building structures for a sustainable farming. When a farmer gets subsidy for constructing a greenhouse, he is supposed to stick to stringent designs what the agencies suggest. For an innovative farmer it is a real issue, and they will not get subsidy if they violate. We need to look at standardisation, less choice, and slow adaptation to new technological changes when we go for subsidy. We have to think of the kind of greenhouse suitable for our location and not the subsidy given by the government.

We prefer naturally ventilated greenhouses, or net houses, or fan and pad system. For fan and pad system no subsidy is offered because it is expensive.

The naturally ventilated greenhouse is not suitable for tropical areas in India. We need to go for soil or soilless growing. The factors that need our focus are the market demand, and the distance of the market from the growing area, and soil condition.

Many greenhouse farmers do not follow the protocols to be followed. We get carried away on what to grow and focus too much on quality which the consumer may not look for or may be ignorant. We have to either educate the consumers or grow what is required by the market. If there is no demand, growing something fancy may not lead to sustainable farming. We also have the middlemen issue, which can be good or awkward. It is a dependency on making farm success in greenhouses.

Pros and cons of protected farming
The advantages are better yield, quality, low fertiliser and pesticide use, less

water consumption, lower MRL. Cons are higher cost per kg, requiring better management skills, basic education to manage the greenhouse, calculations and observing various changes and remediate them. The skills have to be acquired. Pest management is tough. In a greenhouse if a pest enters it multiplies fast. If we do not take steps it will multiply.

Precision agriculture

The traditional farming is what we have acquired from our predecessors. Precision agriculture is not easy. We have to understand the science behind growing crops in greenhouses. Cost is high, and we need to do some targeted yield management and natural farming. We have to increase yield and quality to make cost per kg low. Apply fertilisers according to the soil. pH and EC of media is critical and should be monitored and balanced. We should manage temperature and humidity.

Greenhouse hygiene –a key factor missing in Indian greenhouse farmers. The new generation farmers do not take this seriously. When a worker or operator gets into the greenhouse after working elsewhere, there is possibility of them carrying virus, bacteria, and pests on clothes and body. They can transfer the infection when they enter without fumigation. So it needs to be controlled at the entry and exit levels than manage post attack. In Triangle Farm, the entire design is hygiene-centric with good control on pests and diseases.

Consumer demand and mindset – ignorance is a key thing when we talk about greenhouse farming. The consumer may be influenced by the traditional market. The look of these produce may be good, but such produce will have high level of insecticide and pesticide to kill germs, and they are poisonous. The consumers are not aware of this. But media has been helpful in improving the scenario. As Indian farmers and producers we need to market products, talk about MRLs and quality of proceeds we grow inside the greenhouse compared to open field. That creates extra premium to the products we grow and better ROI.

Risk appetite of the investor or entrepreneur

The scenario is we do farming just because there is land, get subsidy, subsidised urea we apply, and grow what we can and sell it. Per acre farmers can get about Rs. 30 to 40 thousand. But with greenhouse farming, there is every chance of losing the crop due to pest attack, and we may have to scrap the crop inside the greenhouse. The farmer should have the ability to absorb the loss and continue. Many Indian greenhouses fail because there is initial subsidy and crop loan, and for the second round, the farmers do not have money to buy the seeds and fertiliser which are expensive. We have to look into the risk as an investor.

Sales and marketing

We assume that we can dump whatever we grow in the market and get money. But contract farming is a better deal as it gives consistency and forecast. Based on that we can calculate our investment as a greenhouse farmer. If you think you can get money from mandi, you need to take a call or plan about exporting. Sales and marketing is not easy in farming. Customers will want to see what we grow. Farmers may not know what to grow. So we have to think in advance and take a lower risk, and then go all out on a large scale.

Key failure points

Following protocols to be followed in greenhouses, hygiene, pruning, managing fertiliser are very critical. Many farmers do not calculate what has to be given, so either excess or short dose of fertilisers is given. Pest and insect mismanagement due to application of more fertilisers and resistance can never be

fully controlled or eradicated. We have to test the fertiliser quality before applying.

Key success factors

We need to find out the location where we have to erect the greenhouse and distance from the market. Temperature and humidity level should suit greenhouse, else we have to spend more on infrastructure impacting the ROI. Water may have more TDS, and RO plant may have to be used. We have to check this as otherwise it will increase the price of the crop.

The size of the greenhouse may be one acre to start with, provided our goals are smaller and we have a more sustainable model for going for small greenhouse. When we build larger structure, water management on how to take it out of the building becomes a project by itself. It needs huge capital, and we have to ensure that such natural disasters do not lead to failure of greenhouse design.

Greenhouse ventilators should be considered based on the location. Net houses are ideal for tropical climates. In Triangle Farms, we have retractable roof system that can act as a naturally ventilated, closing and opening on every side of the wall and roof. It can blend with nature and make sure the plants are protected from climatic changes. But it is expensive. Market demand and timing are very critical. Greenhouse farmers should enter the market in ideal time for sowing and harvesting.

Plant physiology

Plant lifecycle management in greenhouses is difficult. Farmers continuously give a recipe without any change. Plants develop resistance, and the plants may have to be removed. We have to keep monitoring every day and every section and manage fertigation for the plants. Yield of fruits may be more, but size may not be what is needed in the market. We have to balance.

Is greenhouse farming only for cold climate?

In Telangana, the temperature crosses 47 or 48 degrees with humidity going down to 10%. There are generically protected greenhouses designed for deserts or tropical areas. Gulf countries use them to be sufficient in their produce requirement.

What is the cost implication?

Greenhouse farming is very specific to the requirement of the market. If there is demand, economics work out to sell a produce at a premium, only then we should go for greenhouse farming.

What are you growing?

We grow colour capsicum.

Can stevia be grown in greenhouse?

Stevia is a foliar plant. So we should be able to grow in a greenhouse. We have to work out the economics.

Should we check the fertiliser quality as it comes under FCO?

Yes. If the ingredients of the fertiliser are not according to the requirement, it will impact the crops.

What are the essential criteria to maintain quality of produce in greenhouse?

Greenhouse systems are evolving. Some standards may be available. It does not happen overnight. We have demonstrated that the quality of our produce is better and better yield. Hygiene plays an important role.

Can organic manure be applied to greenhouse land?

We are experimenting with it. We are trying combinations.

We are trying Haifa fertilisers, and Yara and Nagarjuna fertilisers.

Cost of greenhouse for one acre?
The smaller the greenhouse the higher the cost. the cost for the shell of a low cost greenhouse is around Rs. 15 to 18 lakhs per acre.

What crops can be grown in other parts of India in greenhouse?
Greenhouse can be designed to suit the crop. We need to survey the market and decide.

Can we have partition for different crops?
Yes, in our greenhouse, we have 3 zones to grow different crops.

Is it compulsory to put GI structure?
It is preferable to make sure the structure lasts longer.

Does NABARD promote greenhouse agriculture?
Yes, the NHM and NHB promote greenhouse cultivation, and NABARD gives subsidy.

Can we grow grapes?
Yes, but may not be viable as it needs lot of sunlight.

Can we grow hydroponic crops in greenhouse for better yield?
Not much of difference. Soil has natural fertilisers, but soilless environment does not have. We have to manage precision fertigation system. Soilless farming does not get diseases in plants. When we go for soilless, we have to keep in mind the cost.

Will leafy vegetables give more yield?
Yes, because it is a protected area and density is high, but ROI needs to be checked.

Advice for younger generation?
Every factor has to be checked fully and seen from business perspective. We have to do prudent expenses at every level. If it works, then we can look ahead.

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SAJJAD AHMAD

Apple producer , Kashmir Organics, Bijbehara, Anantnag District, Kashmir

Mr Sajjad Ahmad is an apple producer at Kashmir Organics in Bijbehara, Anantnag district, Kashmir. While his family is into producing apple since the last 7 decades, he has been into apple production for the last 2 decades. In a recent interview he talks about his experience in quality apple production and marketing.

I am a progressive apple grower. We focus on two points - production and marketing. There are some distinct practices that we need to follow for a quality production. I am in touch with some of the advanced growers in other countries for growing quality apples, and it has been doing good to me. It needs a lot of care from every point of view. As a basic, we should ensure best varieties in terms of colour. Though we have many varieties, some of them are traditional, and the colour may not be proper in such varieties. We grow the best varieties and even import to advanced countries.

We need to prune the plants first. This is required as the plants need proper sunlight for the colour and aeration to get the best quality fruits. The apple plants may be prone to many diseases and pruning prevents them to some extent. If there is rain, the wetness does not remain on the plants for a long duration, and the plants get aeration when pruned properly.

We must also know what our soil contains. Nutrition management is essential from the beginning of the plant till harvest. Upon knowing the nutrient content, anything short, we need to provide. We should know if we are providing excess or short and what we are providing. In Kashmir we see flowering of apple trees from the 2nd or 3rd week of April. During this season we need proper pollinators. Everything contributes to flowering and getting a good crop. If we see quality product, we should go for cluster flower thinning. We can take up florets thinning and fruits in peanut stage. We should do florets thinning first and then fruits thinking. It is essential that every apple should be surrounded by 30 to 35 leaves.

When we say quality fruits, we should know that the fruit size at the time of harvesting should be about 200 to 250 grams. We have two grades, large and medium. We get the best price when the apple weighs 250 g or more. There are also small size apples which weigh about 125 t 150 g.Proper nutrition and sufficient number of leaves are essential for getting good quality fruits. We can go for soil or foliar application. When there is cell division in the fruits, at that time it needs good quantity of nutrients. We can make foliar application of nutrients such as Calcium, Boron, or Nitrogen content which are very much needed for best quality fruits. Then we need to consider about disease management. In darment session we can clean orchard floor from leaves as it contains inoculum of many diseases.

Water also plays an important role. We must apply water as per requirement. If the soil is dry, we need to apply water. When we go for rootstock variety of apples, during peak stage, they need 15 litres of water per day. It takes about 180 days to fully ripe for the fruits. So if we calculate from March to August, after that we can check sugar content and if storage has the required temperature to take them. before marketing, we may have to store the apples so that they are in perfect condition.

Diseases and pests should be cleared. We can follow the set norms for the procedure. So from August we can start harvesting. We have to really work hard to take care of the produce. We should know what the plants require and check. In advanced countries, the fruits are of much higher quality because they have all the facilities there. When they apply nutrients to the soil, after 15 days or 20 days or 1 month, they get some sap from the upper portion of the plant and test to check if any nutrients are needed. Here since we do not have such facility, and so we do not know if the nutrients go to the upper portion

of the plant or get leached. We do leaf analysis, but they go for sap analysis and do the test.

We should follow the efforts of such countries since apple industry is the backbone of Kashmir. The government is doing much for the industry by initiating some good projects here. The government offers Rs. 20 lakhs subsidy per hectare. The actual cost per hectare is Rs. 40 lakhs, and the remaining Rs. 20 lakhs the growers have to bear. Since the subsidy is a substantial amount, many people opt for it.

Next comes marketing. Since I produce good quality apple, I plan to go to a good market to get good price. It is a big challenge to market the produce. Nobody knows what rate we will get for the fruits. We send the fruits to other places, but we do not know the market there.

Only after the produce reaches there, we come to know the price. I am planning to opt for open market system where we can sell all the fruits directly in the open markets, and the other one is to sell the fruits to customers directly. In this way we can get good price for them.

The next challenge is how to pack and grade them. There are machines for this purpose. We can grade the produce manually or using these machines. For packing we have two types. The wooden box traditionally used and the corrugated 15 kg box.

Or we can use boxes of 10 kgs with trays as in egg boxes. After the harvest, the produce is directly supplied to the store, and from there I keep them for 2 days in the storage. Then I can pack them in 1 ton grading lines.

Then we have the big problem of road connectivity because roads here are not in good condition. We cannot go fast to deliver the fruit. The fresh fruits reaches Jammu in three days because the national highway is not conducive. We cannot keep the fresh fruits for more than 3 to 4 days also, and we need to reach Jammu. To send to Bangalore, it takes 7 to 8 days. The temperature plays a major role. So I feel it is better to opt for cold chain. Based on the size of the apples you can select the box. It is also better to send them through a/c container so that the consignment reaches the market safely and securely. Since the last 4 years I got much better quality of apples , the produce .This year it fetches Rs. 80-110 per kg which is very profitable to me. By following proper nutrients management and water, we can produce good quality apples. We need to often visit the orchard to solve any issue. like as we have to check disease and any upcoming sport of it .

What is the size of the farm? What is the temperature?

It is 1 hectare. The temperature is currently -2 or 3 degrees, but it does not affect the farm. But actually it is beneficial for the yield.

What is the yield per acre?

Year 2019 it was 1600 kg
Year 2020 it was 25000 kg
This year it was 30000 kg
. It keeps varying.

How long does it take to complete harvesting?

It takes 2 to 3 days to complete the harvesting.

Per plant how many fruits are expected?

Per plant I can get 100 fruits, and in one hectare, 3333 plants are there.

What is the space between the plants?

Plant to plant distance should be 1 metre and row to row 3 metres.

Which variety fetches more price?

Gala fetches good price . It is very tasty and colourful. There is no issue of insects. Earlier red delicious was selling high but gala has taken over the red delicious.

Do you grow them in erect or bushy type?

It depends on our pruning method. It can be bush or a spindle system.

What is your best yield?

We are following the methods advanced countries follow. They have high density apple projects. We can easily get 80 MT or more.

What is the profitability per acre?

Our traditional orchard does not give much profit. My profit in the new orchard is Rs. 8-10 lakhs per acre.

Do you grow any intercrops?

Yes, we grow beans, peas, and onion.

How many varieties are you growing?

We grow 4 varieties – golden apple for pollination, red delicious, gala, and green apples.

Do you grow saffron as intercrop?

At our location, saffron does not grow.

Do you have any farmer producer group?

Yes, we have organic farmers cooperative limited Kashmir.

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Santosh Sharma

Founder - M'ma Organic Farms
Sarai Kela Kharsawan, Jharkhand

Mr Santosh Sharma is the Founder of M'ma Organic Farms in Sarai Kela Kharsawan, Jharkhand. They are nurturing agripreneurs. The farm is working on 68 acres of land that was infertile and converting the same into fertile land. They have 100 cows and use their manure to make the land fertile. He explains on smart farms – the shift from farmers to agripreneurs.

I grow organic crops. I create constructive thoughts, emotions, and actions when I work with people and give meaningful strategies when I work for organisations. I have written a book called Dissolve the Box about which Dr. Abdul Kalam came to know. I met him at his residence, and he suggested how to create engagement platforms for both rural and urban youth and how to channelise the energies of both. So this led me to start M'ma Farm.

We have lots of factories and industries around Jamshedpur. About 30 kms away from the place, there are lots of vacant land where the villagers and tribals are very poor with no meaningful engagement in their lives. Many were training to be naxals, and the energy of many were misdirected. I took up the challenge to set up the organic farm in Dalma surrounded by hills and elephants' wild sanctuary. The land belongs to the farmers. I took the land on lease. The farmers work with us and also get rent for being engaged in the farm. It is an integrated farm with 100 cows that produce 1000 litres of milk every day. We have our backward and forward integration in place.

My aim is to build smart farms for every smart city. When we achieve this, we will be able to connect the urban and rural youth. The smart cities will not be sustainable if they do not have good food to eat. The rural youth can connect and will be able to build an enterprise for themselves in agriculture. The farmers should upgrade themselves from the mentality of being farmers and should think of themselves as agripreneurs.

It is very important because the very mindset of the farmers changes. They will know what is the cost going in, benefit coming in, and try to introduce the best technology. The natural intelligence gets the place. Right from the moment the seed is sown, till money is received after selling, the farmers should behave like entrepreneurs. Many small farmers should come together. If the land size is huge, farmers can employ people, but if it is small, such farmers can come together, distribute their work, form a farmer producer organisation, and create smart farms around smart cities.

The Dalma model is doing this and building integrated farms. The milk we get from the cows is being distributed to many customers, who also get fresh farm milk, vegetables, cereals, and fruits. We thus try to go to the kitchen of every customer, and supply chain works for all the products. In Dalma we have created the platform where integrated farming takes place.

We invite students from the smart cities to visit the farms and learn agriculture with us and innovate for the farmers. In-

novation is very important for the farmers to accept because the old age farming has some benefits such as natural intelligence, flora, and fauna of the soil. We also need precision farming by using less chemicals and more organic manure to produce goods. So when the customers visit the farms, they know the source of the products. They come to the farm, enjoy their stay for the whole day, and engage themselves there. They can also order food cooked from what is grown in the farm. This is another source of income for the farmers.

It is essential that the farmers should not depend on one or two sources of income only. They should educate themselves and the entire team around them and start behaving like entrepreneurs. Then they will be able to go for backward and forward integrations and branding the supply chain, and everything starts improving. It is important that farmers should act ethically, especially when they come together to form farmer producer organisations.

As of now, I am nurturing 120 agripreneurs from different parts of the country, and many of them have very good educational background. When people come to the farm to learn leadership and entrepreneurship at the farm, it is another source of income from the farm. We are trying to communicate to the farmers that they should never beg from the government or people around. They should get stronger enough to create their own future, think, and work like entrepreneurs. The farmers should bring about a real change and enjoy life. They are the real building blocks of he country.

Not all of the farmers are living in smart cities. We will have 400 farms in 100 smart cities with 4 farms for each. Those who are away from the smart cities can join farmer producer organisations and build up the chain so that each group is able to connect to the smart farms. This will bring about a huge change in India. The country can become a superpower only if these people living below poverty line become empowered. They have to think, bring in lot of innovation, and thus bring down the cost and improve output.

Farmers have to understand the new trends in the sector without giving up the old values of farming. Without organic farming, India will not move to the next level. I have come up with an acronym MONALISA. MO stands for more output, NA stands for natural agriculture, LI for less input, and SA for sustainable advancement. Doing farming in a sustainable way is very important. Agripreneurs should be able to sell products at the right time. We should build low cost innovative warehouses around the farm and good supply chains where the farmers can sell the product to the customers directly through proper channels which should be created by people who are engaged in agriculture.

The Institute of Cost Accountants of India has created a task force which is trying to work on the cost benefit analysis of the money spent in agriculture. Technology should be used to find out the pH level of soil, which product will grow well, which part of the year, and farmers should learn to be less dependent on outsiders. They should be able to generate seeds from their own products. Then they can have more bargaining powers.

Farmers should become intelligent enough to understand what their soil is and what they should grow that they can sell in the market. The demand and supply have to be understood by them to fetch best prices. They should create brand name for their product so that people identify the produce. They can charge premium for these products. Research and development should be done on the produce. Farmers should know that it is just not producing goods, but it is important to know the best price they should sell them.

When R and D is done, they will know where the cost can be cut. They can reduce their dependency on anyone else even if the landholding is small. The farmer producer organisation can assign tasks such as marketing and distribution. I can help the organisations with my management knowledge. People should not run away from farming. Farmers should get the technologies, people who are working in technology should come to the farm, and those working in supply chain should be invited to make it an integrated process. We should empower those living below poverty line.

What is the lease amount offered to farmers?

The lease amount for 68 acres is Rs. 1.65 lakhs per year. It was a barren land that we have taken from the farmers. We use cow dung and urine to convert it into agriculture land. Along with that we promote ecotourism. We have not changed the profile of the land but worked on it to remain like that to add scenic beauty to the farm and to bring in more tourism to it.

What is the size of the land?
It is 68 acres in the foothills of Dalma, and it is a remote area.

Is this a farmer producer company?
We are working as a private limited organisation. We would love to work with more farmer producer organisations. I have worked in companies like Maruti, Ernst Young, Kotak Mahindra, ICICI, and Air India. I spotted this farm after discussion with Dr. Kalam. Two friends in USA have invested in the farm.

Please tell us about your book.
It is Dissolve the Box. It is compulsory in many IIMs and IITs. It is about getting the best out of human beings.

What type of ecotourism set up do you have?
We have helped farmers to create mitty resorts, soil resorts. We have allowed people to stay in these resorts. Whatever is cooked in the entire resort is made in the clay utensils. It acts as a coolant during summers and cosy during winters. It is adventurous also as it has a sanctuary around it. We have created adventure tourism around it. We make farmers realise that they should do a lot of R and D on what they are doing. For example, Ethanol can be used as a good fuel. If farmers grow crops that can convert into ethanol, they get income by harvesting the produce and by making ethanol. They should think of at least 3 lines of income to meet the ups and downs. We are also into multicrop layered farming. People come to see the 3 crops grown at the same time. People come and learn these new things.

For ethanol is there any miniature plan or is the government allowing smaller operations?
The MSME minister says that his ministry is promoting buying ethanol from the farmers. It is going to be at a large level. He supports buying from different places and setting up ethanol plants around the farm.

What is your future plan?
I want to work with lot of farmers, farmer producer organisations, and agripreneurs. When we have lot of agripreneurs around smart cities, my dream to connect Bharath and India will be fulfilled. The energy of youth will be channelised into action. My next book Making of a New World talks about how agriculture will evolve from 4.0 to 5.0 to 6.0. Since agriculture is evolving to the next level, we are growing radish at the space stations. So land will be no longer be the only place where seeds will be planted. Innovations such as hydroponics and aeroponics are coming in.

How about funding? Any innovation you have planned?
Farmers should act as entrepreneurs and improve and create new products. The Mahua trees are used to make country wine. It has a lot of medicinal property. We have to do research around the farms. I am also working on a project Khushi where we want to create a Unique Selling Proposition of India in all districts. When we connect different zones, unlock lot of energy and value. It will become bigger than a public sector company.

What do you want to tell the farmers?
I want the Dalma model to be practised by the farmers. I can help in executing it as we need smart farms around smart cities. Farmers should upgrade themselves to agripreneurs. They should change the way they think, work, and market. Technology and natural intelligence will bring in greater rewards. More output, natural agriculture and sustainable advancement will help them. They should have 3 or 4 lines of income. They should not be dependent on anyone.

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Sanjay Bhattacharji

Founder and Director, Teplu Learning Pvt Ltd, Mumbai.

He has worked in large corporates in the field of marketing and digital technology. As a dairy farm entrepreneur, he has faced numerous problems and solved them. He started Teplu to fill the gap that exists in the dairy industry with online educational courses on dairy farming. He explains how he was able to overcome the problems he faced in dairy farming.

When I started the dairy farm in 2007, the problems I faced included:

• **Experts** – I could not find any expert to guide me. I visited to various institutions and met teachers, took training programs, and the information I got online was also less.

• **Partners** – I was managing the operations of the farm all alone. Dairy farming is a complex business that includes several different subjects like selling milk, arranging feed and fodder, and other activities.

• **Land and water** – My farm was not close to the highway and reaching out to customers with milk everyday was also a problem as the production started increasing. Since animals need about 150 litres of water every day and my land did not have sufficient water, I could not expand the farm beyond one hundred animals.

• **Land to grow fodder** – Since the land did not have enough nutrients, when I cultivated maize, the crop failed. I had to get the soil tested to know the nutrient levels and apply fertilisers. Feed and fodder price fluctuation was another problem affecting the profitability of the farm.

• **Design of the farm-** Many sheds were erected to expand the animal count to five hundred. Place to grow fodder was away from the main shed, and feed and fodder were also away from where the milking and feeding activity were taking place. So additional labour was needed leading to increase in labour cost.

• **Construction and generator set** – Since we did not have electricity, we had a single line connection and bought a generator that consumed lot of diesel. This added to overheads.

• **Pricing issues** –The milk price when we initially supplied to local people was good. When we started getting more milk, getting decent price was tough.

• **Creating good asset** – We had no idea about semen and bull to get good breed in the next generation. We could not focus on the breed development in the farm, which even now farmers are facing.

What worked – We started loose housing system where animals had enough space to roam, lie and rest. Dairy animals need at least 12 to 14 hours of rest. We used various

techniques such as pre and post dipping of udder which prevented diseases. We had very few cases of mastitis and zero calf mortality due to our care and secure structure. So cost on treatment of animals was less. We used the concept of TMR, we chopped fodder, mixed with ingredients, and used as a scientific diet plan. Health of animals was good and milk production was high.

We had several compartments for different age groups and milk producing capabilities of the animals. Fodder was provided based on the requirement of the animals. So the cost of feed and fodder did not shoot up. When we saw that we did not get any advice from experts, we decided to hire a veterinary doctor in our farm. He stayed in the farm, took care of the animals.

The problem to marketing the milk with decent price encouraged us to start processing the product. As we were getting one thousand litres in the farm, we started manufacturing ghee which sold at premium price. We also started outlets where we sold traditional products like sweets, paneer, cottage cheese, and ghee. We got good margin and built a brand for the farm. The picture of the farm is mentioned in the store, and any customer who walked in was explained the concept. It got good response, and the uptake of products was good. We tied up with large institutions like Renaissance Hotel and JW Mariiot because the farm was close to Mumbai, and we had healthy orders of booking. That made up for the monetary offsets we would have.

My suggestions to dairy farmers are:

• **Prepare silage in your farm:** Harvest green fodder, chop into pieces, and put in bunkers or pits. Press them and keep them covered for 45 days to use this throughout the year.

• **Loose housing system:** Labour requirement is less, no need to remove cow dung every day, and since the animals have good air and ventilation, they are healthy.

• **Feeding dairy animals:** You should know to feed what the animals need and not feed only what you have.

• **Record:** Write down the type of semen used for the animals because of the concept called inbreeding, failing which there will be lot of problems later. The symptoms may not be visible, but it hampers the milk production.

• **Frugal business:** Focus on breeding. When your calf grows after 2 years you can sell them for decent price. Or you can sell their milk, and when they reach maturity, you will get good income from them.

• **Decent quality milk:** Sell milk that is low in bacterial and somatic cell count. Aflatoxin reduces milk yield and health. You should know about animal health and productivity.

• **Learn from experts:** Invest time in learning from experts. Learn scientific management from experts.

I moved from farm to corporate life because I had problems in the farm and missed family. But I am in touch with farmers and entrepreneurs who want to start dairy farm. Since the problems I faced in the early years exist even now, I started Teplu. IIT Mumbai has helped us verify the hypothesis that farmers need Teplu. There is a lot of research to improve production and profit. We are providing digital solutions to farmers, to improve profits and online courses with solid hand holding.

The first course is on A to Z of scientific dairy farming, and veterinary doctors are taking courses. Many large institutions and foundations avail our services. We had users from sixty-five countries in 2020 and paid users from Africa, USA, and UAE. We go to farms, do research, discuss with experts, and find solutions and new techniques. These are used in online courses. You can visit Farm Check in teplu.in to understand if you are following scientific methods and where you go wrong. It is a ready reckoner with practices to improve.

Farmers should know to select animals, dairy housing, animal health, breeding, calves, and heifers, nutrition, diagnostic procedures, clean milk production, business planning, and silage making. We serve the farmers by farm reviews through calls, coaching, farm check,

farm designs, and farm visits. Teplu platform is easy to use with videos, footage, and instructions. You will be invited for live sessions when you have finished 50% of the course. You can clear all your doubts within 24 hours from experts. You can get instant access by paying. Teplu was created to improve productivity and income with practical curriculum based courses. It brings in credibility, and is institution backed.

Do you have any plans for local breeds and to improve milking?

A large number of farmers have indigenous breeds. Some animals have inherently low milk producing capabilities. Some breeds respond to nutrition and management. You need to create a much better generation with better semen quality. You will get details on the same in our courses.

Any success stories in dairy milk A2milk in South India?

We have such stories in Maharashtra. One farmer in Maharashtra is marketing his products very differently. He manages the farm scientifically, produces products like gomuthra and ghee. In another case, a farmer has Sahiwal cows and packages milk in bottles to be delivered without any pasteurisation. For desi farms, you should look into breed, study market, and then market smartly.

Can we suggest the tribals to convert desi cows to ones yielding better milk or the ones like Gir?

Native breeds suffer from inbreeding resulting in less milk production. They can go for cooperatives or FPOs to manage the resources needed for these animals. With a breeding program, inseminate with superior breeds to improve the yields over generation.

Any project report from SGH or FPO for collective farming?

The Amul model is working because of the cooperative nature of the model. Responsibilities are taken up by the cooperative for offering services needed by small farms such as breeding, quality semen, and nutritional plants. When people start getting more animals, the management tactics change. You need to be very vigilant and use different strategies. The strategies become difficult when converting dairy farming to large farms, such as requiring more milk than supplied. The Amul structure will work well with farmers.

What is your suggestion on integrating dairy farmers with chilling unit and value addition so that farmers can earn more money?

In Maharashtra and Punjab, lot of dairy entrepreneurs collect the milk encouraging farmers to produce better milk, and supply to cities. You may have to pay upfront for them, or vendors may pay you after some time. You need to take care of cash flow imbalance. If one consignment gets spoilt, there is risk. You need to have these in mind.

Any value added product for a desi cow?

You can work on vermicompost out of the manure. You can produce desi ghee. The number of animals depend on the income you expect. In desi cows milk yield comes down, and so you need to calculate how much milk you get, value addition you can make, market size near you and the price you will get.

Where is sex-sorted semen available?

What is the success rate?

Many companies like ABS offer this. It is about 45 to 50%. Time of implementing should be correct, and animals should be without health issues. If you are keen on getting female calves, out of the 45 to 50% we can expect 85 to 90% female calves.

What is the best grass variety to get silage?

It depends on the region you are in. Adventa and UPL offer suggestions.

Is labour availability big challenge of dairy farming?

Yes. You have to design the structure in such a way that cow dung need not be cleared every day. Feeding process is semi-automated with a tractor. But in India the cost of automation is high, and farmers cannot afford.

Can we use milking machine for desi cows?

Desi cows have problem with milking machine. They need the calf around to suckle before milking starts. You can induce the milk let down by bringing the calf and then use milking machine.

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TEPLU
DIGITAL FARMERS

Mehul Shah

CEO, Paama Agrico Pvt Ltd., Bangalore, Karnataka

His interests are upcoming agriculture implements, new ways of agriculture farming, and government initiatives in agriculture segment. The company manufactures Paama Rotavators, rotavators blades, agriculture equipment and farming tools. He explains in detail about rotary tiller (rotavator), types, usage, and its benefits to farmers.

When we talk about agriculture, the first thing that comes to our mind is the crop and implements. Among the implements or mechanisation, the tractor is of highest importance and is largely used everywhere. Among implements, the rotavator is the highest selling one in terms of number, volume, and popularity. Mechanisation in agriculture helps the farmers to increase their income and yield. When compared with Israel, India gets 30 to 35% less yield per hectare. In terms of timeliness and quality of work, effective mechanisation plays an important role.

After the harvest of crop the soil is hard as it is dry for a longer period of time, and develop cracks. There is crop residue on the soil. So it is important to prepare the soil bed properly for next crop, so that the crops can grow well. For proper yield of crop, quality of soil bed is important. Tilling is process wherein the big lumps of soil are broken & pulverised, fertiliser is mixed with the soil so that the nutrients in the soil are available to the plants. The purpose of tillage is to prepare the base for the seed germination, ensuring the plants get enough nutrients, water & air. Traditionally ploughing is used to dig the soil into big lumps of the soil, and then a discing or harrowing is used number of times. Then levelling of soil bed is done, thus preparing the soil bed for seeding.

Rotavator is an implement attached to a tractor. Blades are fitted on rotor shaft which rotates on horizontal axis. The rotavator blades cuts the soil, pulverizes it fine & rotavator trailing board levels the field. Rotavator does all the 3 operations in one go. It is a multipurpose implement.

There are different types of rotavators:

Regular rotary tiller – The rotavator is suitable for dry & wet application. In dry soil it is suitable for seed bed preparation. In wed land, paddy field it is used in mixing the soil and water. The good pulverisation helps in proper germination of the seeds and growth of the plants.

Spike rotavator – It is used for the cultivation of root crops like potato, onion, and ginger. The requirement for this type of rotavator comes as the soil has to be very soft and pulverised and airy so that there is sufficient space available for these crops to grow and expand. Deeper the soft soil, better the growth. It is a new model of rotavator. In the regular rotavator, you can see L or C type of blades. In the Spike rotavator, blades are like turned knife shape. These blades can go deep more than 7 to 8 inches giving a deeper pulverization effect.

Reverse forward rotavator – It is used for inter cultivation and bund forming. It can be moved on either sides. You can find 2 input shafts on the top, one for forward and one in the reverse motion of blades. It can be attached to the tractor on either side depending on the application you are using it for. It loosens the soil in between two crops and re-

moves the weed. It can also form a bund on the side.

Mini rotavator – It is used along with mini tractors for removal of weeds & seed bed preparation.

Heavy duty banana rotavator - This is specially designed for crushing the banana stem and pulverising it with soil in a single pass. In conventional method Farmers spend a lot per acre only for field preparation. With rotavator usage, manpower needed for removing the plantation is reduced. Also, with proper mixing of plants and soil helps it turning into a natural manure.

Rotavator Use in agriculture – The rotavator breaks the soil and levels the land with minimum fuel consumption and time duration. It can be used for both wet and dry lands. It is used as intercultural equipment for horticultural crops.

Disadvantages – Continuous use of rotavator leads to Soil hardening and water will not be able to penetrate in the land due to hardening which leads to waterlogging which in turn leads to salinity which in turn leads to farm turning to be a wasteland. But it will take 5–20 years to happen like this if you use it continuously.

What is the horsepower for power rotavator?

Tractor horsepower required depends upon the size of rotavator. Minimum tractor HP required is 15 - 18 HP for 16 blade mini rotavator and tractor HP requirement increases as rotavator blades & size increase.

What will be the cost of each of the rotavators?

The cost of regular rotavator varies based on the single speed or multi speed and the value addition needed by the farmers. Mini rotavator costs Rs. 60 to 65 thousand. Reverse forward rotavator costs Rs. 50 to 60 thousands. Regular rotavator costs between Rs. 90 to 1.25 lakhs. The banana or heavy duty rotavator for banana application will cost more than Rs. 1.40 lakhs depending on the size.

Under what brand do you sell? Do you offer any special service to the clients? What is the shelf life of the rotavators?

We are selling rotavators under the brand name PAAMA. We have dealer network providing service to the customers. The dealer provides the service & spare parts. In add we have call centre wherein the customer can interact for sales, service & parts requirement.

The life span of rotavator normally is 3 years and above. Customer prefers to exchange the implement between 3 to 5 years and plans a new one.

Do you have dealers all over India?

We started appointing dealers just a year back. We have our network in Karnataka and Tamil Nadu. We are slowly entering into Maharashtra and MP.

What are the other advantages of power harrow over rotavator apart from digging more than 8 inches?

1. Fine Soil Preparation

The Power Harrow has vertically rotating blades (think blender) that allow for the easy breakdown of hard and large clods. This powerful motion allows soil preparation to be obtained much more efficiently and with a lot less passes.

2. Strong Leveling Effect

this machine comes equipped with a hydraulic leveling bar that helps keep ground leveled and smooth. The bar helps distribute soil along uneven ground, and maintain the work done by laser leveling. Uneven distribution of soil (usually caused by disk use) is prevented.

3. Prevention of Hardpan

Due to the vertical action of blades, hardpan is unable to form. With the use of the power harrow deeper soil is never compressed or compacted like it would be in a conventional tillage situation.

What would be the requirement for a dealer?

We would ask for an investment of Rs. 4 to 5 lakhs in terms of fund involved for rotavator stock depending on the state. He may need more money if he keeps the entire range of rotavator stock. If dealer is in current business of any tractor or agri implements, than the same showroom premise can be utilize for showroom. Else we may need a showroom of 20 x 10 ft with 2 sales & service person.

Will you support in marketing?

Yes. We support in many places. We share the cost for the demo rotavator. We also share the cost with the dealer for any marketing activity such as demo, road show, or agriculture fair participation. We also organize factory visit for the customers and show the model plants to them. we participate in all the possible activities to promote the product.

Any subsidy is available?

For rotavators subsidy is available. Every state government provides the subsidy, some part from central and some from state government. Rotavator 5, 6, 7 ft have subsidy from Rs. 35 to 55 thousand depending on the state. Karnataka offers Rs. 47 to 52 thousand for 4 to 6 ft. Tamil Nadu offers Rs. 40 to 50 thousand.

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Ashok Malkarnekar

Partner, Dudhsagar Plantation, Goa

He is a Development Economist turned farmer and Eco-Agri Resort Owner. He started following his passion for nature and settled down in Goa. He has worked in several continents and can speak several languages. He narrates his experience as farmer turned eco-agri resort owner.

We are fortunate to have a 50 acre agricultural property in the Eastern part of Goa. We border on the Bhagwan Mahaveer Wildlife Sanctuary or Mollem National Park. When we moved here in the 80ies, it was a barren piece of land devoid of electricity connection and irrigation systems. We had to set up these systems, bought cows, and installed biogas. We have been organic since the beginning. The land today is home to a diverse ecosystem with lots of fruits, spices, herbs, and vegetables. The main crops are coconut, cashew nut and betelnut. We have a distillery where we produce cashew liquor. We do not use pesticide. So the ecosystem is intact and vibrant.

Many people nowadays have realised that the city life is taking a toll on them and need to reconnect to rural life and nature. Agritourism as a concept for reconnecting with rural life and with the source of our food is a well established concept in countries like Italy and Spain. The concept is now increasingly gaining acceptance in India too. Our farm is near Dudhsagar Waterfalls which is a prominent tourist spot. Thousands of visitors throng there every day. The Tambdi Surla waterfall, an ancient temple in the forest, Portuguese era heritage mansions, prehistoric rock carving sites, the Salaulim dam, and botanical gardens are also in the vicinity Thus by virtue of the location, we already had a captive audience.

When we started thinking about tourism, we had two business models in mind. One is to host day tourists, where people come into the plantation, par-

ticipate in a guided tour, local lunch, and would purchase some souvenirs in the farm shop. This is a high volume business, and margins tend to be thin as substantial commissions have to be incurred. We would have 100s of people coming in, which would also involve high operating cost as substantial staffing would be required. For us, the second model was to make our plantation and its environment available for guests to experience in a slower way, by establishing a homestay at the farm – we call it a farmstay.

As we were already frequently hosting friends at the the plantation, we gave this model a go. It involved only a small investment, and less of a risk – we initially started hosting in cottages that we had built for our personal guests, and created an additional little restaurant space.

We started a website to share information and gauge the interest of people. With 2 cottages, we could easily manage bookings manually. It is essential to undertsand the expectations of the guests. There are different types of guests. One group may want to see certain areas only and are not interested in other activities of the stay. Another group may want to relax in natural environment, book for multiple nights, wander around, enjoy the nature and biodiversity. You will see another set of people who want to trek, explore trails, neighbourhood walks, birdwatching, flora, and fauna.

Though Goa has lot of potential, we don't have well-marked treks and trails for exploring. So we have created maps, marked trails, and this has proved to be very popular. Anyone who wants to venture into this field can consider this as this kind of information and guidance can go a long way in creating a well rounded experience.

People would want their kids to understand about rural lifestyle, food production, and their source. So harvesting or milking cows can be an experience of its kind and highlight of their visit. I am also trying to bring in local people on board to provide certain insights for such tourists which will also provide them a little bit of side income. A lot of the everyday activities, even chores like pulling water from a well, can be interesting activities for city folk. So it is important to try to see things with a non local perspective.

Cuisine plays a vital role in this industry. People like to enjoy local specialties, and in our case, mostly vegetarian local meals are cooked. People love to eat what they see grow and even more if they are allowed to pick the vegetables and cook. They can go to fields, pluck vegetables, and cook them for their meal. It is farm to table dining.

We do also frequently get requests for a night out. This tends to be noisy with music and alcohol. If you have other guests staying at your place who come to enjoy nature and the noisy kind of guests, chances are it will not go down well with them. So we should not cater to everybody's request, and have clear dos and donts in place.

Now how do you promote your place in case you are interested in starting this kind of a business? Walk-ins may not be likely in rural areas. Website is the easiest and straightforward tool to present yourself and make yourself known with a visiting card on the web since most of the travellers do their research online. There are other listings such as Google Mybusiness, Tripadvisor etc., where travellers leave reviews about the places, and other people can get details about the quality of such places. People tend to trust what others say about you more than what you say about yourself. You can use such – hopefully positive - reviews as testimonials on your website.

Online Travel Agencies are also an option to promote your property, and a good listing can get you a substantial flow of customers. This does come at a cost which would have to be factored in while developing your rates. Also, some people will find you on the portals and still book directly if you give them good offers.

Even though travel agents are a more classic way of approaching, for a small property it is cumbersome to contact them and enter into tieups with them. Facebook, Instagram, and WhatsApp are popular and can make your pres-

ence felt. There are also newspapers with special editions, magazines, and TV to sell your product. We were for instance featured on a FoxLife show for our cashew liquor. You can also invite travel bloggers with good following to cooperate to improve your visibility, its a low cost tool.

As we got very good feedback we decided to add 3 more cottages, a natural water pool with organic filtration and with no chlorine so that it does not irritate skin. We also started a booking engine on our website and a channel manager to coordinate bookings between the various online channels. It allows us to give instant confirmation and avoids double bookings.

This is important as guests today usually would like instant feedback, else they may start looking for other places. We have also introduced some basic strategies of revenue management, like calendar based pricing and length of stay discounts. It may sound complicated, but it is easy with regard to revenue management.

In general, people look for cleanliness, well ventilated, clean bathrooms, fresh linen, and good food, so these are minimum requirements. Guests also enjoy getting involved with the work at the farm. We are hosting a Cashew Trail which is a day long experience involving harvest, juice extraction, and liquor processing apart from roasting of nuts, combined with a menu that revolves around the cashew fruit and nut. These type of experiences are not available in standard hotels, so it becomes a USP.

One key conclusion is that at the time of booking, it is absolutely essential to let your guests know what they would find at your place and what they would not get. Here, it is better to undersell and overperform. It is also important to send information on how to reach your place so that there is no confusion for them. Communication is very important in this sector.

I spend a lot of time on answering calls, emails, taking bookings etc. It could be a full time job and can be profitable too. Due to demonetisation and pandemic outbreak, things have slowed down a little, but we are optimistic things will slowly turn around. In such a situation, you are at an advantage if you operate with lean staff.

Generally, it is advisable to start small to test the water and see if this kind of business is for you. With 5 cottages, you can easily make around Rs. 1.5 to 2 lakhs per month. But for full time farmers, this can also mean taking on a second full time job.

I suggest you get some help initially. I can offer my advice on the setting up and technology part. I am also in the process of setting up a portal for farmstays in India which will offer networking, advice and free listings.

Which part of Goa are you from?

We are on the Eastern part of Goa. It is the area bounding towards the Mollem National Park and about 35 kms from the coast.

What is the minimum area you suggest for starting such a resort?

We were fortunate to have a 50 acre plantation with our family where we

could do lot of things in house. If you are in a rural setting and if you can tie up with the local people, it will be good because it will be beneficial for the local economy. When people come to the rural area, they may not want to be cramped down and want to have space. Anything with one or 2 acres should be ok. You may not call it a farm stay but a rural home stay.

We are in the border of Tamil Nadu and Karnataka. What are the clearances we need from the government?

I think it differs from state to state. In Goa, you need to start with the panchayat for your basic NOCs. For any kind of construction, you willneed to go to the Town and Country Planning department. Depending on your area you may require forest clearance too. You need to register with the Tourism Department, take approval of the health department, and for the restaurant part, register with the Food and Drugs Administration.. Lot of clearances are required involving lot of time. But it is better to follow the rules from the beginning to be on the safer side.

Regarding the liquor you would be distilling in your place, do you need any particular license? Can we do it with jackfruit?

Cashew liquor is a traditional beverage in Goa, and there is a very established framework of the excise department for auctioning licenses and for the whole compliance. For jackfruit, this is not existing yet. You may have to consult the local excise department for guidance.

What are the taxes involved in this? How do show the details in Income Tax?

Like anyone else, we need to file the returns. Most of the payments are coming in online, and there is not much of question of cash. You have to pay GST if you go above the GST threshold. Depending on your income, you can file income tax returns.

How are you dealing with agriculture income?

Agricultural income needs to be shown separately as it is non-taxable, but will be relevant for determining your tax slab.

With 50 acres of land and 5 cottages, how many staff are employed, and what is the recurring expenditure on the whole?

We have about 10 to 12 staff regularly employed here. About 3 or4 would be employed in tourism. We have set up our system in such a way that we can use our manpower more or less interchangeably.

Our people are trained in house andthey can work on both the farm and in tourism depending on the workload. We did not send anybody home during the pandemic. Even though the homestay was closed for 6 months, everybody was kept busy. Recurring cost may work out to Rs. 1.2 lakh for the farm and homestay together.

Don't you think 3 or 4 people are too low to meet the requirement of the homestay?

We are doing a lot of work ourselves. I work as front office guy, waiter, and also plumber. We work with low operational costs. Even if you don't have guests, it will not be a problem as you don't have big operational costs.

How about having ayurvedic massage or traditional treatment for long-staying guests?

We have been considering that. We are talking to an ayurvedic doctor to provide services. It will work out expensive if you want to have somebody on a full time basis for a small homestay like ours.

How to reach the resort from Tamil Nadu?

You can come to Goa airport or Panjim railway station. From there it is quite close.

What is the cost for one weekend and normal weekdays?

On normal weekdays rates start from Rs. 3000 per night including breakfast for two.

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Why we must invest more in the farms of the future

- Small farms are the backbone of economies and food systems across Africa, Asia and the Middle East.
- But climate change is threatening food production just when the population is soaring.
- More investment is urgently needed to help small-scale farmers adapt to climate change – or global stability is at risk.

As world leaders travel to Glasgow next week for COP26, there is a little-noticed cause for celebration. Amid the ongoing devastation caused by the pandemic, there was never a need to stockpile food. The global food system shuddered and flexed, yet kept functioning. And the world's small-scale farmers continued to feed us.

Small-scale farmers are the unsung heroines and heroes of the pandemic, alongside doctors and nurses, cleaners and cashiers. Small-scale, because 84% of the world's 570 million farms cover fewer than two hectares, providing about one-third of global food. Heroines, because by some estimates half of the world's farmers are women. In Africa, women do 40% of all agricultural work.

We both have our roots in rural West Africa. For generations, our families have relied on farming for their food and incomes. Yet, across the continent, many small-scale farmers are struggling. Despite the fact that they produce most of their countries' food supply, many are net buyers of food, often earning too little to feed their families. In 2020, more than 280 million Africans – more than one in five – were undernourished, and this figure continues to rise. And, as the climate changes, so does the ability of these farmers to keep growing food. Erratic weather, shifting temperatures and more extreme droughts and floods make farming more unpredictable and difficult than ever. Increasingly common crop failures and livestock deaths put our entire food system at risk.

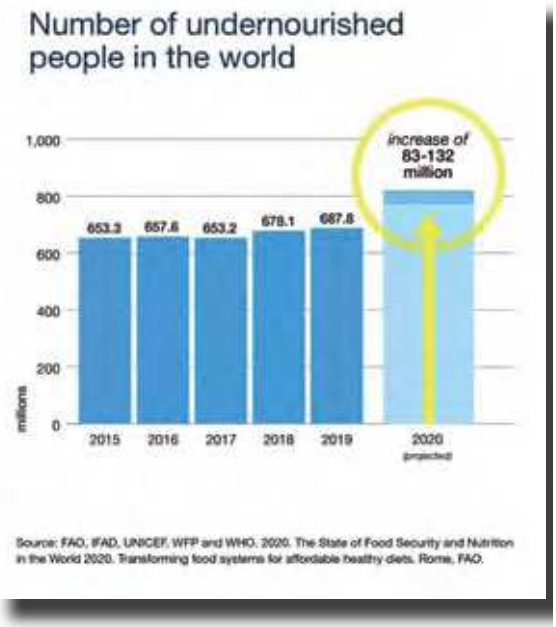
Without action, climate change could push more than 140 million people to migrate by 2050. We can also expect food prices to become volatile. A natural disaster in one part of the world can cause the price of grain everywhere to increase by more than 50 percent.

Hungry for investment

Six years ago in Paris, developed countries committed to mobilize $100 billion a year in climate finance for less developed countries by 2020 – but this has fallen short. Even if all this money was made available, it is unlikely to reach those really on the front line of changing weather patterns. Only 1.7% of climate finance goes to small farms – a tiny fraction of the billions needed to build greater resilience in both farming practices and food chains. This must change.

The International Fund for Agricultural Development (IFAD) is focused on eradicating rural poverty and hunger, and it has already integrated climate mitigation and adaptation measures into all of its projects. Our Adaptation for Smallholder Agriculture Programme (ASAP) mobilized over $300 million from 11 donors to help six million farmers in 40 countries respond to climate threats.

In Mali, for example, ASAP helped 65,000 farmers adapt to changing conditions by providing biogas digesters and solar panels to reduce tree-felling, and guiding village initiatives to reforest degraded watersheds, protect irrigated areas from flooding and replenish depleted groundwater.



In Mozambique, the program is helping farmers diversify cropping systems, introduce drought-resistant varieties and new horticultural techniques, and improve water management, while providing access to weather forecasts and finance.

Stepping up to the challenge

But far more resources are needed, even as pandemic responses have exploded the budgets of many developed countries, tempting some to cut overseas development assistance. At this COP, we are calling on governments to make a pledge to IFAD's replenishment and it's ASAP+ climate finance programme, to help raise the final $350 million required to help more rural communities recover from the pandemic and rebuild their lives.

If governments up their climate finance contributions to rural small-scale farming, they are investing in the food of the future – raising famers' production, sales and incomes and securing the global food supply. Without increased investments in the resilience of small farms to climate change, we will face more, and more frequent, crises in the years ahead. The effects of climate change can drive conflicts over land, water and other resources, pushing people to migrate. Investing to counter deforestation and loss of wildlife habitats, meanwhile, can cut the risk of viruses crossing from one species to another, triggering global pandemics.

Smallholder farms are central to restoring the health of our planet and stemming climate change. Their well-being matters to all of us, not just the 2.5 billion people worldwide who depend upon them for a living. A green transition is central to many countries' COVID recovery plans. But some of the best investments we can make to combat climate change and all that flows from it are in sustainable agriculture and small farms in Africa.

We are at a pivotal point. The world's leaders need to step up to the challenge.

Written by Gilbert Fossoun Houngbo, President, International Fund for Agricultural Development (IFAD)

Source : World Economic Forum

This insect could eliminate food waste in cities. Here's how

Green advancements in food waste processing are opening new opportunities for cities to not only become more sustainable, but to play an important role in the creation of a local circular economy. The pandemic is adding to this momentum, as the emergence of Covid-19 has increased the volume of solid and household waste produced, which is leading cities to rethink how they approach waste disposal.

Circular solutions, such as the black soldier fly (BSF), are promising. This incredible insect converts food waste into useful proteins and other high demand products, such as organic fertilizer that can be used in cities, parks and green spaces. Cities produce half of all global waste and are responsible for 60-80% of all greenhouse gas emissions, and so companies are harnessing the power of BSF to divert organic waste that would otherwise be dumped in a landfill or processed through less economically viable methods such as anaerobic digestion or incineration. Using insects to process and recycle organic waste is a clean and circular solution, but progressing this option is challenging due to a lack of knowledge about circular economies coupled with regulations that encumber the implementation of sustainable waste processing.

Cities are sustainability superheroes

Cities have the opportunity to play a key role in advancing local, circular waste processes that go beyond strategy and programmes. Seoul is rich with inspiration – the city implemented a comprehensive initiative that has resulted in the city recycling 95% of its food waste, a massive leap forward when it used to only recycle 2%. Truly sustainable cities can channel their influence into three key actions to create an environment where circular solutions thrive.

Policies and data - Consistent, clearly stated policies around sustainability and food waste are the solid foundation of a local circular economy. The United Nations is encouraging cities to become "Waste Wise" by regarding waste as a resource, a fresh perspective that is best achieved by policies that progress circular economies. The UN recommendations emphasize data collection and analysis, such as a city-wide food waste survey to assess the waste streams available using methodology developed by various waste producers. An approach that combines sustainable policies with data assessment not only serves as a precondition for green processors operation, but positions the city as a leader in the development of a circular food economy.

Education and communication - Truly sustainable cities serve as a hub, connecting eco-friendly service providers with local producers of food waste, but education is sometimes the missing component of this connection. To recycle (ha!) the example above, by placing information gathered in the survey in the public domain, public servants both raise awareness of the challenge and potentially identify ways to reduce some of the waste streams at their source. By educating their local food waste producers about circular solutions, cities facilitate connections between their businesses and green processors. Additionally, education is the key to sustainable cities proactively embedding themselves into the circular economy as an essential source of information and leadership.

Read full article @ https://bit.ly/3DhXnRv Source : World Economic Forum

It's the birthplace of wine, but climate change is making it tough to grow grapes in Georgia

- **Wine making is believed to have originated in modern day Georgia, 8,000 years ago.**
- **Wine and grapes account for nearly 9% of Georgia's exports.**
- **Extreme weather driving growing grape losses.**
- **Farmers are turning to planting hazelnuts and the government is using cloud seeding**

As worsening extreme weather ruins harvests, some winemakers are switching to growing nuts - and the government is firing anti-hail rockets.

The grapes in Solomon Nersezashvili's vineyard were almost ripe when a massive hailstorm hit in late August. In just 30 minutes, the ice wiped out most of the harvest - and months of hard work.

Such storms have long plagued Georgia's Kakheti region in the foothills of the Caucasus mountains, regarded by many as the birthplace of wine.

But their growing frequency and intensity - a problem linked to climate change - has triggered a debate over the future of grape-growing in Georgia, including among Nersezashvili's relatives.

The summer storm cost their family-run business $200,000 in lost revenue, according to the 52-year-old, who a decade ago decided to diversify into hazelnuts, which the farm sells to Nutella maker Ferrero.

"My brother says we should do away with the vineyard and just plant nuts," said Nersezashvili, as he contemplated a collapsed vine. "We'll need a lot of money to fix the vineyard and get it ready for the next year, and in any case the harvest is not going to be as good because the plants have been damaged."

Wine and grapes account for nearly 9% of Georgia's exports, according to the national statistics office, and the country's vineyards are also a key tourist draw as its wine becomes more popular internationally. But in recent years, about 100 Kakheti grape producers have partially or totally switched to nuts, a crop that is both hardier and more profitable, said Nika Beriashvili of Georgia's rural development agency (RDA).

Cloud seeding

To address the hail problem, Georgia's government has revived a Soviet-era system of cloud seeding, using rockets to carry silver iodide into the sky to stop ice from forming, ensuring it falls instead as rain. Run by the Ministry of Defence, the system uses 80 launchers operated from the offices of a public defence contractor, STC Delta, which uses radar and weather forecasts to decide where to aim and when to shoot.

In the past year alone, the company said it has launched 4,700 rockets, each costing around 1,400 lari ($450).

The system has blind spots, particularly in late summer when grapes are ripe but hail clouds form at higher altitudes and rockets have to travel further, meaning they can cover less ground, said Delta's scientific consultant Khatuna Elbakidze. Still, the company credits the system with avoiding about 90 million lari in agricultural damage over the past three years.

Some farmers are less enthusiastic.

"They shoot rockets and it still hails," said Isabal Sologashvili, a 79-year-old whose vineyard was also devastated in August.

After the August hailstorm, the government pledged to buy all damaged grapes, and pay 3,000 lari per hectare to farmers whose crop was wiped out. The government already subsidises grape farmers by fixing the purchase price and covering the difference if the market price is lower. Any unsold grapes are bought up by a state-run wine company. Subsidies have been credited with keeping tens of thousands of small farmers exposed to climate risks afloat.

But critics say this cash has been delivered for political rather than economic reasons, as it incentivises quantity over quality - and the costs are unsustainable in the long term as climate impacts worsen.

Patchy coverage

Nino Zambakhidze, head of the Georgian Farmers Association, said the money would be better spent helping farmers to invest in their business and prepare for climate change pressures.

Zero-interest loans to buy anti-hail nets or hot air cannons could be helpful, as could new weather stations, said winemaker John Wurdeman, who grumbles he has to check forecasts from a Norwegian provider as local ones are not as accurate. Insurance is another problem.

A government insurance scheme provides subsidised coverage for grape growers, but farmers complain the package covers only grapes, leaving out damage to vines and from hail or frost striking early.

The compensation follows the state system for subsidies, which broadly divides grapes into red and white, despite Georgia being home to more than 500 varieties.

"It's kind of ridiculous because there's no difference if it's organic, biodynamic or a very rare variety," said Wurdeman, an American who co-founded his Pheasant's Tears natural winery in 2007 and has never been insured.

Nino Dekanoidze, who heads the RDA's regional management service, said the government was aware that the agricultural insurance sector needed modernising and was working with international experts to do that.

Resilient

Despite its many challenges, Georgia's wine industry has been growing in recent years, said Tata Jaiani of the Georgian Wine Association.

It has already proven resilient to shocks like a Russian embargo in 2008 that had winemakers scrambling to find alternative markets, she said.

"Wine for Georgia is not only a business, it's the culture and the identity of Georgian people and they will never stop doing it just because of the risks or the high costs," she added.

Nersezashvili, the farmer, said that despite pressure from his brother he could not bring himself to replace the vines that his father planted decades ago.

"We've invested too much money and work to just cut it all down," he said.

Written by Umberto Bacchi, Journalist, Thomson Reuters Foundation

Source : World Economic Forum

Here's what climate change could mean for your morning cup of coffee

- **A new review has analyzed risks facing the coffee industry due to climate change.**
- **The study suggested that coffee flavor is susceptible to changes in its environment.**
- **For example, factors such as water stress, increased temperatures and carbon dioxide can reduce its quality.**
- **Understanding more about the science of these changes can help farmers adapt and improve their coffee production.**

Coffee quality is vulnerable to shifts in environmental factors associated with climate change, a research review finds.

Coffee grows on more than 27 million acres across 12.5 million largely smallholder farms in more than 50 countries.

Many coffee-producing regions are increasingly experiencing changing climate conditions, whose impact on coffee's taste, aroma, and even dietary quality is as much a concern as yields and sustainability.

The review, led by researchers from the Friedman School of Nutrition Science and Policy at Tufts University and Montana State University, also finds that some current adaptation strategies to combat these effects provide hope. The findings appear in the journal Frontiers in Plant Science.

"A subpar cup of coffee has economic implications as well as sensory ones. Factors that influence coffee production have great impacts on buyers' interest, the price of coffee, and ultimately the livelihoods of the farmers who grow it," says Sean Cash, an economist and the Bergstrom Foundation Professor in Global Nutrition at the Friedman School and senior author on the study. "Climate change impacts on crops are already causing economic and political disruption in many parts of the world," he says. "If we can understand the science of these changes, we might help farmers and other stakeholders better manage coffee production in the face of this and future challenges."

In their analysis, the researchers looked at the effects of 10 prevalent environmental factors and management conditions associated with climate change and climate adaptation, respectively, across 73 published articles.

The most consistent trends the team found links farms at higher altitudes with better coffee flavor and aroma, and too much light exposure with a decrease in coffee quality. A synthesis of the evidence found that coffee quality is also susceptible to changes due to water stress and increased temperatures and carbon dioxide, although more research on these specific factors is necessary.

Some current efforts to mitigate the effects of climate change, including shade management to control light exposure, selection and maintenance of climate-resilient wild coffee plants, and pest management, show promise and feasibility, but innovative solutions to support bean growth at all elevations are necessary, say the researchers.

"These strategies are giving some hope that coffee quality can be maintained or improved and will ultimately help farmers consider how to design evidence-based interventions to support their farms," says Selena Ahmed, an ethnobotanist in the Food and Health Lab at Montana State University. "These impacts on crops are important to study in general, not just for coffee. Our food systems support our food security, nutrition, and health."

Written by Lisa LaPoint, Author, Futurity

Source : World Economic Forum

Singapore bio-milk maker TurtleTree raises $30m in Series A funding

Biotech startup TurtleTree has raised $30 million in the first tranche of its Series A round. Luxembourg-based merchant bank and asset manager Verso Capital was the lead investor. In a statement, TurtleTree said that other "worldwide" investors participated in the tranche, without disclosing their identities. The latest capital injection takes its total funding to date to $40 million. Verso had previously invested in TurtleTree's $6.2 million pre-Series A round in December 2020. Launching in 2019, the Singapore-headquartered startup set out to develop 'better-for-you' and 'animal-free' milk and dairy products by cultivating proteins from mammal cells.

Its initial focus was on recreating human milk in the lab, to offer mothers more sustainable breastmilk or formula replacements, as well as 'growing-up' milk for toddlers.TurtleTree's purview later expanded to growing milk components, such as proteins and complex sugars, with a view to developing functional ingredients with wide-ranging potential health and nutritional benefits aimed at adults as well as children.

Earlier this year, the startup established a B2B unit, TurtleTree Scientific, to work with third-party cultivated meat and dairy companies in order to produce affordable food-grade growth factors and cell culture media. Last month, it opened an R&D facility in Sacramento, California, to hone its precision fermentation technology and produce dairy proteins such as lactoferrin, which it says offers "proven benefits for immune system function, gut health, and cognitive development." The startup expects its cell-based lactoferrin be its first commercially available product. The Series A funds will allow TurtleTree "to scale up our processes and come a huge step closer to creating a new era of sustainable nutrition," said co-founder and CEO Fengru Lin. Some of the capital will be devoted to hiring talent, while tech development and expansion of the company's nascent product portfolio will also be strategic priorities.

"The funding received has truly opened up a new world of possibility. We can now set our sights on turning ambitions to reality, starting with our US-based expansion plans and then moving on to the development and manufacture of our first consumer-ready products," said co-founder and chief strategy officer Max Rye. Julien Machot, managing partner, at Verso Capital, said .

Read full article @ https://bit.ly/3FiDWIU

Source : agfundernews.com

TreeDots nets $11m Series A funding for its food surplus marketplace

TreeDots, an online marketplace aimed at fighting waste and loss in the agrifood value chain, has raised $11 million funding. The Series A round was co-led by Amasia, a climate change-focused VC firm based in the San Francisco Bay Area, and Indonesia's East Ventures.

Other investors taking part in the round included ACTIVE Fund, a VC affiliate of Philippine conglomerate Ayala; Singapore government-linked Seeds Capital; US business and psychology writer Nir Eyal; and Singaporean actor Fiona Xie. Established in 2018, TreeDots describes itself as "Asia's first vertically-integrated food supply chain ecosystem." It's app-based marketplace helps suppliers and distributors sell surplus and "imperfect" food items that are shunned by their usual bulk buyers, such as retailers.

Co-founders by Tylor Jong, Lau Jia Cai, and Nicholas Lim came up with the idea for TreeDots after working in the commodities trade and witnessing tons of imported produce go to waste in shipping ports – stuck there and rotting due to regulatory hurdles, delays, and other supply chain inefficiencies. The Singapore-based startup uses tech to help suppliers redistribute any unsold inventory to prospective buyers they wouldn't normally be able to reach – such as restaurants, cafes, and hotels.

"We realised that a grocery chain might not buy a chicken that's too big or has a broken bone because it looks funny on their shelves. But F&B outlets don't care because they will cut it, plate it, and make it look nice before serving," co-founder Jong, who is now the company's CEO, said in a statement.

"If they can purchase essentially the same product at prices up to 90% cheaper than alternatives, they are very happy. This original insight drove us to start an oversupplied foods marketplace to match supply and demand for these products." TreeDots initially focused on the B2B market, hosting foodservice buyers on its marketplace. But it has since opened to end consumers seeking lower prices and more sustainable options. Leaning on the community group-buying model popularized in China by the likes of Pinduoduo, TreeDots allows consumers to form teams in order to make bulk buys on its platform.

These purchases are then delivered to one of the team members, who takes responsibility for distributing the food to the rest of their group. This helps to cut down on costs and carbon. TreeDots is also looking to provide its enterprise customers with various value-adds, including its TreeLogs cold chain logistics service.

Read full article @ https://bit.ly/30zZbXU

Source : agfundernews.com

Question

Q&A

Answer

01 TERRACE GARDENING

varagoor: *Dear All, I am interested in terrace gardening in my 1200 sq feet. I need expert advice from scratch... Please help. Thanks, mani*

Answer 1 -- garao56: Dear sir, A garden on the flat roof of a building, especially one found in an urban setting is called roof garden. Often here is a misconception in India between roof gardening and terrace garden. In many publications, the gardening on the roof is often termed as terrace gardening which is not strictly correct according to the British concept. In modern times, individual homes with a compund and lawn are becoming rare in cities and towns and skyscrapers are replacing such homes. As a result, the private home gardens are vanishing and the only place left for gardening are the roofs of houses. A spacious well planned roof garden can be a place of joy and recreation. In bigger cities of India, many of large hotels and public buildings are developing this type of gardens.

Answer 2 -- maryselvi : Sir, I am interested in terrace gardening. Please help. Thanks

Answer 3 -- happirehabcenter : Hello, We can provide you with collapsible growbags, collapsible water tanks, greenhouse nets, plants, growth media, fertilizer, etc and continued support for terrace garden on consultation basis.

02 SPIRULINA CULTIVATION

mahi_136: *Hi, I am planning to start Spirulina Cultivation, If anybody has an idea about marketing/Buyers for this product and how the market trend will be?*

sathsaran: *Hi, Am interested to cultivate the spirulina. Kindly give a guidance, and share how to contact...*

Answer 1 -- garao56 : There is good demand but marketing channels are to be ascertained

Answer 2 -- minalahm : Good afternoon sir . Actually spirulina has very high demand nowadays. I can give full guidance . Please contact if interested.

Answer 3 -- sundar964 : Sir I am interested in SpirulinaCultivation...need your Guidance...kind Let me know how to get in touch with you.....

Photo Courtesy : www.openaccessgovernment.org

Photo Courtesy : www.liveandinvestoverseas.com

Answer 4 -- bhavsinh: Please send planing details.

Answer 5 -- intertrade : I have production capacity of 5 tpm. Coordinate with regular requirements on a % benefit basis. GMP certified plant.

03 NEED SOLUTION FOR COCONUT FLOWER FALLING

prabakarants: *Coconut tree flowers are falling. No young coconut (kurumbai) is growing. Pl provide solution. It is short type tree*

Answer 1 -- motin : I shall try to help you. Pictures needed. Any soil- water testing report available?

04 WHAT ARE FEW CROPS THAT SELL WELL AND ARE NOT QUICKLY PERISHABLE?

kevin256: *I'm interested in part time organic gardening/farming.*

Currently grow around 1,000 lbs produce annually for my family (includes heavy stuff like melons, squash, potatoes so not that impressive). I want to expand and try my hand at a farmers market or direct to consumer. But for the first few seasons I'd like to focus on items that I can store in a cool dry place and sell slowly.

I'm thinking that winter squash, pumpkins and gourds, ornaments corn, heirloom potatoes, while not the most valuable can be stored for some time without the need for a cold room like leafy greens require.

Any thoughts or suggestions?

Answer 1 -- organic84: Hey, There are many crops that sell are very good and they are not perishable quickly.

1.) Cabbage:- A vegetable with an amazing shelf life is cabbage. You should avoid washing or cutting your cabbage until you are ready to consume it, as this can cause bruising, which can shorten its longevity.

2.) Lemons and Limes:- lemons and limes can last two weeks when left out and up to a few months when kept refrigerated. The best way to store them in the refrigerator is in a crisper drawer whole. Do not store them in a container as it can make them go bad more quickly.

3.) Carrots:- The best way to keep carrots for longer is by choosing fresh, whole carrots. When in this state, carrots can be kept in the vegetable drawer of your refrigerator for four to five weeks.

There are many more other crops that are not Perishable quickly and if you want to produce your crop in a more effective way then you should also use organic Products.

vmap:Hi sir/madam It is better to go cultivation of ground nut OR you can choose medicinal plant cultivation and select only demandable plants that to suitable to your land.

Answer 2 -- orgfarm12: grain and oilseeds depending on your ground

Photo Courtesy : www.fibl.org

Q05 NEED GUIDANCE TO START UP ORGANIC FARMING IN KOLHAPUR

anilgurav75: *I am looking forward to join the club, followed by available training and start organic farming in Kolhapur. Could you please help me here with the process for the same.*

Answer 1 -- greenlandfns: We provide complete consultancy for organic farming projects. Please see our other posts in this site. Please mail us your land details etc for further details

Q06 NEED GUIDANCE TO START-UP ORGANIC FARMING AND ESTABLISH BRAND

ginglefeed: *We want to establish organic brand in organic agriculture produces so pls guide experts how we can start organic farming and establish brand.*

Answer 1 -- greenlandfns: Please mail us for details of consultancy services for organic farming and establishing organic brand etc. Please see our diverse posts related to this subject in this site. Please mail with your vision, location, investment capacities etc

Answer 2 -- hareesh_m: Where is the farm Located, how many acres please let me know

Q07 NEED GUIDANCE TO START ORGANIC MORINGA FARM CULTIVATION IN ANDHRAPRADESH

ramyach: *Hi all, I need some basic information about organic moringa cultivation in 1or 2 acres land,*

1) which soil is suitable for moringa farming
2) where can I get good organic seed to plant
3) how long it takes the seeds to grow as trees
4) labour information

Answer 1 -- cnuvakil: Hi..Gud Morning.... Here's the answers to your valuable questions
1) any type of soil with well drained is better for cultivation..
2) I have Organic Seeds..if you can...pls contact me at 8919535229.. Iam not a Trader
3) 160 to 180 days for harvesting
4) less labour required if you go for organic cultivation

Answer 2 -- sampadafarms : Hi Ramya, we can provide end to end solutions for the cultivation of moringa in organic way. Terms & Condtions apply

Q08 SUPERCRITICAL FLUID EXTRACTION

murikan : *Is SCF using Co2 profitable inspite of the high costs involved in the installation of the plant ?*
what is the future of extraction industry in India

Answer 1 -- futurezen: Co2 SCF products have good demand in market and even we may get double the price for solvent extracted products, but the buyers are limited and are used only in niche applications. Let me know the exact application and nature of products.

Q09 GUAVA PROCESSING

vermaaditya: *Dear Experts, Can you please suggest what are the options to preserve guava? what are possibilities? Jam/Spread/pulp? what's min capacity? Please share your experience. Best Regards*

Answer 1 -- maitys: There are several new brands using innovative culinary recipes to prepare bottled Guava juices -
Blending with vegetable juice , Sugar cane juice etc.
Blending of fruit with sugarcane juice is new entrant in the Indian juice space, not only enhances flavour but also elevates the nutritional profile of the juice and is a great source of vitamins and other essential micro nutrients.
Clarified guava juice powders were made using freeze-drying, spray drying and tunnel drying.
The freeze-dried product had superior quality; however the spray-dried product was stable and may be more economical.
Simple Guava sorbet (ice cream) with spicy combinations ..is also available in India ... one brand is doing roaring business in South India .
Guava commercially used in the production of juice, jams, jelly, beverages, canned slices, etc., which leaves behind huge amounts of guava wastes in the form of peels, eaves, bark, seeds, and pomace.
Pectin can be extracted from Guava waste (peel, pulp, seeds , peels etc.)

Answer 2 -- futurezen : Please connect to us for Guava Processing.

Q10 RICE PROCESSING

agvenki: *We are planning to setup idly rava and rice floor processing unit in West Godavari, Dt, Andhrapradesh. Any guidance or information regarding this.*

Answer 1 -- futurezen: Please connect with us.

Answer 2 -- garao56: Please inform us the capacity of the unit and accordingly acquire machinery. For detailed project report contact us

Q11 IS SOLAR FREEZER AVAILABLE?

chi_abr7: *Dear friends does anyone of you have solar freezers or has contact no. of someone who manufactures it.*

greenfarmertn: *Is there solar cold rooms as well? Is that commercially feasible?*

Photo Courtesy : greenmarketafrica.com

Question

Q&A

Answer

Answer 1 -- shibutmat : Please contact us for details.

Answer 2 -- hemantamba: Videocon had earlier launched solar AC room model. I hope you will get it on Websites

Answer 3 -- intertrade : Mobile Freezer Box available, patent pending, IIT Chennai invention * No ice required *Also with UV led to sanitize any product, utility items.
Multipurpose* Zero maintenance.

Q12 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.

Q13 DATES PROCESSING

vpatel009 : *Respected team members I am looking dates processing techniques for Paste and dates powder if any one know then please guide me.*

Answer 1 -- maitys : Date powder or Date Syrup contains considerable amount of invert sugars especially fructose usually extracted from inferior quality solar dried date fruits and used as a substitute of sweetener .
Crude date fruit powder or Date Fruit can be processed from solar dried ((Solar Driers / solar tunnel drier / Vacuum Drier or Hot Air Oven Drier)
Pitted date fruits are grinded in heavy duty grinder and sieved at finer mesh size and packed but need to be stored at 4-5 deg C .
2. Refined and free flowing Date Pulp Powder is processed from Drum Drying or Spraying Drying technology .
MD and TCP , Gum Arabic etc. added to extend the shelf life and texture of the product .
Vacuumed packed spray dried date powder can be stored at room temperature for more than 2 yrs.
Date seeds are traditionally used for animal feed.They can also be used as a source of oil (which has antioxidant properties valuable in cosmetics), as a coffee substitute, as a raw material for activated carbon or as an adsorbent for dye-containing waters .

Photo Courtesy : kj1bcdn.b-cdn.net

Answer 2 -- futurezen : Hi Mr. Patel,We have already worked on feasibility on this project. Request you to connect to us

Q14 ALOVERA CULTIVATION IN NELLORE DISTRICT IN ANDHRAPRADESH.

kalyann: *I am from Nellore district in Andhrapradesh. i going to start my alovera cultivation in my sand field of 2acre. may i know the place to sale my alovera leafs nearby nellore and onemore thing chennai is also my near place. I am middle of chennai and nellore. please help to start the cultivation.*

shivlu*: How profitable is aloe vera farming?*

Answer 1 -- garao56 : #2 Marketing is a problem for Aloevera. Please go for other fruit crop like guava, as your lands may be situated on the river side

Answer 2 -- drsantos: Hi, Plan any other crop which can you sell easily. Aloevera has good market earlier. But not now.

Answer 3 -- garao56: How to utilize the juice either to supply to cosmetic companies, medical companies or own use for preparation of drinks or other purpose to taken into account while taking up cultivation

Q15 JACK FRUIT PROCESSING

rvs030791: *Want to start Jack fruit processing plant .I need a detail list of what all products can be developed and also it's export potential . I appreciate any consultancy which has very good knowledge with that field . Please leave your mail id and contact detail .Thank you*

Answer 1 -- maitys : Food processing has no limit on innovate ; for one who is from food technology background!
Jackfruit is called as noble fruit in the west, having great potential for numerous value additions … ethnic or high end, but not feasible or profitable for home scale manufacturing.
Raw or green fruit based : vegan mock meat, pickled raw jackfruit, dehydrated raw jackfruit flour, jackfruit flour based snacks, baked goodies, pickles, canned raw jackfruit etc.
Ripe jackfruit : Frozen ripe jackfruit chunks, Jam, Jelly, Squash, Leather, Candy, Candied jackfruit, Pulp, Chocolate, Baked goodies Wine ,Vineger ,Vegan Honey etc.
Jack fruit seed : low fat vegan milk , flour , baked goodies etc.
Tender green leaves : Fresh vegetables ,Idly steaming container ,
Jackfruit waste : peel and central axis of the fruit for extraction of pectin , cattle feed

Photo Courtesy : media.istockphoto.com

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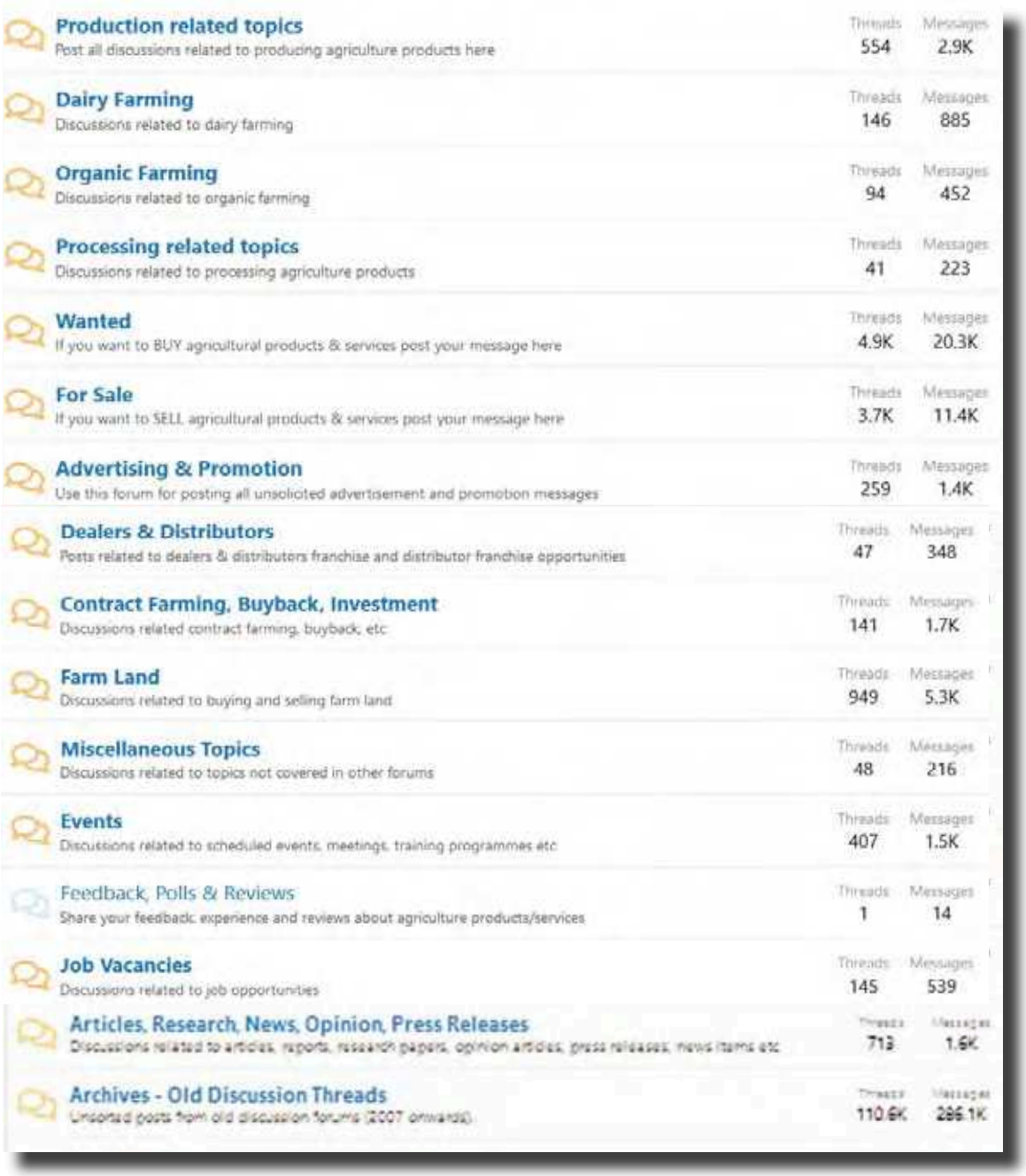

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Production related topics Post all discussions related to producing agriculture products here	554	2.9K
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Organic Farming Discussions related to organic farming	94	452
Processing related topics Discussions related to processing agriculture products	41	223
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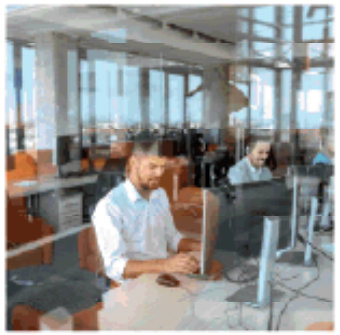

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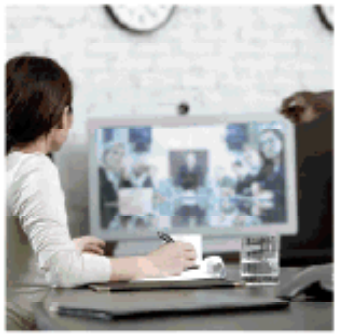

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