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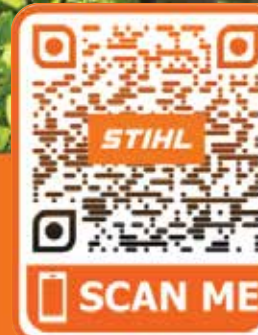
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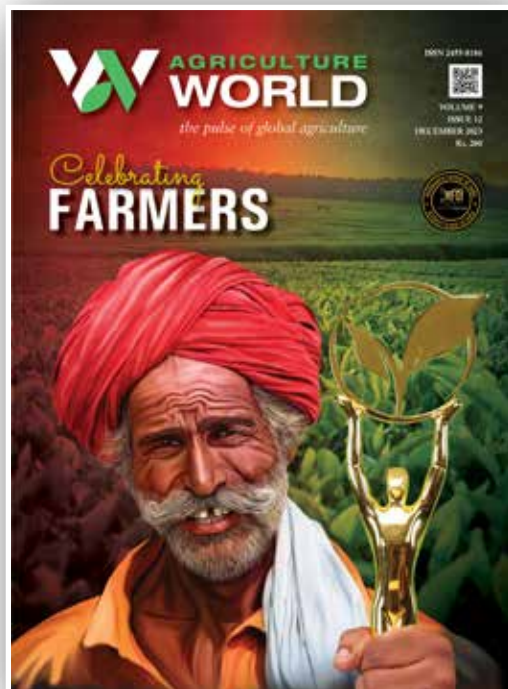


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Mahindra Tractors Millionaire Farmers of India Awards

Maximising The Income of Farmers for a Healthy and Prosperous Bharat

India's agriculture sector is surging ahead. With enabling government policy, modern equipment and latest technologies, farmer wealth creation is the common objective.

The noble profession of agriculture has been our economic lifeblood. It has now entered the pantheon of successful and rich businesses.

Maximising the income of farmers for a healthy and prosperous Bharat. This is the new mantra. This is also the driving force of the Mahindra Tractors Millionaire Farmers of India Awards, instituted by the Krishi Jagran Group.

Our successful farmers are the symbols of prosperity and progressiveness. They encapsulate the nation's real richness.

Mahindra Tractors Millionaire Farmers of India celebrates their successes, recognises them and honours them with power and pride. They are the real rockstars of India.

These farmers have written their success stories in golden letters across diverse sectors of agriculture. They have motivated, mentored and helped the younger generation to continue to believe in agriculture as a profession and also pursue it with glory and pride. They led the Green, Blue and White revolution so that globally, we stand tall.

India's Golden Journey shall not be complete without these millionaires, who have braved adversity. They have fought the vagaries of nature and they have taken the paths less treaded.

Our industrious farmers have pushed the boundaries through their innovative and path-breaking methods to be on the road to success. They have redefined farming to not only significantly contribute to the nation's food production but also make farming glamorous.

As we enter the next phase of growth and move towards becoming a \$5 trillion economy, a large portion of our success lies in the hands of our farmers, our nation's glory.

MC Dominic
Founder & Editor-in-Chief

For India's Food Security, We Thank Our Farmers

As Dr MS Swaminathan said
"If Agriculture goes wrong, nothing will go right!"



No race can prosper till it learns there is as much dignity in tilling a field as in writing a poem. The words of Booker Washington have never been truer than in recent times. As India races ahead to the top of the world economies, it is the farmers who have ensured the economic sustenance.

They are the backbone of the country and the economy, contributing 18% to the overall GDP and employing over 50% of the people of the world's second most populous nation. Indian farmers are second to none when it comes to production and productivity. They feed, sustain and nourish a country.

Whether it is rural development, poverty alleviation, food security, export earnings or cultural heritage, farmers play a crucial role in the socio-economic structure of the country. They are multifaceted and a key link between the country's progress and people's well-being. Agriculture development is one of the most powerful tools to boost prosperity.

At the same time, farmers are also the custodians of our cultural heritage, as the practice and maintain the unique and traditional farming practices that not only contributes to India's cultural identity but also maintains the diversity of crops and agricultural techniques.

But if one thought that agriculture and farming is all about men, then you are sadly mistaken. Women play a vital role in agriculture and form an essential component of society. The strength of the Indian farmers comes from the women, who form 42% of the agriculture labour in the country. As the wise have said, farming is not a job but a way of life. So, if you eat today, thank a farmer.

Shiny Dominic
Managing Director



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Farming is the fabric of rural India. A complex and multifaceted profession that involves a wide range of risks, tasks and responsibilities, farming is about working with the land to produce food and other products in a sustainable manner. Farmers play a vital role in India's growth and development across various dimensions. Agriculture is a significant sector in the Indian economy, and the contributions of farmers extend beyond mere food production. It encompasses environmental stewardship, rural development, cultural preservation, global trade, food security, resilience, indigenous innovation and economic sustainability.

Agriculture can trigger job-led economic growth, provided it becomes intellectually satisfying and economically rewarding. One of India's major blessings is the rich store of experience and knowledge available in the rural and tribal areas. The future of food security will depend on a combination of the ecological prudence of the past and the technological advances of today.

Farmers often face challenges such as climate change, pests, and market fluctuations. Their resilience and ability to adapt are crucial for ensuring food production continues despite obstacles. Many farmers adopt sustainable and environmentally friendly practices, such as crop rotation, organic farming, and agroforestry, to minimize their impact on the environment. Some farmers engage in practices that promote biodiversity, helping to maintain a balance in ecosystems.

As India celebrates 75 years of Independence, it's time to break a few conventional mindsets and start celebrating Agriculture & our FARMERS who stand testimony to agricultural prosperity & growth during the last few decades. KRISHI JAGRAN gears up to felicitate these Role Models to glamorize our FARMERS and motivate our youth to opt for this profession as their first choice.

I take this opportunity to extend our heartfelt gratitude to Indian Council of Agricultural Research (ICAR), Dr US Gautam, DDG Extension; Dr RR Burman, ADG Extension, all ATARI Directors, KVK Heads and enterprising Millionaire Farmers across India for believing in our vision and supporting our mission, unconditionally. Krishi Vigyan Kendras have been playing a crucial role in agricultural extension, technology transfer, and capacity building at the grassroots level, contributing to the sustainable development of agriculture in India.

It is time for a standing ovation to this selfless fraternity!

Mamta Jain
Group Editor & CEO

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Basket Case to Breadbasket, Mendicant to Millionaire

Evolution of Farm and Farmer

About The Author

Dr Tarun Shridhar is former Secretary, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India



We are either the global leaders or holding one of the first three positions in the production of pulses, wheat, rice, jute, vegetables, fish etc.

“Uttam kheti, madhyam vyapar, nishkrit chakri, bheekh nidan” goes the ancient proverb: farming is the supreme vocation, mediocre is trade and lowly is service; finally if nothing works beggary is the solution to survival. Agriculture sits atop the pyramid.

“I wish to become a farmer when I grow up.” Shouldn’t then this should be the response of an urban middle class young teenager to the question as to what his or her aim in life is. Not a doctor or engineer or civil servant, but a farmer. But then one is also reminded of the law of inverse proportion: the less you could or wish to do about something, the more you talk about it. And so it is with agriculture despite such an exalted status. Too many bleeding hearts, too few inclined to challenge the status quo.

Agriculture Is Our Wisest Pursuit

“Agriculture is our wisest pursuit, because it will in the end contribute most to real wealth, good morals and happiness,” Thomas Jefferson, the third President of the USA had instructed about 200 years ago.

In the year 2015, the union Ministry of Agriculture acknowledging that the wealth creator too deserved recognition had the following added to its name “and Farmers Welfare”. The focus henceforth had been singularly on production, now the producer too attracted attention in the scheme of governance and policy making.

“To enhance productivity and production of agricultural commodities to ensure food security of

the Nation and also to make agriculture a sustainable and viable vocation,” states the Vision of the now called Ministry of Agriculture and Farmers Welfare. No longer confined to production and productivity for food security, it aims at making agriculture a viable vocation. Please note the choice of word; it is vocation not occupation. It implies adoption of agriculture as a profession by choice. The Mission Statement proclaims, “To achieve targeted growth rate for the agriculture sector with the help of State Governments and other Departments of the Government of India by enhancing agriculture production and ensuring farmers welfare by successful implementation of Ministry’s schemes.”

Prosperity For Farmers

Farmer is the fish’s eye that Arjun sees, farm and its produce is all around this eye. Our sights now should be on substituting “welfare” with “prosperity”. The farmer is no longer a mendicant of the past, today he aspires to be a millionaire. The aspiring millionaire is becoming as much an entrepreneur as he is a farmer. My friend Manoj M Sharma, an enterprising shrimp farmer of Gujarat describes his own growth as one of a “Roadpati to Crorepati” who from “earning a dollar a day” now owns a “million dollar



Once in your life you need a doctor, a lawyer, a policeman, and a preacher. But every day, three times a day, you need a farmer

million tonnes of wheat to Afghanistan, adding to the 40 million sent tonnes last year.

An ambition to become a farmer, despite these developments, may still be a far cry for the aspiring middle classes, however, it is no longer a pipe dream. How do we translate the dream into a reality? Address the root of the problems rather than the symptoms. A farmer truly understands the critical importance of the root which gives the plant its strength, support and sustenance; the vision to create millionaire farmers should be long term which strengthens the roots of the agriculture sector instead of embellishing the branches. How do we do it?

Our Challenges, Our Achievements

We are said to have gained the distinction, a dubious one, of being the most populous nation in the world; we already had the largest rural population. This would also mean that we have the biggest consumer base in the world. As on date, we are either the global leaders or holding one of the first three positions in the production of pulses, wheat, rice, jute, vegetables, fish etc.

Owning the largest livestock population we have been the biggest milk producer for more than a decade now; and close on the heels of the first position holder in egg and meat production. So in absolute terms we are huge, but low productivity plagues us, be it per hectare, per cattle/livestock, per unit of input or effort. Half the country's population is engaged in agriculture, and this includes livestock, but contributes a meagre less than 16% to the national GDP. This simple fact itself gives a clear idea of how low our productivity is, and what a lost opportunity it amounts to. The overarching issue of productivity once addressed would increase the economic viability of agriculture multifold, and hence a wealthy farmer.

Another bane is the small size of the holdings which is an inherent impediment to higher productivity; 86% agriculture land holdings are less than 2 hectares. Poor farm infrastructure, limited value addition, inefficient markets, lack of access to credit are some of the other formidable challenges. Contrary to the romanticism of rural life and farming visualised by the urbanites through cinema and other such mass media, the reality of farming is rather harsh making it a thankless task. No wonder that agriculture has been regarded as merely a basic food production system, not a profession. Obviously, the farmer is wary of any long term investment and hence content to live from harvest to harvest. Such risk aversion stands against the principles of growth. The end result is that the farmer manages to share only a small fraction of the end retail price of his produce, the bulk being cornered by the trader, processor, retailer and other such entities along the supply chain. Against this background, what scenarios should we be envisaging and working on?

Food Security, Income Security

Food security was the guiding principle of the green revolution; we slowly moved on to income security. The obvious movement from here on is to prosperity through agriculture. We have more than adequate surpluses to promote such a move. Therefore, the policy of periodic restraints on exports of basic agricultural commodities is best sent to hibernation. Further, our food production approach and system should move away from calorie centric production to nutrition focused produce, an approach of looking beyond basic cereals. This would lend greater profitability to agriculture. Hereto orphan crops, the indigenous millets, are back on our plate with a vengeance and commanding a princely price too.

The green revolution, no doubt, was a strong movement infusing modern technology, inputs and farming practices resulting in increased production, especially of foodgrains. Our inability to look beyond gradually resulted in the onset of stagnation, and now the past success of this revolution became a burden in the form of low value farm surpluses. It is important to differentiate between food and agriculture. While food is one of the biggest items of household expenditure, the money flows more to value addition rather than agriculture. Therefore, doubling production does not necessarily mean doubling farmers' income as has been the stated government policy. Contrast this with the white revolution i.e. the operation flood. This was farmer focused rather than being technology centric and production obsessed. Milk production has been consistently growing at above 6% per annum and the milk producer obtains about 70% of the retail consumer price. Agriculture could do well through a paradigm shift in approach from production to value, a shift from quantity to quality, both of the produce and the life of the farmer; a model already demonstrated effectively by the white revolution.

Rainbow Revolution

Rainbow revolution! What an attractive and catchy nomenclature to the integrated development of agriculture encompassing cereal crops, horticulture, dairy, poultry, aquaculture, meat production etc.; seeing the whole rather than a narrow focus on farm crops. It is a realisation that besides addressing the issue of meeting the rapidly growing consumption and demand of animal protein, it would also be a much greater contribution to enhanced farmer income. In fact, a business empire could be built around this model; and yes, several young enterprising farmers have demonstrated it. So, the future policies and strategies of agriculture could do well to involve all of the livestock, poultry and fisheries activities as the real potential of growth exists here.

Reduce Input Costs, Increase Monetary Value Of Output

A simple and desirable solution to profitability is reducing input costs and increasing the monetary value of the output, a basic tenet

all businesses work upon. So should it be in agriculture, the mantra being to produce more with less; much like the call for "more crop per drop". Effective input controls would entail, inter alia, effective water management. At the other end of the spectrum would be output management by way of efficient supply chains and value addition. After all, isn't it a pity that nearly 20% of our fruit and vegetables perish on account of poor supply chain, and a large quantity realises low returns due to lack of value addition. The situation in fish is no different. Various empirical studies indicate that in agriculture produce such as fruits & vegetables, milk etc. the return to the farmer could be as much as four times higher through value added products. A clear advice that investment in strengthening supply chains and building processing infrastructure should be accorded a high priority.

Possibilities are endless, so could be the suggested interventions. Reforming the extension system is one area of concern; the research in new breeds, seeds, technology, practices etc. is still far out of reach of the farmer. He relies more upon his own traditional knowledge and experience rather than the extension system, which in any case is characterised by a complete disappearance. Let us shift from traditional food crops to promotion of high growth and higher value commodities as we have already established the need to look beyond food security. This would also require facilitating crop diversification, so it is reiterated that the role of the extension system becomes critical. Shift from basic farming to efficient, productive and, above all, smart and sustainable farming would encourage the next generations to adopt it willingly as a profession or say vocation, not a burden.

Let us admit and recognise that the existing thought and approach, as also the solutions they offer are outdated and ineffective. We must also confess that both agriculture and farmers have been captives of a narrow vision dictated either by politics and populism, or by policy makers too distant from the soil. An honest vision should accord a recognition to agriculture as a prime engine of economic growth and not merely a source of votes or brownie points. Championing the cause of the farmer we clamour for Minimum Support Price (MSP). Why the minimum? Why instead should not we demand an ecosystem which offers opportunities for realising Maximum Return on Investment (MRI)? We would have created millions of millionaire farmers.

The Merriam-Webster dictionary explains the lost meanings of 'Farm' and 'Farmer' thus, "the medieval farmer was a money collector." Why shouldn't the modern farmer too? Brenda Shoepf, the Canadian farmer author reminds you, "My grandfather used to say that once in your life you need a doctor, a lawyer, a policeman, and a preacher. But every day, three times a day, you need a farmer."

company." Farming, and only farming, shrimp in his case, has made this possible. We have role models like Manoj.

Not too long ago we were derided as an agriculture "Basket Case", characterised by perpetual shortages and chronic distress in the agriculture sector. Who in our generation can forget PL-480? A wheat imported under this law from the USA which was "fit enough only for the pigs to eat", and this too would be in short supply. And now we have reason to thump our chests having emerged as the "Breadbasket" of the world.

Indian Agriculture Is Flourishing

The sector may still be plagued with imperfections plentiful, the growth rate may still be pointing towards stagnation, access to finance continues to be an issue, markets are yet to mature, technology and other inputs may even now be out of reach of the small farmer; yet it may not be a hyperbole to say that the Indian agriculture is flourishing in the face of multiple challenges. Amidst the difficult working environment and conditions, our farmers have been giving us record harvests, each bettering the previous one. Leave aside the phenomenon of famine, today's generation won't even know what food shortage means. Agriculture exports in the fiscal year ending in March were up by 9% representing 7% of India's exports. During the global food scare that followed Russia's invasion of Ukraine last year, India came to the rescue of the global community emerging as the major exporter of rice and wheat; after all, we are the world's second biggest producer of both. In one of the many such examples, we recently offered to send 20

If a farmer becomes the Prime Minister

Imagined policy turnaround to unleash the real powerhouse of growth



With more income in the hands of farmers, and knowing that agriculture is the largest employer, a policy shift to renewing farming will also reduce the monumental task of creating more employment and that too at a time when the world is faced with increasing automation and jobless growth



About The Author

Mr Devinder Sharma is a leading agriculture and food policy expert, researcher, and writer

With 47 per cent of the country's workforce engaged in agriculture, and with 70 per cent of the rural households dependent on farming in one way or the other, imagine the day when a farmer becomes the Prime Minister.

In a democracy, a farmer too can look up to be there. It doesn't however mean that I have anything against the present crop of political leaders, but all I am trying to look at is the great expectation that the society at large will have, knowing that a farmer is in a better position to feel the pain, apathy and anger that the rural population is living with.

After all, why should they be destined to live in penury, with all the riches being amassed by a privileged few? Why should farmers always look excitedly at the doles and promises the political parties throw at the time of elections? Why can't we have economic policies that make farming prosperous and a sought after employment option? To put it succinctly, why can't a farmer dream to be a lakhpati, and why can't the future high-net-worth individuals (HNWI), people with liquid assets exceeding \$1 million, come from agriculture?

What A US President Told His Mother

It isn't easy I know. But it has to begin somewhere. When Jimmy Carter decided to contest, and we know he was also a peanut farmer, in an interview later he shared as to what happened when one fine evening he told his mother that he wanted to stand for President.

"President of what? She asked.

"United States," he replied. His mother did say how she noticed the throbbing of a nerve around his neck and could therefore see how serious he was. The rest is history. Jimmy Carter served as the 39th President of the United States from 1977 to 1981. Prior to that he was a member of the Democratic Party and had been the governor of Georgia State from 1971 to 1975.

All Great Things Begin With An Idea

Now, before you accuse me of harbouring a stupid idea and at the same time think of what appears to be an impossible dream of seeing a farmer as the Prime Minister, let us assume even if it is hypothetical that a farmer does get an opportunity to eventually lead the nation. With a farmer at the helm of affairs, it will be interesting to see what kind of economic policies are ushered in to see a complete turnaround in agriculture, so as to meet the aspirations of a healthy agriculture, healthy environment and wealthy farmers.

In my imagination, this is only possible if the new leader is willing to take bold decisions, and doesn't feel obliged to carry on with the same kind of skewed economic thinking that has led the rich to become stinking rich, while the poor have been driven against the wall. If the World Bank's estimate of 91 per cent of India's

population to be living in less than Rs 280 (or \$4) per day is correct, the challenge to turn the tables certainly seems to be gigantic. But that should not be a deterrent for a political leadership that is determined to rebuild agriculture, aiming to convert agriculture into a profitable and an economically viable proposition. Simply put, take steps that can chart a new pathway of economic growth, where everyone gains and not only a handful of billionaires.

Budget Talk

Let's begin with the annual budget. In 2023, of the total proposed budgetary allocation of Rs 45-lakh crore, agriculture received only Rs 1.25-lakh crore. This is just 2.8 per cent of the total budget. With such a low budgetary outlay, the unwritten objective is to make farmers abandon agriculture and migrate. In a country where roughly half the population or nearly 700 million people (including their families) are engaged in farming, the biggest economic challenge would come from a policy swing that provides for at least 50 per cent of the budget devoted to agriculture.

The enhanced annual budget itself will lay a strong foundation and also offset the farm losses, if properly designed, for a sustainable and prosperous future. The economic focus has to shift to revitalising the farm economy. To understand this, let's first take a look at some of the startling studies that depict the extent of deepening crisis and the reasons behind the continuing farm distress. Rural indebtedness and suicides have been escalating over the years. Even at the risk of sounding repetitive, it is first important to know the magnitude of the crisis that afflicts agriculture.

To begin with, a study by the Organisation for Economic Cooperation and Development (OECD), the richest trading block, along with New Delhi-based ICRIER had shown that in a period of 16 years, between 2000 and 2016, Indian farmers had suffered a loss of Rs 45-lakh crore, which means approximately 2.64- lakh crore every year.

A still bigger travesty is that no academia, no media, no State Assembly and even Parliament didn't even take cognizance of the serious implications of the study. As if this is not enough, the Down To Earth magazine (Oct 31, 2023) quotes another OECD report that assesses agricultural policy and support 54 countries provide. Accordingly, Indian farmers were taxed \$169 billion (Rs 14-lakh crore) in 2022 alone, some of the loss being exacerbated by export bans and restrictions.

Wrong Priorities

If only this loss estimate was for the industry, the TV channels would have been shrieking about the prevailing policy paralysis, and the need to provide an economic stimulus. But since it was agriculture that suffered the severe blow, nobody cared. That is how we have been literally handing over money to the rich thereby exacerbating inequality. Give them tax concessions, bank-write-offs and economic stimulus packages at the drop of a hat.



It is time to emerge free from the shackles of an outdated economic thinking that has certainly outlived its utility, and is primarily responsible for keeping agriculture deliberately impoverished

But why is that farmers' invariably face police lathi-charge, water cannons and even police firing when they ask for high prices or bank waivers? Why is that I have never seen the corporate chief executives sitting at a protest at jantar mantar raising their demands? The economic policies should therefore not make any distinction based on the economic status. Let the policies be inclusive, in harmony and imbibe justice for all.

The latest report of the Situational Assessment Survey for Agricultural Household, pertaining to the period 2018-19, works out the average income of an Indian farm household at Rs 10,218 per month. This puts farming at the bottom of the pyramid in India. Earlier, the Economic Survey 2016 had shown that the average farm income in 17 States of India, which means roughly half the country, stood at Rs 20,000 a year. This meant that a farming family was surviving on less than Rs 1,700 per month. A farmer can't even rear a cow in the same amount.

No wonder, as the OECD report says, since the year 2000, Indian farmers continue to be taxed. In fact, India is the only country where the negative market support for agriculture has not been covered up by budgetary support. To keep food prices affordable, the economic design the world follows ensures that the entire loss is borne by farmers. In reality, it must be accepted that they alone carry the burden of subsidising the country.

Farmer Prosperity Shall Make The Nation Prosperous

With a farmer leader is at the helm, agriculture will receive the recognition it deserves, knowing there is no other way to achieve the vision of Sabka Saath Sabka Vikas. More income in the hands of farmers will not only revitalise the rural economy, but in turn will boost the national economy. Imagine if half the population had more to spend, the huge rural demand it will generate will surely act as rocket dose for the economy. Only the mainline economists can't see this.

If 76 years after Independence, farmers are unable to eke out an economically viable livelihood, there is certainly a need for economic rethinking. It will require out of the box thinking, treating agriculture as the real 'mainstay' of the economy rather than seeing it only as a burden. At the same time, it should be clear that with more income in the hands of farmers, and knowing that agriculture is the largest employer, a policy shift to renewing farming will also reduce the monumental task of creating more employment and that too at a time when the world is faced with increasing automation and jobless growth.

This will call for disbanding the Niti Aayog, and replace it with a policy think-tank that has the focus steadfast on a people-centric economic transformation. It also calls for a re-look at the macro-economic policies, discarding the consumer price index (CPI) to begin with, so as to ensure that the inflation index is based on real inflation, which means incorporating the inflation in housing, education and health so that the axe does not deliberately fall on food prices as the villain of the story.

There are numerous other initiatives that will need to be taken and will happen hopefully with time. But the first and foremost, to pull nearly half the country out from the clutches of poverty and hunger, and put it on the path to economic resurgence, a strong economic architecture that even defies the dominant structures will have to be laid out.

Let us not be brow-beaten with macro-economists who will continue to breathe down our neck. It is time to emerge free from the shackles of an outdated economic thinking that has certainly outlived its utility, and is primarily responsible for keeping agriculture deliberately impoverished.



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India's Push For Corporate Agriculture Will Be Disastrous For Small And Marginal Farmers



**For a real growth story,
India needs to promote
agroecology, the
growing movement for
a real climate solution
based on chemical
input-free sustainable
farming system**



In India's rural economy, it has been widely observed that when our farmers prosper, the demand for goods and services in rural areas increases, leading to economic growth and improved living standards for rural communities.

Today, agriculture has become a big business and a lot of money is being invested in this sector but unfortunately, it is not reaching the small and marginal farmers who are still at the mercy of big landlords, private money lenders, middlemen and input shop owners. The agrarian crisis which started with the economic reforms in the early 1990s is continuing, rather it is getting worse and has become a crisis for survival for Indian farmers.

Unabated farmers' suicides and the provision of 5 kg of free foodgrain per month for more than 80 crore Indian poor (including farmers) under the Pradhan Mantri Garib Kalyan Ann Yojana (PMGKAY) are the manifestations of the deepening agrarian distress in the country.

Farmer Suicides

For more than 3 decades, there has been no respite in farmers' suicides in the country. Recently, as per a report from the Divisional Commissioner's office, as many as 685 farmers committed suicide in Maharashtra's Marathwada region between 1 January to 31 August 2023.

The Leader of Opposition in Maharashtra state legislative assembly, Vijay Wadettiwar, also claimed that 1,555 farmers committed suicide in the state between 1 January to 31 July 2023, the highest being in Amaravati division with 637 suicides, followed by 584 in Aurangabad division, 174 in Nasik division, 144 in Nagpur division, and 16 farmers suicides in Pune division.

Not only in Maharashtra but farmer suicides have been reported from Karnataka where the Cabinet Minister in Government of Karnataka, Shivanand Patil recently reported that 1219 farmers committed suicides from April 2022 to 9 September 2023. The Union Agriculture Minister, Narendra Tomar, in a written reply in Parliament, revealed that 28,572 farmers committed suicide across the country from 2017 to 2021. As per the National Crime Records Bureau (NCRB) report 2021, an agricultural labourer committed suicide every two hours.

The key reasons for farmers' suicides have been crop failure due to poor germination or climatic conditions, debt burden, crop price crash or family issues and illness. However, the high debt burden among farmers indicates that indebtedness among Indian farmers is huge and our government and its policies have failed to provide a real benefit to farmers to reduce their debt burden or minimise the cost of production, let alone doubling the farmer's income, which has proved to be a misnomer.

ABOUT THE AUTHOR

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Despite several agricultural reforms and policy changes aimed at improving the economic conditions of farmers, India's small and marginal farmers are still faced with several challenges and constraints, such as limited access to credit, land tenure issues, fragmentation of land, market volatility, the impact of climate change, increasing mechanisation, increased labour cost and increased cost of production etc.

Alienation of women farmers through the introduction of more intensive technology in farming, leading to displacement and pauperization of women farmers is a big concern for farmer's organisations like ours, the Bhartiya Kissan Union (Tikait). Women's roles in rural India are important to the progress of the rural economy because they play multiple roles as farmers, wage earners, and entrepreneurs.

Increasing Corporatisation Of Agriculture

However, the real issue for most small farmers in India is the increasing corporatisation of agriculture and the policies favouring agribusinesses. The Indian farmers were up against the three farm laws brought in by the Indian government in 2020 because these would have speeded up corporate control of the means of production and chains of distribution, thus making farmers, vendors, and consumers permanently dependent on the agribusinesses.

We are already experiencing a strong presence of agribusiness companies from the US, Canada, Australia, Israel and several European countries, who have already penetrated into commodity procurement, inputs and finance, mechanisation, agriculture storage, cold-chain management, agri-processing and dairy. Almost all big names in transnational agribusiness have established their strong presence in India and they are not here to help the Indian farmers prosper but to replace them and take over agriculture as they successfully did in other countries, for example, in Brazil.

They are neither here to ensure the food security of Indians but to procure from here and export to wherever they would get a better profit. That was the reason farmers protested for more than a year opposing the liberalisation of food procurement and introduction of a private mandi system as well as legalising hoarding of food. So far India has not opened up foreign investment in land but soon we will see this happen because the foreign companies are desperately seeking to invest in land which would allow them to do farming on their own replacing the contract farming system.

Indian farmers would never allow legalising investment in land for foreign entities and would oppose it at any cost.

Devastating Impact Of Corporatisation And Liberalisation In Agriculture

We are already witnessing the devastating impact of the corporatisation and liberalisation in agriculture in India. In the edible oil sector, India was self-sufficient till the early 1990s, but

the WTO-induced liberalisation forced India to open up the edible oil sector and today India is the world's biggest importer of edible oil, mainly palm oil. When India introduced genetically engineered Bt. cotton in 2002, we had several varieties of indigenous cotton but 20 years after, our indigenous cotton diversity is finished and it is replaced with thousands of GM cotton varieties.

More than that, Bt cotton has been proven to be a big failure. Instead of learning a lesson, the Indian government allowed the environmental release of the first GMO food crop, Mustard (DMH-11) in 2021, knowing fully well that India has a vast diversity of local mustard which would get contaminated as Bt cotton did with our local cotton diversity. Moreover, the DMH-11 is a herbicide-resistant crop, which would not perform without the use of 'roundup' or 'glufosinate', a hazardous agrichemical.

This is despite the Supreme Court Technical Expert Committee's recommendation in July 2013, which opposed HT crops and called them "unsustainable" and "unsuitable" for India because they cause cancer and therefore recommended a 'total ban' on all HT crops on a 'precautionary principle'. The Indian government has also deregulated the GMO rules by allowing the introduction of gene-edited crops in March 2022, which wouldn't require formal approval from the regulatory agencies. With this, it would be impossible to detect the presence of GMOs in any food products and the companies introducing them won't be liable to label them either.

Negotiating Free Trade Agreements

Despite having a trade deficit with almost all the partner countries, India has signed an FTA in the last 15 years, we are still negotiating free trade agreements with the EU, EFTA, Israel, Canada, New Zealand, Australia, and others, which would lead to serious impact on the Indian farmers as witnessed after the FTAs with ASEAN, Indonesia and Malaysia. These FTAs has caused much harm to plantation farmers and there are several crops which have seen price crash, especially coconut, rubber, vanilla and spices due to the dumping of palm oil, rubber, spices etc from ASEAN countries.

Moreover, the FTA negotiations with the European Union and EFTA are demanding that India must accept joining UPOV which would allow patenting of seeds in India, thus, it would compromise our farmer's rights to seed, especially, their right to save, exchange, sow and resow seeds. The inclusion of the issue of public procurement under the India-UAE FTA would force India to accept this provision in other FTAs as well. This could lead to liberalising procurement of the foodgrains under the public distribution system, thus foreign agribusinesses like Cargill, ConAgra, Bunge and Australian Wheat Board would compete with FCI in procuring foodgrains and they would procure for export and not supply to India's food security programme to feed the needy and hungry.

Demand Regarding Minimum Support Price (MSP)

To have a real growth story for Indian agriculture, the government of India must legalise the minimum support price (MSP) which would give a guaranteed price for millions of small and marginal farmers for their agricultural produce and raise their economic status. Indian farmers don't want empty promises but an effective legal approach to ensure both remunerative prices (through MSP) and a commitment by the government for compulsory procurement of farm produce.

In the name of increasing yield and efficiency, Indian farmers are pushed into digital agriculture which is designed to accelerate India's growth story in farming, but it is handing over the Indian agriculture to the agri-corporations through digital control.

We believe that digitalisation will lead to further marginalisation of farmers and will bring in an era of invisible extension services. For example, farmers joining the agribusiness giant Bayer's digital app "Farmrise" would get daily agronomic advice. In return for the "advice" offered, farmers would supply a steady flow of data on soil and weather conditions, the prevalence of pests, crop yields, etc.

In reality, the farmers would become their customers, increasing their dependency on their advice forever, replacing our public agricultural extension services. For corporations like Bayer, Corteva, Syngenta Group/ ChemChi-na, and BASF, this would be yet another profit-making possibility, as a market for so-called 'solutions' which would lead to the sale of unsustainable chemical inputs combined with greater loans and indebtedness of farmers.

Need To Promote Agroecology

For a real growth story, India needs to promote agroecology, the growing movement for a real climate solution based on chemical input-free sustainable farming system. India should not get into the trap of climate-smart agriculture or regenerative agriculture which are corporatized models of sustainable agriculture because their promoters, corporations like YARA and Bayer advocate the use of chemical fertilizer and glyphosate (as weedicide).

India's biggest initiative to shift to climate change-resilient structures and practices, the Project on Climate Resilient Agriculture (POCRA) in Maharashtra, the crop production practices are the same as in the green revolution-based chemical input-intensive agriculture model, which has already proven unsustainable.

Under POCRA, farmers are advised to use techniques like zero tillage, which requires the use of chemical weedicides like glyphosate at least three times in a season. It is quite a dangerous trend to use climate change as an opportunity to reintroduce green revolution technologies in the name of climate-resilient agriculture.



GOI must legalise the minimum support price (MSP) which would give a guaranteed price for millions of small and marginal farmers for their agricultural produce and raise their economic status

The baby step of getting FPO farmers into digital retail space is already catalysing into a win for all stakeholders

About The Author

Dr Maninder Kaur Dwivedi



Small Big Steps Impact

How Small Digital Intervention is Snowballing into a Bigger Ecosystem

The government supported Farmer Producer Organisations (FPOs) are collectives of largely small and marginal farmers- set up so they can leverage economies of scale for inputs, processes and selling their agri-produce. A group of farmers has more bargaining power than a single individual not just in trade to their advantage but also for storage and processing. Most FPOs start their journey with sale of seed, fertilizer, pesticides etc, as this gives a margin of 15-20% to the FPO, to sustain its own cost. When FPOs move to sale of their aggregated produce, the wholesale profit therein, averaged across crops is about 1%. Grading, processing and value addition near the farmgate is a logical way to increase the margin on sale of agri-produce, but an assured market linkage has been the challenge.

In April 2023, Open Network for Digital Commerce (ONDC) started encouraging FPOs to onboard any of the network's seller apps. The FPOs hesitantly initiated the exercise to get all regulatory compliances (e.g. GST, FSSAI etc) while they invested in packaging and branding for B2C in the unknown digital world. The seller app techies started talking to the FPOs to understand the product, explain checking of online orders, printing shipping labels etc. Initial days were fraught with cancelled orders, missed calls and late deliveries. Then something magical happened- the diverse groups- farmers, techies, delivery agents and finance, all started following each other's language. Today there are 3000 plus FPOs on the B2C network of ONDC with over 4000 products and growing.

What transpired in the early months was, even in the chaos of forgotten passwords and bad photo uploads, that some orders went through and completed the course till delivery, i.e from the farmer it reached the end consumer. Since this was a FPO farmer selling its own produce at the village price, there were repeat orders and this sustained the engagement of all stakeholders. When some FPOs got online orders, the word spread and more onboarded the network. The impact however is much larger than just enhanced transactions, for every step in the supply chain.

The Success Of FPOs

The FPOs who got orders early were encouraged to add products to the digital platform. These were items that complement- like rice and dal or more variations of the same agri-produce, for instance wheat, dalia and atta.

Aryahi Fed FPC from Saharanpur, for instance, started with five varieties of unifloral honey. It quickly added more variations plus other beehive products like pollen and beeswax candles. Interaction with more buyers lead to new product development - jam made with honey and millet cookies baked with honey.

Each of the new items reflects a local Farmer Interest Group (FIG) with enhanced local livelihood. Each combo pack on offer means an FPO works out the logistics cost and is leveraging it to reduce the price the end consumer has to pay, while it sells a bit more.

Similarly New Agriverse FPCL from West Bengal started with paddy as the main crop. As a collective they started growing

mushrooms on the paddy straw. After going online they have diversified to a range of dried mushrooms, mushroom powder and mushroom based pickles, vadi, noodles and more.

It is as if the network exposed them realistically to other products within their own capability of processing and packing. In addition to the FPO farmer's engagement being higher, this has also spurred local pickup and delivery services in the rural areas. FPOs selling online are also checking the apps on the network to see what they can buy.

Niche food items, with traceability of source are now available to consumers across the country. It is illustrated by 200 plus varieties of rice, many even GI tagged, being sold on ONDC by FPOs. There are over 50 mono floral honey, a host of cold pressed oils, about 20 varieties of turmeric, besides traditionally processed food items like malts, rotlas, khakras, pickles and preserves.

Fish pickles, saffron infused honey, shilajit and freeze-dried fruits like strawberry, sea buckthorn tea are other examples of the unique offerings straight from farmers. Regional delicacies of many dried fish, Katarni poha, Mithila makhana, Kashmiri Kahwa and Kashmiri Masala tikki and such are offered online at the farmer's cost. The FPO products are invariably pure and premium quality - simply because it's their own produce and there is no advantage to adulteration of the same, as it's being sold under their own label.

Win-Win For All Stakeholders

ONDC has given an opportunity to FPOs to get margins of up to 15% on sale of produce, which in local mandis is about 1% in bulk. This opening needs to be taken up and multiplied many times over, as much for creating local jobs in processing and packaging of food, as for the consumer accessing quality items. The baby step of getting FPO farmers into digital retail space is catalysing a win for all stakeholders.

Stubble Burning

Simple & Sustainable Solutions



It's that time of the year yet again when the air quality in Delhi-NCR and surrounding areas worsens to 'severe category'. Starting from mid-October the air in the region becomes so hazardous that it seems like a deadly gas chamber.

All the government agencies like Central Pollution Control Board, Commission for Air Quality Management, System of Air Quality and Weather Forecasting and Research (SAFAR), all the laws and measures taken and all the governments- Central, Delhi, Haryana, Punjab, and Uttar Pradesh, who are responsible for

monitoring, management and control of the situation have failed to curb this pollution for almost a decade now.

On the front pages the newspapers show pictures of farmers burning paddy stubble to dramatically highlight that the farmers are the villain of the story. All the money spent on machines, stubble management systems and solutions with fancy names like happy seeders, balers, bio-decomposers etc. goes down the drain every year without any positive results. Then the blame game starts till the situation improves naturally and everybody goes back to business-as-usual till the same time next year.

Let's examine the so-called 'main source' of this pollution- the annual stubble burning exercise, and propose the simplest, cheapest, most effective, and sustainable eco-friendly solution to it. The main sources of pollution in the Delhi-NCR are- local traffic, industries, construction works, sweeping of roads, local biomass burning, hotels, restaurants, households, crops residue burning etc. If we factually consider the contribution of stubble burning to this pollution it mostly falls in the range of 15 to 30% during this period, as per the government agencies' data. Most of the stubble burning is being done by the farmers of Punjab and Haryana, if we ignore a few hundred incidents in other states that don't have any significant impact.

The genesis of the problem is the Sub-soil Water Conservation Acts passed in 2009 to conserve the ground water by Punjab and Haryana governments. This law prohibits early paddy plantation, delaying it by 2-3 weeks towards mid-June and beyond so that the paddy plantation in these states is done nearer to the arrival time of Monsoon in July, thus conserving ground water.

Since by law the crop is now planted later, obviously it's ready harvesting only later. Thus, we have mandatorily delayed the crop cycle by 2-3 weeks. Earlier after completion of paddy harvesting in October the farmers had a window of about 4 to 6 weeks to sow the next Rabi crop mainly wheat but now that window has shrunk by half due to the delayed plantation of paddy. Traditionally the farmers had been harvesting paddy manually that leaves no stubble and is also an eco-friendly method.

The labour was available and shifted from field to field completing harvesting over a period of 6 weeks. Paddy is still harvested manually all over India except in Punjab and Haryana where the number of days for harvesting has been halved due to delayed plantation. Due to the smaller window of harvesting, all the paddy farmers need labour to harvest fields almost at the same time. So, manual harvesting labour becomes scarce, very costly and unaffordable. It's a question of man-days.

If the number of days is halved, the number of labourers must be doubled to complete the task in time. Consequently, the farmers



For manual harvesting of paddy and subsequent manual stubble management, the governments should pay what it costs to do it – about Rs 4000 per acre. MNREGA funds could also be used to partly finance it

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We must pay the farmers so that they switch back to manual harvesting of paddy. It has all the benefits at very low costs to society

use machines to harvest the paddy crop but mechanical harvesting leaves about two feet of stubble in the field which must be burnt to quickly clear the fields for the next crop. Mechanical harvesting and stubble management requires about Rs 4000 per acre which is unaffordable to most of the farmers, so they're constrained to burn the stubble.

Huge Costs To The Country

But this practice has huge costs to society and the country. Stubble burning leads to depletion of Nitrogen, Phosphorus, Sulphur, Potassium, and other micronutrients that are essential to soil health and good crop yields. This entails application of extra quantities of these nutrients in the next crop cycle. Since we import huge quantities of these chemical fertilisers and pay huge amounts of fertiliser subsidies- it's likely to exceed Rs 2.25 lakh crores this year, it raises import bills, increases our current account deficit, fertiliser subsidies and thus fiscal deficit. Stubble burning also releases harmful greenhouse gases that contribute to pollution, global warming, and climate change. Also, the earthworms and other useful insects and worms get killed in the burning process. All this has consequences like lower yields and degradation of soil. Mechanical harvesting also uses costly diesel which means more burning of fossil fuels, increased petroleum imports and attendant costs. The pollution and haze in Delhi-NCR also negatively affects tourism, investments and defames the country.

We Must Harvest Paddy Manually

The best, sustainable and most eco-friendly solution is to harvest paddy manually, it leaves no stubble to burn. After manual harvesting and manual thrashing, paddy residue is used as fodder to feed the animals that convert it into milk or animal power and cow-dung. A part is used as bedding under animals in the winter. The cow-dung and bedding residue is recycled as natural manure into the fields, all this happens without any pollution. Manual harvesting thus also mitigates the acute fodder shortage problem that leads to higher milk prices for consumers. Natural manure leads to lesser application of chemical fertilisers in the next crop cycle. The crop residue can also be sold to industries that may use it for packaging, making cardboard boxes or other biodegradable items, producing ethanol, electricity generation etc.

Lucrative Employment Opportunities For Farm Labour

For manual harvesting of paddy and subsequent manual stubble management the governments should pay what it costs to do it – about Rs 4000 per acre. MNREGA funds could also be used to partly finance it. If handsome payments are made to the labourers, then a large number of labourers would migrate to Punjab and Haryana to do manual harvesting of paddy, as they do every year for paddy plantation in June-July, generating lucrative employment opportunities for them. It'll also partly mitigate the rural unemployment problem. Defaming and penalizing farmers, subsidising costly fossil fuel guzzling machines and blaming others is no solution.

The governments only nudged the farmers towards wheat and paddy crops in Punjab and Haryana to ensure the food security of the country when we were dependent on imported foodgrains to feed our people. We must be grateful to our farmers for turning a foodgrains-deficit and importing country to foodgrains-surplus and exporting country. We can't push the bill to the farmers or punish them for ensuring the food security of the nation.

The farmers can also be nudged towards crop diversification by ensuring legal guarantee of MSP and assured purchase of other crops like coarse cereals, oilseeds, and pulses. This will reduce the area under water guzzling crops like paddy in Punjab and Haryana and ensure self-reliance in vegetable oils. We import about sixty percent of our edible oils annually. In 2021-22 we spent about \$19 billion of foreign exchange to import vegetable oils.

Eco-Friendly, And Sustainable Solution

Paying for manual harvesting is the cheapest, most eco-friendly, and sustainable solution to stubble burning. It saves water, the air, and the earth with the least costs. All other options take very heavy toll directly or indirectly in terms of- health costs, soil and environment degradation, global warming, extreme weather events, compromised food security, increased milk prices and food inflation, purchase of air-purifiers, tourism and investments curtailed, schools and institutions closed, banned vehicles, restricted economic activities, pollution monitoring costs and corruption by enforcement agency employees, wasteful expenditure in smog towers or water sprinklers, increased fertilizer and oil imports, increased subsidies and fiscal deficit, among others.

We must pay the farmers so that they switch back to manual harvesting of paddy. It has all the benefits at very low costs to society. When we are talking about spending trillions of dollars to fight global warming, contain carbon emissions and climate change at COP27, why not begin by paying a few thousand crore rupees to the farmers for 100 percent manual harvesting of paddy. It's worth it. Let's not be penny-wise but pound-foolish.



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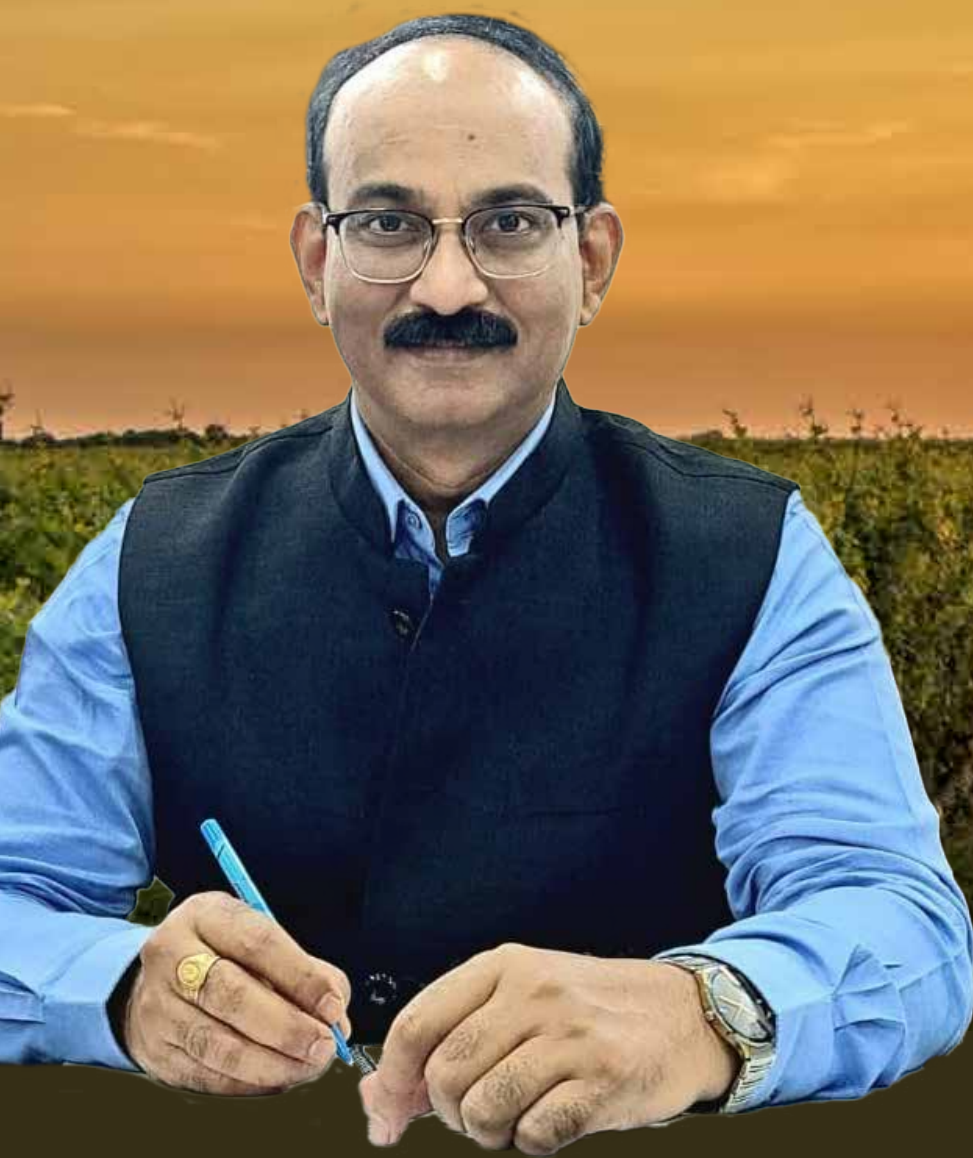
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Striding Ahead In The North-East Region

Strengthening research-development linkage for sustainable agriculture development in NER



About The Author

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Dr Mohanty is the Director of the institute

In recent years, the region has also been emerged as a hub for eco-tourism, medicinal plants, unique fermented food products and vibrant arts and handicraft sector

Role of ATARI, Zone VII

The North-East region of India, known as the geographical gateway for India's rich flora and fauna, nestled in the Eastern Himalayan region of the country, represents Indo Myanmar biodiversity hotspot, which is recognized as one of the important 25 global biodiversity hotspots.

The region is characterized by highly diverse mosaic of ecological, physiological and social landscapes that significantly contributes to the regional economy and the livelihoods of more than 75 % of its population thriving on agriculture and allied sectors. The Northeast region comprising of eight states; namely Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura inhabiting with more than 124 tribal communities covers nearly 5.6 % total geographical area of the country with net sown area of 1.76 m ha with around 1.2% share of the national human population and 1.5% livestock population (Bhatt et.al., 2019).

The region boasts of being blessed with a wide range of physiographic, ecoclimatic, edaphic and altitudinal variations that offers a conducive environment for growing a wide range of crops, including rice, maize, millets, pulses, oilseeds, fruits, vegetables, tea, and spices (Birthal et al., 2006) and witnesses a significant potential in horticultural crops, gaining prominence with cultivation of oranges, apples, pineapples, bananas, and citrus fruits etc. in the region (Gupta et al., 2022). Furthermore, the agro-climatic conditions of the region favour the cultivation of high value crops like ginger, turmeric, black pepper, and large cardamom with better market demand within and beyond the region (Yadav et al., 2004; Devi and Raj, 2021; Ralte and Ekhe, 2022). Agroforestry, animal husbandry and fisheries are also considered as the integral component of the farming systems of North Eastern region stands as a strong base of the agriculture economy of the region.

Unique Agro-Climatic Diversities, Undulating Topography

The region is distinct from others parts of the country, because of its unique agro-climatic diversities, undulating topography, small farm holders, low input based–low output oriented subsistence farming, technologically lagged mixed farming system and shifting agriculture (Baishya et.al., 2021). Agricultural production system is by and large, Complex, Diverse and Risk prone (CDR), which is characterized by large variation in cropping intensity (range 100-189% with an average of 135%) with dominance in mono-cropping pattern and subsistence farming practice.

Distinct Agricultural Practices

The region being a repository of rich biodiversity is recognized as a 'Climate Marker'. Each tribe also follows distinct agricultural practices based on their cultural backgrounds coupled with variable habits, climatic situations, resource conservation practices across the states which makes the region unique being endowed with various agricultural systems adaptable to local agro-climatic conditions like zabo farming system in Nagaland; Apatani method of rice farming system in Arunachal Pradesh; Panikheti system of rice cultivation in Nagaland, Sikkim and Manipur; Alder (*Alnus nepalensis*) based farming system in Nagaland; Bun (raised bed) method of cultivation in Meghalaya; Bamboo drip irrigation method in Meghalaya (Sen et al., 2015) that emphasize on balance resource conservation measures and need intensive analysis on priority setting policy initiatives, so that the region may witness a sustainable agricultural growth in the coming years.

Hub For Eco-Tourism And More

In recent years, the region has also been emerged as a hub for eco-tourism, medicinal plants, unique fermented food products and vibrant arts and handicraft sector (NITI Aayog SDG report, 2021-22). In addition, the practice of "Jhumming" is mostly predominant in the hilly states of Arunachal Pradesh, Meghalaya, Mizoram, and Nagaland. But the growth of agriculture in NER is interrupted by lack of suitable technological interventions, non-availability of quality inputs, inadequate farm mechanization, substantial post-harvest loss, weak value chain system, poor market infrastructure, limited information support systems and above all inaccessible hilly terrains that creates a hurdle in transportation of farm commodities.

Pivotal Role Of ICAR-ATARI Zone VII

Under these circumstances, ICAR-Agricultural Technology Application Research Institute (ATARI), Zone–VII, headquartered in Umiam, Meghalaya, plays a pivotal role in boosting the agricultural production scenario of the NER through introduction/ intervention/ application of advanced research technologies evolved by various ICAR research institutes and State/Central Agriculture Universities through its network of 43 Krishi Vigyan Kendras (KVKs) spreading



ICAR-ATARI, Zone VII takes a lead in translating the agricultural research output into the process of development for the growth of the NEH farming sector that encompasses agriculture, horticulture, animal husbandry, farm mechanization, fisheries, women empowerment, agri-prenureship etc.

across five North Eastern states—Manipur, Meghalaya, Mizoram, Nagaland, and Tripura.

The institute is actively involved in selection of appropriate location specific, problem oriented, farmers centric, climate resilient, commercially viable technologies and backstopping the KVKs for technology assessments, refinement, front-line demonstrations followed by hand-holding the farming community through training programs and conducting various extension activities for technology popularization. During its almost five decades of impactful journey, the institute has created significant impact in the region with a visible growth in the hill farming through introduction of improved technologies in agriculture and allied sectors.

In addition to the overseeing and monitoring of technology transfer programmes; ICAR-ATARI, Zone VII has also taken initiatives for conducting multi-locational technology assessment in collaboration with ICAR research institutes. The institute has also taken maiden attempts in partnering with private companies/ start-ups/ agri-prenures for collaborative testing of their commercialized technologies/inputs/products/ processes for the benefit of the farming community that helps in establishing the market linkage

between the farmers and agri-prenures/ start-ups for sustainable growth of the sector, also promotes agri business opportunities among the village youths.

Growth Of NEH Farming Sector

In order to make the effective implementation of the suitable proven technologies, ICAR-ATARI, Zone VII plays a prominent role in handing over the technologies to the state agencies for large scale implementation across the state by incorporating in the concerned state action plan. Thus, ICAR-ATARI, Zone VII takes a lead in translating the agricultural research output into the process of development for the growth of the NEH farming sector that encompasses agriculture, horticulture, animal husbandry, farm mechanization, fisheries, women empowerment, agri-prenureship etc.

Additionally, it contributes to the formulation and execution of relevant research projects aimed at technology application in agriculture and allied fields under NEH ecosystem and knowledge management in different domain. Currently, the institute is dealing with many national programs such as NICRA –TD in farmers' fields through 15 selected KVKs, Attracting and Retaining Youth in Agriculture (ARYA) initiative through six KVKs, Farmer FIRST Projects (FFP) through two nodal centres spreading across five different states of NEH Region. Moreover, the institute is leading various flagship schemes of Govt. of India namely CFLD (Oilseeds), CFLD (Pulses) and Natural Farming funded by the Ministry of Agriculture & Farmer's Welfare, through 23, 21 & 25 selected KVKs, respectively; in addition to successful implementation of DAMU and STRY projects, funded by IMD and MANAGE, respectively.

In fact, Northeast Hill agriculture needs to be revamped by expanding its activities like crop diversification, climate resilient agriculture, value addition, precision farming, high tech agriculture, organic farming, agri-prenureship, export marketing etc. to make the sector more viable and profitable (Padmaveni and Bhagya Lakshmi, 2018). Keeping this in mind, ICAR-ATARI, Zone VII, Umiam is committed with its unwavering manoeuvres to bring a paradigm shift in Northeast Hill farming through focussing upon secondary agriculture tailored to the specific agro-ecological and farming systems leveraging the latest tools of Information and Communication Technology (ICT), to realize better productivity, profitability and ensure a comprehensive approach for a holistic and sustainable agricultural development creating avenues for rural employment, doubling farm income and socio-economic empowerment of farming community in the North Eastern region (Azad et.al., 2021).



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The agrarian economy in India progressed impressively since Independence. Consequently, the nation transformed from deficit to surplus producer and net exporter of many commodities. The growth in agricultural GDP was over 3.4% during global pandemic COVID-19 when all the other sectors of economy were sharply negative. Agriculture proved a saviour for jobs and livelihood support to those who need it the most during the global pandemic.

Beyond the economic indicators, the sector is pivotal in providing two square meals to over 1.4 billion people. Ensuring food security was the prime necessity immediately after independence and hence, concerted efforts were made by agricultural research and extension which led to progressive increase in foodgrain production, with intermittent shocks.

The foodgrains production reached an all time high of 323.55 million tons in 2022-23 (II Advance Estimate, M/o Agri & Farmers Welfare, 2023) from 50.82 m tons in 1950-51. Other commodities also recorded multi-folds increases in production due to green, white, yellow, blue, golden, silver, brown and grey revolutions.

The agricultural frontline and mass extension have always played a central role in achieving these technology intensive revolutions. The most recent pulses revolutions are the best testimony of impactful outcomes of frontline extension and research. Today, the aggregate production of food and non-food commodities is over 1.45 billion tons in India due to coordinated efforts of National Agricultural Research, Extension, Education System (NAREES) and the hard work of our millions of farmers coupled with conducive policy support on price and productivity fronts.

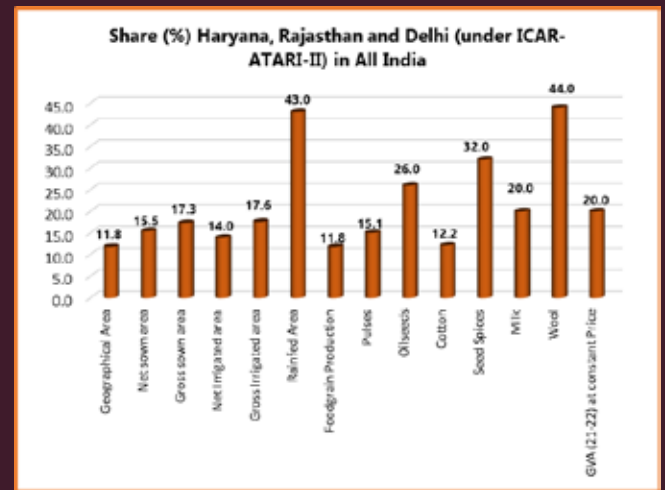
“The ICAR-ATARI and KVKs systems have positioned themselves to play a catalytic role in the structural and cyclical change in agriculture sector likely to be in the offing as we are reimagining Indian agriculture in “Amrit Kaal”

Reimagining Indian Agriculture

The Role of Frontline Extension

Contribution Of Farmers In Haryana, Rajasthan And Delhi

The agriculture and farmers in Haryana, Rajasthan and Delhi have been pivotal not only in the green revolution for much needed food security at household level but also for the nutrition and energy rich crops and commodities like pulses, oilseeds, milk, meat, egg, etc. This zone is specifically a hub of export potential commodities such as basmati rice, cumin, pomegranate, medicinal herbs etc in spite of the stressed ecologies. The dominance of water stress has been a characteristic feature of Rajasthan and southern districts of Haryana. Together these account for 43% of the rain dependent cultivated area of the country. Despite the stressed ecology, the zone contributes 11.8% of total foodgrains, 15.1% of pulses, 26% of edible oilseeds, 32% seed spices, 20% of milk and 44% of the country’s wool. Haryana, Rajasthan and Delhi cumulatively contribute about 20% of the country’s agri-GDP at 2020-21 prices (Figure-1). The three states together account for 6.3% of the total holdings of India. Interesting to note that 47.7% of large and 23.8% of medium farm holdings of India are in the Zone-II.



ICAR-ATARI-Zone-II

ICAR-ATARI Zone-II representing Haryana, Rajasthan and Delhi States coordinates with 66 KVKs, 10 State Agriculture/Veterinary/Horticulture Universities and one ICAR-Deemed University-IARI for technology application at farmers fields. Location-specific technology assessment, refinement and demonstrations, development of crop and enterprise diversification and alternate land use systems, popularization of IPM, INM and IWM interventions, promotion of rural entrepreneurship, income generating and drudgery reduction activities, and alternate livelihood support systems for marginal, landless and farm women to minimise rural out migration are the thrust areas of work. ICAR-ATARI has been implementing frontline demonstrations, onfarm testing of technology, interventions for attracting and retaining youth in agriculture and doubling farmers income (DFI), in-situ management of crop residue, outscaling of natural farming and agri-drones.

For the disadvantaged farmers, the tribal sub plan and scheduled caste sub plan has been implemented for individual and community development. On an average about 50000 farmers of SC/ST category are benefited every year. Since 2012 technology demonstrations have been implemented under NICRA. Farmer FIRST Programme has been implemented since December 2016. The Land Diagnostic Survey(LDS) of mustard, cotton and rice based cropping systems in Haryana under CSISA project of ICAR-CIMMYT collaborations. Capacity development of CBBOs and farmers under 13 FPOs.

Milestones in Agri-Extension

Agricultural Extension has been amongst the front players in the development of Indian Agriculture. Starting with community development programme in 50s to national demonstrations and high yielding varieties programme (HYVP) in 60s, KVKs, T&V System and Operational Research Programmes, IRDP and Lab to Land in 70s, Technology Mission on Oilseeds & Pulses (TMOP) in 80s and IVLP and NATP in 90s, Integrated Cereal development programme, NAIP, NMMI, MIDH, NFSM during 2001 to 2009, NICRA, National Mission on Agricultural Extension & Technology (NMAET), ATMA, ARYA, Farmers First, Cluster Frontline Demonstrations, Seed Hubs on Pulses and Oilseeds, Mera Gaon Mera Gaurav during 2010-2020 etc are the milestones in the journey of evolution of agricultural extension in India which contributed for the food security, income augmentation and community development. Frontline extension in India, has proved its merits in augmenting productivity and production since the Green Revolution. In 80s the frontline extension led to the yellow revolution and oilseeds production doubled between 1986 to 1998. The recent initiatives of frontline extension for promotion of improved varieties of pulses and innovative seed system through seed hubs resulted in the pulse revolution.



The State Departments of Agriculture, Horticulture, Water Resources, Animal Husbandry, Fisheries, Rural Development, and SAUs are natural allies of KVKs and ATARI

farmers of Trans Gangetic Plain Region under Haryana, Delhi and Rajasthan increased by 3.14, 2.54 and 2.25 times in horticulture, livestock and field crops, respectively in 2020-21 over base year (2016-17) income. The KVK interventions helped increase household income by 2.7 times between 2016-17 and 2020-21 in Rajasthan.

Collaborations and Convergence

Agriculture is increasingly exposed to climatic variations and moving towards capital intensive and knowledge based enterprise. It can only remain competitive with high-tech interventions and efficient use of quality inputs. The changing scenario calls for much coordinated efforts to adopt system approach, augment the scientific base for ecological benefits due to diversified farming beyond the cost: benefit ratio but to compatibility and environment and people health; group formation and aggregation on small and marginal farm holdings in managing agriculture professionally and capacity improvement and standardization of diversified practices for conserving the natural resources in the most productive regions of the country.

The extension system has been closely working with central ministries/departments such as Agriculture & Farmers Welfare, Fisheries, Animal Husbandry & Dairying, Rural Development, Jalshakti, Food Processing Industries, Micro, Small & Medium Enterprises, Earth Science, Petroleum & Chemicals, Women & Child Development, NITI Aayog, MANAGE, ICRISAT, CIMMYT, IFFCO, Prasar Bharti and NCDC, etc. The State Departments of Agriculture, Horticulture, Water Resources, Animal Husbandry, Fisheries, Rural Development, and SAUs are natural allies of KVKs and ATARI. The overarching collaborations and coordinated mechanism helped ICAR-ATARI-II, to reach out to over 4.65 lakh farmers annually in the last decade through various activities.

Way Forward

Indian agriculture suffers from a cyclic syndrome of “low area-less production-high market price” followed by “higher area-high production-lowest market price”. It is witnessed in many commodities due to the prevailing practice of “everything grows everywhere”. While enforcement of restrictions of regional crop plans is a distant dream in India, the area and productivity led price shocks can only be averted with market linked R&D and augmented frontline extension for good agricultural practices (GAP) to produce more export friendly crops and commodities targeting new destinations overseas. The ICAR-ATARI and KVKs systems have positioned themselves to play a catalytic role in the structural and cyclical change in agriculture sector likely to be in the offing as we are reimagining Indian agriculture in “Amrit Kaal”. Necessarily, we have to look and practice agriculture differently than it was looked at and practiced during the previous decades.

For enhancing pulses seed availability, 10 seed hubs on pulses are working in Rajasthan and Haryana since 2016-17. Weather, soil and crop information are assimilated to issue weather-based agromet advisory since November, 2018. Training of farmers and extension personnel, rural youths for capacity building and entrepreneurship development is core activity. Besides, ICAR-ATARI has been facilitating KVKs for business incubation.

Recently, two KVKs in Zone-II have established incubation centres on food processing. The ICAR-ATARI have been facilitating KVKs to produce and provide quality seeds and planting materials to farmers of Rajasthan and Haryana. More than 1 lakh farmers benefited directly with seeds and planting materials provided in the last 5 years in the Zone-II by KVKs. Our outreach and on farm programmes have contributed to significant increase in productivity of foodgrain crops (26.7% in Haryana, 55.7% in Rajasthan and 18.5% in Delhi) during 2005-06 to 2021-22.

The increase in productivity of wheat, rice, bajra, maize and pulses was 33.1, 70.9%, 80.7%, 95.7% 138%, respectively in Rajasthan and 17.9, 18.2, 102.1, 47.4 and 35.5% in Haryana. In oilseeds, productivity increased by 28.6% in Rajasthan and 68.0% in Haryana during the same period. The average income of the



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Surging Ahead In Amrit Kaal

Role of ATARI, KVKs and Farmers In Development Of Agriculture In Zone-V



ICAR-ATARI, Kolkata with 59 Krishi Vigyan Kendra (KVKs) under its jurisdiction in Zone-V comprising states of Odisha, West Bengal and UT of A&N Island, together with host organizations is creating waves of positive change through empowering farmers and other stakeholders of farming. Farmers of Zone-V with hand holding of KVK played a crucial role in the development of agriculture as well as the interconnectedness of food security and nutrition. The pinnacle of this symbiotic relationship between farmers and KVKs was attained when farmers continued to work tirelessly to produce food and ensure its uninterrupted supply despite the challenges posed by the COVID-19 pandemic. They have maintained their agricultural activities, including sowing, cultivation, harvesting, and post-harvest management, to meet the food demands of the population.

With active support from KVK, farmers have shown remarkable adaptability by adopting new practices to minimize the impact of COVID-19. They have implemented social distancing measures, used personal protective equipment, and applied hygiene practices to ensure the safety of themselves and their workers while carrying out agricultural operations. They have teamed up with KVKs to leverage mobile apps, online marketplaces, and agricultural consulting services to stay abreast of market trends, establish connections with customers, and acquire inputs to limit disruptions to the agricultural supply chain. They have contributed by providing employment opportunities to migrant workers returning to their villages, distributing food grains and essential supplies to those in need, and supporting local initiatives to address food security challenges.

Knowledge And Technology Hubs

KVK served as knowledge and technology hubs that bridge the gap between farmers and scientific advancements through conducting 1545 on-farm trials and 73630 FLDs during the last five years. They also provided practical training on innovative solutions to more than 5.48 lakhs farmers as well as more than 70 thousand extension personnel, enabling them to enhance productivity and sustainability in their agricultural practices.

Farmers, many-a-time use poor quality seeds due to its unavailability in the local area; KVKs of Zone-V addressed this vital issue of sustainability by producing more than 7156 tons of seeds during the last five years to meet local demand for quality seeds and partly addressing required seed replacement rate. One of the main obstacles to the development of horticulture is the inadequate supply of planting materials; KVKs intensified the work on production of clean planting materials and contributed more than 4.34 crores planting materials in the region.

A total of 10.26 crores of livestock strains/fingerlings also helped the animal and fisheries sector of the zone. Our KVKs also participated in the enumeration of soil health and water quality of the region by analyzing about 1.42 lakhs of samples and supplying recommendations.

Entrepreneurship Development

KVKs are addressing demographic dividend through entrepreneurship development by executing different centre sector projects being successfully operated by ICAR-ATARI, Kolkata and executed by KVKs of the zone. One such example is the story of Mrs. Jigisa Samantaray from Patulisahi village in Odogaon block, who received training from KVK under ARYA project and started her journey as a poultry-preneur and is currently earning approximately Rs. 4 lakhs per annum from the single enterprise. Mr. Prantosh Chandra Paul, 38 years old from Mokdumpur village, Tapan block with active support from Dakshin Dinajpur KVK turned



Our KVKs are in the forefront when it comes to development of customized and affordable products

ABOUT THE AUTHOR

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ICAR-ATARI, Kolkata is poised to take up challenges of Amrit Kaal and is ready to catalyze KVKs of Zone-V to serve as change catalyst as well as convergence hub of district agri-tech epicenter for dissemination

Development Of Customized And Affordable Products

Our KVKs are in the forefront when it comes to development of customized and affordable products. One such example is development and promotion of low cost nutritional supplements (SHISHU AAHAR) by Uttar Dinajpur KVK in collaboration with ICAR-ATARI, Kolkata. The product was released on the 95th Foundation Day of ICAR. KVKs are also involved in improving tribal livelihood by promoting organic products through value chain management; one such example is Kandhamal Organic Turmeric (GI tag) by KVK, Kamdhamal.

Working closely with KVKs, three farmers from Zone-V, Shri Batakrushna Sahoo with KVK Khordha, Shri Pataet Kumar Sahu with KVK Kalahandi, and Ms. Sabarmatee with KVK Nayagarh, were awarded the prestigious Padmashree award, one of the highest civilian honours in the nation. Zone-V is also known for its rich biodiversity and traditional farming practices; with technical backstopping by ATARI and capacity building by KVKs, a number of farmers in this region were able to preserve and nurture local land races, in addition to guaranteeing the availability of native seeds for future generations and winning the national Plant Genome Saviour Community Award for the community and Plant Genome Saviour Farmer Reward & Recognition for individual farmers.

Countering Challenges

Many areas of Zone-V are prone to several vulnerabilities. KVKs in the region have implemented NICRA-TDC in collaboration with farmers to cope with these challenges. They employed innovative practices like scaled-up abiotic stress tolerant cultivars, NRM techniques, established Climate Resilient Villages (CRVs)/ set-up Custom Hiring Centres and undertook convergence with ongoing development schemes to mitigate the impact of such vulnerabilities and ensure food security.

Our KVKs are also addressing sustainability through CSISA, building capacity of aspirational districts through Krishi Kalyan Abhiyan, administer protein security through CFLD on Pulses, foster Yellow Revolution through CFLD on Oilseed, helping farmers for informed decision making through Gramin Krishi Mausam Sewa, reaching the unreached and serving the unserved through the programs of Scheduled Tribe Component (erstwhile Tribal Sub-Plan), SCSP and Mera Gaon Mera Gaurav. In the government's flagship "Doubling of Farmers Income" (DFI) program, KVKs played the role of committed change agents and sent a strong signal by accomplishing the task in 5742 farm households by creating momentum in the right direction.

ICAR-ATARI, Kolkata is poised to take up challenges of Amrit Kaal and is ready to catalyze KVKs of Zone-V to serve as change catalyst as well as convergence hub of district agri-tech epicenter for dissemination.

into bee-preneur and registered a branded company named "Sumadhur".

Similarly Mr. Manas Ranjan Das, a resident of Jagatpurgram village of Tangi- Choudwar block with the hand holding of Cuttack KVK turned into a mushroom-preneur, obtained FSSAI license for his products with a brand name of Ritanjali Mushroom and earning a profit of Rs. 3.48 lakh annually. He is now an inspiration for others and about 1200 members from different Govt. as well as non-Govt. organizations witnessed his successful mushroom unit and process of value addition.

Mr. Ujjwal Ghosh, a resident of Khargram Block of Murshidabad district with the help of Dhannyaganga KVK of Sargachi, turned into goat-preneur and currently they are earning more than Rs. 4.00 lakh per year mainly from Black Bengal Goats. Mr. Bikram Khuntar, an energetic youth of Purulia district has successfully become a lac-preneur with knowledge of scientific techniques of lac cultivation from Purulia KVK; now he is earning a profit of Rs. 2.10 lakh per annum from lac cultivation through selling brood lac of kusumi and rangeeni strains and processed lac. So far 50 men and women are working with him to extend the scientific method of lac cultivation among their fellow farmers/ youth.

Mr. Aditya Kumar Sahoo, a Graduate of Dharmagarh block of Kalahandi got the knowledge of custom hiring services from KVK started his own custom hiring centre with annual profit of approximately Rs. 9.00 lakhs from agri-implements. With his efforts, the farmers of his locality are well acquainted with farm mechanization and he is able to generate employment for rural youth of his locality.

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ICAR-ATARI, LUDHIANA

Enabling Farmer Success

ARYA entrepreneur made fortunes through High-tech Natural Farming – The Inspiring Tale of Shri Munish Kumar



ABOUT THE AUTHORS

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Dr Navneet Jaryal is from KVK Hamirpur at Bara, Himachal Pradesh

Natural Farming has been promoted as low budget option of farming for saving small and marginal farmers from financial distresses including indebtedness. However, several educated and enterprising rural youth have shattered the limits of low budget in natural farming to demonstrate that successful high-tech natural farming is also an economically viable option for earning an attractive livelihood. Most of such youths have been cultivating high value crops under open as well as protected conditions for earning very high net income from natural farming.

More than a dozen ARYA (Attracting and Retaining Youth in Agriculture) entrepreneurs in the ICAR-Zone-1 states/ union territories have been applying natural farming bio-formulations

to their crops through drip irrigation in polyhouses. ARYA is an ambitious project of the ICAR that was envisaged to empower rural youth for locally earning decent livelihood through entrepreneurship.

The Entrepreneur

Shri Munish Kumar is one of such educated youths and is a Bachelor in Physical Education by his academic training. He comes from Samrala village of Didwin block in Hamirpur district of Himachal Pradesh and is part of the small category of farm families.

He used to cultivate vegetables on a small holding of 7 Kanal area (less than 1 acre) at the time of the inception of ARYA project in the district during 2016-17. His village is about 12 km from the district headquarters of Hamirpur and about 45 km from the KVK at Bara in Hamirpur. For the livelihood of his family, he totally used to depend on vegetable cultivation till 2015-16. He had constructed two polyhouses of 105 m² each, for protected cultivation of vegetables, about 3-4 years before 2016-17.

The poly sheets of both the structures were completely damaged and the structures were grossly useless. He was unable



Hard work, focus and ability to receive technical and financial support from various public institutions constitute the core competency of entrepreneurship, and Mr Munish Kumar proved to be a winner everywhere

to get his polyhouses repaired for replacement of his damaged poly sheet due to his poor financial conditions. As a result, both his polyhouses were idle and he was forced to cultivate vegetable crops under open conditions with a compromised productivity and a financial disadvantage. He was losing his interest in farming due to inadequate returns.

ARYA intervention

Munish Kumar approached KVK Hamirpur at Bada during 2016 to have pertinent solution for ensuring himself a desirable livelihood out of his limited resources. The concerned scientist assessed his farm situation and analysed his precise needs. He was advised cultivation of vegetables in the polyhouse and the damaged polythene sheet of both his poly-houses was replaced with the financial assistance under ARYA project.

After the renovation of both the poly-houses, he started growing vegetable crops inside the poly houses. Capsicum, Tomato, Cucumber, Coriander, Summer Squash, Onion, Palak, Methi, Brinjal Cauliflower and Radish etc., were some of the prominent crops which were grown by the entrepreneur.



Subsequently he was advised to produce chemical free vegetables for the health-conscious consumers and also to grow nursery seedlings of the vegetable crops. Nursery seedling growing became critical component of net-income enhancement for this ARYA entrepreneur.

Marketing

Munish quickly became famous in his area for the quality vegetable production so in order to build upon his favourable reputation, he opted for self-marketing of his farm products. His decision proved right and he was able to sell his produce at the farm gate and nearby local markets at attractive prices. He never visited APMC Mandi for selling his farm produce. He started earning handsome income from the sale of high-quality seedlings of cucurbits and other vegetables grown under protected conditions during January and March months.

COVID Opportunities

While COVID doomed finances of very large number of farmers in India, it proved a lucrative opportunity for Munish. His reputation of high-quality nursery seedlings induced him to

“ Innovativeness in self-marketing of the farm produce by building a quality reputation can convert adversities into opportunities. This is a great lesson for budding rural young entrepreneurs



increase area under nursery seedlings of vegetables just before the COVID lockdown in January 2020 shifting some of his polyhouse space from main crops cultivation to nursery production.

Subsequent COVID lockdown proved to be a boon for his farm business as buyers used to visit his place to purchase the nursery seedlings. Resultantly, his net income increased 60% during COVID ridden year 2020. He started gradually increasing open fields cultivation of vegetable nursery as well as main crop by increasing land under cultivation. During second COVID affected year 2021 his net income further increased to Rs. 6.7 lakh from the previous year's net income of Rs. 4.57 lakh.

During this year, this hard-working agripreneur started earning additional income by becoming master trainer in various

trainings on Mushroom cultivation and natural farming for which he himself was trained at KVK Hamirpur under ARYA project and other programmes.

Impact on livelihood

Proportion and multiple times enhancement of net-income of Munish Kumar due to ARYA intervention

Particulars	2016	2017	2018	2019	2020	2021	2022
Proportion (%) of income due to ARYA intervention	35.11	71.90	75.93	77.97	86.23	90.60	92.56
Income enhancement due to ARYA (multiple times)	1.54	3.56	4.16	4.54	7.26	10.63	13.44

Munish Kumar experienced tremendous improvement in his financial performance after the ARYA intervention. The details of his economic performance were recorded. The net-income from conventional cultivation of vegetable under open field conditions stagnated in the range of Rs. 58000 to 68000 over the years for him.

Though he started increasing area under open fields cultivation of vegetables during 2020 but it would not have been possible without ARYA intervention as his net income from conventional farming was too meagre to enable him expand area. During 2021 he earned Rs. 38000 (increased 2.76 times during 2022) by being the master trainer for various training programmes on mushroom cultivation or natural farming. The net-income of Rs. 94000 (out of which more than one third was ARYA income) increased to Rs. 8.47 lakh during 2022.

An interesting analysis about role of ARYA project in the

enhanced net-income of Munish Kumar was also recorded. The contribution of ARYA intervention in the total net income of the entrepreneur ranged from 35 per cent during 2016 to 92.56 per cent during 2022. In terms of multiple times enhancement of net income due to ARYA intervention the farm income of the entrepreneur increased in the range of 1.54 times during 2016 to 13.44 times during 2022.

Interestingly, COVID pandemic has proved to be a boon for this ARYA entrepreneur on every financial parameter. The success story of Sh. Munish Kumar is an example worth emulation by the youth not only from his area but from other parts of the country also.

Way forward

Munish Kumar has received various national level recognitions and awards. His outstanding success story, created with the help of ARYA project, provides several insights and lessons to the educated rural youth exploring possibilities of entrepreneurship development in the field of agriculture. The hard work, focus and ability to receive technical and financial support from various public institutions constitute the core competency of entrepreneurship, and Mr Munish Kumar proved to be a winner everywhere.

How innovativeness in self-marketing of the farm produce by building a quality reputation can convert adversities into opportunities is a great lesson for the budding rural young entrepreneurs to secure not only sustainability but also a tremendous growth in the farm business. This enterprising rural youth has several business experiences in his story not only to learn but to emulate also.

Declaration: Other developmental agencies, especially the Department of Agriculture, Himachal Pradesh, also have significant contribution in shaping the success of this ARYA trained entrepreneur with technical and financial support.

ICAR-ATARI, PATNA

Unleashing the Potential

Secondary Agriculture in Bihar & Jharkhand through KVKs



ABOUT THE AUTHORS

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Various models have been developed and promoted by the KVK of Zone-IV such as agro-processing, value addition, diversified farming, and waste management

Agriculture plays a pivotal role in shaping the economic landscape of Bihar and Jharkhand, serving as a cornerstone for employment and contributing significantly to the overall progress of these states. To foster agricultural growth, the state governments have initiated various measures, leading to satisfactory progress in primary agriculture.

Nevertheless, the prevalence of smaller farm holdings (less than 1 hectare) poses a significant challenge to the sector's development. As the agro-ecological situation of Bihar and Jharkhand is quite favourable for production of various field and vegetables crops, fruits, livestock, fish, honey and other commodities. In this context, Krishi Vigyan Kendra (KVKs) of Zone-IV are promoting secondary agriculture, focusing on high-value commodities (HVCs) as a viable solution to these challenges.

Promising Models Under Secondary Agriculture Promoted By KVKs

Various models have been developed and promoted by the Krishi Vigyan Kendra of Zone-IV under the framework of secondary

agriculture such as agro-processing, value addition, diversified farming, and waste management.

1. Processing and Value addition of primary agricultural products

a. Food processing unit and jaggery processing unit

A jaggery processing unit was established by KVK Piprakothi for demo-cum-training and for processing of sugar juice which is managed by Farmer Producer Organisation, Piprakothi and monitored and supervised by KVK, Piprakothi. About 25 quintal values added Barfi size jaggery was produced annually from the last four years. Similarly, KVK Piprakothi organised training programmes for entrepreneurship development by providing a platform for marketing of their products and functional linkage with different institutions. Along with this follow up programmes and facilitation for FSSAI Licensing and trademark for their value-added products were also provided by the KVK.

b. Makhana production and processing enterprise

KVK of Bihar is performing demonstrations and through various extension activities popularising Makhana production and processing among the rural masses. The impact of adoption of Sabour Makhana-1 in Araria district till 2022-2023 given below:

Year	No. of Farmer	Adoption			
		Expansion of Area (ha)	Enhancement of income (Rs. in Lakh)	Total Area under Crop (ha)	% Adoption
2022-23	3000	720	1162.73	4100	17.56

Similarly, a trainee of Krishi Vigyan Kendra, Madhepura Sh. Anjani Thakur set up a Makhana Processing Unit by learning skills related to shining, grading (4<6<8 sutta) and quality packing that yield up to 8-9Q/ha. This light popped traditional makhana varieties such as swarnvaidhi /Sabour Makhana-1 are generally used in paneer and kheer.

c. Honey production and processing

Beekeeping as an independent enterprise is promoted by KVK Gumla (Jharkhand) through the establishment of FIG of beekeepers. Till now about 106 youths have established their own entrepreneurial units. Similarly, more than 100 tribes are currently involved in honey production in Banka district of Bihar who sell their produce mostly to whole sellers locally. At KVK Ranchi which has favourable condition for beekeeping and honey production due to the presence of many floras like Karanj, Berseem, Eucalyptus, Litchi, Jamun, Surbujja, Acacia, rapeseed, Shisham, Mustard and Coriander. KVK Ranchi has refined the technology by replacing 3 combs to 5 combs in the starting colony for better production. Enhancing income of bee-keepers is also targeted by formation



Under the guidance of KVK Jahanabad, paddy straw finds an innovative purpose in crafting exquisite wall hangings and scenic creations

of FPO. The technology is up-scaled upto 4000 farmers which are rearing about 6000 colonies and producing about 500 tons of honey in the district every year.

d. Mushroom cultivation

For the past few years, particularly women of Nalanda, Katihar, Gopalganj, Banka districts of Bihar have been involved in mushroom farming through the intervention of KVKs. The Anantpur village of Nalanda has been declared as the Mushroom village by the State Agriculture Department in 2012. KVKs are providing scientific training for mushroom farming and its processing for employment generation. Beside technical guidance they also provide good quality seed of three types of mushrooms namely Oyster, Milky White and Button mushroom and market linkage to their beneficiaries.

2. Alternative enterprises linked to rural off-farm activities

a. Crop diversification through pulse and oilseed

To encourage crop diversification, KVKs conducted cluster demonstrations on rapeseed-mustard, covering 100 acres in

adopted villages. Simultaneously, the introduction and distribution of high-yielding mustard varieties such as Pusa M28 and Pusa M30 were implemented. Critical inputs like fertilizer, pesticides, irrigation pipelines for proper watering, and seed bins for storage were provided by KVK. A significant intervention was the formation of a Farmers Interest Group (FIG), which played a crucial role in promoting secondary agriculture by ensuring the proper functioning of the oil extraction unit and devising new marketing strategies. Under the technical guidance of KVK Nawada, a women-based Panchane Fed Farmer Producer Company Limited in Nardiganj, Nawada, Bihar was established for promotion of oil seed and pulses with all shareholders being women farmers.

b. Crop diversification through black wheat

Many farmers in Bihar are increasingly choosing to cultivate black wheat due to its associated health benefits, departing from traditional varieties. The efforts of KVK Gaya for cultivation of black rice in the district reached 120 acres in 2022. The production potential stands at 36 quintals per hectare, resulting in a net income of Rs. 96,700 per hectare for the farmers.

c. Diversifying income through various integrated farming system model

Various models including (Crops+ Fish+ Poultry+ Dairy+ Fruit & vegetables Crops), Goat based integrated farming system were promoted by KVKs as a coping strategy under water scarcity and available resources suitable as per the topographical and suitable environmental conditions. Bee-keeping based IFS may play a vital role in achieving the goal of doubling the farmers income.

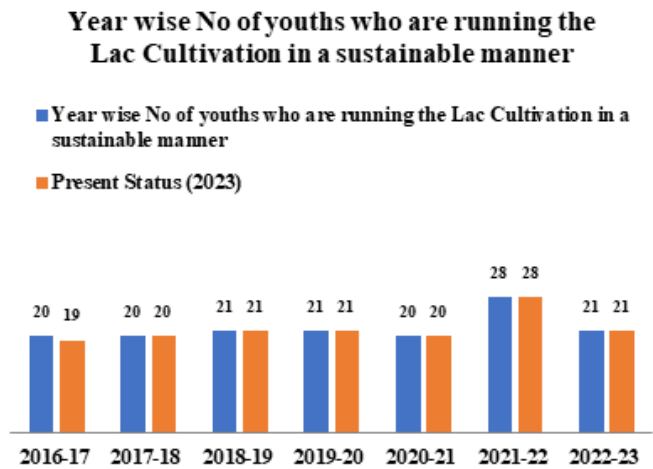
Farming System	Production cost	Gross income (Kg/ha)	Net Return
Crop alone	35756	57273	21517
Bee-keeping + Crop	45000	210000	165000

c. Hi-tech bamboo nursery

Bamboo common facility centre was established at KVK Piprakothi to provide better quality of bamboo plants to farmers for plantation. This unit has 1 lakh bamboo seedlings of 13 different varieties and available to sell for farmers and also provide training for making bamboo-based furniture. It also sells 100000 seedlings/year of major species of bamboo.

Items	Cost of Making	Gross return	Net return	BCR
Sofa + center table	20000	25000	5000	1.25
Resting chair	3000	5000	2000	1.67
Night lamp	600	800	200	1.33
Bed	8000	12000	4000	1.50
Carved Memento	800	1400	600	1.75
Wall hanging	100	200	100	2.00
Bamboo curtain	1000	1500	500	1.50
Bamboo basket	100	200	100	2.00
Bamboo wall clock	800	1000	200	1.25

d. Lac cultivation for tribes' farmers in rain fed areas
KVK Gumla conducts regular training programmes along with provision of inputs like brood lac and other tools for the participating farmers. As a result, about 158 youths established their own entrepreneurial units. Along with this FIG of lac growers and establishment of various market linkages is also facilitated by KVK.



3. Enterprises related to crop residues and waste management

a. Paddy straw-based enterprise. Paddy straw management through straw bales was carried out by KVK Rohtas. In 2022-23 baling machines on custom hiring basis were supplied to farmers leading to saving of total 1050-acre paddy straw area from burning and generated a significant revenue during the year.

Year	Covered area (Acre)	Straw Bales volume (Ton)	Revenue generated (Rs.)	Uses
2020-21	10	11	22,000	Feed block (COMFED)
2021-22	47	58	40,000	Feed block (COMFED)
2022-23	1050	1200	16,80,000 (Farmers)	CBG plant (Methane & Manure)

Biochar Model: Similarly, a sustainable approach to manage solid waste through biochar assisted composting was developed by KVK Rohtas.

S. No.	Year	Biochar Cycle No.	Production (Ton)	Uses
1	2021-22	26	8.33	Used in trial of CRA program at KVK Farm
2	2022-23	27	8.52	



Biochar Model developed by KVK Rohtas



Scenery made up of paddy straw

b. Wall hangings and scenery of paddy straw

Under the guidance of KVK Jahanabad, paddy straw finds an innovative purpose in crafting exquisite wall hangings and scenic creations. This venture proves particularly advantageous for women in rural areas, providing a source of income through the readily available crop residue. The low production costs of crafting wall hangings and other decorative items make it an accessible and popular rural craft for both farm women and the youth. This eco-friendly innovation not only contributes to the rural economy by generating additional employment opportunities but also promotes environmental cleanliness through the proper utilization of agricultural residue.

c. Sukhet model for vermicomposting

From 53 households in the village of Machhadi, household wastes, crop residues, cow dung, and other biodegradable materials are systematically collected. These materials are then transformed into vermicompost, while, in a contrasting initiative, every household receives an LPG cylinder every two months. This dual approach contributes to reduced air pollution, generates revenue through the sale of vermicompost and earthworms, and provides employment opportunities for the villagers. The success of this model earned recognition, with the Hon'ble Prime Minister praising it in the 80th episode of 'Mann Ki Baat.'

Benefits Of Advancements

Bihar and Jharkhand possess considerable opportunities to boost their agricultural sectors by adopting advanced practices, incorporating technological innovations, upgrading infrastructure, and fortifying connections to markets. It is crucial to guarantee that the benefits of these advancements reach small and marginal farmers, who constitute a significant segment of the farming community. Enacting these measures has the potential to position Bihar and Jharkhand for the advancement of secondary agriculture, resulting in the doubling of farmers' income, stimulating agricultural growth, generating employment prospects, and making substantial contributions to the comprehensive development of both states.

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India's prominent agri-media house, Krishi Jagran is delighted to announce India's number one tractor brand, known to stay 'Tough Hardum' - Mahindra Tractors – as the Title Sponsor for the 'Millionaire Farmer of India Awards 2023'.

Scheduled to take place from Dec 6 to Dec 8, 2023, at Pusa Grounds in the heart of New Delhi, 'Millionaire Farmer of India Awards 2023' will be the perfect amalgamation of award ceremonies, exhibitions, business opportunities and seminars during the three-day event.

Pleased to address, as it will be by the industry from now on - Mahindra Tractors Millionaire Farmer of India Awards 2023 - seeks to recognize the extraordinary achievements of Indian farmers who have not only doubled their incomes but have also evolved into millionaires through their relentless efforts and innovative agricultural practices.

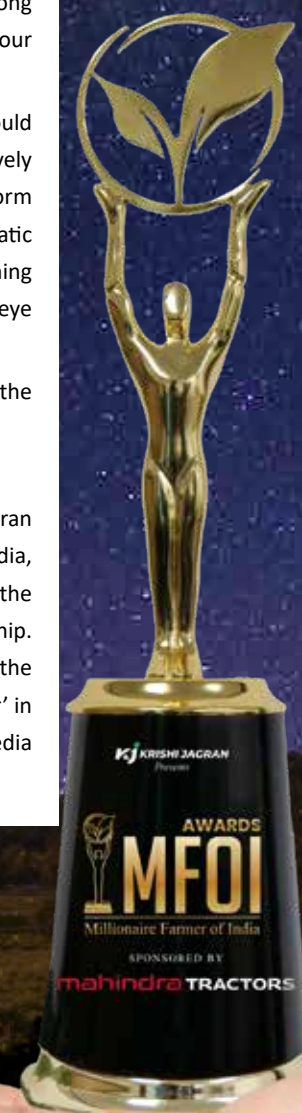
Mahindra's MFOI Awards 2023 will bring together some of the top corporates along with the richest and progressive farmers under one roof to acknowledge and honour the real field heroes from India's agriculture and allied sectors.

"I'm honoured to have Mahindra Tractors as our Title Sponsor. What else could I've asked for! Dreamt 27 years back, MFOI was one dream that I thought I positively needed someone faithful and dependable to fulfil. And today I have a hand in the form of a brand that is known to help many ride through their tough roads," shares ecstatic MC Dominic, Founder & Editor-in-Chief, Krishi Jagran and Agriculture World. Summing it up, Managing Director, Krishi Jagran, Shiny Dominic quips, "Goldsmiths have an eye to recognise the real gem."

Riding with Mahindra Tractors, MFOI Awards 2023 is on its road to becoming the Oscars for the Indian agriculture fraternity.

About Krishi Jagran

Known for its forte in agriculture journalism in the last three decades, Krishi Jagran has left its indelible mark in various formats from print to digital to social media, which is well acknowledged by 'Limca Book of Records', featured therein, for being the largest circulating journal, published in various languages with the highest readership. Acknowledging our content deliverance via digital and social media platforms for the farming sectors, we have also been awarded 'Krishi Udyami Krishak Ratan Puraskar' in the 'Excellence in Digital Media' category. With its deep penetration of social media platforms, it won't be an exaggeration to say that KJ rules the rural!



ICAR-ATARI, JABALPUR

Striving for Sustainable Development of Farmers

“Soil and water testing is an important activity for better soil health management, improving the soil fertility and sustainability of agricultural production and enhancing economic return to farmers

Indian agriculture has proved its resilience and strength during the toughest times. This would have not been possible without the support of the Krishi Vigyan Kendras (KVKs) aiming the intervention of location-specific technology modules in agriculture and allied sectors, through its assessment and demonstrations. Further, KVKs have been functioning as Knowledge and Resource Centre of agricultural technology with supporting initiatives of public, private and voluntary sectors for improving the agricultural economy of the district and are linking the NARS with extension systems and farmers.

These KVKs are governed and monitored by 11 ATARIs in India. ICAR-Agricultural Technology Application Research Institute (ATARI), Zone-IX was initially established as Zonal Coordinating Unit in the premises of Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, Madhya Pradesh by ICAR on 11th September, 1979, upgraded to Zonal Project Directorate (ZPD), Zone-IX in March 2009 and was retained to ATARI, Zone-IX in the year 2015. The institute coordinates, monitors and evaluates the mandated activities of 82 KVKs spread across two states viz., Madhya Pradesh and Chhattisgarh.

ABOUT THE AUTHOR

Dr. SRK Singh is the Director, ICAR-ATARI, Zone-IX, Jabalpur (MP). The Institute coordinates, monitors and evaluates the mandated activities of 82 KVKs spread across Madhya Pradesh and Chhattisgarh

Nutri-SMART Villages

ATARI, Jabalpur has been the flag bearer for the initiation Kisan Mobile Advisory (KMA), KVK-ATMA Convergence Model and Nutri-SMART Villages (NSV) in convergence with the line departments viz., Dept. of Farmer Welfare & Agriculture Development and allied departments. In association with Dept. of Women and Child Development of Madhya Pradesh, till date, a total 57 Nutri-SMART villages have been established. NSV aims at promoting nutritional awareness, education and behavioural change in rural areas involving farm women and school children, along with harnessing traditional knowledge through the local recipe to overcome malnutrition and implementing nutrition-sensitive agriculture through homestead agriculture and Nutri-garden.

Later this project was replicated at national level under the project named as NARI (Nutri-Sensitive Agriculture, Resources & Innovation) based on the concept of “Grow what you eat and Eat what you grow” by increasing nutrition literacy and ensuring nutritional security specially for women and children. Under NARI program, each KVK established at least one Nutri-SMART Village in their area and promoting nutri-related interventions to ensure nutrition security through concepts like Nutri-garden, Saat-Din Saat Kyari (Seven days seven plot), Backyard kitchen garden, vertical farming, poshan thali, poshan calendar, poshan mala, poshan rangoli, etc..

Innovative Approaches

Moreover, the institution is also working in various projects like National Innovations on Climate Resilient Agriculture (NICRA), Cluster Front Line Demonstrations (CFLD) in -pulses & oilseed, Attracting and retaining youth in Agriculture (ARYA), New Extension Methodologies and Approaches (NEMA), Natural Farming, etc and has also been involved in promotion of various technologies like Kadaknath, ridge and furrow method, broad bed method, drip irrigation, etc benefiting lakhs of farmers since establishment of ATARI in 2015.

For the improvement and betterment of the farmer community, with the support of KVK's, ATARI, Jabalpur has assessed a total of 9568 technologies through 1.49 lakh on-farm trials (OFT). Also, a total of 1.51 lakhs farmers were benefitted through 7,125 front line demonstrations (FLD) covering 62064.66 ha area.

Since the establishment of the ATARI in 2015, total footfall of farmers and other officials has reached 17.78 lakh for seeking information and getting technical support in agriculture and allied activities. Besides, more than 30 million farmers have benefited by Kisan Mobile Advisory (KMA) provided to them. Further, 640 varieties of farmers have been registered through PPVFRA, out of 4410 farmers' varieties documented and 101 FPOs (Farmer Producer Organization) have been supported by KVKs.

KVK-ATMA Convergence Model

Under KVK-ATMA Convergence Model, farmers of 26,551 villages covering 4.14 lakh ha area were supported and benefitted. As per the ranking given by NILERD, New Delhi in 2018 for 66 KVKs, 46 KVKs were ranked under category 'A' and 20 were ranked under category 'B'.

To develop and strengthen the skills, instincts and abilities of the farmers, farm women and the youth, various Training and Capacity Building programs have been organized at KVK level under the monitoring of ATARI. Till date total 54,598 courses have been organized benefiting 15.74 lakh participants (farmers and farm women, rural youth, extension personnel).

In addition, more than 7.50 lakh extension activities have been organized in the form of field days, etc. for promoting the technologies in the region which benefited farmers and extension personnel in the ICAR-ATARI, Zone-IX.

Availability of the quality seeds on time and adequate happened to be the major constraints to the farmers. Therefore, it was taken as a challenge and appropriate steps were taken at the KVKs to help the farmers in this regard. With industrious efforts, a considerable progress has been made and KVKs of the Zone has produced total 1.54 lakh quintals of seed and 431.98 lakhs of planting material of different crops (cereals, pulses, oilseeds and vegetables), medicinal plants, fruits, etc. and distributed among farmers.

Farm Support

Soil and water testing is an important activity for better soil health management, improving the soil fertility and sustainability of agricultural production and enhancing economic return to farmers. Therefore, to analyze the samples for their nutritional status total 5.82 lakh soil samples and 2241 water samples have been analyzed by KVKs of the Zone benefiting 19.91 lakhs farmers of 34,802 villages. Based on the results, the nutrient application through fertilizers and manures to meet the crop specific needs are recommended to the farmers.

As a result of continuous hard work and dedicated efforts of KVKs and farmers, Zone-IX has been bestowed with many prestigious awards including 20 ICAR and 10 other awards of national importance viz., Best KVK Award (National), Pandit Deen Dayal Upadhyay Rashtriya Krishi Vigyan Protshahan Puraskar, Vasant Rao Naik Award, Agri Extension Award, Fakhruddin Ali Ahmed Award, Krishi Karman Award, Mahindra Sammridhhi Award, Progressive farmer award, Innovative Farmer Award, etc.

ICAR-ATARI, KANPUR

Technological empowerment of farmers of Uttar Pradesh



The initiatives of ICAR-ATARI, Kanpur have constantly accelerated the KVKs of Uttar Pradesh to foster their services for the betterment of farm families in the state



ABOUT THE AUTHOR

Dr. Shantanu Kumar Dubey is working as the Director, ICAR-ATARI, Zone III, Kanpur

ICAR-Agricultural Technology Application Research Institute (ATARI), Zone 3, Kanpur is one of the 11 ICAR-ATARIs formerly known as Zonal Project Directorates (ZPDs) and the erstwhile Zonal Coordination Unit (ZCU) functioning under Division of Agricultural Extension established in the year 1979. ICAR has established a vast network of KVKs all over the country under the administrative control of various ICAR institutes, State Agricultural Universities (SAUs), State Department of Agriculture, Non-Governmental Organisations (NGOs) and other institutes for implementing the central governmental projects/schemes. In the Zone, 3 Agricultural Technology Information Centres (ATICs) are working for delivering the "Single Window" delivery system. Since, Zonal Project Directorate has been elevated as ICAR-Agricultural Technology Application Research Institute (ATARI) during 2015.

Major Functions Of ICAR-ATARI, Kanpur

- Planning, monitoring and reviewing of KVK activities in the zone; to identify, prioritize and implement various activities related to technology integration and dissemination
- Coordinating with SAUs, ICAR institutes/organizations, line departments and voluntary organizations in the zone for implementation of KVK mandated activities and
- Facilitating financial and infrastructural support to KVKs for effective functioning.

Contribution of ICAR-ATARI, Kanpur

Every year KVKs of UP organize 9131 training courses with the participation of about 2.0 lakh farmers, farm women, rural youths and extension functionaries representing 80.62 per cent and 19.38 per cent respectively for farmers and farm women. In all 1.69 lakh farmers and farm women and 22,000 rural youths are given skill training in different enterprises. Similarly, about 18-20th extension personnel are also trained in different areas annually.

Similarly, annually 32.0 th. frontline demonstrations are also organized annually on crops (20.00 th), horticulture (0.74), farm implements (1.09 th.), livestock strains (1.6 th.) and other enterprises (1.16 th.). Total area and units covered under FLDs are about 8-9 th. ha and 6-7th respectively.

On an average, every year, total about one thousand recommended technologies are assessed. Of on-farm farmer participatory trails conducted under three categories namely, crop (3227), livestock (752) and other enterprises (538).

Similarly, every year the KVKs organize the awareness creating programmes by organizing about 50-52 th. extension activities benefitting about 12-13 lakh farmers; 30-35 th. mass communication extension activities, disseminating about 1.00-1.25 lakh 123468 mobile advisories through text and voice for covering nearly 30-35 lakh farmers. About 20-25 th soil samples are also analyzed by the KVKs annually which benefitting 38-40 th farmers, technology week celebrations (4-5 th annually) with participation of 2-3 lakh farmers, trainings and demonstrations under rain water harvesting & micro irrigation system are also arranged by them.

Seed Production

Production of quality planting material is another major focus of KVKs. Annually, these KVKs produce about 21-22 th. q seed of cereals (16-17 th. Q), pulses (1-2 th. q), oilseeds (1.0-1.5 th. q), vegetables (1.2-1.5 th. q) besides, fodder (0.32 th. qq), spices (0.056 th. q) and commercial crops (0.53 th. q). Likewise, the planting material/sapling production of vegetables, fruits, ornamentals, forestry, medicinal & fodder plants are also produced by the KVKs. For serving the farmers.

Planting Materials Production

Annually, these KVKs produce 80-81 lakh planting materials including vegetable seedlings (54.11 lakh), paddy seedlings (16.15 lakh), fodder (4.25 lakh), fruit saplings (3.26 lakh), medicinal and aromatic (1.81 lakh), ornamental (0.81 lakh) and forestry (0.48 lakh). There are certain bio-products also which the KVKs are producing for the use among farmers. Annually, the production level is 2-3 th. quintal of bio-products. It included vermi compost (1.5-2.0 th. q) and NADEP compost (0.35 th. q). Besides, KVKs also produces bio pesticides, bio-fungicide and other bio-products.

Livestock Strains and Fingerlings Production

For the betterment of the livestock owners in the state, KVKs of Uttar Pradesh produce approx. 50-55 lakh livestock strains including dairy animals (esp. cows, buffaloes, calves, goat etc); poultry including broilers, layers, ducks etc; piglets and fisheries (50-55 lakh fingerlings).

As the ATARI, Kanpur is the guiding force for the KVKs, it annually brings out 50-60 publications including research papers, book chapters, popular articles, technical report, newsletters and bulletins. KVKs being the knowledge centre in the district, they also bring out approx. 15-18 th. publications annually including books, training manual, book chapter, abstracts, research papers, seminar papers, technical bulletins, technical reports, proceedings and others.

Most of KVKs are strengthened in the state by financial support from ICAR as well as RKVY scheme of state government. They have their own infrastructure facilities like Administrative Building (67), Farmers Hostel (59), Staff Quarters (59), Soil Testing Labs (44), Soil Testing Kits (104), IFS (26), Demo Units funded by ICAR (211), Demo Units funded by others (56), e-connectivity (26), Technology Information Unit (23) and Four wheeler (87), Two wheeler (70) and Tractor (66).

Flagship Programmes

This institute is coordinating the execution of different projects and special programmes namely, NICRA, ARYA, CRM, ASCI, Pulses Seed Hub, TSP/KSHAMTA, SCSP, Farmer FIRST, DAMU, Natural Farming, IFS, Aspirational District Scheme, NARI, NEMA, SBA, MGMT, RWHS, Drone Project and CSISA project. These project/special programmes are being running under ICAR funded, Government of India funded and Institute funded projects.

The above initiatives of ICAR-ATARI, Kanpur have constantly accelerated the KVKs of Uttar Pradesh to foster their services for the betterment of farm families in the state.

ICAR-ATARI, PUNE

“ **KVK and Amazon signed MoU for collaboration to identify and set up demonstration plots to impart and share ideas about established agricultural practices** ”



ABOUT THE AUTHOR

Dr Subrata Kumar Roy is Director ICAR-ATARI, Pune

Agricultural Development in Western Region Initiatives of KVKs In Maharashtra, Gujarat and Goa

KVKs have played a pivotal role in the success of the farmers in the Western region. 78 KVKs in the states of Maharashtra (47), Gujarat (30) and Goa (1) work for enhancing farmers' income. A total of 8504 cases of Doubling of Farmers Income cases were documented by 78 KVKs. A perusal of the success stories where farmers income doubled or more than doubled during 2016-17 and 2020-21 indicate that the concerted efforts of the KVKs has really paid off and the overall income of selected farmers has increased during 2020-21.

KVKs in Maharashtra

50 KVKs of Maharashtra are looking after the overall agricultural development in the state. In Maharashtra, 20 KVKs are working under state agricultural universities, 28 KVKs under Non-Governmental Organizations, 1 KVK under ICAR and 1 KVK under other university. 18 districts (Amaravati, Ahmednagar, Pune, Nashik, Aurangabad, Buldhana, Nanded, Beed, Yavatmal, Solapur, Jalgaon, Satara, Jalna, Sangli, Nagpur and Kolhapur) are having two KVKs in the district.

KVKs in Gujarat

30 KVKs of Gujarat state provides farm support to the agricultural sector and creates awareness about the improved agricultural technologies. In Gujarat, 18 KVKs are working under state agricultural universities, 7 KVKs under Non-Governmental Organizations, 2 KVKs under ICAR institutes and 3 KVKs under deemed university. Double KVKs have been established in 3 districts (Banaskantha, Kutch and Rajkot) of Gujarat. It has helped the additional KVKs to reach the farmers.

KVKs in Goa

In Goa, 1 KVK is working under ICAR institute and 1 KVK under State Department of agriculture. 2 KVKs of Goa are providing technology assessment and demonstration for its application and capacity development of the agriculture sector in the state.

Achievements of KVKs in Western region

On Farm Testing (OFT)

The purpose of On Farm Testing (OFT) is to assess the location specificity of agricultural technologies under various farming systems. A total of 34,120 OFTs was conducted by the KVKs of western region of the country during 2017 to 2023.

Front line Demonstrations (FLD)

KVKs organizes Frontline Demonstrations to establish production potential of technologies on the farmers' fields. Between 2017 and 2023, more than 1.22 Lakh FLDs were conducted by the KVKs of Maharashtra, Gujarat and Goa.

Training

Skill set up gradation is necessary for every single farmer,

new improved technology adoption through different training programs organized by KVK's play vital role in improving livelihood of farmers, In the western region, 82 KVKs organized 9060 training courses with the participation of 354327 farmers, farm women, rural youth, extension functionaries, regular, sponsored and vocational trainings involving Maharashtra, Gujarat and Goa states during 2022-23. In all 288968 farmers and farm women and 36549 rural youth were trained on different skills in different enterprises. Similarly, 28810 extension workers were also trained in different areas.

Involvement of KVKs in Agricultural Development Programmes

Natural farming

Natural farming practices exclude any commercial inputs, whether they be organic, biological, or otherwise, and instead rely on biomass mulching, year-round green cover, and locally derived cow-based dung and urine compositions. A project on natural farming is implemented in 48 KVKs (30 KVKs in Gujarat, 17 KVKs in Maharashtra and 1 KVK in Goa) in the western region. During 2022-23, the KVKs conducted 632 awareness programs, 64 trainings, and 395 demonstrations on natural farming, involving 80306 farmers. In addition to this, conducted 24 training courses on Natural Farming covering 732 participants covering 511 male and 221 female participants in Gujarat.

Agriculture Drone Project (ADP)

A total of 40 drones was sanctioned, including 7 to State Agricultural Universities, 23 to ICAR institutes and 10 to KVKs under Agri-Drone Project under Sub Mission on Agricultural Mechanization for the year 2022-23 in Maharashtra and Gujarat. The drone pilot training in Maharashtra and Goa state was conducted at RPTO, MPKV, Rahuri to 35 people. Among these, 33 were completed and 2 under process.

In Gujarat, pilot training was conducted to 22 persons at RRU, Gandhinagar, among these 20 completed (2 under process) and 2 scientists from ICAR-NIASM, Baramati completed pilot training at RPTO, MIT, TN University, Chennai, Tamil Nadu. 36 Drones were purchased by the PIC and 4 are under process, 1195 Kisan drone demonstrations were conducted at KVKs, ICAR research institute and Agril. Universities field for benefiting farmers of the western region of the country.

National Innovations in Climate Resilient Agriculture (NICRA)

National Innovations in Climate Resilient Agriculture (NICRA) is a multi-institutional and multi-disciplinary network project launched by ICAR in 2011. Technology Demonstration Component (TDC) of NICRA which is implemented in 121 climatically vulnerable districts of the country focuses on

enhancing the adaptive capacity of farmer in these districts to climatic change and to ensure security of livelihood in times of climatic aberrations. The Technology Demonstration Component (TDC) of NICRA was implemented through KVKs during 2022-23 in 11 climatically vulnerable districts located in the states of Maharashtra, Gujarat and Goa.

Nanaji Deshmukh Krushi Sanjivani Prakalp (PoCRA)

The Project on Climate Resilient Agriculture (PoCRA) has been initiated by the Government of Maharashtra (GoM) in Partnership with the World Bank. It was implemented in 16 Districts and 157 talukas of Maharashtra in 4894 villages. The project development objective (PDO) of PoCRA is 'to enhance climate resilience and profitability of smallholder farming systems in selected districts in Maharashtra'. This is envisaged to be achieved by promoting climate-resilient agriculture systems, value chain promotion, post-harvest management, and institutional development. The KVKs have provided trainings and all technological backstopping for successful implementation of the project.

Farmer Producer Organisations (FPO)

Department of Agriculture, Co-operation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India has introduced the CSS Formation and Promotion of 10,000 FPOs under Co-operative Societies Act. DAC & FW act as a funding source and NCDC along with ICAR is the implementing agency. In Western India, it is being implemented in total 10 blocks in 6 KVKs, out of which there are 6 blocks from 4 KVKs from Maharashtra and 4 blocks from 2 KVKs of Gujarat with the aim to enhance economic strength & market linkages of farmers for enhancing their income.

Gramin Krishi Mausam Seva (GKMS)

Under GKMS Scheme, 21 DAMU centers of Maharashtra, Gujarat and Goa coordinated in dissemination of Agromet Advisory Services to farmers. During the year 2022-23, these 21 DAMU centers generated 18118 agromet advisories and disseminated weather-related advisories through different means. A total of 267 awareness programs were organized involving 16946 farmers and 1748 WhatsApp groups created by DAMU KVKs by involving 2.96 Lakh farmers for taking up timely farm operations and to prevent crops during extreme weather events.

Special Project on Cotton development

The project titled 'Targeting technologies to Agro-ecological zones - large scale demonstrations of best practices to enhance cotton productivity' implemented in 2023. The pilot project comprises of three sub-projects. 1) High density planting system in low productivity areas with shallow soils with canopy, nutrient, soil health management. 2) Closer Spacing planting system in medium productivity areas with medium deep soils under rainfed cotton ecosystem with canopy, nutrient and soil health management



The Krushik App is a mobile based application developed by KVK Baramati, Maharashtra



3) Production technology for ELS cotton in niche areas under rainfed/irrigated farming situation. Seed Companies like Rashi, Rallis, Mahyco, Nuziveedu, Kaveri and Ankur are involved in the Project. 15 KVKs from Maharashtra and 3 KVKs from Gujarat are implementing from 2023.

Connecting the Farmers

Some initiatives of the KVKs of the western region are highlighted below, through which they will provide better services to both producers and consumers.

MoU on marketing strategies with Amazon

Amazon is engaged in the business of inter-alia retail sale of food products manufactured and/or produced in India. KVK and Amazon had signed MoU for collaboration to identify and set up demonstration plots in order to impart and share ideas about established agricultural practices with interested farmers / cultivators and demonstrate the impact and effectiveness of certain agronomy practices.

KVK Narayangaon and Baramati along with Amazon officials will identify and set-up separate plots for each crop to demonstrate and establish the impact and effectiveness of the package of practice (PoP). Each demonstration plot will be of minimum half acre of

land and contain soil(s) which is adequate for the cultivation of the crops like cauliflower, cabbage, beetroot, broad beans, cucumber, watermelon, okra, onion, brinjal and coriander.

KVK Narayangaon will conduct workshops with respect to each demonstration plots. Each workshop will extend from the time of sowing the seeds of the crops up to harvesting and marketing. KVK will assist the person engaged in agricultural production on the demonstration plot to plant the crops and apply the PoP, as identified, and provided. KVK will demonstrate and impart information to the farmers or cultivators attending the workshop at their own discretion. KVK will provide training and infrastructure facilities at its premise. The charges to be bear by Amazon.

Amazon will work in collaboration with the association to finalize the PoP to be followed for each crop in the demonstration plots. Amazon will inform farmers (with who Amazon has direct procurement arrangements) and invite them to participate in the demonstration at such day and time as mutually agreed by the parties. Amazon will also work to identify adequate demonstration plots. Amazon will bear costs and expenses in setting up demonstration plots and for collection and verification of information related to impact of SOP. Amazon will pay to KVK Narayangaon the crop demonstration monitoring and farmers training charges of Rs 25000/- per crop demonstration.

Krushik App

The Krushik App is a mobile based application developed by KVK Baramati, Maharashtra and the features of the application are as follows:

- Provides crop wise fertilizer recommendations of all four agricultural universities of Maharashtra
- Incorporation of district wise crop nutrient recommendations of concerned agricultural university
- Provides recommended dose of fertilizers for various crops based on soil health card
- Calculation of cost of fertilizers required per acre as per current market price
- Options available for application of primary (N, P, K), secondary (Ca, Mg, S) & micronutrients (Fe, Mn, Zn, Cu, B, Mb) fertilizer alternatives as per recommendations for that crop.
- Options for combination of straight, complex & mixed fertilizers for nutrient application
- Calculation of water-soluble fertilizers to be given by Fertigation
- Calculation of fertilizer application according to village wise land fertility index.

The Man Who Left His Job As An Automobile Engineer To Grow Dals

Today, he earns in crores and has helped farmers around him prosper

It is generally considered that the IIT and IIM graduates are some of the highest paid employees in India. But not everybody finds his calling in the corporate sector. Some of us chart a different path. A man who had started his career as an automobile engineer went on to become of the country's richest farmer by leaving engineering to pursue his passion.

When it comes to high paying jobs in India, the youths think that they must be MBA graduates, doctors or engineers. It is true that IIT and IIM graduates make up majority of the highest paid workforce in the country. But a farmer named Pramod Gautam proved that we all can chart a different path. He left the corporate world to grow cops, and became one of India's richest farmers.

Mr Pramod Gautam from Maharashtra has one of the most unique success stories which is also inspiring for both rural and urban youth. His passion turned him from an engineer into a farmer practicing horticulture in Maharashtra. Mr Pramod Gautom proved that with passion and commitment, one can earn more from farming than even CEOs of big companies.

Shift To Farm Sector

Mr Gautam used to work at a big MNC as an automobile engineer and had a high salary, but his job did not provide him with fulfilment. Fortunately, Mr Gautam owned 26 acres of farmland in Nagpur. He decided to answer the call of his heart and leave his job in order to turn a farmer and entrepreneur.

Mr Gautam decided that he would not stick to traditional farming. He decided to take a new route and explore horticulture. Coming from an engineering background, horticulture was a comfortable choice for Mr Gautam. He decided to grow fruits and vegetables inside a greenhouse, applying science and technology.

Mr Gautam started with growing peanuts (moongfali) and turmeric (haldi) at his farm. It did not yield much profit. Thereafter, Mr Gautam decided to grow moong dal. Mr Gautam chose the variety of moong dal that was unpolished and free of adulteration. Also, it did not require heavy labour.

Vandana Foods

Soon, Mr Gautam was able to make good profit. He was also able to help the farmers in his area by enabling them to process dal at his dal processing unit. In this way, Mr Gautam gained prominence. He started his own dal brand called Vandana Foods, which sells different types of pulses and grains.

With this, Mr Gautam was able to find greater success. The pulses and grains sold by Vandana Foods are available for sale across the country through Amazon and Flipkart.

Mr Gautam was also hugely successful in earning a good profit and a turnover of more than Rs 1 crore. Mr Gautam proved that with the right approach and with dedication, one can pursue one's passion and also make good money.



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Chhattisgarh

The Mechanical Engineer Who Redefined Farming For Fellow Villagers, Charted The Path To Success



to the call of his heart and relocated to Medhpar village of Bilaspur district, Chhattisgarh. He decided that he would be a farmer.

The Move To The Village

In the beginning, Mr Kale found the going tough. Everything seemed to be a problem since he had no idea about farming. His educational background and training stood him in good stead. He decided that he would learn everything from farming the ground to planting the seeds.

During this time, Mr Kale used his 15-year-old provident money to launch a renewable energy model. This proved to be a wise decision. Mr Kale's land was valued all year and yielded the highest profit.

Mr Kale has proved through his successful career as a farmer that education and training in any field always yields rich dividends. In 2014, Mr Kale founded his own firm to assist farmers with the contract farming concept. Within a few years of his endeavour, Mr Kale's company was assisting more than 150 farmers.

The farmers were very happy to gain from his educational background and expertise. The farmers were collectively working on more than 200 acres of land. In this way, through the contract farming concept, the income of all the farmers in the group saw a steady increase.

Mr Kale was able to earn more Rs 2 crore approximately by helping the farmers to organise into contract farming.

Mr Sachin Kale was greatly inspired by his grandfather Mr Vasant Rao Kale. Even as a farmer, he always kept in mind the lessons given to him by his grandfather. Mr Kale has said in some media reports that his grandfather would encourage him to take up farming. At the same time, his grandfather also warned him that farming was a risky business. One of the biggest concerns for a farmer was the availability of labour for his farm.

Valuable Lessons From Grandfather

Mr Kale's grandfather gave him many valuable lessons. One of those lessons was that he would get labour easily if he enabled them to earn more than what they were already learning.

Mr Kale also learnt that one of the best ways to grow was to make others grow. In this way, he helped a large number of farmers around him to scale up their work and collectively become prosperous.

Mr Kale has spoken in media reports about how the interactions with his grandfather shaped his vision. Mr Kale said that his grandfather would often tell him that one could survive without earning money, but one could not survive without food.

This created an interest in Mr Kale in the art of growing food. Mr Kale said that his grandfather would take him to his 25-acre ancestral land. It was the dream of his grandfather to revive the family land into a farm someday. Mr Sachin Kale fulfilled the dream of his grandfather by developing a successful farm and by making fellow farmers succeed.

Mr Sachin Kale started out with the qualification of a mechanical engineer from REC, Nagpur (now called as VRCE) in 2000. He also did MBA (finance) after engineering and he is also a law graduate.

Professionally, Mr Kale began his career in a power plant. Initially, Mr Kale thought that the corporate life would be his world. But life had other plans for him.

In 2013, Mr Kale decided to quit his corporate career. At that time, he was working as a manager for Punj Lloyd. His salary was Rs 24 lakh per year approximately.

Mr Kale's initial interest in entrepreneurship started developing around 2007, when he started his PhD in developmental economics. Steadily, the spark of entrepreneurship ignited in his mind. Mr Kale found himself beset by thoughts that why was he working for someone else and not for himself. He was still climbing the ladder of success in his corporate life, but he felt that his heart lay in working on his farm.

During this time, Mr Kale was also toying with various options for entrepreneurship. He realized that the food industry is the most important, yet it is ignored by most of us. He decided that he would create his future in the food industry.

Though he was living in the millennial city of Gurgaon, Mr Kale felt that his calling was on his farms. In 2013, Mr Kale finally gave in

Rajasthan

Engineer Turned To Exotic Aloe Vera Farming, Is A Global Supplier Today

Mr Harish Dhandev is the Engineer-Turned-Aloe Vera Farmer, who has made an impressive fortune from agriculture.

In Rajasthan, it is common for farmers to stick to the old formula of growing Bajra (pearl millet) and wheat. When Mr Dhandev left his career in engineering and turned to farming, he opted to grow Barbie Denis Miller— an exotic breed of aloe vera.

This was a highly intelligent and considered choice. It brought rich dividends to Mr Dhandev. By opting for this unique choice in farming, Mr Dhandev proved that agriculture can be a smart choice if we are willing to do our homework, and study what the market needs.

Mr Dhandev realized the basic truth – that there is huge economic potential in the agriculture and farming industry. He realized that there was no need to stay in the rat-race for government employment and corporate jobs.

Rather than looking for the comfort zone of a steady monthly pay cheque, Mr Dhandev decided that it was more rewarding to create jobs and sustain livelihoods through smart agriculture.

Mr Dhandev was a professionally qualified engineer, engaged in a well-paying government job. But he realized that his heart lay in being on his farm. In order to pursue his dream, Mr Dhandev quit his government job. He decided to raise a special breed of aloe vera crops which eventually made him a millionaire.

Mr Dhandev proved that with the right attitude and the ability to work hard, one can tap the huge financial avenues in the farming and agriculture industry. Mr Dhandev followed the call of his heart and headed to his farm. Mr Dhandev has charted success as the founder of the Dhandev Global Group.

From Government Job to Farming

Mr Harish Dhandev was born in a middle-class family of farmers in Rajasthan. He completed his engineering and later cleared the exam. He got a government job as a junior engineer with the Jaisalmer Municipal Council in Rajasthan.

But Mr Dhandev was not satisfied with life and career in a well-paying government job, even though it gave him assured perks and retirement benefits. Mr Dhandev realized that his dream was to do something big that would turn his life around.

He was waiting for the idea which would help him realize his dreams. The big breakthrough came when he was visiting an agriculture expo in Delhi. Mr Dhandev decided to pursue agriculture as a profession.



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The high-quality aloe vera crop grown at Mr Dhandev’s farms was purchased by Baba Ramdev’s Patanjali group. With premium international quality aloe vera grown within the country. In the same way, many other buyers for the premium aloe vera led to hugely handsome profits for Dhandev Global Group

‘Barbie Denis’

Thereafter, Mr Dhandev left his government job and started farming. His family’s 120-acre agriculture land in Jaisalmer was his area of work. Mr Dhandev decided that he would not go in for the normal farm practice of Bajra (pearl millet) and wheat, which is popular among many farmers in his region.

Mr Dhandev opted to cultivate Barbie Denis Miller. This is an exotic breed of aloe vera with high demand abroad in Hong Kong, Brazil, and the United States and many other regions. This breed of aloe vera is one of the key raw ingredients used in premium beauty products and cosmetics.

Huge Growth In Business

Mr Dhandev’s business saw a fantastic growth. He started with the plantation of 80,000 Barbie Denis Miller saplings. Mr Dhandev went on to own seven lakh plants. He further expanded his agricultural empire and founded his first company ‘Naturelo Agro’, in Dhaisar on the outskirts of Jaisalmer.

The high-quality aloe vera crop grown at Mr Dhandev’s farms was purchased by Baba Ramdev’s Patanjali group. With premium international quality aloe vera grown within the country. In the same way, many other buyers for the premium aloe vera led to hugely handsome profits for Dhandev Global Group.

According to media reports, Mr Dhandev became the official supplier of aloe vera to the Patanjali group. The product was used for the group’s vast range of aloe vera-based-products like gels and soaps. This tie-up with the Patanjali group led to major profits for Dhandev Global Group.

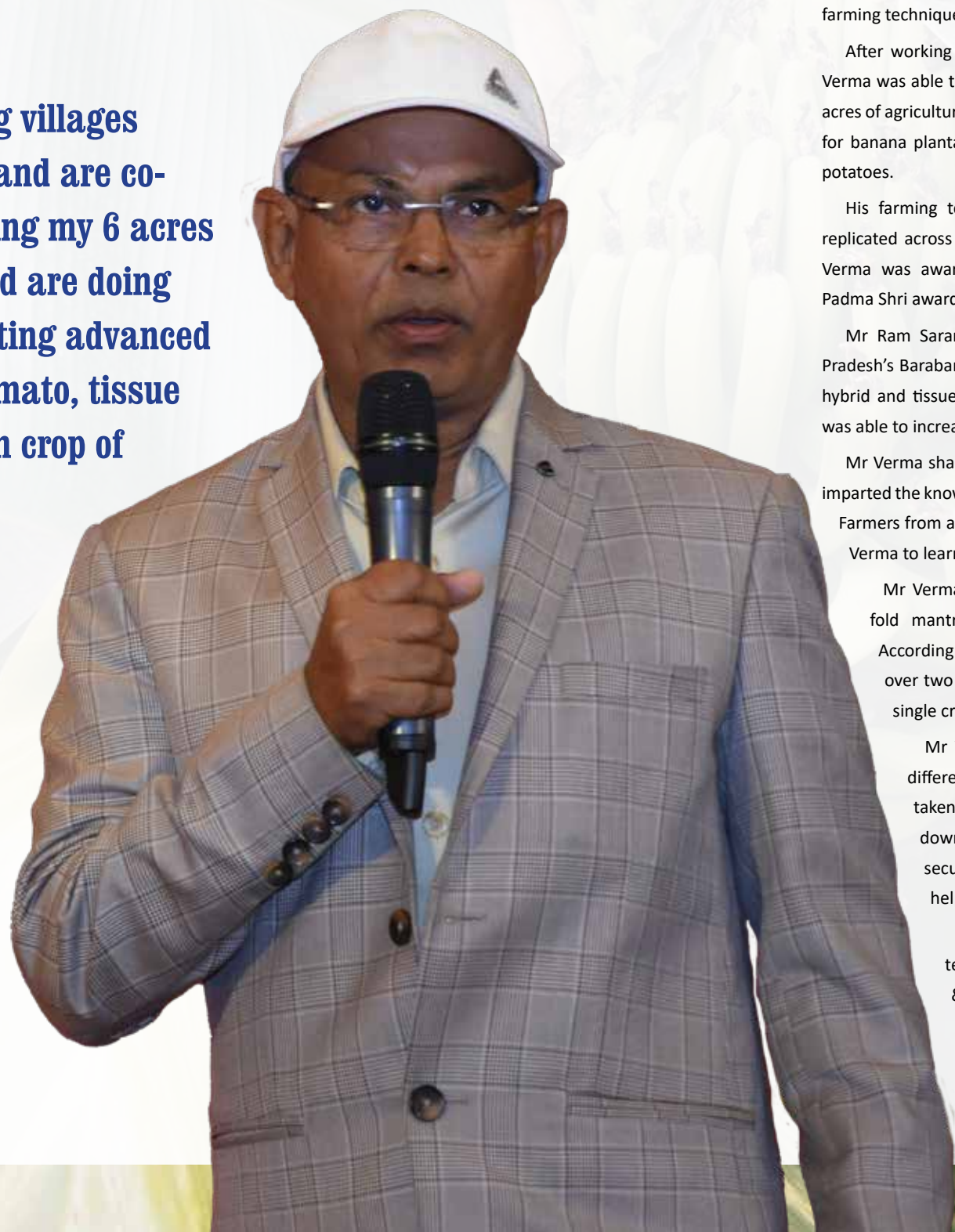
Uttar Pradesh

Padma Shri Mr Ram Saran Verma

HAS, Developed Award-Winning Agri Practices



Farmers of neighbouring villages along with 84 acres of land are co-related with me. Including my 6 acres we, with 90 acres of land are doing high-tech farming adopting advanced techniques on hybrid tomato, tissue culture banana, rotation crop of potato-mentha etc.



Padma Shri Mr Ram Saran Verma is one of the most successful farmers of India. Mr Verma is credited with developing highly advanced and profitable farming techniques.

His major achievement is that he is introduced these techniques to small farmers spread across many villages in his state, and also in other states.

Mr Verma has won many awards for his pathbreaking work. Mr Verma started farming in 1990 with only five acres of land. Through his constant efforts and thought the development of innovative farming techniques, Mr Verma achieved stupendous success.

After working on his successful methods for some years, Mr Verma was able to expand his agricultural practices on about 200 acres of agricultural land. Mr Verma started using 100 acres of land for banana plantation, and 100 acres for growing tomatoes and potatoes.

His farming techniques were so successful that they were replicated across his state, and also in other states. In 2019, Mr Verma was awarded India's fourth-highest civilian award, the Padma Shri award.

Mr Ram Saran Verma hails from Daulatpur village of Uttar Pradesh's Barabanki district. It is notable that he devised his own hybrid and tissue culture technique. Through this technique, he was able to increase crop yields by as much as 300 per cent.

Mr Verma shared his knowledge with farmers for free. He has imparted the knowledge of his techniques to thousands of farmers. Farmers from as far as Gujarat and West Bengal have visited Mr Verma to learn his techniques of farming.

Mr Verma developed his technique based on the three-fold mantra of technology, quality and crop rotation. According to media reports, Mr Verma rotated five crops over two years. This helped him avoid the slowdown in a single crop.

Mr Verma says that once a farmer is growing five different crops, the ups and downs are automatically taken care of. For example, if the price of banana went down, the price of potato was high and it helped him secure a good profit. Similarly, high price of tomato helped him make a profit.

Mr Verma offers training in his agricultural techniques at his office titled "Hi-Tech Agriculture & Consultation" at Village Daulatapur in Uttar Pradesh.

The following is the information provided by Mr Verma on his website vermaagri.com

Information On His Website

I, Ram Saran Verma son of Sri Chhedalal, am the inhabitant of the village Daulatpur, Block - Harakh, District - Barabanki.

My academic qualification - High School Failed, Paternal profession - Farming. Present profession - Hightech farming.

My residence is about 40 kms away from Lucknow, the capital of U.P., on the Lucknow-Faizabad national highway. I am a common farmer having interest in agriculture.

I am the owner of merely 6 acres of cultivated land gained from my father. On this land I started traditional farming of rice, wheat, potato, mentha etc. during the start of my career. But the start was not beneficial.

From here, the utmost desire to make the farming beneficial pinched me and I began to search new crop and technique beneficial to farming. In this sequence I came across with different papers, magazines, fairs/gosthies, trainings, exhibitions. I met with many farmers, saw their farms. I met and interacted and evaluated them. In 1995 I started with banana and tomato as a new crop and mentha and potato with advanced scientific technique.

Profits From Agriculture

From here, benefits emerged. Now about 15 years have elapsed. I always remained optimistic and pessimism could not touch me. By now farmers of neighbouring villages along with 84 acres of land are co-related with me. Including my 6 acres we, with 90 acres of land are doing high-tech farming adopting advanced techniques on hybrid tomato, tissue culture banana, rotation crop of potato-mentha etc. through green manuring, biofertilizers irrigation management, crop management, management of tillering, weed control, marketing & human resource development. Due to above, we have reached one crore cost benefit ratio per year.

Besides this we are in the contact of more than 50,000 visiting farmers, officers, officials, visitors, media persons, scientists, political dignitaries etc. By honouring them, by interacting with them for beneficial farming and side by side creating 50000 mandays and correlating with 100000 farmers, out of which about 20000 farmers are doing farming like us.

Hi-Tech Agriculture & Consultation

1 lakh farmers linked with network

6 Acre own Land

1 Crore turnover per year

50,000 employment per year in rural areas

On 84 Acre, practice of cooperative farming

20,000 farmers follow this model in UP and other states.

Love for agriculture turns a technician into a farmer

Unnikrishnan has set an example for organic farmers

From a mere 1.5-acre plot of land, a Thrissur-based organic farmer Mr Unnikrishnan Vadakkumchery has been reaping rich success by generating nearly 40 tonnes of fresh vegetables every year through his cutting-edge farming methods and innovative ideas.

But it was not an easy task for Mr Unnikrishnan Vadakkumchery, who until a few years ago was reluctant to get his hands dirty and till the land. He was more interested in his computer repairing business.

Though his father was a farmer, who started off when he was 11 years old and continued till his death at the age of 94, Mr Unnikrishnan Vadakkumchery was never really interested in farming.

It was only in 2012, that Mr Unnikrishnan Vadakkumchery evinced some interest when he saw some farmers growing vegetables in the paddy fields following the harvest season. So, he decided to give it a try.

He started by sowing vegetables in just 1-acre plot. His father was delighted and even offered to bear any loss that he might incur. But his first attempt ended in failure and disappointment. He tried the conventional chemical farming but was unable to get enough in terms of both revenue and produce. He was disheartened. But his father, who bore the loss, prodded him on and asked him to try again.

A year later, while Mr Unnikrishnan Vadakkumchery was about to give up farming entirely, he happened to see a TV programme on precision farming. He procured all the necessary equipment and tried his hand. But again, it was disappointment as he failed to secure a reasonable price for his vegetables. He was frustrated.

The Turnaround

It was during this low phase that he happened to meet Kannur Krishi Vigyan Kendra head Dr P Jayaraj, who spoke about how the nutritional deficiency of the soil leads to abnormally shaped vegetables and fruits.

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Mr Unnikrishnan Vadakkumchery believes that the key to success lies in soil management and scientific cultivation and his success story has made many farmers to adopt organic ways and he has inspired many to adopt the method in the most scientific way

It was Dr Jayaraj who advised Mr Unnikrishnan Vadakkumchery to adopt a trial farming method without using any bio-pesticides or heavy deposition of manure. And three weeks later, Mr Unnikrishnan Vadakkumchery had found the right recipe for his farming.

Kerala Agriculture University's Dr Narayanan Kutty was another person who helped him with his advice to practice shift cultivation all through the year. Now, Mr Unnikrishnan Vadakkumchery sows his vegetable seeds in half an acre and once they are ready for harvest, he prepares the seedbeds in the other half. Through this method, he is able to grow a wide range of seasonal vegetables throughout the year and is able to harvest it three times in a year. Besides, he also practices vertical farming, where he grows long beans and bitter gourd.

Key To Success

Mr Unnikrishnan Vadakkumchery believes that the key to success lies in soil management and scientific cultivation—always check the soil pH before sowing. He now adjusts the soil pH value

using lime, dolomite or potassium humate. He has also found an innovative way to ensure the best germination technique.

He uses a mixture of organic goat manure, chicken manure, neem cake and vermicompost to set the seedbeds and then cover then with polythene mulching sheets, perforated at specific intervals through which the saplings can come out. Drip irrigation ensures accurate supply and lesser wastage of water. All this has led to considerable reduction in input cost.

Every year, Mr Unnikrishnan Vadakkumchery sells around Rs 10-11 lakh worth of vegetables bringing in a profit of Rs 8 lakh from just 1.5 acre. Today, the supermarket chains approach him seeking his vegetable and he does not have to go in search of buyers.

In 2016, Mr Unnikrishnan Vadakkumchery was awarded by the Indian Council of Agricultural Research (ICAR) for this bumper harvest on a small plot.

He believes that his success story has made many farmers to adopt organic ways and he has inspired many to adopt the method in the most scientific way.



The Pioneer

The Man Who Has Led The Movement For Zero Straw Burning & Affordable Mechanization

Dr Vikram Aditya Ahuja hails from Fazilka, the border district of Punjab. Initially, he joined his traditional family business of tractor marketing and selling. Gradually, in order to expand, he started with the development of an equipment rental bank in Fazilka, by the name Zamindara Farm Solutions.

The enterprise allowed for easy equipment rental amongst farmers. It achieved the primary motive of making farm inputs more accessible and affordable. The even distribution model made the communities more resilient to price changes by lowering input costs. Secondly, shared resources decarbonized the agricultural system and made it more sustainable.

Impressive Growth, Outreach to Farmers

Dr Ahuja's team Zamindara is associated with thousands of farmers, biomass aggregators and most of the biomass users in Punjab and Haryana. The Trust run by his family, the JBNR Trust, has trained more than one lakh farmers in Punjab and Haryana on CRM, resource conservation & NRM techniques.

Zamindara Farm Solutions was a new and futuristic venture. This model got him associated with several state governments, organisations, and development agencies such as Nabard, USAID, CSAM -UN, DAI, IRRI etc.

Dr Ahuja's blended value business model got recognized by institutes such as IIM-Ahmedabad and XLRI Jamshedpur. He was often invited by the prestigious institutes to speak to management trainees about the blended value business model.

Crop Residue - Earn, Do Not Burn

In order to disseminate his knowledge to farmers, Dr Ahuja got into farmer training and campaigns with NABARD. In 2018, "Jalayan Nahin Kamayen" – the "Earn Do Not Burn" campaign pioneered by Dr Vikram Ahuja got selected as one of most successful campaigns in India on crop residue management. Considering his success and his vision, Dr Vikram Ahuja is considered to be a pioneer in the field of affordable mechanisation through the "Pay for use" model and crop residue management.

ABOUT THE AUTHOR

Dr. Vikram Aditya Ahuja is a fourth-generation farmer, Director of Zamindara Farm Solutions and Trustee of the family's JBNR Trust



In 2018, "Jalayan Nahin Kamayen" – the "Earn do not burn" campaign pioneered by Dr Vikram Ahuja got selected as one of most successful campaigns in India on crop residue management

Recently, his team under Zamindara has stepped into crop residue (Wheat, paddy, and mustard straw) collection as well. His team uses the large database of crop residue machine owners and farmers to collect large quantities of wheat and paddy straw to be used in various industries such as bio fuel, dairies, power plants, paper manufacturers etc.

Resource Aggregation Is The Way Forward

'Pay for Use' model can be promoted at Custom Hiring Centers (CHC). At many places, non-availability of residue management machines with custom hiring centers is a problem. Nevertheless, shared resources or aggregation is the way forward.

With small land holdings, balers, happy seeders and ploughs are not affordable for 99% of farmers. With the agriculture equipment library or CHCs, farmers do not have to bear fixed mechanization cost. For a fully owned machine, even the EMI is a fixed cost.

Dr Ahuja advocates that in order to make agriculture profitable for the farmers, the days of individual ownership of agricultural equipment are over. For Custom Hiring Centers, help should be extended in the shape of soft loans or back-ended subsidy instead of capital subsidy. Dr Ahuja highlights that the government is offering 80 per cent subsidy if a group of farmers buys the happy seeder, but the complete resolution of the problem lies elsewhere.

Dr Ahuja says that adoption and promotion of the PAU happy seeder is good for sowing without anchored stubble. In this case, the farmer can use normal cutter spreader followed by PAU Happy Seeder. Simultaneously, incorporation of crop residue is possible into the soil with Reversible MB plough.

Uses Of Straw Bales

Straw bales are used at biomass-based power plants and by paper mills and cardboard factories. The straw management machines of use here are slashers, rakes, swathers, and balers. A challenge herein is that farmers do not have enough rakes and balers, which function as straw management machines.

Dr Ahuja advocates that a good option for straw management is bio char. Farmers can exercise this option within their fields. The process needs very little space and investment. Application of 2 tonnes of bio char per acre either to wheat or rice reduces urea consumption by one-third, produces 10% more green yield and improves soil health significantly after three years. Application of bio char increases the retention of nutrients like phosphorous and nitrogen in the soils, aids in decreasing the leaching of nutrients of soil into the groundwater and helps in saving the nutrients from erosion due to the surface water flow. Bio char helps to reduce environmental pollution by 60-70%.

Logical Consent, Positive Action By All Stakeholders

The campaign for paddy stubble management needs logical consent and positive action by all stakeholders. With the support of new technologies, we need to reach out to farmers with common sense economics, believes Dr Ahuja.

Such bouquet of solutions, with both in situ and ex situ options, must come with government support and encouragement. The farmer knows his land, his economics and working conditions the best. Let each farmer decide what's best for him, as long as the accepted principle remains Zero Straw Burning, emphasises Dr Ahuja.



Food, Nutrition and Livelihood Security

Inclusive Technologies, Innovative Approaches

The ICAR-ATARI, Zone-XI located at Hebbal, Bengaluru, Karnataka has 48 KVKs under its operational jurisdiction of which 33 in Karnataka, 14 in Kerala and one in Lakshadweep these KVKs are under the administrative control of different host organizations viz., SAUs (33 KVKs), NGOs (8 KVKs) and ICAR Institutes (7 KVKs).

Mandate, Activities

Special Programmes

The following are special programmes/schemes carried out by ATARI through its network of KVKs in Zone XI:

- Cluster Frontline Demonstrations on pulses under NFSM
- Cluster Frontline Demonstrations on oilseeds under NFSM (NMOOP)
- Seed hubs on pulses
- National Innovations in Climate Resilient Agriculture (NICRA)
- Skill Development Programme (ASCI)
- Attracting and Retaining Youth in Agriculture (ARYA)
- Swachhta Abhiyan
- District Ago Meteorological Units (DAMU) under KVKs
- Farmers FIRST

Achievements

The ICAR-ATARI is playing a vital role in orienting the KVKs to function as knowledge and resource centres at district level for serving the farmers, farmwomen, rural youth, extension functionaries and other stakeholders through selected need based appropriate agricultural technologies. The ICAR-ATARI is guiding its KVKs in terms of technology and methodology backstopping for implementation of mandated activities through formulation of various technical programs. Further, the ICAR-ATARI is structuring the technical programmes of KVKs through SAUs level and state level annual action plan workshops in association with the Directorate of Extension Education of State Agricultural Universities before start of kharif season every year wherein technical programmes for each KVK are discussed and finalized. Accordingly, KVKs are implementing the action plan under the technical guidance of ICAR-ATARI, respective Director of Extension, and host organizations wherein many technological interventions are being carried out.

Some of the significant milestone activities carried out by the ICAR-ATARI through its KVKs are given below:

Spectrum Of Successful Interventions

Puthari FPO Promoted by KVK, Kodagu

The Puthari Farmer Producer Organization was established and registered as Puthari Farmers Producer Company Ltd. in 2017 with financial support from NABARD under the technical guidance of KVK Kodagu and consists at present 980 members. Besides providing office space in its campus, KVK has provided handholding support to Puthari FPO through regular capacity building programmes.

- The Puthari FPO dealing with 430 products including manures, fertilizers, plant protection chemicals, irrigation pumps, sprinkler and drip irrigations items, farm machinery etc., catering to the needs of coffee, pepper and paddy

farmers. Puthari FPO has also prepared a roadmap for the marketing of coffee and pepper grown by its members under its own brand "Jamma".

- As dolomite and lime are used in bulk for plantation crops, Puthari FPO initiated supply of certified lime and dolomite at farmers door step which saved about Rs. 1750/acre.
- The farm inputs supplied to farmers by Puthari FPO are at much cheaper rate than in the market, as Puthari FPO charges only minimal administrative costs and keeps minimum margin.
- This FPO is one of the largest farmer organizations in plantation crops as it effectively translates into more than 25000 acres.
- Together, the members of Puthari FPO produced about 7500 tonnes of Robusta Coffee Cherry in one year. The company has achieved a turnover of Rs. 2.20 crores annually.



A view of Puthari FPO products

Farm Sale of Watermelon Facilitated by Udupi KVK

- Shri Suresh Nayak, Hiriyadka village, Udupi district has cultivated 13 acres of watermelon in staggered system under the technical guidance of KVK, Udupi. Shri Nayak has adopted recent technologies in watermelon cultivation. Unfortunately, all the trading links with the middlemen and wholesale traders from Kerala and other neighbouring states were closed because of lockdown.
- KVK came to the rescue and shared the information with nearly 3850 members of wholesale traders and individual buyers about the farmer details and quantity of watermelon harvested by Shri Nayak through whatsapp groups to all KVK contacts.
- Shri Nayak sold nearly 36 tonnes in 3 days, at his farm at an average price of Rs 10/kg of fruit and sold more than 322 MT of watermelon, pumpkin, cucumber, pineapple, tapioca, onion etc. through on-farm sale with return of Rs. 22,80,500 during lockdown period.

Organic Grape Production

Vijayapura district is known for growing superior quality grapes for marketing not just in the state but also in the international market. Over 13400 ha of grape plantation exist across the district, where no other districts in the state have such large grape plantation and the district is popularly known for its unique taste and deliciousness.

KVK Vijayapura-I has taken up awareness programmes on health and environment problems due to heavy use of chemicals by grape farming community in the district.

- Shri Ningond Dundappa Toravi from Madabavi village in Vijayapura taluk two tier system method of grape cultivation under the technical guidance of KVK.
- He recorded yield levels to the tune of 40 to 50 per cent more than that of single fruit bearing method. This method of grape cultivation influenced neighboring farmers and villagers and already 30 farmers adopted and experienced positive result.

Success of Farm Women of Ballari, Facilitated By KVK, Ballari

Fig is an important horticulture crop grown in Ballari district in Karnataka.

Covid led to a break in the supply chain of raw figs and a sudden drop in demand.

KVK, Ballari responded quickly to this unprecedented situation on a war-footing. KVK refined a post-harvest technology for producing fig bars and fig rolls, developed originally by UAS Raichur, to suit the local needs. This was disseminated to farm women of Srinivas camp, Kurugodu taluk in Ballari district where figs are grown extensively. Hands-on trainings, online advisories, field visits and demonstrations organized by KVK Ballari for the farm women, led to impactful results. Self Help Group (SHG) leaders Mrs. Sudha and Mrs. Pooja learnt the process of making value added products. FSSAI licences were obtained, branding and labelling were done.

With the market intelligence gained, the group is now planning to produce 15-20 quintals of fig rolls each day by employing 60 skilled women.

KVK-Ballari helped to establish links between the entrepreneurs and local administration. This helped to install Solar Tunnel Dryers by the Dept. of Horticulture. Under the Prime Minister's Formalisation of Micro Enterprises (PM FME) 'One District-One Product' (ODOP) scheme, fig is identified as a potential crop for Ballari district. KVK-Ballari arranged a platform for interaction of the farm women entrepreneurs with the expert advisors of PM FME scheme.

Increasing Popularity Of Banana Flour, Facilitated by KVK, Uttara Kannada

Indian stakeholders are now taking food items prepared with banana flour. Realising the immense potential and opportunities available with banana flour, workshop on "Banana flour (BaKaHu) value addition and Competition" was organized by ICAR-Krishi Vigyan Kendra, Uttara Kannada, Sirsi in collaboration with Uttara Kannada Organic Federation, Sirsi, Dept. of Horticulture, Sirsi and State Dept. of Agriculture (ATMA) on 11.08.2021 at KVK Uttara Kannada (Sirsi), Karnataka as a part of the "Bharat Ka Amrut

Mahotsav" to commemorate 75 Years of India's Independence. Over 350 participants including Farmers, farm women, entrepreneurs, SHG's and other stakeholders participated in the banana workshop.

- The food, nutrition and energy value of banana flour is widely popularised by the women groups with highly commercial importance and prosperity among the farmers.
- The main attraction of the Workshop was Exhibition cum competition of BaKaHu value added products. Nearly 56 farm women and SHG members participated have prepared and exhibited more than 175 BaKaHu products in sweet, spicy and daily usable category.
- Products such as Bakahu Chocolate, Bakahu Jalebi, Bakahu Cake, Bakahu Sanjivini, Bakahu Kurkure, Bakahu Bhakarwada, Bakahu Khakhra, Bakahu Uppittu, Bakahu Burfi, Bakahu Kare, Bakahu Chakli, Bakahu Idli, Bakahu Mudde etc. were rated as excellent products.



Onattukara Spices Farmer Producer Company Promoted by KVK-Alappuzha

Alappuzha district in Kerala, once known for its quality turmeric production, went down during the past decades facing a lot of constraints. ICAR- KVK, Alappuzha, through a series of interventions including OFTs and FLDs revived the sector, finally leading to the formation and promotion of FPO, 'Onattukara Spices Farmer Producer Company' (OSFPC). The company focussed on quality seed availability, scientific cultivation, procurement, processing and marketing activities of the major spice crops of the region viz., turmeric, ginger, pepper, and garcena in close technical guidance of KVK.

The FPO procures 20-25 tons of turmeric annually from 264 shareholders of Bharanikkavu and Mavelikkara blocks and selling with better price than the prevailing market price.



A view of the event with the participants, live preparation of BaKaHu products and display at the exhibition.

Mr Jojo Jacob's Horticultural Nursery Helped By KVK Kozhikode

Mr. Jojo Jacob, aged 50 and ex-trainee of KVK, Kozhikode is a resident of Changaroth Panchayat of Kozhikode District in Kerala has established plant nursery unit in his farm.

The focal point of the nursery is much prized bush pepper plants from six months of age to 15 years. Probably their nursery must be the largest bush pepper nursery in the world selling over 18,000 plants annually.

Annual income from a mere 36 cents of land from nursery unit is nearly Rs.25 lakh. Mr. Jojo has received several panchayat and district level awards for his achievements.

To promote farming in a greater perspective, Smt. Bindu started a YouTube channel during the year 2019 named as "Techflora" with over 80,000 subscribers.

Regular videos on farming for the benefit of farmers as well as young entrepreneurs are uploaded in the channel. She also conducts hands on training to school and college students in both on and off campus modes.

Drones to Redefine Farmer Drudgery Mitigation, Facilitated by ICAR-KVK, Thiruvananthapuram

ICAR- Krishi Vigyan Kendra, Mitraniketan, Thiruvananthapuram, facilitated farmers through Front Line Demonstration of drone based spraying of micro-nutrients on paddy was taken up in coordination with the State Department of Agriculture and Farmers' Welfare.

KAU Sampoorana, the micro-nutrient mixture for paddy developed by Kerala Agricultural University was sprayed in the field using drone. Application of this micro-nutrient directly on the leaves reduced the diseases and increased the yield by 13.71 per cent.

Innovative Approach To Manage Wild Animal Menace In Hill Agriculture At Idukki By KVK, Idukki

The forests in Idukki district are highly fragmented due to settlements and agriculture. Crop damage by wild animals like Elephant (*Elephas maximus*), Wild Boar (*Sus scrofa*), Indian Porcupine (*Hystrix indica*), Gaur (*Bos gaurus*), Sambar (*Cervus unicolor*), Bonnet Macaque (*Macaca radiata*), Mouse Deer (*Tragulus merninna*), Blacknaped Hare (*Lepus nigricoflis*), Malabar Giant Squirrel (*Ratufa indica*) and Pea Fowl (*Pavo cristatus*) in agricultural fields and adjoining the forest areas is a serious problem.

Idukki district has 1.45 lakh ha of small cardamom plantation damaged by elephant and monkey with losses accounting to an average of 27 percent. To solve the problem, ICAR-KVK, Idukki has initiated innovative technology of KR-LED lighting system for deterring crop raiding by wild elephants in small cardamom plantation. Multi-location trials conducted by KVK recorded 15 % increase in yield of small cardamom.



About 700 farmers have adopted the technology and also horizontally expanded through Kerala Forest Development Corporation and ATMA in Idukki district. Based on the demand, KVK has planned to supply technological products at village level covering more area during 2021-2022.

KVK-Lakshadweep Leads in Using Barn Owls to Control Rat Menace

The island accommodates coconut in an area of 2,674 ha with a production of 87 crore nuts. The estimated loss due to rat menace accounts 40% in the island.

To address the issue, the age old method of using Barn Owls to control rat menace was intervened by KVK. Since, 2014 KVK-Lakshadweep took attempts to introduce barn owl as a counter for reducing the rat menace with the technical and financial support of UT administration and Kerala Agricultural University.

Rat population has declined due to the introduction of Barn Owls.

Lakshadweep Islands Declared Organic- A Game Changing Effort by KVK Lakshadweep

After Sikkim, Lakshadweep is the second territory in the country to get the whole territory declared as organic and getting the Large Area organic certification.

Ladakh also now in the process of going organic after Lakshadweep. KVK Lakshadweep with the guidance of ICAR-ATARI, Bengaluru, actively involved with administration of Lakshadweep Union Territory in the process of getting Scope Certificate (large area organic farming) from PGS – India, Ministry of Agriculture, Cooperation and Farmer Welfare, Govt. of India for different crops in Kadmat, Andrott, Agatti, Kalpeni, Minicoy, Kavaratii, Kiltan, Amini, Chetlat islands of Lakshadweep Union Territory for the crops grown in the farmers’ fields.

The standards given to the farmers by PGS India are in tune with National Standards for Organic Production (NSOP) prescribed under National Programme for Organic Production (NPOP) maintaining uniformity in organic production process and quality of organic products.

The certification will give the Lakshadweep farmers to get the

global recognition for their produce and get more remuneration/ premium prices.

Coconut Sap and its Value Added Products (KVK, Udupi, Karnataka)

KVK conducted capacity development programmes on the following value added products from coconut sap:

- Kalparasa
- Kalparasa sugar
- Kalparasa jiggery
- Kalparasa honey

Salient points

- KVK trained 21 Kalparasa tapping technicians.
- Farmers are earning Rs. 80,000- to 1,00,000 annually by tapping 8 trees.
- KVK promoted FPO is tapping 8 trees/farmer and get @12 ltr/day and around 4000 ltrs/year earning an amount of Rs.2,40,000/- from 8 trees
- Handholding Kalparasa tapping FPO and Kalparasa tapping technicians in value addition and marketing linkages by KVK.

Spices Value Added Products (KVK, Idukki)

KVK prepared the following spices value added products:

- Green Cardamom
- Cardamom Seeds
- Cardamom Drops
- Cinnamon Drops
- Clove Drops
- Black Pepper
- Lemon Grass Oil
- Eucalyptus Oil

Doubling of Farmers Income (DFI) - KVKs of Karnataka and Kerala

National Agenda: The Government of India in its annual budget of 2016-17 set a policy target of Doubling Farmer's Income by 2022.



Sushri Shobha Karandlaje, Hon'ble Minister of State for Agriculture & Farmers Welfare, Government of India released "KVK KISAN KART" during KVKs Zonal Workshop 2022 held at UAS, Dharwad

ICAR Role: The ICAR has ably shouldered the responsibility of achieving the national agenda on DFI through its frontline extension network of KVKs.

KVKs of Karnataka: As a part of ICAR target on DFI, KVKs of Karnataka have implemented multipronged and location specific strategies in their respective district to facilitate doubling farmers income since 2016-17. Significant achievements are summarized below.

KVK KISAN KART - Bringing Fresh Harvests to Your Doorstep

The ICAR-ATARI has developed by involving KVK, Pathanamthitta the "Web based platform for marketing products of KVK and farmers".

Objectives

- To establish an e-platform for KVKs to sell their technological and other agro products online.
- To ensure easy access to technological products of KVKs to farmers and other stakeholders.
- To enable farmers and entrepreneurs to sell their products through KVK of respective district there by enable the farmers/entrepreneurs to get reasonable price and easy market for their products.
- To enable continuous availability of regional products across the country.

KVKs need to complement the efforts of the GOI in designing the above post-Green Revolution future for the country.

Scientists/Officers at ICAR-ATARI, Bengaluru

- Dr. V. Venkatasubramanian, Director, ICAR-ATARI, Bengaluru
- Dr. M. J. Chandre Gowda, Principal Scientist (Agricultural Extension)
- Dr. D. V. S. Reddy, Principal Scientist (Agronomy)
- Dr. B.T.Rayudu, Principal Scientist (Agricultural Extension)
- Dr. Thimmappa K, Principal Scientist (Agricultural Economics)
- Dr. D. V. Kolekar, Scientist (Agricultural Extension)
- Dr. Mallikarjun B. Hanji, Chief Technical Officer (Computer)
- Shri J. Mathew, Administrative Officer (Additional Charge)

Acknowledgement

The best efforts of all 48 KVKs in Zone XI comprising of Karnataka, Kerala and Lakshadweep for implementing various interventions towards farmers’ prosperity through sustainable agricultural development.

HERBAL GLORY

Dr Rajaram Tripathi Of Bastar, Chhattisgarh

Dr Rajaram Tripathi was born and brought up in Kaknar, a very backward tribal-dominated village of Bastar. He spent his childhood in the dense forests of Bastar, grazing cattle and doing ancestral farming with his tribal friends.

Dr Tripathi has won accolades as one of the best farmers of the country.

Without any government help, Dr Tripathi worked tirelessly for almost thirty years in Bastar, Kondagaon, for the conservation and promotion of dozens of endangered species of rare herbal medicines. He grew a dense forest full of biodiversity over about 10 acres and created a natural environment for herbal medicines. Today, his farm boasts of about 5100 rare herbal medicinal plants, where more than 340 species are flourishing.



Dr Tripathi's aim is to successfully plant one crore trees. Under his guidance, the one-acre poly house to be built by Maa Danteshwari Farm and Research Centre million is more natural, cheaper, and more sustainable

Cooperative Farming

Under the guidance of Dr Tripathi, all the farmers of the area decided to get organized in cooperative farming to confront the syndicate of a handful of big businessmen who have monopoly on the trade of herbs. Led by Dr Tripathi, the organic and herbal farmers formed a strong common platform titled Central Herbal Ayurvedic Marketing Federation of India (www.chamf.org) to jointly market their products.

Dr Tripathi says that Banaras Hindu University Professor Virendra Kumar Dubey, Professor VK Joshi, Dr. Gurpal Singh Jarial of Bhopal and Dr. Sahdev Singh, Vishal Bharat etc. many teachers and colleagues helped significantly in giving shape to this concept. "Through this nationwide common platform, we all can sell our

products at a minimum support price ourselves. This is how we started doing joint trading of our agricultural products. In this way we solved the problem of marketing to some extent for the first time. This was an important achievement for us, because I believe that the farmer loses less in the fields but loses 100% in the market."

Challenges In Exports

Dr Tripathi further adds, "In 2003, we took the export license and started to export directly. We faced many challenges but we did not give up. We realized that instead of exporting directly, it is better to export goods through good reliable exporters. By 2005, our association of farmers across diverse states became the largest organization of organic farmers in the country, CHAMP 16. In September 2005, the Ministry of Agriculture of India gave us the status of National Organic Producer Farmers Organization of the country."

Dr Tripathi says that India has many valuable agricultural products to offer to the world market. Hundreds of our medicinal herbal products, medicinal plants, aromatic products, essential oils, all spices including black pepper, ginger, turmeric, coarse grains, food colours, jaggery, honey, many types of superfoods are such agricultural products which are the best in the world. It is a huge and fast-growing market. Corona has proved that these natural things are necessary for good health and immunity and will always have a huge demand.

ACHIEVEMENTS

- Under the leadership of Dr. Tripathi, 'Maa Danteshwari Herbal' achieved the distinction of getting the country's first "International Certificate of Certified Organic Spices and Herbs Farming" 22 years ago.

- Dr Tripathi received the "Best Exporter's Award" by National Horticulture Board of GOI for quality control in the export of spices and herbal products to countries like Europe, America etc. for over two decades.

- Dr. Tripathi has travelled to about 34 countries for comparative study of agriculture and marketing systems.

- Dr. Tripathi has also tied up with CSIR-IHBT to develop a zero-calorie stevia species without bitterness and high sweetness, to make zero-calorie stevia sugar 250 times sweeter than sugar from its leaves.

- Dr. Tripathi has developed a new variety of black pepper "Maa Danteshwari Kali Mirch 16", a new variety of Peepli, which gives more production and better quality than traditional species.

These products have been appreciated by the scientists of Spice Board and the agricultural experts of the country.

- Dr. Tripathi is the first farmer of the country who has received the Best Farmer Of The Country Award three times in two decades by different Agriculture Ministers of the Government of India. Dr. Rajaram has received many international national awards including RBS Earth Hero, Green Warrior i.e. Harit Yoddha Award.

- Dr Tripathi's aim is to successfully plant one crore trees. Under his guidance, the one-acre poly house to be built by Maa Danteshwari Farm and Research Centre million is more natural, cheaper, and more sustainable.

- Natural Green House Kondagaon model gives more benefits than an ordinary polyhouse. It costs Rs 1.5 lakh, whereas alternative polyhouse costs Rs 40 lakhs. This model, which has increased the income of farmers manifold, has created panic in the whole country. This is being called as a game changer. For this, he has received the country's best farmer award 2023 from the hands of the agriculture minister of GOI.

Along with the Maa Danteshwari Herbal Group established by Dr Tripathi, now the second generation is being led by his daughter Apoorva Tripathi, who turned down a package of 25 lakhs to work with her father. As the Managing Director of pure certified organic herbs, spices, and a series of excellent food products are grown here in collaboration with tribal women groups of Bastar. Their Bastaria brand products are now 'trending' on Flipkart and Amazon.

Recognition On Diverse Platforms

Dr Tripathi's herbal farm located in Bastar, which he calls the farmer's laboratory, has been visited by Hon'ble President APJ Abdul Kalam Azad, Governor Mr. Dinesh Nandan Sahai, Chief Minister Mr. Ajit Jogi and many other eminent persons.

Many delegates of America, Netherlands, England, South Africa, Ethiopia and other countries have also visited his farm. Maa Danteshwari Herbal Farm and Research Centre Farm is visited by thousands of progressive farmers, school children and medicinal plant researchers, scientists and innovative youths from all parts of the country.

Dr. Tripathi is a member of "National Medicinal Plant Board", Ministry of AYUSH, GOI. He is also the member secretary of the National Horticulture Board, an apex organization constituted by the Government of India, Organization of Aromatic Plant Producers.

Dr. Tripathi is the chairman of the Central Herbal Agro Marketing Federation of India (CHAMPH), which is the country's largest organization of organic farmers.

He is the national convenor of the political platform, All India Farmers Federation (IIFA) as the strong voice of the farmers across the country - for the preservation of tribal dialect, language, and their culture.



Women's Land Ownership and Tenure Security in India



Women play a vital role in Indian agriculture, accounting for nearly 50% of the agricultural workforce. However, they own only 13.9% of agricultural land. This low level of land ownership is a major barrier to women's economic empowerment and food security in India.

Challenges Faced

There are several challenges to women's land ownership and tenure security in India, including:

- **Patriarchal norms and practices:** Traditional inheritance laws and customs often favor male heirs over female heirs, which can make it difficult for women to inherit land from their parents.
- **Lack of awareness of legal rights:** Many women are not aware of their legal rights to land, which makes it difficult for them to claim their land rights.
- **Discrimination in land markets:** Women often face discrimination when trying to purchase or lease land. This can be due to several factors, such as lack of access to credit and financial resources, and social and cultural norms that discourage women from owning land.
- **Weak enforcement of land-laws:** The enforcement of land laws is often weak, which can make it difficult for women to defend their land rights, especially against powerful male landowners.

ABOUT THE AUTHORS

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Impact Of Low Land Ownership On Women Farmers

Low land ownership has several negative impacts on women farmers, including:

- **Reduced income and productivity:** Women farmers with little or no land are often forced to work as landless laborers, which means that they have less control over their work and income. They may also have difficulty accessing agricultural inputs and services, which can reduce their productivity.
- **Increased vulnerability to poverty and food insecurity:** Women farmers with little or no land are more likely to be poor and food insecure. This is because they have fewer resources to fall back on in times of difficulty, such as crop failure or illness.
- **Reduced social status and empowerment:** Land ownership is often seen as a symbol of social status and empowerment in India. Women with little or no land may have less social status and power in their communities.

Government Initiatives

GOI has taken many initiatives to improve women's landownership and tenure security in recent years, including:

- **Passing laws and regulations that promote women's land rights:** The government has passed several laws and

regulations that promote women's land rights, such as the Hindu Succession (Amendment) Act, 2005, which gives women equal inheritance rights to property as men.

- **Implementing land reform programs:** The government has implemented several land reform programs that aim to redistribute land to landless and marginal farmers, including women.
- **Raising awareness of women's land rights:** The government has launched several awareness-raising campaigns to educate women about their land rights.
- **Strengthening land tenure security:** The government has taken steps to strengthen land tenure security, such as digitizing land records and issuing land titles.

Statistical data on women's land ownership and tenure security in India:

- According to the Agriculture Census 2015-16, only 13.9% of agricultural land in India is owned by women.
- Of the 20.25 million women land-owners in India, only 6.5% own land individually.
- The remaining 93.5% of women land-owners own land jointly with their spouses or other male family members.
- The rate of women's land ownership is particularly low among marginalized groups, such as Scheduled Castes and Scheduled Tribes. For example, only 3.4% of agricultural land in India is owned by Scheduled Caste women and only 5.4% is owned by Scheduled Tribe women.

Critical Issue

Women's land ownership and tenure security is a critical issue for the development of Indian agriculture. Improving women's access to land and other resources will help to empower women farmers, increase agricultural productivity, and reduce poverty and food insecurity in India.

Recommendations

- The government should continue to implement and enforce laws and regulations that promote women's land rights.
- The government should implement land reform programs that specifically target women and other marginalized groups.
- The government should continue to raise awareness of women's land rights.
- The government should take steps to strengthen land tenure security for all landowners, including women.
- Development organizations and civil society groups should work to promote women's land rights and to support women farmers.

Path-Breaking Initiatives Of Andhra Pradesh For Farmer Prosperity



Agriculture in Andhra Pradesh is reaching heights with our smiling, innovative and dynamic leader, Hon'ble Chief Minister Shri YS Jagan Mohan Reddy Garu, who has truly translated farmer dreams into reality

Agriculture in Andhra Pradesh is reaching heights with the smiling, innovative and dynamic leader, Hon'ble Chief Minister Shri YS Jagan Mohan Reddy Garu, who has truly translated farmer dreams into reality.

The Vision Of Hon'ble Chief Minister of Andhra Pradesh Shri YS Jagan Mohan Reddy Garu

Agriculture is one of the major sectors in Andhra Pradesh with 60% of the population engaged in the activities of Agriculture and allied sectors. The total geographical area of the state is 162.97 lakh hectares, of which 60.48 lakh hectares is the net sown area. The gross irrigated area is 37.3 lakh hectares. Agriculture and allied sectors contribute 10.78% of state Gross Value Additions (GVA).

Budget allocations to Agriculture & allied sectors increased substantially from 2019-2020 to 2023-2024 with a vision to support the farming community as this sector contributes a major portion of GSDP (34%) which is 16% at the national level.

Our Hon'ble Chief Minister Shri YS Jagan Mohan Reddy Garu had a vision to rescue the hurdles faced by the farmers in the past and transform their lives duly by digitizing Agriculture and ensuring the availability of pre-tested certified quality inputs at farmers doorsteps and dissemination of the latest technology from research institutes to the village level.

Rythu Bharosa Kendralu

Rythu Bharosa Kendralu is a game changer in Agriculture & Allied sectors acting as single point of contact (SPOC) in delivery of farm services at farmers' doorstep. Agricultural development has been the top priority, the Rythu Bharosa Concept was initiated by the Hon'ble CM Sir. RBKS, a shining example of how technological knowledge and expertise can be harnessed to improve the lives of farmers.

Rythu Bharosa Kendralu was the brainchild of Hon'ble Chief Minister's vision. These are the first of its kind in the entire nation, rendering valuable services from seed to sale of Agri and allied sectors in a transparent manner at village level. There are 10778 Rythu Bharosa Kendras at the village secretariat level supplying pre-tested certified quality inputs (both subsidy & non-subsidy), so that farmers need not go to distant places like Mandal or district headquarters for purchase of inputs.



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ATMA Activities under State Government

Sri C. Hari Kiran, IAS,
Special Commissioner of Agriculture &
State Nodal Officer (SNO) ATMA

'Soil Testing Through Selected Schools' Facilitated by ATMA & Dept of Agriculture

The ATMA (Agricultural Technology Management Agency) executed the GOI pilot project on Soil testing through selected Schools at Kendriya Vidyalaya, Tenali, Guntur District, Andhra Pradesh.

19 students and three teachers of KV Tenali and officers of various cadres of ATMA and Department of Agriculture, Andhra Pradesh were involved in this pilot project to implement various activities like collection of soil samples, soil analysis and distribution of Soil Health Cards.

Apart from the supply of inputs, RBKs are rendering services from seed to sale of agricultural produce, farm machinery CHCs, Soil, and seed testing for all beneficiaries lists of different farmer welfare programs like Dr. YSR Free Crop Insurance, Dr. YSR Sunna Vaddipantarunaalu (interest subsidy), input subsidy due to natural calamities and procurement of agricultural produce are displayed at RBK level for social audit to identify the eligible farmers in a transparent way.

Digital Kiosk - Heart of RBK

The RBK hosts the Kiosk which acts as the interface between the farmers and the outside world. The farmer logs into the system with his phone number, after which he is taken through the different inputs available with the RBK. He can select his product and check out after payment through digital means or direct payment.

The digital Kiosk through which the agri inputs are indented by the farmers undertakes payments/transactions through UPI mode with biometric authentication. The Govt of A.P. undertaking agencies viz., APMARKFED (Andhra Pradesh State Cooperative Marketing Federation Ltd) for the supply of Fertilizers, Micronutrients, etc., and AP Seeds (Andhra Pradesh State Seeds Development Corporation Ltd) for the supply of seeds through RBKs. Retail fertilizer licenses were already issued to all the RBKs to get fertilizer stocks on FOL. RBK 2.0 Android mobile 3.1 App. DBT through an ePos machine with Aadhar Biometric Authentication has also been made.

As a result of RBKs, stabilization of market-operated prices of farm inputs has been observed. Pre-tested quality assured choice input supply at fair prices at farmer doorsteps have been made. Hoarding, price escalation, and panic situations in Fertilizer supplies/distribution are unheard in our state. Farmers are saving costs towards logistics/transport resulting in decreased overhead charges in the cost of cultivation.

The small and marginal farmers, who constitute a major farming force in rural areas, make use of RBKs for any kind of services at the village level without venturing to mandal headquarters. Availability of various services viz., quality inputs at farmers' doorsteps, the services of 160 integrated Agri labs for quality check, price stability in the open market, etc., have enhanced their confidence levels and brought happiness to their lives.

Dr. YSR Crop Insurance

Andhra Pradesh state is the only state in the country that is implementing free crop insurance without even a single rupee burden on the farmers. Each acre of land cultivated with a notified crop and registered with the e-crop app is brought under the ambit of Dr. YSR Free Crop Insurance scheme. NITI Aayog has recognized Dr. YSR Free Crop insurance implementation as a role model for other states to follow.



GOI has appreciated the initiatives taken by the Andhra Pradesh Govt for the welfare of farmers to achieve universal coverage under Crop insurance with a unique model. GOI acclaimed AP as a pioneer for other states to maximize the coverage under crop insurance. Maharashtra, Odisha, Puducherry, and Meghalaya announced crop insurance with Re 1 premium to be paid by farmers during 2023-24 which AP did in 2019.

YSR Rythu Bharosa PM Kisan

This scheme has been operational since 15th October 2019. The scheme has been extending financial assistance of Rs. 13,500/- (Rs. 7500/- from the AP Govt funds and Rs. 6000/- from GOI through PM Kisan) to all the eligible land-owner farmer families. The timely availability of funds to the small & marginal farmers through RBKs has empowered them to take up crop management efficiently and this has led to increased productivity and profits. Since the inception of the scheme, an amount of Rs. 30.98 Crores was credited directly to 52.38 lakh farmer families.

YSR Rythu Bharosa to Tenants: CCRC Cards

The benefit of Rs. 13,500/- is also being extended to the eligible landless (tenants) SC, ST, BC, Minority cultivators including ROFR & Endowment land cultivators exclusively from the state government funds. Andhra Pradesh Crop Cultivators Right Act 2019 enacted from 17-08-2019 to provide all facilities including banking, insurance, and other government benefits to tenant farmers without affecting the rights of the owner of the land.

According to the Act, Crop Cultivator Right Cards (CCRC) will be issued with the mutual agreement of land owner and cultivar for a period of 11 months, which entitles the tenant farmers to avail bank finance. Tenants have all the rights on crop for a period of 11 months and are eligible for all the Govt schemes related to crop. Despite issuing CCRCs still there are tenant farmers left without coverage under CCRCs cultivating their crops. The Government has taken an initiative to bring those landless tenant farmers into farming by forming Joint Liability Groups to access institutional credit. An amount of Rs.158.81 Crores was released as 1st installment to Tenants during 2023-24.

e-Crop

The registration of crop particulars under e-Crop booking is a big initiative of the Andhra Pradesh Government. It is a digital android application to register all the actual cultivators being adopted in AP., which is a crucial step in this regard. It is the single source of truth for extending all the welfare program benefits like Dr. YSR Free Crop Insurance, Dr. YSR SVPR (Interest-free crop loans) disbursement of Input subsidy to the farmers in the event of natural calamities, and procurement of harvested produce from the farmers.

The e-crop data is also integrated with the procurement portals of the Civil supplies dept. to enable them to procure paddy at MSP in the RBKs, CCI for cotton & AP Markfed for other crops like

Ground nut, Pulses, Jowar, Bajra, turmeric, etc., from the actual cultivators. Biometric authentication through e-KYC is being taken from the cultivator in the RBK to ensure accountability in the DBT system.

ICC : Integrated Call Centre

Toll free no 155251

ICCs have been established at the state level to address the farmers' field problems and provide instant remedies over the telephone. RBK channel at state level telecast need based and latest technical content through smart TVs at RBKs and live interaction with officers and scientists.

District Resource centers (DRCs) at district level impart training aid in capacity building of farmers and organize diagnostic field visits with scientists. Alerts on outbreaks of pests/diseases from integrated call centers have many times saved crops from pests.

Farmer Field Schools

The Dept. of Agri organizes Farmer field schools Dr. YSR Polambadi enable the farmers to produce quality output duly following GAPS including the organic practices for obtaining lucrative prices to the output in the market.

Promotion of Millets

This year 2023 has been declared as "International Year of Millets" for increasing the area and productivity under millets. The following strategies/interventions are being adopted by the state of Andhra Pradesh.

- Focus on the cultivation of nutria cereals in rainfed areas, fallow, and wastelands of low productivity and high potential districts.
- For area expansion, the state is promoting improved technologies like seed, Integrated Nutrient management, Integrated pest management, and input use efficiency, along with the capacity building of the farmers.
- All types of critical inputs like seeds, seed treatment chemicals, farm equipment, biopesticides, PP chemicals, etc., are supplied through RBKs on 50% subsidy to the farmers.
- Processing and value addition at the farm level to enhance local consumption.
- Creating awareness by road shows, district, and state level festivals, and publicity about the nutritional and health benefits over other traditional food grains and popularization of millet products among consumers.
- Creating marketing infrastructure with an innovative supply chain model for increasing the farmer's income.

ICAR-ATARI, HYDERABAD

Significant Role of KVKs During the Pandemic

Emergencies, such as wars, pandemics, and natural disasters, often bring about unforeseen challenges that profoundly disrupt human life. India, once plagued by drought and food scarcity after its independence in 1947, has undergone a remarkable transformation. The nation's commitment to agricultural research and rural development has led to innovative farming practices, improved irrigation systems, and advanced crop varieties. This progress, combined with the government's focus on food security, enabled India to not only become self-sufficient but also to emerge as a global exporter of food and agricultural products.

In India, the pandemic served as a stark reminder of how such crises can have far-reaching consequences. During the pandemic, as supply chains were disrupted globally, India's agricultural resilience played a vital role in maintaining food security not only for its citizens but also for many countries heavily reliant on Indian

food exports. India's successful response in meeting the demand for food commodities helped mitigate the adverse effects of the pandemic on global food supplies.

The Pandemic and its Impact on India

The pandemic swept across nations, causing severe health and socio-economic crises. India, as the second-most populous country in the world, with its densely populated cities and limited healthcare infrastructure, faced a significant challenge in combating the virus's spread.

The pandemic disrupted various sectors, including agriculture, leaving farmers in a precarious situation. The farmers couldn't access the farm inputs for crop cultivation and were unable to transport their harvested produce to the consumer in time which leads to wastage of harvested produces.



India's transformation from a nation grappling with drought to becoming an exporter of food and agricultural products demonstrates remarkable progress, reinforcing its position as a global agricultural powerhouse



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Lockdown had affected the farmer's ability to sow for the upcoming season due to labor not being available and not being able to access or afford inputs such as seeds, fertilizer, and pesticides. To amidst these challenges, the Indian Council of Agricultural Research (ICAR), along with its extensive network of Krishi Vigyan Kendras (KVKs), emerged as a significant force in extending crucial services to farmers and the entire nation.

ICAR and KVKs: A Helping Hand

In the face of the pandemic, ICAR, in close collaboration with KVKs, stepped up to provide much-needed support to farmers and rural communities. The KVKs, spread throughout the country, serve as agricultural knowledge centers, delivering innovative technologies and best practices to farmers. These centers acted as a critical link between government agencies and farmers during COVID-19.

Firstly, KVKs focused on disseminating timely information to farmers, providing guidance on adopting safety protocols, maintaining social distancing, and incorporating health measures while working on their fields. By conducting awareness campaigns and virtual training, KVKs educated farmers about the importance of health and safety during the pandemic, ensuring minimal disruption to the agricultural sector.

Secondly, ICAR and KVKs collaborated to address various challenges faced by farmers during lockdowns and travel restrictions. They facilitated the supply chain by organizing transportation and logistics for farm inputs, ensuring uninterrupted access to agricultural essentials. Moreover, KVKs aided in marketing farmers' produce, fostering direct linkages between producers and consumers.

Best Practices of Zone X KVKs

- Provided farm advisory services through Kisan Mobile Advisory Services and WhatsApp groups promoted by KVKs
- KVKs widely used Aarogya Setu app for the benefit of farmers and provided extension services on importance of social distancing, wearing mask and preventive measures.
- Ensure the supply of agriculture and animal husbandry input to farmers like seeds and fodder etc.
- KVKs coordinated with line-departments for the supply of seeds and fertilizer in time to the farmers.
- The SHGs and Krishi Mitras promoted by KVK have extended services by supplying vegetables, fruits, milk and eggs to the consumer doorstep.
- The FPOs have supported the marketing for farmers producers by arranging transport facilities to the urban areas as part of marketing support for farmers.



In association with District administration, ICAR –KVK, Erode extended the services to the necessary and needy people to improve their production potentials and marketing their products. KVK promoted institutions are rigorously involved in delivering the necessary goods to the community at their door steps. KVK scientists and technocrats are being part in providing advisory services and extend the service to avail the technology in time. With the continuous effort of KVK, 4.5 ton of Agricultural inputs (Seeds and Fertilizers), 18 ton of harvested fruits and vegetables, 6.5 ton of grocery items, 4000 litres of desi cow milks with the worth of Rs. 19 lakh products supplied to the farmers and consumers on monthly basis for the period of six months. 625 farmers and 120 tribal families marketed their produce through KVK and its promoted institutions.

Accelerated Economic Growth

Despite the challenging times brought about by the pandemic, India has showcased remarkable resilience. Forecasted to be the fifth-largest growing economy by 2023, India has demonstrated its potential to recover and bounce back stronger than ever before. A significant contributor to this growth has been its robust agricultural sector, powered by the synergistic efforts of ICAR, KVKs, and Indian farmers.

Necessary Support

The pandemic has presented unprecedented challenges to India, impacting various aspects of human life. However, through the proactive efforts of ICAR's extension wing and KVKs, Indian farmers received the necessary support to navigate these testing times effectively. India's transformation from a nation grappling with drought to becoming an exporter of food and agricultural products demonstrates remarkable progress, reinforcing its position as a global agricultural powerhouse. As India strides towards becoming the fifth-largest growing economy, the role of agriculture in ensuring overall economic growth remains pivotal.

Meghalaya

Transportation Of Agriculture Produces Through Rope Ways In Hilly Terrains

“ Rasong’s success story is an inspiration, showcasing how tradition and innovation can coexist harmoniously, even in isolation, with the ropeway at its heart

The state of Meghalaya is mountainous, with stretches of valley and highland plateaus, and it is geologically rich. About 70% of the state is forested and its forests are considered to be among the richest botanical habitats of Asia (Meghalaya and Its Forest, 2014). These forests receive abundant rainfall and support a vast variety of floral and faunal biodiversity. Due to diverse climatic and topographic conditions, Meghalaya is also the home to a large variety of fruits, vegetables, spices, medicinal plants and a large stock of little known crops.

There are many challenges which the farmers of the State in general and Rangphlang particular have faced over the years, one of which is the transportation of agriculture produce from the low lying areas. Even though the areas produce many kinds of high quality of fruits, vegetables, broom sticks, honey, etc. The farmers are unable to market their produce due to the harsh hilly terrains and the high cost of transportation as they had to trek for 3 to 4 Hours in the hilly terrains to reach the motorable road which ranges from Rs. 6.00 to Rs. 7.00 per kg for fruits and vegetables and Rs. 10.00 per kg for broomsticks. Apart from the difficulties of transporting, the people would have to spend around 10 to 14 days for transporting the 6 to 10 quintals of broomsticks to the upland and then to the market.

To cope with the challenges faced by the farmers in the areas, the Directorate of Agriculture have come up with an innovative idea in transporting the agriculture produce through rope ways. With this aim in mind, rope ways were constructed under RKVY connecting the hills of Mawkshim to Mawkala, Mawkala to Mawshrain and Mawshrain to Sohdkhew in Rangphlang area in Mawkynrew Block under the supervision of the Border Areas Development Department.

Ancient Ropeway System

The same intervention was nestled in the breathtaking Laitlum canyons, Rasong’s remarkable success story revolves around its ancient ropeway system. Despite its remote location, Rasong’s residents have ingeniously preserved their traditions while embracing modern needs through this remarkable feat of engineering. Connected to the nearest town, Mawkynrew, and the motorable village, Laitlum, Rasong’s journey is a challenging one. A 1-kilometer rocky path takes around an hour to traverse, the time varying based on individual trekking abilities.

Rasong shares its altitude with the neighbouring village of Rangphlang, creating a strong sense of community. But it’s the age-old ropeway that truly stands out. This ingenious method of transporting food, grains, fruits like banana, Papaya, Oranges etc., species, commercial crop like betelvine, coffee and others essential supplies up and down the treacherous terrain symbolizes resilience and unwavering determination. It’s a lifeline that not only maintains a connection to the village’s roots but also ensures their survival in the modern world.

Rasong’s success story is an inspiration, showcasing how tradition and innovation can coexist harmoniously, even in isolation, with the ropeway at its heart. With the coming of the rope ways, the people in the areas have benefited highly as both the cost and time of transportation have been drastically reduced. The people can now transport their produce at a rate of Re. 1.00 per Kg. for fruits and vegetables cutting the rate of transportation by Rs. 5.00 to Rs. 6 per Kg and Rs. 2.00 per Kg. for broom sticks cutting the rate of transportation by Rs. 9.00 per Kg. More over the people can now transport the 6 to 10 quintals of their produce (broomsticks) within one day which usually takes around 10 to 14 days. Thus, the construction of Rope Ways in Rangphlang and Rasong have saved both time and money.

ABOUT THE AUTHOR

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