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INDIA'S DEVELOPING STORY

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The National Agriculture Magazine

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From the Editor's Desk

The Buzzing Agribusiness

Food is one of our basic necessities. But with the growing complexities of the world, food production scenario has changed and gotten more complex. The Indian food industry has been increasing its contribution in world food trade every year. In India, the food sector has emerged as a high-profit sector on the back of the scope it offers for value addition, particularly with the food processing industry getting recognised as a high-priority area.

Food, undeniably an output of agriculture, owes its present boom to the country's agri business. Agriculture in its present format thrives on a host of input industries. Seeds, agrochemicals, agri machineries, irrigation equipment, capital are some of the important inputs that go into the survival of India's agri sector.

With a turnover of over Rs.15,000 crore, the Indian seed industry ranks fifth in the world. India produces four million tonnes of seeds every year. The market size of the industry is expected to grow 11 per cent every year.Although public sector plays a crucial role in supplying the input, private sector has also made an impressive imprint on the seed sector.The insatiable demand for better productivity has been driving the seed sector to soaring production and economic gains. Similarly another thriving agri business is that of agro chemicals. The market size of Indian agro-chemicals industry is expected to more than double to $5 billion by 2017 on rising farm production and increasing awareness among farmers. India is the fourth-largest producer of agrochemicals in the world after the United States, Japan, and China.The crop protection market has experienced strong growth in the past and is expected to grow further at approximately 12 per cent p.a. to reach $ 6.8 billion by FY17.The rapid expansion of irrigation, spread of HYV seeds, introduction of Retention Price Scheme, distribution of fertilisers to farmers at affordable prices, expansion of dealer's network, improvement in fertiliser availability had spurred the fertilizer sector. Today India is the second largest consumer of fertilisers in the world, after China.The Indian tractor industry is the largest in the world and accounts for one third of global production.Currently growing at more than 10 per cent per annum, India's food processing industry is an emerging agri business with immense potential.

A neglected but highly relevant allied enterprise in today's agriculture is the agri infrastructure. The superfluous production of food grains and the mismatched storage infrastructure has been the bane of India's agriculture. Although the condition has been salvaged to some extent by concerted efforts from government and private players the demand is far lower than the availability. As against the total requirement of 61 million tonnes of cold storage capacity, only 32 million tonnes have been set up so far. Cold storage, warehouses, refrigerated transport are yet to expand in concurrence with Indian agriculture's demand.

The cold chain industry in India currently is very fragmented, with players not having the cash strength to invest in the technology needed to build high quality cold storage infrastructure or even be able to cover the entire value chain from procurement at far-flung farms through transportation in reefer trucks to delivery at retail centres in cities. We need a robust agri infrastructure to leverage India's agro biodiversity.

Dr. MJ Khan

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Editorial Comments

Sugar Turns Bitter

The Indian sugar sector is headed towards a crisis

India's sugar industry has been navigating through troubled waters for some time. The situation has gone from bad to worse with mounting arrears and debts. A recent report by global consultancy firm McKinsey has confirmed that the Rs 80,000-crore Indian sugar industry is headed towards "worst-crisis in 30 years".

The industry thus exhibits all the signs of a sinking ship. But the report points out that there is still hope. India could save $1.7 billion of foreign exchange annually by 10 per cent mandatory ethanol blending with petrol, as proposed in the report which also advocates promotion of the sugarcane by-product to boost revenues of the cash-starved sugar mills.

The report has also suggested several short- and long-term measures to bail out millers such as boosting exports and raising production of cane by-products including ethanol.

The debt ridden sugar industry has raised alarm in the country. The sugar mills currently owe about Rs 65,000 crore to banks and farmers: cane arrears to farmers are about Rs 14,500 crore, at present. The depressing global sugar prices have turned export of raw sugar non viable. The sugar exports are hence at a very low pace. According to the data by Indian Sugar Mills Association (ISMA), so far, mills have exported only 4.6 lakh tonnes of sugar till first week of May, 2015. Another 2-3 lakh tonnes of sugar may get exported in the remaining period of the season. The domestic conditions are also not promising. The prices of sugar are plunging. This has not been commensurate with the cane prices. The cane price has gone up by over 50% in the last three years, unmatched by any other crop in the country. On the other hand, the sugar price has only fallen and is at its lowest in the last 6 years.The huge mismatch between cane price and sugar price has distorted India's economics of sugarcane and sugar production. This disparity arises because it is not the market forces that determine the cane price, but the government. To soothe the farmers, successive governments have not dared to stem this gap fuelling a crisis in the sector. Both the state and center determined State Advised Price (SAP) and Fair Remunerative Price (FRP), which the millers have to pay the sugar farmers have been unfair to the millers,. Millers have been unable to clear past dues and this has many times invited a confrontation between the farmers and the millers.

As clearly the industry is tipping towards a crisis, efforts must be directed towards reaching an amicable solution to this current impasse. The report has made some practical and valuable solutions which can be implemented to avoid a full blown crisis. Sugar mills can export around 10 per cent of their annual production over a period of two years and the loss they suffer could be compensated by an increase in cess on sugar sold domestically during periods of low sugar prices. Or else, the government could buy sugar from millers and export it and use the cash earned to pay back the farmers. While this is a short term solution just to ward off the imminent crisis, the industry has to ponder for long term solutions that can avoid such near catastrophe.

As the report suggests, distillation capacity for producing ethanol could be raised by 2.0-2.5 times of the current, building a cane price stabilisation fund and exploring ways to stabilise the fair and remunerative price (FRP) to give right price signals to farmers.

Also, it holds the potential to positively influence the Indian economy. It would provide job security and a stable income for more than 40 million people engaged in the industry, including 30 million farmer households. It has the potential to enhance food and energy security, as co-generation could have the potential to produce around 30 billion units of power annually.

The sector is facing a huge liquidity crunch, as the output has exceeded the domestic demand for the last five years. The distortions existing in the sugar sector has been the main reason that has questioned the liquidity of the sector. What needs to be done is to develop a fair price regimen not only for the farmers but also the millers to ensure that the sector remains buoyant.

Editorial Comments

Dis'content' with DD Kisan

DD Kisan fails to connect with the farmers

Despite the hope and the propaganda that was rife at the launch of the much touted DD kisan channel, the channel has failed to deliver its promises. Modi's pet project was launched to broadcast information about best agricultural practices and related content on a national platform with authenticity and authority that was purported to help India's farming community.

The agriculture ministry has openly expressed its disappointmenton over the channel's content and has decided to cut spending on farm-related TV content on Doordarshan's newly-launched Kisan channel as it feels it is not getting its money's worth from the programmes aired by the public broadcaster. Less than months into the high-profile launch of the Kisan channel, a 24x7 farm TV, the content meant for farmers appears stodgy and expensive to the ministry. After an internal review, it is even unsure if such programmes are of "interest to the public". So, agriculture minister Radha Mohan Singh has decided to cut back funding of farm based programmes by 44% and wants the content to be better.

At a time when funds for the Pradhan Mantri Gram Sadak Yojana, a flagship scheme of the Modi government, are scarce, projects like DD kisan may face the ire of the ministry. In a recent letter addressed to the information and broadcasting secretary Bimal Julka, his counterpart in the agriculture ministry, Siraj Hussain, had voiced his concerns about the project and said that content for farmers on Prasar Bharati's channels, which include the flagship DD and DD Kisan, needed to be more "meaningful". He also asked the ministry to gauge farmers' response.

Under the Prasar Bharati Act, the public broadcaster has a "public service" mandate, especially in the field of agriculture and rural development.The agriculture ministry's internal feedback is that the programmes, including the long-running 30-minute Krishi Darshan, or "Farm View", are largely unattractive.

This comes as a disappointment for the farm sector. Barely three months into the launch of the channel, it failed in its mission of engaging farmers and arousing their interest in the channel. Instead the programmes are losing audiences. In its own performance report, the point was made that the channel has little connect with "real farmer issues". The channel has utilised only Rs 3.79 crore of the Rs 45 crore allotted to it for FY16. Viewership has been declining since its debut.The performance report said Rs 100 crore had been allotted initially for the channel, of which Rs 74 crore was returned to the Centre by the public broadcaster.

It is a real dampener for the sector. More than sixty years post independence, we hadn't utilized the services of the visual media to reach the farmers. Although the main channel DD hosts agri related programmes, those are restricted to certain topics and aired at pre determined time slots. A 24X7 agri channel would have been a dream for the farmers, where availability of information was not constrained by the limits of time and content. Such a channel had the possibility of browsing through a multitude of content from throughout India and across the borders.

At this age of digital revolution, where the world itself has turned into a global village, our farmers need constant exposure to changing dynamics of the world around him which can positively influence his vocation. Although we have good rural telecom services and several organizations and agencies are working hand in hand to deliver information to the farmers, the effect of the visual media cannot be underestimated. This could be a good platform to deliver new technologies, advanced farming operations, new crops, new products, agri news from around the world, expert analysis – the possibilities are endless.

It is a shame that despite the availability of funds and absolute abundance of content, the DD kisan channel is unable to put together a show that can positively transform the gains from agriculture. It must be assumed that the management is incompetent and disconnected with the farmers' interest. In such a situation, a change in the approach or management can only paddle this boat forward. Services of consultants can also be availed to derive a plan that can turn around the current course of the channel.

There is no dearth of farm related content in India. If the current telecast is not able to grip the mind of its intended targets, it is time to change the approach.

Editorial Comments

India's Icon

An academician, scientist and humanitarian, M.S. Swaminathan turns ninety

Ninety years ago, a legend was borne in "Kumbakonam", TN – the name of the city that derives from an allusion to the mythical pot (kumbha) of the Hindu god Brahma that contained the seed of all living beings on earth. Coincidentally that legend held the key for India's food security as his initiative brought seeds of high yielding varieties of wheat and rice which spurred the green revolution in India that led to India's food security. Mankombu Sambasivan Swaminathan, India's 'Father of Green Revolution', was instrumental in transforming India's food economy from being a begging bowl to bread basket. Even as today when our politicians take credit for their policies for the bumper harvests and yields, it was his work in the seventies that laid the foundation for India's food economy. A true humanitarian, M.S. Swaminathan is still relentlessly pursuing the goal of zero hunger.

M.S. Swaminathan was inspired to pursue a career in agricultural science after seeing widespread malnutrition in Asia and famines in Bengal and China. His initiative brought high yielding varieties of wheat and rice to India that increased India's food grain production. In the early 1960s, India's wheat and rice production were languishing at 10-12 million tonnes (mt) and 35-36 mt, respectively, forcing massive grain imports that crossed 10 mt in 1966-67. In 2013-14, domestic wheat output was estimated at 95.85 mt, while at 106.65 mt for rice.

As Director General of the Indian Council of Agricultural Research, M.S. Swaminathan reorganized India's agricultural programme. His dream is to rid the world of hunger and poverty, and he has devoted his life to this cause. Through the last several decades, Dr. Swaminathan has served as the Director General of the International Rice Research Institute, where he continued his efforts in genetic conservation and improvement, founded and chaired the M.S. Swaminathan Research Foundation (MSSRF), taught young scientists as a professor at various institutions, been elected a Fellow of Royal Society of London, the U.S. National Academy of Sciences, the Chinese Academy of Sciences, and the Italian Academy of Sciences, and has authored over 200 scientific papers and numerous books.

Although India achieved food sufficiency, he was moved by the malaise of malnutrition and hunger that is prevalent in India. He thought beyond the natural confines of agriculture as a science and used it as a tool in combating poverty and other social evils. MSSRF was envisioned and founded by Professor M. S. Swaminathan with proceeds from the First World Food Prize that he received in 1987. The Foundation aims to accelerate use of modern science for agricultural and rural development for development and dissemination of technology to improve lives and livelihoods of tribal and rural communities. MSSRF follows a pro-poor, pro-women and pro-nature approach and applies appropriate science and technology options to address practical problems faced by rural populations in agriculture, food and nutrition.

Although his approach was responsible for intensive cultivation, he was aware of the perils of this form of agriculture. He had cautioned about the damage the intensive cultivation brought to the soil structure and fertility as early as 1968. Although India was carried away by the gains of green revolution, today we are confronted with problems of yield stagnation and unsustainable use of natural resources. Swaminathan coined the term "evergreen revolution" to indicate that what we need is increase in productivity in perpetuity. He believes that as most of our farms are small in size, farmers need more marketable surplus and climate resilient farming methodologies.

His interests were not restricted to India's food security alone. He was quite considerate when it came to the plight of the farmers. In 2004-06, when he headed the National Commission on Farmers, his recommendations on improving the farmers' conditions received wide attention. His suggestion that MSP for crops be at least 50 per cent more than the weighted average cost of production caught the attention of the politicians and policy planners. The electoral campaigns vied to adopt this proposal and even Narendra Modi made it as part of his poll campaign.

Honours and recognitions showered from different parts of the world on this luminary. A Padma Shri and Padma Bhushan winner, Shri Swaminathan's visions were adopted by many countries.

At this juncture, when the world celebrates his ninetieth birthday, we wish to thank him for the valuable contributions that he had made in the field of agriculture. India still needs his leadership and guidance and we are all looking forward for it.

Editorial Comments

More Power to Farmers

Ministry of Agriculture will be now Ministry of Agriculture and Farmers' Welfare

The seven decade-old Agriculture Ministry will now be known as 'Agriculture and Farmers' Welfare Ministry'. While addressing the nation on its 69th independent day, Prime Minister Narendra Modi announced the move to rechristen the Ministry of Agriculture with a view to take care of the farming community's needs as well as the personal problems faced by them.

The decision to include the farmers' welfare into the ambit of Agriculture Ministry is a welcome move. Indian farmers, the battered lot, have been facing some rather excruciating times lately. Eighty per cent of Indian farmers belong to small and marginal categories. They cultivate on smaller land areas, and the problems of paucity of resources are not helping them either. Their income is consistently reduced as their produce are passed through exceptionally long supply chains with intermediaries ripping off most of their hard earned income. As a result they get entangled in the traps of local money lenders who charge exorbitant rates of interest. One bad crop year can leave them landless. Farmers are willing to leave their lands and home in search of better job prospects in urban areas. The vicious circle of poverty that has become synonymous with farming in India,are driving the younger generation away from this vocation. Suicides have become a common phenomenon among farm families. The farmers are also displeased by the government policies and they have demonstrated their displeasure quite openly on the streets of Delhi. Suicide of Gajendra Singh at India's capital is still a fresh in our memories. The central government's land acquisition bill has also not helped the matter. Agriculture Minister Radha Mohan Singh's recent insensitive remarks on the reasons behind farmers' suicides have also alienated the farmers. It was imperative for the government to act fast and express their solidarity with the farmers' cause.

So the idea of inculcating farmers' interests also into the wide realm of Indian agriculture puts forward the point that the government has not forsaken their duty towards the farmers of India. The welfare of the farmers is crucial for the overall growth of the agri-sector. As Modi emphasized during his speech on the Independence Day, rural and agricultural development can only be complete when welfare of the farmer is also ensured. He had also promised that the government will formulate schemes for the development of farmers and the government will work in the direction of addressing problems faced by the farmers in their personal lives.

It is not the first time that the government in power has changed the name of this ministry. India's agriculture has changed over the years and so has the name of the ministry dealing with agriculture affairs. Convenience of the ruling parties, political equations and the ease of governance have made the successive governments to fiddle with the names. Pre-independent India had a combined Department of Revenue, Agriculture and Commerce set up in June 1871. In 1881, the Department of Revenue and Agriculture was reconstituted as separate departments, but in 1923, the departments of Education and Health were combined with it to form the 'Department of Education, Health and Lands'. In 1945, it was trifurcated into three separate departments of Agriculture, Education and Health. The Department of Agriculture was re-dedicated as the Ministry of Agriculture in August 1947. At present, the Agriculture Ministry under Radha Mohan Singh is mandated to devise schemes to incentivise crop production, including by fixing the minimum support price, for more than 20 crops. A separate Ministry of Consumer Affairs, Food and Public Distribution, headed by Union Minister Ram Vilas Paswan, looks after procurement of foodgrains and their supplies through ration shops.

Narendra Modi through his speech on the Independence day has reasserted that farmers are his priority and their well being is relevant in today's agriculture. But can a new name bring things into perspective? An emphatic no would be the answer. We need sound policies. It is a positive development that farmers have been identified as a separate entity and there is a ministry to deal with their matters. This will give them immense hope and faith. But we also need proper programmes that will ensure their welfare and will keep them tied to this sector. So while assigning a ministry to the farmers is thoughtful, implementing programmes that would actually culminate in their wellbeing is progressive.

Dhanuka Agritech to use farm training as branding tool

Dhanuka Agritech, one of India's largest agrochemical formulation companies, has decided to employ training and education programmes as a brand promotion tool among the farming community. The company, which manufactures a wide range of farm input products to help the pursuit of better farming, is one of the top five agro solutions companies in terms of sales. With farmers being their primary target customers, the company lays special stress on an intensive marketing network penetrating into the interiors of the country. Dhanuka has lined up plans to conduct training and education programmes among the target group on how to increase farm income using a diverse range of products and solutions for all problems related to crops, innovative marketing strategies and international technical tie-ups, top company officials said. The product portfolio of the company includes herbicides, insecticides, fungicides, miticides, plant growth regulators in various forms – liquid, dust, powder and granules. Dhanuka recently rolled out its latest eco-friendly green label insecticide, Cover, for paddy, red gram, black gram, soyabean and sugarcane growing farmers across India. "The company adds new

products every year through its collaborations and continuously looks to bring the latest technology to Indian farmers," said Partha Sen Gupta, senior general manager, Dhanuka Agritech. The new product is being made available in West Bengal, Bihar, Assam and other eastern states through a wide network of authorised dealers and distributors. "Dhanuka Agritech has always been at the forefront of providing new, innovative and world class crop protection solutions to the farmers. Our new product, Cover, is not just an insecticide, but a guarantee of the farmers' prosperity," Sen Gupta said. "All our new products like Lustre, Mortar and Sempra have done consistently well and we are confident that Cover too would be instantly accepted by farmers," he added. Dhanuka Agritech has a pan-India presence through its marketing offices in all major states. It has a network of more than 8,000 distributors and dealers selling to over 75,000 retailers across India and reaching out to more than 10 million farmers. The company plans to tap this wide network to conduct its proposed farm training and education activities.

WaghBakri to diversify into tea plantations, coffee

After 35 years, Gujarat-based WaghBakri group, one of the established regional packet tea players, is looking to diversify into coffee and tea plantations. "The board has cleared this diversification," said Piyush Desai, chairman and managing director of WaghBakri. The extension into coffee, however, would be under a new brand name and not WaghBakri. "The distribution channel would be the same for packet tea and coffee. The total investment is likely to be Rs 30-50 crore," said Desai. In plantations, WaghBakri is on the lookout for gardens in Assam. "We are interested in a clutch of gardens and not a single garden," he explained. Together, the gardens are likely to produce three to five million kg. What has prompted WaghBakri to consider entering the plantations business is that sourcing quality has become difficult. "In many cases, even when you buy from big gardens, the tea is mixed with tea from bought leaf factories and there is no distinction in the garden mark," said Desai. WaghBakri packets around 40 million kg of tea. "Of this, 25 million kg is sourced from Assam gardens," said Desai. A small portion is also sourced from Sri Lanka and Kenya. If the import duty is brought down, WaghBakri could increase sourcing from Sri Lanka and Kenya. At present, the duty on Sri Lankan tea is around 15 per cent and Kenyan at 100 per cent. "A small amount of Kenyan tea, when blended, gives great colouring which doesn't happen with Indian tea," Desai added. Kenyan tea is used in WaghBakri's premium brand, Good Morning. The group has a turnover of Rs 900 crore and is hoping to close the year with Rs 1,000 crore.

Adani Group plans move into fertilisers

The Adani Group, with revenues of $11.5 billion and interests in multiple sectors including logistics and energy, is planning a major foray into the fertiliser sector in a move that could help the country cut its expensive imports of urea. The Ahmedabad-based group, sources said, is carrying out due diligence of at least three defunct urea manufacturing units, including Sindri in Jharkhand, an official privy to the development said. Gautam Adani, executive chairman of the group, would shortly review the process and take the final call on whether to acquire these units, these sources added. The group's two liquefied natural gas (LNG) terminals to come up on the east and west coasts and the massive pipeline infrastructure being created in the public sector are expected to come handy for the group in its fertiliser manufacturing enterprise. Although the price of urea is still controlled by the government, it is expected that sooner rather than later this key fertiliser would be decontrolled and the subsidy would be transferred to the eligible farmers directly, unburdening the industry in the process.

Valenica Orange debuts in India

The Valencia Citrus, also known as Valencia orange and famous for its superlative taste and colour will now be available to Indian consumers with I.G. International Pvt. Ltd. (IGIPL) and Star South launching the renowned citrus from South Africa. Greatly valued for their high juice content and availability outside of the citrus season, Valencia oranges are considered to be among the world's healthiest foods. Typically thick skinned and containing few seeds, a medium-sized Valencia citrus has about 60 calories and provides 116% of the daily value of vitamin C. Thanks to this high vitamin C content, they are helpful in lowering cholesterol, risks of cancer, heart disease, kidney disease and prevent signs of ageing on your skin. South Africa is the largest citrus producer in the Southern Hemisphere where most of the crop produced is Valencia citrus which are in high demand for their taste, quality of juice and nutritional benefits. Sanjay Arora, Director, IGIPL, one of the leading names in fresh fruits imports and exports in the country, said, "The Valencia citrus produced in South Africa is one of the best and healthiest fruits in the world and now the Indian consumers can enjoy it." The Star South citrus from South Africa will be available in the market in 15 kg packs consisting of 72 to 88 citrus fruits. Infrastructures.

Premium teas from Unitea group

Tea connoisseurs in the country will henceforth be able to enjoy Nilgiri tea premium grades, manufactured in Chinese and Japanese style, from the leaves plucked at a height of over 7,000 ft above mean sea level from Chamraj and Korakundah estates owned by The United Nilgiri Tea Estates Co Ltd. (Unitea). "These grades packed in attractive containers are now available exclusively for Indian tea drinkers," Unitea Director D Hegde informed. "Korakundah Oolong tea, manufactured in the style of 400-year-old Chinese Ming Dynasty, is rich in anti-oxidising vitamins and enzymes beneficial for digestive health," Hegde said.

"While a single green tea itself has proven health benefits Chamraj Emperor's Choice premium green tea is a blend of select green tea grades from delicate-leaves and steam-processed in traditional Japanese style preserving natural flavour and colour. These leaves, are vibrant green which brew into golden green liquor with delightfully herbaceous sweet flavour that is extremely rare," he said. "Detox tea, now released, has herbal infusion helping metabolism and energy," Hegde added.

Cabinet extends 3% subvention scheme on short-term crop loans

In order to ensure farmers receive short-term crop loans up to Rs 3 lakh at seven per cent interest per annum, a proposal to extend the interest subvention scheme for banks was approved by the Cabinet Committee on Economic Affairs (CCEA). Rural and semi-urban branches of public and private sector banks, regional rural banks, cooperative banks and Nabard are covered by the continuation of the scheme while these entities will also "…provide additional interest subvention of 3 per cent per annum to those farmers who repay on time," according to an official statement. The period of repayment stated is within one year of disbursement of the loan. The Cabinet approved the expenditure of Rs 18,110 crore for 2015-16 as interest subvention for 2015-16 with short-term crop loans capped at Rs 3 lakh under the scheme. While Nabard will receive Rs 2,332 crore, the remaining Rs 15,778 crore will be provided to public and private banks, RRBs and cooperative banks. The CCEA also sanctioned Rs 374 crore as subvention for small and marginal farmers holding Kisan Credit Cards who can avail of loans against negotiable warehouse receipts. For those affected by natural calamities, a continuation of 2 per cent subvention will be made available to banks for the first on the restructured amount. The target for agriculture credit flow was increased to Rs 8.5 lakh crore for 2015-16 against Rs 8 lakh crore for the previous year.

AIC, ECGC likely to get Irdai waiver on rural obligation

State-owned Agricultural Insurance Co (AIC) and Export Credit Guarantee Corp (ECGC) may get a waiver on the rural and social sector obligations front from country's insurance regulator Irdai. Every insurer must undertake rural and rural sector obligations. According to Irdai (obligations of insurers to rural and social sectors) regulations (draft), rural sector obligations for general insurers are two to seven per cent of total gross premium income written direct in that year. Rural sector implies places or areas classified as "rural" while conducting the latest available decennial population census while social sector includes the unorganised sector, informal sector, economically vulnerable or backward classes and other categories of persons, both in rural and urban areas. A proposal was floated so that Irdai may not prescribe any obligations to Agricultural Insurance Company and Export Credit Guarantee Corporation. It was held that Agricultural Insurance Company underwrites only crop insurance of which the whole can be considered eligible under rural sector as well as social sector. "... therefore Authority (Irdai) may not specify any percentage of business as obligations," a Irdai document said. For the Export Credit Guarantee Corporation, it was reasoned that it is a specialised insurer created for providing export credit insurance facilities to exporters

and banks in India. The proposal said that no rural and social sector obligations should be prescribed to ECGC owing to its nature of business. The proposal to provide a waiver to the Agricultural Insurance Co and Export Credit Guarantee was accepted with advice of due examination of Act's provisions and legal vetting. In April 2015, the Export Credit Guarantee Corporation logged gross premium underwritten worth Rs 92.51 crore, a growth of 9.21 per cent over the same period a year ago. As for Agricultural Insurance Company, the company reported Rs 50.08 crore gross premium underwritten, a year-on-year rise of 5.94 per cent. The Export Credit Guarantee Corporation is essentially an export promotion organisation, seeking to improve the competitive capacity of Indian exporters by giving them credit insurance covers comparable to those available to their competitors from most other countries. Agriculture Insurance Company (AIC) was formed in December 2002 to sub-serve the needs of farmers better and to move towards a sustainable actuarial regime. It has taken over the implementation of National Agricultural Insurance Scheme, which until FY 2002-03, was implemented by the General Insurance Corporation of India. In addition, AIC also transacts other insurance businesses directly or indirectly concerning agriculture and its allied activities.

AIC ropes in 10 private companies to insure farmers under NCIP

According to an announcement made by Minister of State for Agriculture, Mohanbhai Kalyanjibhai Kundaria, 10 private insurance companies have come together for implementing National Crop Insurance Programme (NCIP) for the farmers under the auspices of Agriculture Insurance Company of India (AIC). Under the scheme, private insurance companies like ICICI-Lombard, IFFCO-TOKIO, HDFC-ERGO, Cholamandalam-MS, Tata-AIG, Future Generali India, Reliance, Bajaj Allianz, SBI and Universal Sompo General Insurance Company have been roped for implementing farmers' insurance programme.

National Crop Insurance Programme consists of three insurance programmes (NCIP) for the farmers - Modified National Agricultural Insurance Scheme (MNAIS), Weather-Based Crop Insurance Scheme (WBCIS) and Coconut Palm Insurance Scheme (CPIS). Under the Modified National Agricultural Insurance Scheme (MNAIS) actuarial premium rates are charged with a provision of subsidy upto 75%, which is shared by the Central and State Governments on 50 : 50 basis. The entire liability of claims lie with the implementing insurance companies. It is compulsory for loanee farmers and optional for non-loanee farmers. Risk coverage extends for pre-sowing/prevented sowing and post harvest losses due to cyclone in coastal areas. On account payment up to 25% advance of likely claims as immediate relief in the areas which suffered at least 50% crop yield loss. It has more proficient basis for calculation of threshold yield and has two higher indemnity levels of 80% & 90% instead of earlier 70%, 80% &

90%. There is also reduction in Unit Area of Insurance to village/village Panchayat level. Private insurance companies have been involved to provide the benefits of competition. The Weather-Based Crop Insurance Scheme (WBCIS) provides coverage against weather deviation from the notified standards on the basis of weather data received from the notified Automatic Weather Stations (AWSs) and Automatic Rain-Gauges (ARGs). The actuarial premium rates are charged with a provision of subsidy upto 50%, which is shared by the Central and State Governments on 50:50 basis. The entire liability of claims lie with the implementing insurance companies and it is compulsory for loanee farmers and optional for non-loanee farmers. It also has add on coverage in respect of hailstorm and cloud burst on individual assessment basis. Private insurance companies have been involved to provide the benefits of competition. The Coconut Palm Insurance Scheme (CPIS) is eligible for individual farmer/planter/grower offering atleast 5 healthy nut bearing palms in a contiguous area/plot. It provides coverage against total loss of palm on account of happening of peril insured leading to death of the insured palm or its becoming unproductive. The Fixed premium rates range from Rs.9-14 per palm depending upon the age of palm. However, Government is providing subsidy upto 50% by GOI and 25% by State Government. The sum insured per palm range from Rs. 900-1750/- and the scheme is implemented by AIC.

Centre proposes crop insurance for farmers

The Union Government is planning to chalk out a crop insurance policy to bail out farmers from crisis, Union Parliamentary Affairs and Urban Development Minister M Venkaiah Naidu informed recently. Naidu said that the proposed policy would boost the irrigation sector. The need of the hour is a crop insurance scheme, he said. The minister visited a village he has adopted near Bengaluru, where he held a meeting with agriculture scientists. The Centre and Karnataka government should jointly implement the insurance scheme because it would require a lot of capital. The Centre would give Rs 8,50,000 crore but that may not be sufficient, he pointed out. On farmers' suicides, Naidu said that the Opposition party, in particular the Congress, should not politicise the issue. The focus should be to solve problems. Suicides used to take place during the Congress regime and the previous NDA regime. They are also happening in the BJP and Congress ruled states. There should be no efforts to score political points over this issue, he said. He appealed to farmers not to commit suicide and said that they can avail farm loans as a temporary solution.

Cabinet to review disbursal of soft loans to sugar mills

The Cabinet is likely to review the progress in disbursal of soft loans to sugar millers for clearing cane dues for the 2014-15 season that will end in September. The Cabinet had in June cleared Rs 6,000-crore soft loans to help sugar mills clear part of their Rs 14,000-crore dues to farmers. However, these loans were provided only to those units that have cleared at least 50 per cent of their outstanding arrears by June 30. The government has mandated banks to obtain from sugar mills a list of farmers with bank account details and the extent to which cane dues are to be paid. "The idea is to make direct transfer of dues to the bank accounts of farmers on behalf of sugar mills. Subsequent balance, if any, would then be credited into account of the mill concerned, Union minister Nitin Gadkari had then said. The mills, however, said this won't address the basic problem of a surplus and depressed sugar prices.

Govt allows export of rice bran oil in bulk

The Government has allowed export of rice bran oil in bulk and other edible oil in branded consumer packs of up to five kg with a minimum export price of $900 (Rs. 57,363) a tonne. Trade expects rice bran oil exports to jump sharply to 10,000 tonnes this fiscal against 2,000 tonnes achieved last year. India produces about 10 lakh tonnes of rice bran oil annually and is largely consumed in the domestic market. Bran, the brown layer on rice grain, has 10-25 per cent oil content. Though the rice bran oil is considered cheap and healthier, it has not gained popularity among Indian consumers as it does not have any particular taste unlike groundnut, soybean or sunflower oils. India, one of the largest consumers of edible oil, imports about 10 million tonne (mt) of edible oil per annum. It meets about 60 per cent of its vegetable oil demand of 17-18 mt through imports. Speaking on the sidelines of Global Rice Bran Conference organised by the Solvent Extractors' Association, Dr V Prakash, Scientist with Council of Scientific and Industrial Research said, "The decision to allow rice bran oil export in bulk without any limit may push up prices in the domestic market as producers would find it easier to sell it abroad than packaging and labelling for the domestic market. However, he added, given the poor demand and low awareness of the benefits of rice bran oil, bulk exports will not have much impact for consumers. Though India is the second largest producer of rice after China, the nation has not fully explored the potential of producing rice bran, which can be also be used in the pharma sector.

Govt mulls sugar export to China under preferential quota

Government is considering a proposal to allow sugar mills to export to China under the preferential quota system as part of a strategy to help them liquidate surplus stocks. India exports 10,000 tonnes of white sugar to the EU and 8,100 tonnes to the US through the preferential quota system, under which exports are permitted at low tariffs. After the quota is reached, a higher tariff is applied on additional exports. Food Minister Ram Vilas Paswan had said last week that the government is considering barter trade of sugar against import of farm items like pulses from some countries. "Besides barter trade, we are exploring sugar export under the quota system to China. We are also looking at giving sugar as part of the aid programme to African nations," a senior government official mentioned. The commerce and external affairs ministries are holding discussions with various countries and their missions in India on this issue, the official added. On sugar exports under the quota system, the official said, "We have been selling sugar to the US and EU markets under the preferential quota system. We can explore the same with China, which imports three-four lakh tonnes of sugar annually from India." The government is also in discussions with other countries like Canada, Indonesia and Malaysia to know if there is a possibility to barter sugar for vegetable oils and pulses in those countries. India has managed to export 1.26 million tonne sugar in seven months to April 2015 at a time when the world market is facing a glut situation, as per the official data. Although exports via normal route are not viable now due to sharp decline in global prices, the government is trying all options to push export of four million tonnes of surplus sugar to help cash-starved domestic mills make payment of dues over Rs 14,000 crore to cane farmers. The sugar industry is unable to make payment as it is facing severe liquidity crunch on account of surplus production that has resulted in low prices of sugar in domestic markets. Sugar output has exceeded domestic demand in the world's second largest sugar producing country for the last five years and the trend is expected to continue in this marketing year (October-September) too. The country is estimated to produce 28 million tonne sugar in 2014-15 marketing year, against annual demand of 24.8 million tonne. There is still surplus stock of 10 million tonne in the country.

Organic farming subsidy for clusters

The Centre will subsidise clusters of farmers, instead of individuals, to promote organic farming over larger tracts of land. "When implemented by individual farmers, the full potential of organic farming can never be realised," a senior official said. The Paramparagat Krishi Vikas Yojana, announced by the Centre, will run in addition to the existing schemes for promoting organic farming. The objective was to ensure a uniform use of central funds. The National Mission for Sustainable Agriculture, the Rashtriya Krishi Vikas Yojana and the Mission for Integrated Development of Horticulture are dedicated to providing organic inputs like vermi compost and organic compost to individual farmers. Certification of organic products, earlier, was also limited to exports and was provided by the department of commerce. Officials said, the big change in the new programme was its focused approach and its targeting of clusters of farmers. The new scheme makes the use of neem-coated urea manda-

tory for 100 per cent of organic produce. Though neem-coated urea was notified as a regular fertiliser in 2010, it was not mandatory and the limit was capped at 35 per cent. Officials said, the soil health card had also been made a central scheme. Earlier, it was an initiative of the state governments which the Centre supported. Only 50 million farmers of a total of 130 million have soil health cards, though the programme has been on since the 10th Five Year Plan (2001-02 to 2005-06). Earlier, central programmes assisted state governments with soil testing laboratories. But, the schemes did not help in collection of samples and their analysis. The new scheme plans to provide all farmers with soil health cards in the next three years which will then be renewed for another three years. Samples and nutrients for which soil needs to be tested have also been standardised. The Pradhan Mantri Krishi Sinchaee Yojana seeks to converge all existing irrigation schemes and adopts a bottoms-up approach. The Cabinet recently allocated Rs 50,000 crore for the scheme to be spent over the next five years.

10% duty imposed on wheat imports till March 2016

The government recently imposed 10% import duty on wheat till March 2016 to curb imports and liquidate poor quality grain procured by the FCI and state agencies under relaxed quality standards. Finance minister Arun Jaitley placed the relevant notification before the Lok Sabha, which states that the measure would result in revenue of Rs 90 crore to the government in the remaining part of the current fiscal. In the recently concluded rabi marketing season, the Food Corporation of India (FCI) procured 28.08 million tonne of wheat from farmers, out of which 26.62 million tonne have been purchased under the relaxed quality norms as the crop got damaged due to unseasonal rains. At present, there is no import duty on wheat and private traders, especially those in Tamil Nadu, have been importing wheat due to lower global price and lack of availability of quality grains in the domestic markets. Food ministry sources said that traders in southern India have contracted for import of five lakh tonne of wheat from Australia recently. Export prices of Australian wheat are ruling at around $260 per tonne, cheaper than locally available grain, making it attractive for flour millers in southern India. According to ministry of consumer affairs data, the retail prices of wheat on Friday was ruling at Rs 32 per kg and Rs 19 per kg in Chennai and Delhi, respectively. As per the International Grain Council data, the exports price of wheat

from the United States was $217 per tonne on Thursday while the domestic minimum support price offered to farmers during recently concluded rabi marketing season was Rs 1,450 per quintal. Food minister Ram Vilas Paswan had last month suggested that a 10% import duty on wheat be imposed since there is surplus stock. The government is keen to sell off the wheat on a priority basis, which was procured under the relaxed quality norms, through public distribution system and through Open Market Sale Scheme (OMSS). In case of wheat, FCI has a grain stock of 38.6 million tonne on July 1 while the buffer norm stipulates only 27.5 million tonne of grain to be held with the government agencies. The country's wheat production is estimated to have declined to 90.78 million tonne in 2014-15, as against the record production of 95.85 million tonne during 2013-14.

Subsidised onions in markets soon in Telangana

With onion prices skyrocketing, the Telangana government has decided to extend the sale of subsidised onions in Rythu Bazaars to the entire state from August 5.A special counter will be set up in each revenue division in districts for the purpose. The initiative has been implemented in Rythu Bazaars in Hyderabad since the last week of July. The government has fixed a quota of 2 kg/head at Rs 20/kg against the retail market price of nearly Rs 50/ kg. The quota was fixed after the stocks started getting exhausted in Rythu Bazaars in the city within two hours as thousands thronged to purchase onions at subsidised rates in bulk, leaving many people to return empty handed. The TS government will procure onion directly from Nasik in Maharashtra and from Kurnool. It has also been decided to set up more special counters in the city at various locations since Rythu Bazaars are not accessible from many areas.The TS government has decided to procure good quality onions from markets in Nasik (Maharashtra) and Kurnool by spending up to Rs 3,000 per quintal.Officials from the Marketing department have been sent to Nasik and Kurnool to purchase stocks directly from farmers.

With onion prices touching Rs 45 per kg in retail markets, the Odisha government on Monday decided to launch Onion Mission and provide easy loans and high yielding seeds to farmers. Though Odisha produces 3.95 lakh metric tons of onions every year against its requirement of 2.97 lakh metric tons, agriculture minister Pradeep Kumar Maharathy said people face shortage as farmers sell their produce to traders due to lack of cold storages. Stating that the Odisha onions were being procured by traders from Chhattishgarh and Madhya Pradesh, Maharathy said steps would be taken through the Mission to create cold storages for farmers.

Rice deficit bars FSA implementation in Telangana

The Telangana government is in a Catch-22 situation over implementing National Food Security Act from October 1, the latest deadline set by the Centre. The Centre had warned the states that it would stop the supply of ration quota if they failed to meet the October deadline. It is supplying only 1.12 lakh metric tonnes of rice to Telangana, while the requirement here is 1.80 lakh metric tonnes. The TS government has written to Centre in May this year to fill this deficit to implement the Act, but there has been no response so far.

The TS government argues that it cannot afford to purchase rice from open market to meet this deficit, amounting to nearly 68,000 metric tonnes. According to the Centre's data, there are 1.91 crore BPL families in the state against the TS data of 2.86 crore, showing a variation of nearly 95 lakh. The Centre has been allotting rice quota to TS based on its data. Moreover, the Centre has been supplying only 5 kg of rice per head in a household, while TS is giving 6 kg of rice per head. Besides, the TS government had raised the annual income limit to Rs 1.5 lakh in rural areas and Rs 2 lakh in urban areas for a family to be eligible for the ration cards in 2014. Earlier, the income limit was Rs 60,000 in rural areas and Rs 75,000 in urban areas. All these factors contributed to 95 lakh excess BPL families in TS, when compared with Centre's data. Moreover, TS is providing rice at Rs 1 per kg, while Centre is supplying rice to the state at three variable prices — Rs 3 per kg, Rs 5.65 per kg and Rs 8.30 per kg. These factors are putting huge burden on TS government. Only 11 States and Union Territories have so far implemented the Act which was passed by Parliament in September 2013 despite extending the deadline twice since then. Finance and civil supplies minister Etela Rajender on Friday held a meeting at MCRHRD with officials on this issue. It was decided to take up the issue with Centre again seeking enhancement of ration quota. It was also decided to issue new food security cards for beneficiaries at Rs 6 per card from September besides introducing biometric system for distribution of ration to check irregularities. Mr Rajender said that the government had seized over 54,000 bogus cards so far and the drive will be continued in all other districts.

Maha sugar output may be hit by 25-30% next season

A recent survey conducted by the Western India Sugar Mills Association (WISMA) has revealed that while sugarcane plantation in Maharashtra may remain the same in the coming season, productivity could be affected by 25-30% owing to erratic rainfall across the state. From a bumper production of 104.5 lakh tonne in the 2014-15 sugar season, output could come down to 70-75 lakh tonne in the coming season, the survey said. According to the preliminary estimate for 2015-16 released by Isma, the area under sugarcane in Maharashtra is likely to remain at 10.6 lakh hectare. However, yield is likely to be less due to poor rainfall. Officials at the sugar commissionerate have estimated production to come down by around 15%. A total of 178 factories had crushed 929.5 lakh metric tonne of cane and the production had touched 104.79 lakh metric tonne in 2014-15 season. According to WISMA president BB Thombare, in the last three years there has been less than 50% rainfall in some parts of Maharashtra such as Marathwada, Khandesh, Solapur and Ahmednagar because of which groundwater level in these regions has gone down. Last year, an acreage of 10.5 lakh hectares resulted in a production of 930 lakh tonne of cane. As per the survey, cane is being used as fodder for cattle in Solapur and Ahmednagaramong other areas. Around 30-35% of the cane is expected to be used for fodder purposes. In the coming season, around 700-750 lakh tonne of cane is likely to be available for crushing. Senior officials, however, said that diverting cane as fodder has been the normal practice in these regions and therefore this should not affect the overall production. When contacted, sugar commissioner Vipin Sharma said that the first estimates of the season on the cane area, production and recovery would be released next month. Senior officials pointed out that the meeting on the cane estimate, which is done in association with the agriculture department officials, is yet to be held. Recovery is likely to take a hit because of the rain situation in the state, the commissioner pointed out. As of date, around 120 mills in the state have been issued the 50% cane dues clearance certificates from the commissionerate and the cane arrear position has gone down to R2,900 crore, he said. Two rounds of hearings have been held with sugar mills and a fresh round of hearings will be held next week so that more funds can be mopped up, Sharma said.

AP govt scraps tax on sugar

Saddled with huge stocks of unsold sugar, the industry in Andhra Pradesh has heaved a sigh of relief with the Government deciding to source all its sugar requirements from local factories and do away with Value Added Tax and Central Sales Tax. The Government is a major consumer of sugar as it requires about 1 lakh tonnes of the commodity for its public distribution system (PDS) and other needs. The South India Sugar Mills Association (SISMA–Andhra Pradesh) has been demanding the Government remove taxes.

Kerala approves subsidy for rubber farmers

The Rubber Production Incentive Scheme (RPIS) declared by the State Government is at its final stage, after observation of all formalities with the active involvement of Rubber Board and Rubber producers' Societies. The Government has allotted Rs. 300 crores in the budget for subsidy disbursement. For two hectares, growers will get subsidy up to 300 kg a month. The difference between the price published by the Rubber Board for RSS 4 and Rs. 150, will be the subsidy credited to the bank account of growers. In spite of the various measures adopted to give relief to rubber growers, the market has fallen abruptly. The price of latex has also declined to Rs. 102.50 from Rs. 152.00. Growers demand that latex be brought under the purview of RPIS. In 2013, the average price was ruling remunerative at Rs. 170.00 a kg. The downtrend started in the following year. This year in April, the market ruled very low. By the second week of June, there were signs of recovery as it touched Rs. 131.00 a kg. But the market became weak yet again on July 29; prices slipped to Rs. 122.00 a kg for RSS 4. As a result of the price fall, a large number of trees in plantation areas was left untapped. According to Rubber Board sources, production loss was also massive during April to June 2014 and the same period in 2015. Production loss during the two said quarters was 24,000 tonnes. Total loss in terms of money is yet to be compiled. The propaganda that the stalemate could be resolved with the subsidy amount of Rs. 300 crores sanctioned by the Government appeared to be against facts, said VC Sebastian, Secretary General of Infam, an organisation of farmers. The Government should ensure that small traders holding licenses should procure rubber at the price published by the Rubber Board, he demanded. As on July 26 this year, 21,587 growers became members of RPIS. Of this, about 9,300 were eligible to get subsidy. There are 2,200 societies registered under the Rubber Board, enrolling growers as members of the scheme. About 200,000 rubber growers have applied for subsidy. Of the 12 lakh small and marginal rubber growers, the Government expects a minimum of 3 lakh to apply for subsidy in the first phase.

A new transgenic variety holds great promise for reducing greenhouse gas emission

Flooded rice fields are a known source of anthropogenic greenhouse gas (GHG) emission—as per the Intergovernmental Panel on Climate Change, such fields generate enough methane to account for 20% of global warming. Over 90% of the world's total wetland paddy cultivation happens in Asia. And the two top rice-growers in the continent, and indeed, the world, China and India—India accounted for over 22% global rice production in 2014—also happen to be two of the top overall GHG emitters. So, it is welcome news that Chinese scientists, as per a Nature report, in collaboration with researchers in Sweden and the US, have developed a strain of rice that can cut methane emission. So far, increasing the yield has been the focus of rice research, and not cutting methane emission. For the latter, the minimal efforts undertaken have all been concentrated on modifying agricultural practices—moderating fertiliser usage, water management, etc. SUSIBA2, the new variety developed by Chinese scientists, is the harbinger of a biotechnological intervention that can meet the twin goals of increasing yield and reducing methane emissions. The strain was created by transferring genes responsible for starch production in stem and grains using transcription factor technology. Expression of the gene routes most of the starch produced by photosynthesis to the grains and stems, which means lesser than usual is available at the roots for soil microbes to process into methane. While scientists are pondering over what the large scale cultivation of such rice would mean for the survival of beneficial soil bacteria in the long-term, there can be no doubt that SUSIBA2 represents an important breakthrough for rice-growing nations.

Wheat genome sequencing in 3 years

India has set a three year target to sequence the wheat genome and procure better quality variety, the Indian Council of Agricultural Research (ICAR) has said. A French group that started sequencing before 2005 has been successful in doing it for one chromosome, it said. "All other partners of the International Wheat Genome Sequencing Consortium including India target to complete the sequencing in the next three years," ICAR said in its reply to a request filed under the Right to Information act by Gopal Prasad. It said that up til now sequencing of the whole wheat genome has been partially successful. "The genome sequenced so far is blueprint only and not the complete genome," it said.

Spices Development Agency to boost local varieties

Farmers growing red chillis, tamarind and turmeric in Andhra Pradesh will soon get help as an exclusive Spices Development Agency takes shape. They would get advice on best practices and ways to improve profitability. Established following the Centre's decision on a regional body under the supervision of the Spices Board, the Agency will focus on development of locally popular spices such as chillies, tamarind, curry leaf and turmeric. The Agency, which would have 14 members drawn from the trade, farming, the government and other stakeholders, would work out of Guntur to meet domestic and other export requirements. "The agency would act as a bridge connecting several State and Central departments for the development of spices. It would bring in better farming techniques, processing and packaging methods to get more value to the produce in the domestic and global markets," a Government official said. The Centre has promised to allocate funds for the agencies after receiving proposals for specific programmes to be taken up by the local agencies.

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Asian nations join hands to promote rice bran oil

The major rice producing countries of Asia — India, China, Thailand, Japan and Vietnam — have decided to promote the use of rice bran oil and facilitate its global trade. The newly-formed International Association of Rice Bran Oil (IARBO) is in the process of being registered in Thailand and will be headquartered out of Bangkok, said Dr AR Sharma, president of the association. Pakistan has also enrolled to become part of the organisation, Sharma said, adding that more rice producing countries in the continent are expected to join the association. Though the oil is considered cheap and healthier, it has not gained popularity among Indian consumers as it does not have any particular taste unlike groundnut, soyabean or sunflower oils, he pointed out. Unlike Europeans, who produce and promote the use of olive oil extensively, there is little awareness about rice bran oil and its health benefits, Sharma said,

adding that a recent study says that rice bran is much more suitable for Indian cooking because Indians cook at high heat and olive oil often does not break down as easily. Globally, about 15 lakh tonne of rice bran oil is produced, out of which India produces about 9.5 lakh tonne per annum. IARBO was formed at the initiative of Dr Xubeing Xu, Wilmar Global R&D Centre and asst prof. Dr Riantong Singanusong, Naresuan University, Thailand. They brought together India, China, Thailand, Japan and Vietnam. The objectives of IARBO are to encourage technological innovations in the field of processing rice bran oil and other value added products and to standardise specifications of the oil with a view to promote international trade. According to Sharma, the potential of rice bran oil in the world is 3.5 million tonne as against about 1.5 million tonne at present. The major producers are India (9,50,000 T), China (2,00,000 T), Japan (80,000 T) and Thailand (50,000 T). Although China is the highest producer of paddy in the world, bran is chiefly used as animal feed and while Japan is a pioneer of rice bran oil, there is limited availability of raw material which puts India in a very comfortable position, he said. Over 40 Units were set up in the recent past throughout India with the assistance from the government, said BV Mehta, executive director, Solvent Extractors Association of India (SEA). The government recently allowed export of rice bran Oil in bulk. This has opened a new avenue to tap eorld market, he said.

INDIA LOOKING FOR PARTNER TO SET UP UREA PLANT IN IRAN

The Government is scouting for an Iranian partner to set up a fertiliser plant entailing investment of over Rs.5,000 crore in the Persian Gulf nation. India revived its plans after Iranian authorities approached the Government officials and evinced interest to partner with them in the project. India had nominated state-run Rashtriya Chemicals and Fertilisers (RCF), Gujarat Narmada Valley Fertilisers & Chemicals (GNFC) and Gujarat State Fertilisers Corporation (GSFC) for the proposed 1.3 million tonnes urea plant. “Now the government is looking for an Iranian partner to be part of this project. And therefore a senior delegation from India will visit Iran next month,” a source said. The proposal is to set up a urea joint venture plant at Chahbahar in Iran, using natural gas as feedstock, which is abundant in the country. “Indian Government officials have conveyed to the Iranian authorities that they are looking for a long-term gas contract at feasible rates for producing urea,” the source said. Earlier, Iran authorities had indicated gas price of $2.9 MMBtu. Both nations have been talking to each other since 2013, for setting up of a fertiliser plant in the Persian Gulf nation, but talks were stuck over gas price issue. The proposed urea joint venture plant in Iran would be on the lines of OMIFCO (Oman India Fertiliser Company) in Oman, where the Indian entities have jointly invested in urea manufacturing with local player. OMIFCO is 50 per cent owned by the Oman Oil Company SAOC and 25 per cent each by the IFFCO (Indian Farmers Fertiliser Cooperative) and KRIBHCO (Krishak Bharati Cooperative Limited). The Indian government has a long term off-take arrangement with OMIFCO for sourcing urea, which is produced at lower rates compared to domestic production. India’s annual demand of urea is about 30 million tonnes, while the domestic production is around 22 million tonnes.

Openings in China for high-quality food export

Beside the export of traditional agricultural products like spice and sugar, Indian companies can now look forward to supplying high-quality foodstuff to China, with consumers there becoming more quality conscious. "Indian companies can scout for business opportunities in China," said Ping Chew, Asia head for food & agricultural research at Rabo Bank, in an interview to Business Standard. "Following the increasing demand due to safety concerns among Chinese consumers, producers/ distributors there are looking for outsourcing safer and quality products and also tying up with foreign companies." E-commerce there has grown to 10 per cent of retail sales. Last year, China's per capita income was $7,500 per annum; measured by purchasing power parity, it was $13,000-14,000. Despite a slowing economy, consumption remains a main driver. Higher disposable income has also has made consumers more choosy about quality, safety and protein rich products. Chew said, "Several incidences of issues emerging in food safety were reported in China." This is another reason why more Chinese companies source good brands, mainly from the US and Europe. China's economy is now expected to grow at six to seven per cent annually till it stabilises, "a new normal for the economy", said Ping. He foresees further consolidation in China's food and agriculture sector. It will increase import of soybean and feedgrain. At the downstream side, e-commerce will continue to play a big role. "There are enormous opportunities in China for foreigners to invest or tie-up with local companies, and Indian companies can look forward for such opportunities," said Ping. Products in this regard include high-value dairy, cashew, processed seafood, basmati rice and sesame seeds.

Scotland to ban GM crops

Scotland is set to ban the cultivation of genetically modified (GM) crops, officials announced. It is set to implement the move under European Union rules introduced earlier this year which allow countries to opt out of growing the crops, a statement from the Scottish government said. "The Scottish government will shortly submit a request that Scotland is excluded from any European consents for cultivation of GM crops, including the variety of genetically modified maize already approved and six other GM crops that are awaiting authorisation," the statement said. The Scottish government has responsibility for domestic policies.

Global cotton output is estimated to decline by nine per cent in crop year 2015-16 on a marginal diversion of the crop on low prices in major countries like India. The Washington-based International Cotton Advisory Committee (ICAC) has forecast global output at 23.83 million tonnes (mt) in 2015-16 as against 26.2 mt the previous year. In 2013-14, a bumper global cotton output was reported at 26.28 mt. Against that, however, global consumption of the natural fibre was forecast at 24.9 mt in 2015-16 as compared with 24.35 mt the previous year. With an import and export global balance at 7.7 mt, global carryover stocks are estimated at almost 21 mt in 2015-16 against 22 mt the previous year. ICAC forecasts India's output at 6.4 mt, a dip of two per cent from the previous year. After increasing 16 per cent to 9.4 mt in 2014-15, stocks held outside of China are expected to decrease by four per cent to nine mt by the end of 2015-16. Much of the world's excess stock is held by the Chinese government, from purchases made by China National Cotton Reserve Corporation under its stockpiling policy from 2011-2014. The Reserve made its final purchase of the 2013-14 crop in March 2014, with sales continuing through August, ending with an accumulation of 11.3 mt. On July 10, the Chinese government started to sell its stockpiles at prices close to the current domestic market price in the hope of maintaining market stability, ICAC said. The agency estimates India's ending stock at 2.2 mt in 2014-15, the second largest volume. Part of the rise is with the government, which procured under a minimum price support programme. Cotton Corporation of India purchases in 2014-15 are estimated at 1.5 mt and sales through the end of July at 650,000 tonnes. However, exports from India have fallen 51 per cent to 980,000 tonnes, also contributing to the build-up of stocks.

Agri Infrastructure and Agribusiness

India's Developing Story

Agribusiness has become synonymous with agriculture today. The scope and definition of agriculture now encompasses the broad concepts of agribusiness and houses many businesses from agri inputs to agri service. As a result of this transformation, many new technology and products have become an integral part of agriculture. Agri infrastructure which was until recently a superfluous addendum to agriculture, is vigorously augmented in the agri sector today to make it more profitable and practical. Many private firms have channelled their interests and investments in building agri infrastructure which will truly work in favour of millions of farmers and aid in rural development.

India's food production has taken a major turnaround in the recent past. The minor occupation of growing and selling food for the purpose of survival of the farmers has turned into something of gigantic proportions today. Today agriculture is not mere farming but 'agribusiness' which has flourished into many major and minor enterprises spanning from the input industry to processing industry.

The seventies made the groundwork for the food production revolution that was about to be witnessed in the ensuing years. The spurt in food production did take care of the domestic food demands. They years that followed made many new contributions to the food industry which took agriculture from the fields of the Indian farmers beyond the borders of the country.

The better economic prospects of the country and the discerning consumers played an important role in widening the scope of agriculture in India.

India's Booming Food Industry

Food is one of our basic necessities. But with the growing complexities of the world, food production scenario has changed and gotten more complex. The Indian food industry has been increasing its contribution in world food trade every year. In India, the food sector has emerged as a high-profit sector on the back of the scope it offers for value addition, particularly with the food processing industry getting recognised as a high-priority area.

Accounting for about 32 per cent of the country's total food market, the food processing industry is one of the largest industries in India and is ranked fifth in terms of production, consumption, export and expected growth. The total food production in India is likely to double in the next 10 years with the country's domestic food market estimated to reach US$ 258 billion by 2015.

The Indian food and grocery market is the world's sixth largest, with retail contributing 70 per cent of the sales. It is projected to grow at the rate of 104 per cent, touching US$ 482 billion by 2020. The Indian food processing industry accounts for 32 per cent of the country's total food market, 14 per cent of manufacturing GDP, 13 per cent of India's exports and six per cent of total industrial investment.

Indian food service industry is expected to reach US$ 78 billion by 2018. The Indian gourmet food market is currently valued at US$ 1.3 billion and is growing at a CAGR of 20 per cent. It is expected to cross US$ 2.8 billion by 2015. Indian food brands are increasingly finding prime shelf space in retail chains abroad. These include Bikanervala Foods, MTR ready to eat foodstuff and ITC's Kitchens of India.

The online food ordering business in India is in its nascent stage. Share of online food ordering would be in single digits of the overall food ordering business which in 2014 was estimated to be around Rs 5,000-6,000 crore (US$ 800.19-960.12 million). We are growing at 20-30 per cent month-on-month.

The poultry sector of India is expected to register double-digit growth in 2015 on the back of stable feed prices and encouraging rural demand.

The Industry Led Growth

Agriculture in its present format thrives on a host of input industries. Seeds, agrochemicals, agri machineries, irrigation equipment, capital are some of the important inputs that go into the making of India's agri sector. So it is natural to assume that these input industries have become major sources of income and business opportunities.

Seeds are undeniably the most significant inputs used in agriculture. With a turnover of over Rs.15,000 crore, the Indian seed industry ranks fifth in the world. India produces four million tonnes of seeds every year. According to National Seed Association of India, the market size of the industry is expected to grow 11 per cent every year. This is against a compounded annual growth of 16.3 per cent between 2007 and

2012. Nearly 87 per cent of the seeds produced are for grains and the rest for vegetables.Although public sector plays a crucial role in supplying the input, private sector has also made an impressive imprint on the seed sector. Currently there are over 500 private seed companies including a few multinational companies. The private sector accounts for almost 70% of market turnover of processed seed in the country, whereas public sector has greater share in term of volume.The Indian hybrid seed sector is believed to be growing at about 17.5% annually and has grown from estimated Rs 5700 in 2008-09 to an estimated Rs 12550 in 2013-14. The insatiable demand for better productivity has been driving the seed sector to soaring production and economic gains.

The green revolution not only brought the concept of better seeds, but also threw open the fields of Indian farmers to a number of agro chemicals which ranged from fertilizers to pesticides. When the production of food grains soared, the agro chemical sector also expanded leading to newer and better brands landing on the Indian farmers' fields. The market size of Indian agro-chemicals industry is expected to more than double to $5 billion by 2017 on rising farm production and increasing awareness among farmers. India is the fourth-largest producer of agrochemicals in the world after the United States, Japan, and China.The crop protection market has experienced strong growth in the past and is expected to grow further at approximate 12 per cent p.a. to reach $ 6.8 billion by FY17. The growth would be largely driven by export demand which is expected to grow at 15-16 per cent p.a., while domestic demand is expected

to grow at 8-9 per cent p.a. Biopesticides, which currently represent only 4.2 per cent of the overall pesticide market in India, are expected to exhibit an annual growth rate of about 10 per cent in the coming years. Indian agrochemicals market is supported by strong growth drivers. Currently India's consumption of crop protection products is relatively low i.e., 0.6 kg/ha when compared to world average of 3 kg/ha.This offers immense opportunities for future growth. Availability of cheap labour and low processing costs offers opportunity for MNCs to set up their manufacturing hubs in India for their export markets. The sector is also driven by huge opportunity for contract manufacturing and research for Indian players due to large availability of technically skilled labour.With billions of dollars worth agrochemical patents expiring by 2020, global chains are eyeing to buy or tie-up with Indian companies. At least $9 billion (about Rs 61,000 crore) worth of patents for more than 50 agrochemical products are expected to be taken off the patent list and manufacturing is likely to move to emerging markets like India. Japan's agrochemical firms have already begun forging alliances with Indian firms. While Sumitomo Chemical acquired Mumbai-based New Chemi in 2010, Otsuka Agritechno formed a joint venture in R&D with Insecticides India. Another Japanese major ISK is conducting field trials of new pesticides with United Phosphorus in India. Many Indian manufacturers are also in talks with companies from other regions and deals are likely to be announced soon.

Feeding on the gains derived from India's green revolution and a robust subsidy scheme, fertilizers have stayed in the Indian agri scene for a long time. Today India is the second largest consumer of fertilisers in the world, after China. The rapid expansion of irrigation, spread of HYV seeds, introduction of Retention Price Scheme, distribution of fertilisers to farmers at affordable prices, expansion of dealer's network, improvement in fertiliser availability made sure that Indian farmers stayed loyal to the fertilizers. India has 30 manufacturing units of Urea with an installed capacity of 21.6 million tonnes till 2013. There are 12 units of DAP producing plants with a combined capacity of 8.3 million tonnes. Complex fertilisers in the country have an installed capacity of 6.4 million tonnes from 19 units. Highest number of fertiliser units in the country belongs to Single Super Phosphate (SSP). India has 85 SSP units with a combined production capacity of 7.7 million tonnes.

Although a late entrant, India has also started to invest in agri mechanization. Considering the regular decline of labour force in agriculture, farmers have lately sought the help of agri machinery in many of their field operations. The Indian tractor industry is the largest in the world and accounts for one third

India has 30 manufacturing units of Urea with an installed capacity of 21.6 million tonnes till 2013. There are 12 units of DAP producing plants with a combined capacity of 8.3 million tonnes

Currently growing at more than 10 per cent per annum, Indian food processing industry is expected to touch US$ 194 billion by 2015 from a value of US$ 121 billion in 2012. The packaged food sector in India is likely to double by 2015 to touch US$ 30 billion from the current US$ 15 billion

of global production. The current size of Tractor industry is 5,25,000 units (March, 2013) and is expected to grow by CAGR of 8-10 per cent in next decade. The opening up of the Indian minds and fields to farm mechanization has opened up gates for many farm equipment manufacturers to expand its farm auto business. Deere, the world's largest farm-equipment maker, opened an $80 million factory, its second, in Madhya Pradesh. Mahindra, already the world's largest tractor company, recently invested $45.5 million to build Asia's largest tractor factory in southern India with a capacity of 100,000 vehicles a year. The company is also boosting production of other farm equipment, such as combine harvesters, and it plans to launch rice transplanters. Mahindra has also set up a research and development facility in the southern city of Chennai to come up with new products, including larger tractors. And it has set up 160 centers to encourage farmers to mechanize. Besides, the conventional farming machines and equipment, many industry giants are considering adapting to the local needs.

With a huge agriculture sector, abundant livestock, and cost competitiveness, India is fast emerging as a sourcing hub for processed food. Estimated to be worth US$ 121 billion in 2012, the Indian food processing sector is poised for excellent growth in the coming years. It is ranked fifth in terms of production, consumption and exports. India attracted 1,970 million dollars of foreign direct investment in food processing sector between April 2000 and July 2013. Food and food products are the largest consumption category in the country with a market size of 181 billion dollars. The spending on food and food products amounts to nearly 21 per cent of the gross domestic product. The Indian food processing industry accounts for 32 per cent of the country's total food market. Currently growing at more than 10 per cent per annum, it is expected to touch US$ 194 billion by 2015 from a value of US$ 121 billion in 2012. The packaged food sector in India is likely to double by 2015 to touch US$ 30 billion from the current US$ 15 billion, owing to the rise in income, changing urban lifestyle and modern retail trade. The share of food processing export in total exports from India is 12 per cent. Indian agricultural and processed food exports in the period April 2013–October 2013 stood at US$ 12,797.65 million as compared to US$ 11,827.50 million during the same period last year, according to data released by the Agricultural and Processed Food Products Export Development Authority (APEDA).

Investments Heating up

Agri business has lured many firms to invest in this segment. Private equity and venture capital firms are warming up to investments in agriculture and allied sectors—a trend that started with warehousing companies but is now extending to other segments like crop care.

IDFC Private Equity, the PE fund of IDFC Alternatives Ltd and infrastructure financier IDFC Ltd, is among those looking at incubating and investing in such businesses. IDFC PE is in the process of conceptualizing a crop-care business, which will manufacture and market third-party products, such as fungicides and biopesticides, under its brand name. It will also manufacture specific products.

Zephyr Peacock India, a private-equity arm of the New York-based Zephyr Management Lp, is looking to incubate a firm in agri-input business and plans to acquire

smaller, unorganized businesses under this platform. Zephyr Peacock India, at present, is deploying capital from its second fund, which has a corpus of $70 million.

As per VCC Edge, the financial research platform of VC Circle, since January this year, four firms in the food and agriculture sector have raised $71 million. This compares with $68 million raised by 10 firms in 2014. Over the last five years, funds have allocated more than $1 billion towards food and agri businesses in the country.

In June 2015, George Soros's The Aspada Investment Co., which provides early-stage capital, invested $3.3 million in EM3 Agri Services Pvt. Ltd, which manufactures farm machinery. In March, Aspada invested $3.18 million in an agriculture products firm INI Farms Pvt. Ltd. "There is an increasing pressure on growing more food in India. This has created an opportunity to marry the trends of rising incomes, the need to grow more food and using the latest technologies around farm productivity, which have become economically viable to be deployed in a large way," said Kartik Srivatsa, managing partner, Aspada Investments.

Since 2011, the fund has made six investments in the agri space, committing almost $25 million of capital.

"In order to upscale and modernize, companies in these sectors need capital infusion. Also, companies have to set up vast distribution networks to reach out to the large, but scattered, farmer population, which again needs a lot of capital investment," said Dhanraj Bhagat, partner, Grant Thornton India Llp, adding that the market for agriculture products and services is huge and largely untapped by organized firms.

On 21 July, Fairfax India Holdings Corp. acquired a 74% stake in National Collateral Management Services Ltd (NCMSL) for about Rs.800 crore.

Government this year sanctioned proposals for setting up 30 new cold chains in the country with a total investment of Rs 724.9 crore

NCMSL is a private-sector agriculture warehousing firm. Another such firm, Sohanlal Commodity Management Pvt. Ltd, is in the process of going public.

Agri Infrastructure – Firming up

While India has been displaying stupendous alacrity in enhancing its farm production, the country lags regrettably behind in matching infrastructure. Disappointingly, India loses a good amount of its farm produce due to the inequities in the infrastructure and the paltry interest in it. Union Minister Sadhvi Niranjan Jyoti recently said that only 2 per cent of the food produced in the country is processed while farm commodities worth Rs 92,000 crore are wasted every year.

India's cold storage infrastructure was built in the 1960s, mainly for potatoes and potato seeds, and there were no massive investments in cold storage for a long time, until organised retail started picking up recently. India has a total of roughly 5,300 cold storages with a capacity of 23 million metric tonne, over 90 per cent of which are suitable to store potato products only and are fairly archaic. The cold chain capacity situation is even worse at just over 60,000 metric tonne only.As per the NSEL report, there is deficit of 29 million tonnes of cold storage capacity in the country. As against the total requirement of 61 million tonnes of cold storage capacity, only 32 million tonnes have been set up so far.

The consistent losses associated with the perishable agri produce made the government cognizant of the much needed cold storage infrastructure and refrigerated transport.Budget 2011-2012 provided infrastructure status to the cold chain sector which opened up the sector for perks like viability gap funding. The Budget also exempted air-conditioning equipment and refrigeration panels used in cold chain infrastructure, including conveyor belts, from excise duty. Budget 2010-2011 proposed a concessional import duty of five per cent with full exemption from service tax to set up and expand cold chains to preserve farm produce as well as milk, meat and poultry products. The proposal also included duty-free import of refrigeration unit, which is required to make refrigerated vans or trucks. It also exempted trailers and semi-trailers used in agriculture from excise duty. As part of Budget 2009-2010, Government of India introduced tax benefits for companies making investments in setting up cold chain facilities. Other past incentives include access to external commercial borrowings, 100 per cent FDI

and provision of up to 25 per cent project costs involved in setting up cold storage facilities provided by the Government under the Capital Investment Subsidy Scheme. The Government of India has also revised its Scheme of Food Parks under the 10th Five Year Plan into the Mega Food Park Scheme (MFPS) under the 11th Five Year Plan, which envisages a growth in India's share in global food trade from 1.5 per cent to three per cent by the year 2015. This would be achieved through promotion of both processing and cold storage facilities in India.

The new government is also keen on promoting this side of the agri sector. Government this year sanctioned proposals for setting up 30 new cold chains in the country with a total investment of Rs 724.9 crore."These projects will help in a big way in reducing the wastage of food, and the Ministry will also provide grant of Rs 274.9 crore on these projects," Food Processing Minister Harsimrat Badal said. The total capacity of these projects will be 1.12 lakh tonnes of cold storage and 11.10 lakh litres of milk per day. It would attract an investment of another Rs 470 crore. It will also result in addition of 209 reefer or refrigerated container vehicles. Once all the 138 cold chain projects become operational, it will add 4.76 lakh tonnes of storage capacity and 118 lakh litres per day milk processing capacity and 810 reefer vehicles.

India's deeply unmet warehousing requirement is also stirring up expansion of India's warehouses. The Indian warehousing requirement is expected to grow at an annual average rate of 9% to 1,439 million sq. ft in 2019 from 919 million sq. ft in 2014, according to global property consultancy Knight Frank

The Modi government this year allocated 17 mega food parks across the country to state governments and private firms, including Adani Ports & SEZ, envisaging an investment of over Rs 6,000 crore.A mega food park provides various facilities to food processors, farmers, retailers and exporters, helping achieve faster growth of food processing industries. The project cost to set up these 17 mega food parks would be Rs 2,030 crore, of which the Central grant would be Rs 850 crore. An estimated investment of another Rs 4,000 crore would be from food processing units to be set up in these parks.Under the scheme (2008-09) of mega food parks, the food processing ministry had sanctioned 42 projects throughout the country. Of these, 25 parks have already been allocated.Five state governments -- Punjab, Haryana, Andhra Pradesh, Telangana, Odisha --- have been allocated one food park each, while Kerala government has been allocated two food parks. Adani Ports and Special Economic Zone, Jain Agro Trading Company and Ruchi Acroni Industries are among 10 private players who have been allocated food parks by the Centre. In these mega food parks, 80,000 people are expected to get employment while 5 lakh farmers would also be benefitted.

The Mega Food Park Scheme, based on cluster approach, is modelled on hub and spoke architecture. It aims at facilitating the establishment of a strong food processing industry backed by an efficient supply chain, which includes collection centres, central processing centre (CPC) and cold chain infrastructure.

India's deeply unmet warehousing requirement is also stirring up expansion of India's warehouses. The Indian warehousing requirement is expected to grow at an annual average rate of 9% to 1,439 million sq. ft in 2019 from 919 million sq. ft in 2014, according to global property consultancy Knight Frank. The India Logistics and Warehousing Report 2014 released by Knight Frank estimates the additional demand for warehousing space per year as around 104 million sqft till 2015 and will entail investments of about Rs.15,000-16,000 crore every year. According to an 18 February 2015 report by a committee on strengthening negotiable warehouse receipts, set up by the Warehousing Development and Regulatory Authority (WDRA), India's total warehousing gap is estimated at 35 million tonnes.According to the WDRA report, India has a storage capacity of 117.52 million tonnes for post-harvest commodity warehousing, of which the private sector contributes just 18.97 million tonnes. Sensing the huge gap in the sector, companies operating commodity warehouses that are a vital link in the agriculture supply chain are looking to raise private equity (PE) capital as they expand their business and create new growth verticals. SohanLal Commodity Management Pvt. Ltd, Origo Commodities India Pvt. Ltd and National Collateral Management Services Ltd (NCMSL) are looking to raise fresh capital from PE investors. Apart from stocking a range of commodities and issuing receipts against them, modern commodity warehouses provide allied services such as procurement, maintenance, collateral management and financing.

Troubled Waters

What India needs at this juncture is significant development of agri infrastructure to keep pace with India's food production. Undeniably India's agriculture has matured into a high stake agri business enterprise. But still there gaps and voids in this development story.

The cold storage industry is an energy intensive one and hence there are formidable operating costs associated with it. The operating costs for the cold storage business in India are approximately Rs 80-90 per cu ft per year as compared to Rs 40 per cu ft per year in the West. Energy expenses alone make up about 30 per cent of the total expenses for the cold storage industry in India compared to 10 per cent in the West.

These factors make the business of setting up of cold storages one of high entry barrier.

Increasing real estate price is another deterrent that has been discouraging the newbies from entering this segment. Typically, a fully integrated, international class cold storage facility with one million cu ft of storage space will require an area of an acre to build, which could cost anything between Rs 1 crore and 1.5 crore, constituting 10-12 per cent of the project cost. Cooling units are not mobile units, and so location becomes a key factor, and with India's small land holdings, getting a sufficiently large tract of land to build a cold storage unit becomes a major additional constraint.

The cold chain industry in India currently is very fragmented, with players not having the cash strength to invest in the technology needed to build high quality cold storage infrastructure or even be able to cover the entire value chain from procurement at far-flung farms through transportation in reefer trucks to delivery at retail centres in cities. Currently, fresh produce is left near the fields till a truck-load is accumulated for drop at the local market. To add to the problem, pre-cooling in most parts of India is unheard of, and the transportation is done in open body trucks.

A majority of investment into setting up cold storages in India has been in states like Uttar Pradesh, Uttaranchal, Maharashtra, Gujarat, Punjab and West Bengal. This needs to be more geographically diverse, and reflective of the production levels of fruits and vegetables in various parts of the country. Secondly, the cold storages that have been traditionally set up can cater to single commodities only. Different commodities require different ambient conditions for storage and the current technology in use at most Indian cold storages prevents that, resulting in poor capacity utilisation and low financial viability because of the expected seasonality of food products.

Large investments are needed to develop agri infrastructure in India, and needs support to a significant extent from the private sector. Even though business groups like the Birlas, the Future Group, the Reliance Group and the Bhartis have been investing in cold chain, easing restrictions on FDI in retail could open up the channels for further fund infusion from new foreign entrants into the retail business.

Today's agriculture has developed into a major enterprise aligning many compatible operations thus widely broadening the canvas and scope of the agribusiness. The emergence of agribusiness in India has brought together the farmers, consumers, traders and industry deriving a synergy that can still fuel further India's agri business. But what India needs at this point is to fill the gaps in the infrastructure to make it more productive, economical and sustainable.

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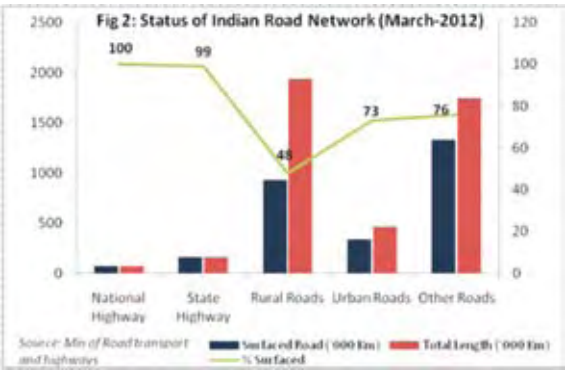
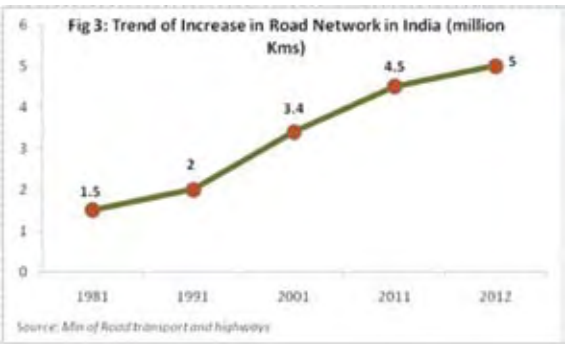
Agribusiness and Farm Infrastructure – An Overview

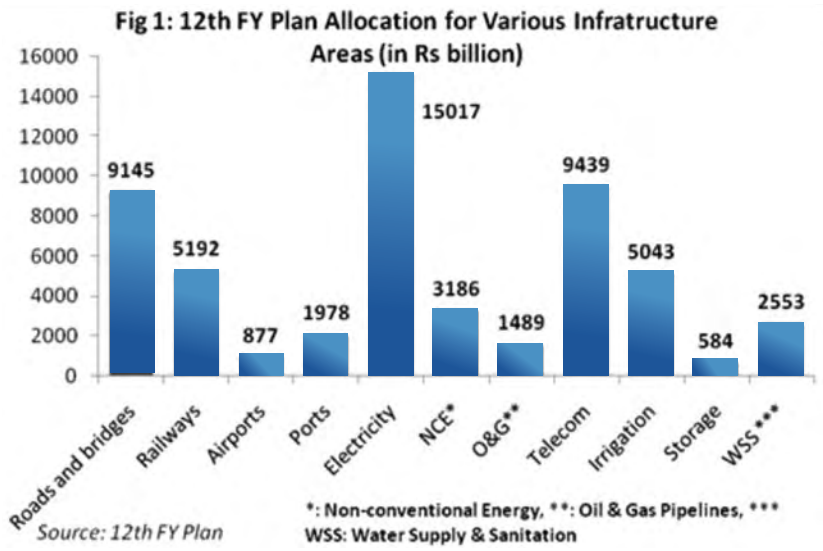
A well-developed infrastructure related to agribusiness and farm society as a whole has been one of the priority areas for India to boost a sustainable and holistic development of the farm sector. Providing adequate infrastructure for agribusiness and the farm sector is important not only for rapid growth of agricultural production but also for attaining holistic developmental goals such as poverty alleviation, employment generation and industrial development. Infrastructure development in the country has been traditionally supported by the public sector since independence, though in the recent decades, private sector participation has been encouraged. Agricultural infrastructures can be capital intensive (like irrigation, roads, bridges) as well as capital extensive (like extension services) along with institutional infrastructure (in the form of formal and informal institutions). Agribusiness and farm infrastructure are related to various areas like irrigation, watershed development, rural electrification, roads, markets, credit institutions, agricultural research and extension, and allied sectors.

Twelfth Five Year plan has an elaborate financial outlay for various infrastructure developments in the country, some of which are directly related to the agribusiness and the farm sector. As seen in Fig 1, substantial amount of money has been earmarked for infrastructure development like roads and bridges (Rs 9145 billion), Railways (Rs 5192 billion), Electricity (Rs 1507 billion), Irrigation (Rs 5043 billion) and even very critical and emerging needs like storage (Rs 584 billion).





Status of some of the critical infrastructure essential for the growth of the agribusiness and farm sector is discussed in this section.



Road Infrastructure in India

Till the end of March, 2012, India had a total road network of about 5 million kilometres. 77000 km of National Highway run across the length and breadth of the vast country, linking different regions to one another (Fig 2). Entire length of this national highway network is surfaced. State highways are important for linking different places within a state and are quite crucial for the farm sector for accessing different markets. India has 164000 km of total state highways and almost 99% (163 km) of it is surfaced. India has a total network of almost 2 million km of rural roads, which forms the artery for the movement of rural population and

Table 1: Road Accessibility Indicators	
Road Density	Km As on 31st March, 2012
Road Length per 1000 sq. km	
Urban	5940
Rural	621
Road Length per 1000 Population	
Urban	1.3
Rural	2.3
Source: Min of Road transport and highways	

farm goods. However, the condition of rural roads needs improvement as only 48% (930 km) of it is surfaced. Other than these, India has 464000 km of urban roads and 1748000 km of other roads, much of which is not surfaced.

India's road network has received a major impetus during the last three decades. The total road network in the country has increased by 233% from 1981 to 2012. In 1981, the total road network in the country was just 1.5 million km. This increased to 2 million km till 1992. Another 1.4 million km of road was added in the country in the subsequent decade till 2001, increasing to 3.4 million kms by the end of 2001. It increased further to about 5 million kms till 2012. Considering the fact that road transportation accounts for 65% of freight movement and 80% of passenger traffic in India, government has taken up various ambitious and important projects to develop the road connectivity. One such important initiative is the Golden Quadrilateral project, connecting the four major cities of Delhi, Mumbai, Chennai, and Kolkata and is the fifth-longest highway in the world. There are also other initiatives like Pradhan Mantri Gram Sadak Yojana to improve and increase the connectivity of rural roads.

Railway Infrastructure in India

Indian Railways is the lifeline of the nation traversing the length and breadth of the country and provides the required connectivity and integration for a balanced agribusiness and farm development. With a system like the Indian railways that never rests and that has been up and working unceasingly for the last several decades, it provides a crucial infrastructure support for the movement of essential agri inputs like fertiliser and farm outputs like grains and other food products..

Indian railways is one of the largest transportation and logistics networks of the world which runs 19,000 trains, out of which 12,000 trains carry over 23 million passengers per day connecting about 8,000 stations spread across the sub-continent which is equivalent to moving the entire population of Australia every day. Apart from that, it also runs more than 7,000 freight trains per day carrying about 3 million tonnes of freight every day. The total network of Indian railways is more than one and half times the circumference of the earth.

Fig 4 provides a look into the consistent increase in freight carrying capacity of the railways in the recent years. During 2013-14, Indian Railways carried 1.05 billion tonnes of revenue earning freight traffic and is expected to carry 1.1 billion tonnes in 2014-15. However, the railways infrastructure of the country faces challenges of capacity constraints. The freight tariffs are higher and further rising, a measure which is adopted to offset the populist policy of huge subsidies offered in the passenger fares. As a result of capacity constraints and very high

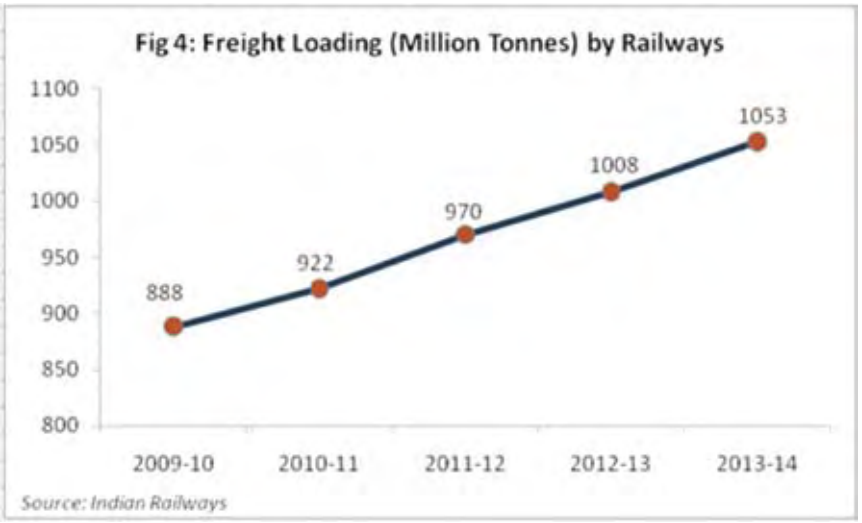
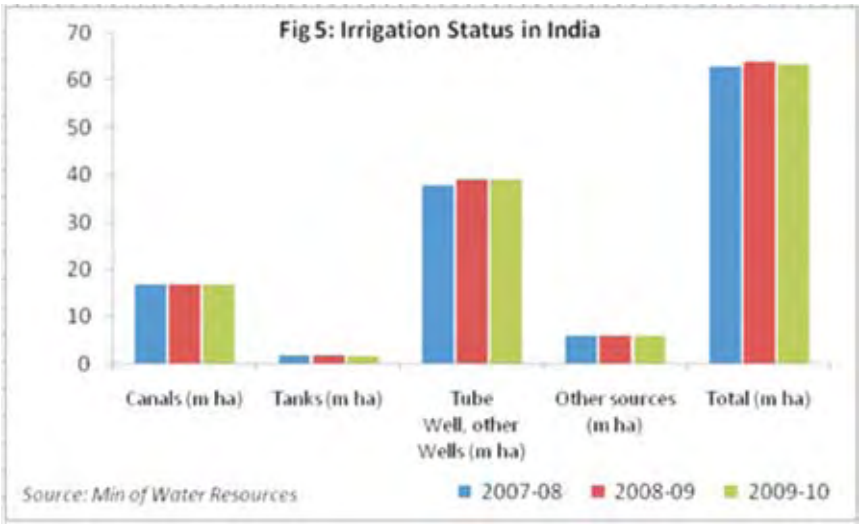
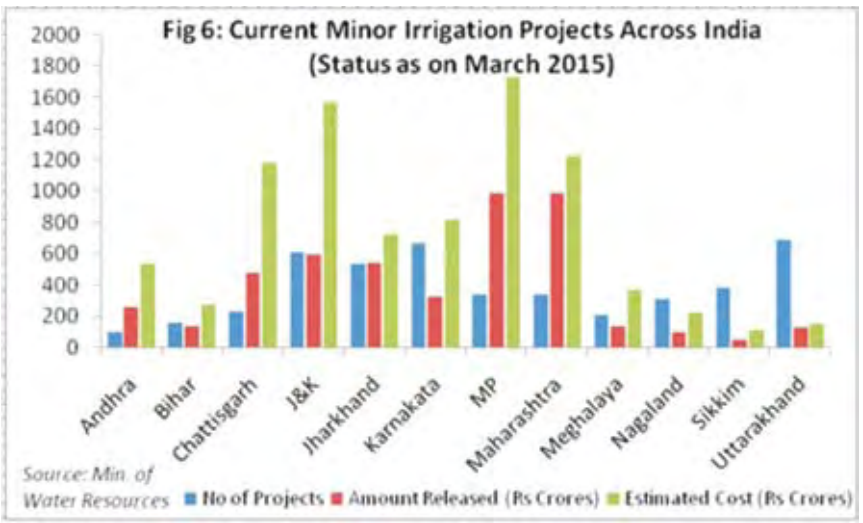


Table 2: Key Parameters of Railway Infrastructure	
Route Km(All Gauges)	65,806
Running Tracks Km (All Gauges)	89,987
Total Track (Km)	1,14,907
Freight Carried (Million Tonnes)	1,054
Wagon Turn Round (Days)	5.13
Wagon Capacity (Million Tonnes)	13.65
No. of Passenger Trains Run Daily	12,874
Source: Indian Railways	

freight tariff, Indian railways have always been less productive when compared to other major countries. In 2012-13, Indian Railways achieved 1,008 million tonnes of originating loading and in the process, entered the Billion Club in freight loading.It has fixed a target of 1,105 million tonnes for the current financial year and 1,405 million tonnes during 2015-16 which is the last year of the 12th Five Year Plan.





Irrigation Infrastructure in India

Irrigation infrastructure is very crucial in a country like India where agriculture is still the backbone of the economy. If agriculture productivity has to be increased to meet the demand of the ever growing population amidst a scenario of decreasing arable land, irrigation infrastructure is very crucial. Currently, only half of the agricultural land in the country is covered by assured irrigation and the rest is left to depend on the June-September monsoon which remains uncertain every year.

A total of 63.6 million hectares of land was under irrigation during 2010. Canals in the country irrigate about 17 million hectares of farm land, tanks and other sources irrigate 1.6 million hectares and 6 million hectares of land respectively. Area under irrigation by tube wells and other wells is the highest in the country at 39 million hectares.

Fig 6 provides the latest scenario related to some of the important projects currently in place with an aim to improve the irrigation infrastructure of India. In the state of Uttarakhand, a total of 691 minor irrigation (MI) projects are currently in progress. As on March 2015, out of the estimated cost of Rs 152 crores, an amount of Rs 131 crores has already been released. 664 minor irrigation projects have been taken up in the state of Karnataka with an estimated cost of Rs 821 crores, out of which Rs 328 crores has been disbursed so far. Jammu and Kashmir is poised for a susbtantial improvement in the irrigation status with 607 projects related to minor irrigation projects currently in progress. States like Jharkhand (538 minor irrigation projects), Madhya Pradesh and Maharashtra (343 MI projects each), Nagaland (314 MI projects), Sikkim (381 MI projects), Chattisgarh (232 MI projects) etc., are all important states in terms of effort from the government to improve the irrigation status. So far, till March 2015, more than Rs 4737 crores of fund has been infused in various projects across the country in various minor irrigation related projects.

In July 2015, India had allocated Rs 50000 crores over the next five years to expand irrigation infrastructure in rural areas to boost crop productivity across the country. The programme known as Pradhan Mantri Krishi Sinchai Yojana (PMKSY) includes both surface as well as micro irrigation techniques. A total of Rs 5300 crores have been allocated for the irrigation projects in the current fiscal year ending on March 31, 2016. Through this spending during the current fiscal year, it is expected to bring an additional 6 lakh hectares under irrigation along with 5 lakh hectares under micro irrigation. Apart from this, 1300 watershed projects have also been targeted to be completed.

The major objectives of the PMKSY scheme is to achieve:

- convergence of investments in irrigation at the field level
- expand cultivable area under assured irrigation (with a slogan of “har khet ko pani”)

- improve on-farm water use efficiency to reduce wastage of water
- enhance adoption of micro-irrigation and other water-saving technologies (more crop per drop)

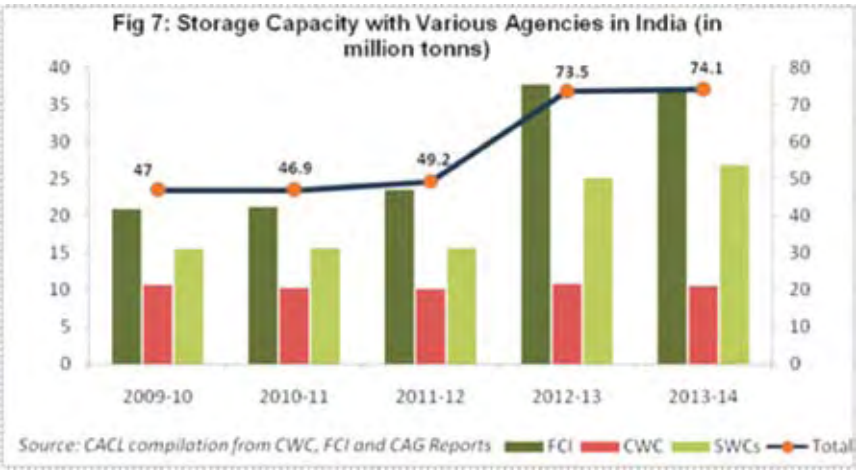
Storage and Warehousing Infrastructure in India

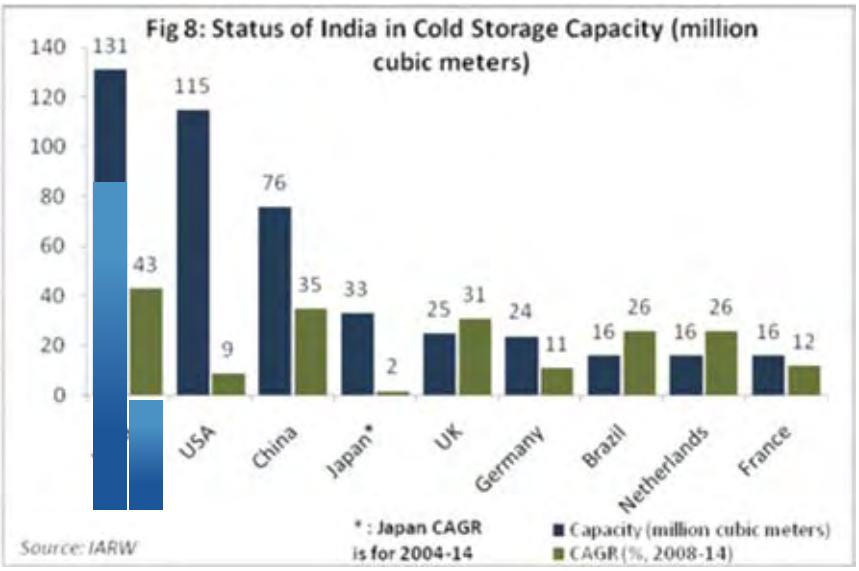
One of the critical infrastructures for the agribusiness and the farm sector of the country is availability of adequate warehousing and storage infrastructure. However, unfortunately, even after almost seven decades of attaining independence, India lacks adequate storage facilities to support its agrarian community to store their produce and avoid distress sale. Currently the warehousing infrastructure is highly fragmented and without any exhaustive estimation of the size of the market and the number of warehouses. The warehousing and storage infrastructure currently consists of central and state warehousing corporations, captive warehouses, some organised high-quality private warehouses, and small unorganised warehouses. Further, warehousing activity currently in India is characterised by high level of information gap between the warehouse owners and warehouse users in terms of the quality of warehouse service. There is a shortage of warehousing facilities and services across the country as a result of which the warehouse owners often exercise market power over their customers.

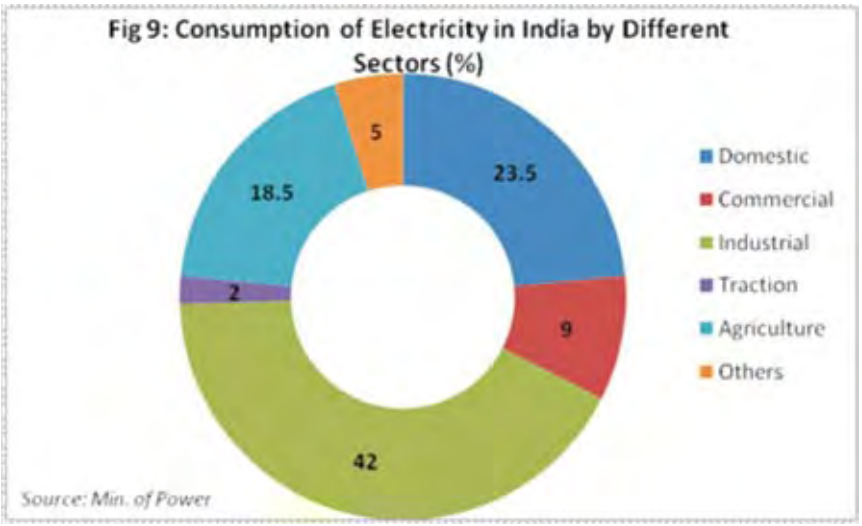
Three government agencies, namely Food Corporation of India (FCI), Central Warehousing Corporation (CWC) and several Sate Warehousing Corporations together are the leading organisations engaged in providing warehousing infrastructure to agribusiness and the farm sector. Between 2009-10 and 2013-14, the warehousing capacity in the country has increased by almost 58%. In 2009-10, the total warehousing capacity in the country provided by FCI, CWC and SWCs together was 47 million tonnes which increased to 74.1 million tonnes in 2013-14. This also represents a CAGR growth of almost 15% during the period. Capacity of FCI has increased substantially by 76.5% from about 21 million tonnes in 2009-10 to about 37 million tonnes in 2013-14.

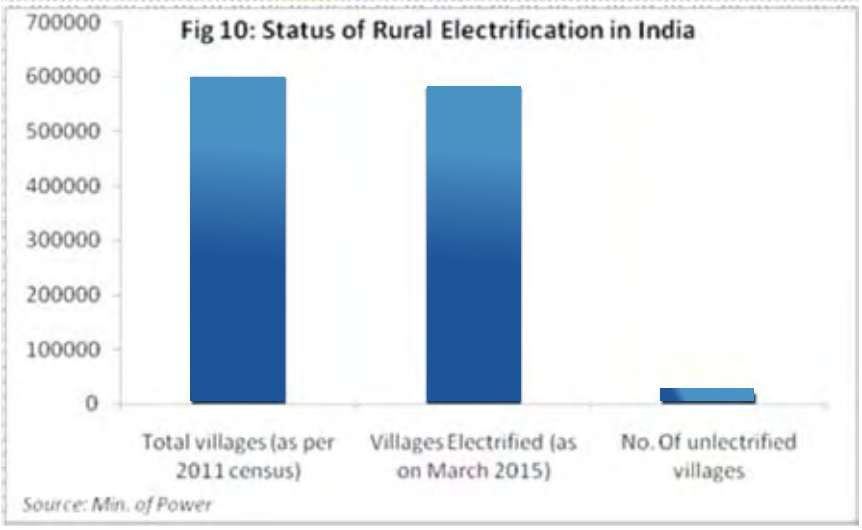
In terms of storage infrastructure in the country, cold storage is emerging as a crucial area for the agribusiness sector. India is the largest producer of fruits and second largest producer of vegetables in the world and unfortunately, post harvest losses of fruits and vegetables in the country account for about 25% to 30% of production which in turn makes the per capita availability of these essential food items very low in the country. Fruits and vegetables account for 18% of our agricultural output and these are mainly perishable in nature requiring a cold chain arrangement to maintain the quality and extend the shelf life. This is very important both for the farm sector as well as the consumers as farmers can reduce wastage of their produce and get better price through cold chain infrastructure while consumers get to eat good quality farm produce.

Though India still lacks adequate cold storage infrastructure to take care of its huge agriculture production and also to ensure equitable distribution of food produce across the country, it has however emerged as the leading country in the world in terms of cold storage capacity, surpassing countries like USA and China. As seen in Fig 8, till 2014, India had a total storage capacity of 131 million cubic meters









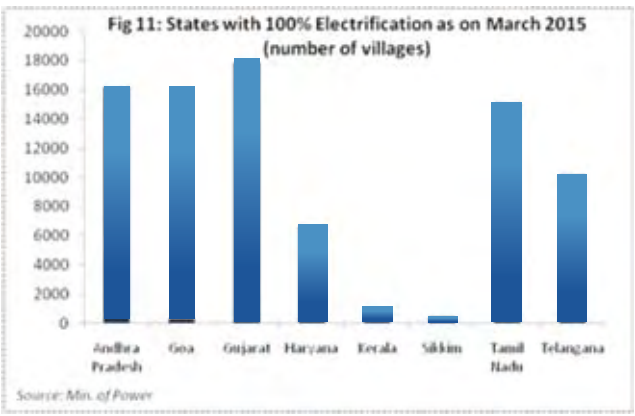
in the country, higher than USA with 115 million cubic meters of cold chain facility.

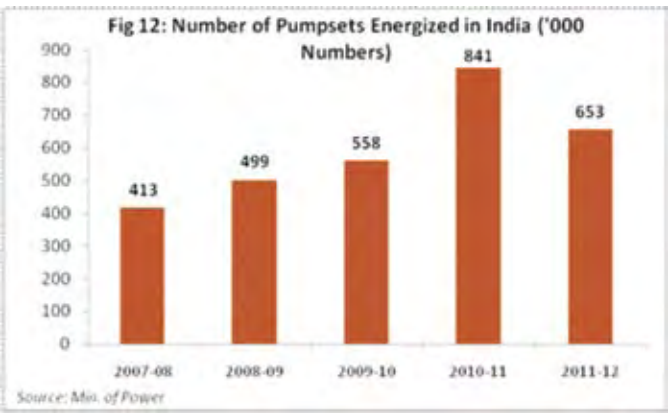
Rural Electrification Infrastructure in India

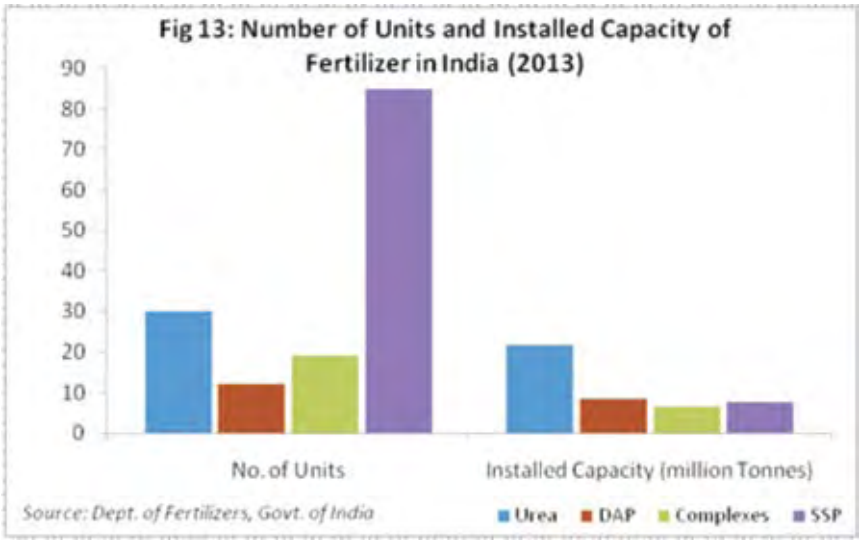
Agriculture sector is the third largest consumer of electricity in the country. As seen in Fig 9, agriculture sector consumes 18.5% of the total electricity available in the country, while industrial sector needs maximum electricity consumption, currently at 42% in the country. Domestic sector is the second highest consumer of electricity with 23.5% of the total available electricity in the country. Needless to say, for the growth of the farm sector and increased mechanisation, electricity is important. The country has been actively engaged in improving the infrastructure related to electricity through policy initiatives and budgets in various five year plans so far.

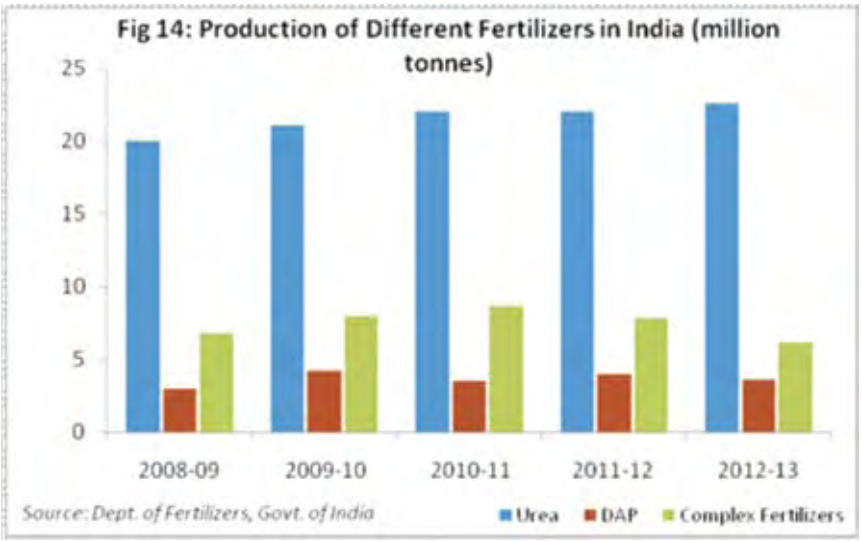
India has been able to improve its rural electrification status in the recent years, which is important for the agribusiness and the farm sector. According to 2011 census, India has almost 6 lakhs villages spread across different parts of the country and many of these villages are very remote in terms of accesibility and topography. Despite the vastness and the geographical challenges in many areas, India has almost 97% of its villages electrified, as on March 2015. As seen in Fig 10, out of 597464 villages in the country, 577698 of them are electrified.

Many of the states have achieved 100 per cent rural electrification Andhra Pradesh (16158 villages), Goa (320 villages), Gujarat (17843 villages), Haryana (6642 villages), Kerala (1017 villages), Sikkim (425 villages), Tamil Nadu (15049 villages) and Telengana (10128 villages) have achieved 100% village electrification as on March 2015 (Fig 11). Other than these states, Union Territories like Chandigarh, Dadra and Nagar Haveli, Daman and Diu, Delhi, Lakhswadeep and Pondicherry have also realized 100% rural electrification.







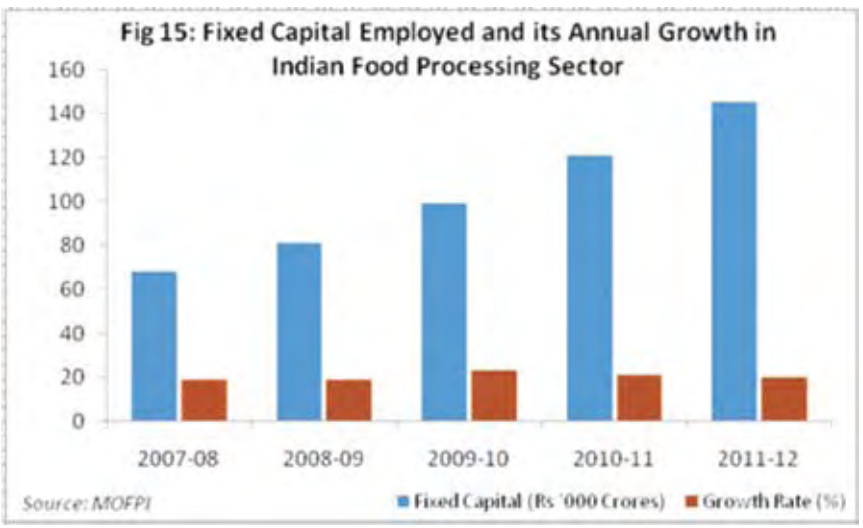


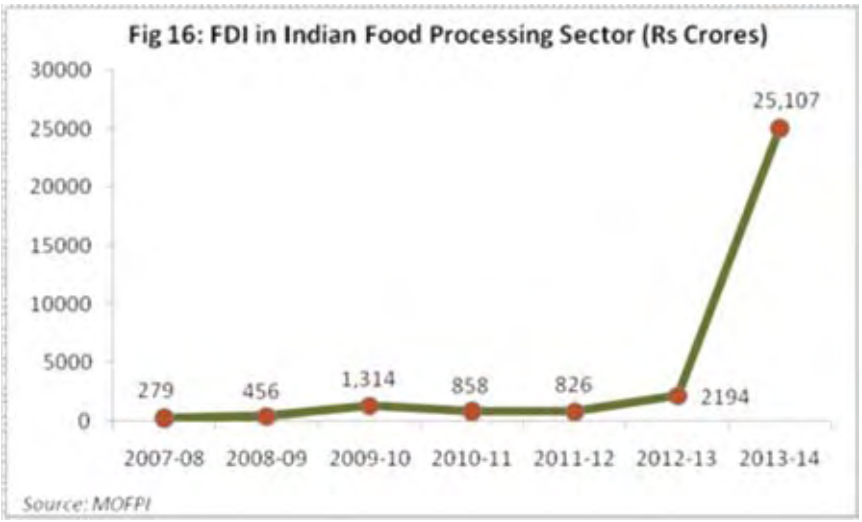
Till 2011-12, there were almost 3 million pumpsets which were energized between 2007-08 and 2011-12. Fig 12 shows the trend in different years related to this aspect which forms an important component of power infrastructure in the country related to the agribusiness and the farm sector. In 2007-08, 413000 pumpsets were energized and the number consistently increased to 841000 in 2010-11, before falling to 653 in the financial year 2011-12.

Fertiliser Production Infrastructure in India

Chemical fertilizers have played an important role in improving the food grain production status of the country and since independence, Government of India has played a very important role in terms of consistently pursuing policies conducive for increased availability and consumption of fertilizers at affordable prices across the country. Although the fertiliser production infrastructure has improved in the last decades, it is still not sufficient to meet the growing demand. Annual consumption of nitrogenous, phosphatic and potassic fertilizers have increased from 0.07 million tonnes in 1951-52 to more than 28 million MT in 2010-11. In terms of per hectare consumption, this translates into an increase from less than 1 Kg in 1951-52 to 135 Kg currently. In 2013, there were 30 and 12 production units for urea and DAP fertilizers. Production units for complex fertilizers were 19 where as the country had maximum number of SSP units amongst all the fertilizer production facilities in the country. In 2013, India had 85 SSP producing units (Fig 13). Installed capacity of urea in the country during this period was 21.6 million tonnes. Production capacities for DAP, complex fertilisers and SSP were respectively 8.3 million tonnes, 6.4 million tonnes and 7.7 million tonnes. India still imports a considerable amount of different fertilizer grades and the country is totally dependent on imports for potassic fertilizers.

Fig 14 shows the production of different fertilizers in the country in different years. In 2012-13, the country produced about 23 million tonnes of urea along with 3.6 million tonnes of DAP and 6.2 million tonnes of complex fertilizers. It is notable





that in the recent years, production of different fertilizers has not increased by any significant level.

Food Processing Infrastructure in India

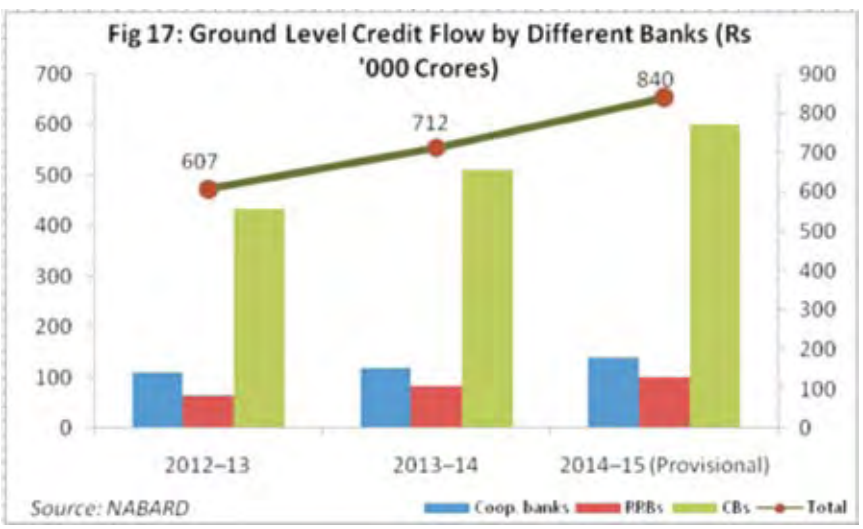
Infrastructure development in food processing sector in terms of cold chain, packaging centres, value added centre, modernized abattoirs etc are not commensurate with the rest of the sectors. Improvement in general infrastructure is a pre-requisite for holistic infrastructural support to the agribusiness and the farm sector. Although the government is giving highest priority to the development and expansion of physical infrastructure for facilitating prompt growth of industries, it lags behind interms of adequacy.

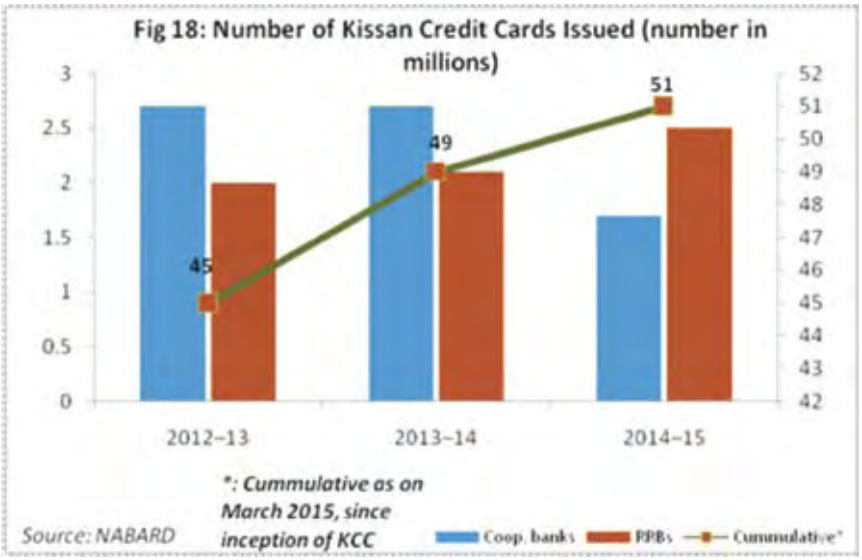
In terms of fixed capital employment, the food processing sector has been improving in the recent years and is a good sign for the overall development of the farm sector as well as employment generation in the country. The fixed capital employed by the sector in India has more than doubled between 2007-08 and 2011-12. From Rs. 68000 crores in 2007-08, the capital employed has increased by more than 113% to Rs 145000 crores in 2011-12 (Fig 15).

Food processing sector has been opened fully to foreign direct investment (FDI) and this has resulted

in development of infrastructure in the recent years. Allowing 100% FDI in the sector is showing its results. From a meagre amount of Rs 279 crores of FDI in the sector in 2007-08, foreign investments in food processing in India has dramatically increased to Rs 25,107 crores in 2013-14 (Fig 16). In order to address the problem of infrastructure in food processing sector, the Government has implemented the scheme for infrastructure development comprising the following components:

- **Food Park Scheme:** Food parks are currently being establised in various parts of the country with the main focus on helping the small and medium entrepreneurs who find it difficult to invest in capital-intensive activities
- **Packaging Centres:** This scheme aims to provide facilities for packaging, which in turn will help in enhancement of shelf life of food products and make them internationally acceptable
- **Integrated Cold Chain Facility:** The scheme is intended to improve viability of cold storages and enhance cold storage capacity and has provision for assistance at 25 per cent of the project cost in general areas and 33.33 per cent in difficult areas subject to a maximum of INR 7.5 million is provided for establishment of cold chain facilities
- **Value Added Centre (VAC):** This scheme has been introduced with an aim to enhance value addition leading to enhanced shelf life, higher total realization and value addition at each level of handling and also to facilitate traceability
- **Irradiation Facilities:** Financial assistance at 25 per cent





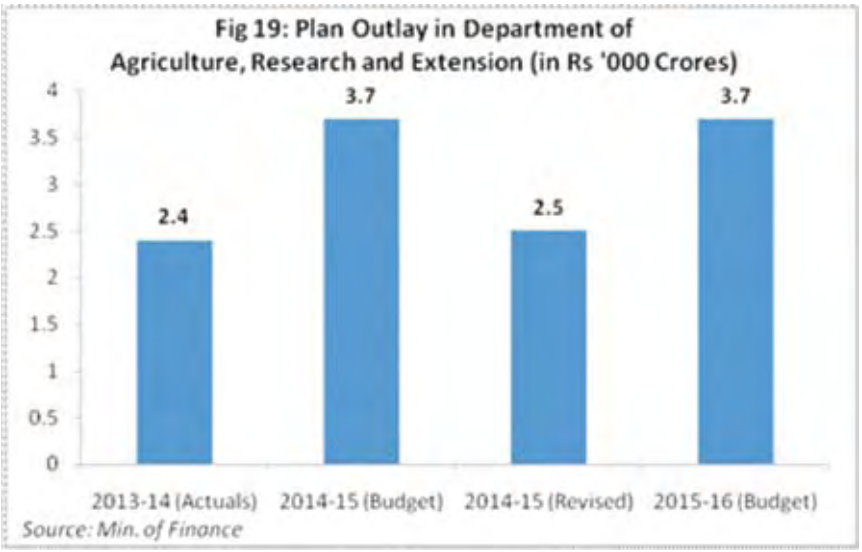
of the project cost in general areas and 33.33 per cent in difficult areas subject to a maximum of INR 50 million is provided for establishment of irradiation facilities

- **Modernized Abattoirs:** This scheme aims to promote scientific and hygienic slaughter of animals, causing least pain to the cattle and ensuring better byproduct utilization

Rural Credit Infrastructure in India

Any effort towards providing infrastructure facilities to the agribusiness and the farm sector remains incomplete and becomes futile if the farmers do not have access to institutionalized credit. A lot of effort is currently in progress to enhance the credit infrastructure of the country so that the rural people and farmers in particular get easy and affordable credit facilities from nationalised banks, NBFCs and other organised credit institutions. Schemes like Pradhan Mantri Jan Dhan Yojana (PMJDY) have been introduced in order to provide banking facility to the poor and the farmers. Fig 17 gives an overview of the increasing status of ground level credit flow through various categories of banks like the cooperative banks, the regional rural banks (RRBs) and the commercialised banks. The ground level credit flow in 2012-13 was Rs 607000 crores which increased to Rs 840000 crores in 2014-15. The majority of the ground level credit flow has been from the commercial banks. In 2014-15, commercial banks shared 71.4% of the total credit given by various categories of banks.

Government of India introduced Kisan Credit Cards (KCC) with an aim to provide timely and adequate credit to farmers to meet their production credit needs and cultivation expenses besides meeting various contingency expenses. KCCs were also meant to help farmers meet expenses related to ancillary activities through simplified procedure facilitating procuring of the loans as and when needed. As on March 2015, a cumulative total of 51 million KCCs were issued and which are still functional since the inception of the programme (Fig 18). Through various cooperative and rural banks, government has been issuing KCCs to farmers spread across the country.



Agricultural Education and Research Infrastructure in India

In order to infuse latest technologies and innovations in the agribusiness and farm sector of the country, a well-developed education and research infrastructure is necessary. India has currently 45 State Agricultural Universities (SAUs), 5 Deemed-to-be-Universities and 4 Central Universities with Agriculture Faculty spread across the country. These educational and research institutes are engaged in producing trained technical manpower in the agriculture sector apart from conducting cutting edge research activities to improve the farming scenario of the country.

Every year, through budgetary allocations, Government of India encourages research and education activities in the agriculture sector. A separate department under the ministry of agriculture in the form of Department of Agriculture Education, Research and Extension (DARE) is dedicated to these activities and fund outlay for this department has been shown in Fig 19.

"AGRI-LOGISTICS IS FAST EMERGING"

Sohan Lal Commodity Management Pvt Ltd (SLCM), an ISO 9001: 2008 and ISO 22000: 2005 certified, Agri-Logistics Company offers one-stop comprehensive solutions in providing warehousing services such as Scientific Storage for agriculture commodities, handling Day-to-Day Operations, Fumigation, Testing and Certification and Funding against Storage Receipts. The company provides its services to Farmers, Processors, Traders, Commodity Exchanges and the Government. Handling more than 157 agriculture commodities, SLCM manages a technology enabled network of more than 750 warehouses and 15 cold storages across 17 states. In a country like India where post harvest losses are pegged at 10%, SLCM has been instrumental in devising technology that has cut post harvest losses to 0.5% irrespective of infrastructure, crop or geographic location. In conversation with Agriculture Today, Mr. Sandeep Sabharwal, Group CEO, SLCM, discusses the contributions of SLCM towards the warehousing and logistics scenario of India.

What is the outlook of warehousing and logistics sector in India?

The outlook of the industry is positive as the government has moved its focus towards scientific warehousing which we welcome whole-heartedly and are hopeful that this will bring the much needed momentum in the sector. With ever increasing demand for processed and healthy agri products, the requirement for production and warehousing facilities is also increasing. As per an E&Y report, Agri warehousing accounts for approximately 15% of the warehousing market in India, or around INR 80–85 billion, in FY13. It has been growing at a 10%–12% rate over the last three years. Agri warehousing capacity in India is 110–120 million metric ton (MT), and it has been growing at a CAGR of 8%–10% over the last 5 years. The significant growth drivers in this segment are growing annual agriculture production, Increased private sector intervention, Improved agri warehousing infrastructure, Standardized warehousing operations as per the Warehousing (Development & Regulation) Act, Subsidy schemes and Tax incentives.

The exponential growth and the sector being driven with innovations like Scientific Warehousing, GPS tracking, Geo Fencing, Real Time Monitoring, etc. is bringing confidence amongst the stakeholders involved in the sector which is bringing in a lot of interest from PE investors as well. With technological innovations, more investments and strategic initiatives by the Government, the underserved sector is bound to accelerate with enormous growth in the coming years.

What are the contributions of SLCM in this segment?

SLCM (Sohan Lal Commodity Management) Group has been the pioneer in Scientific Warehousing Processes and technological innovations for the benefit of sector at large. As one of the leading agri-logistics providers, SLCM has been constantly innovating methods that have proved instrumental in reducing post harvest losses from 10% to merely 0.5%. SLCM has been handling more than 157 agri commodities including Cotton, Barley, Bajra, Castor Seeds, Wheat, Pulses, Maize, Spices, Aloe Vera, etc., across India. As on today, SLCM manages a technology enabled network of more than 760 warehouses and 15 cold storages across 17 states with a total capacity of over 1.76 Million Metric tonnes spread over 9.62 Million square feet area and a throughput of more than 240 Million Metric tonnes.

SLCM has devised an in-house SOP 'Agri Reach' which is an amalgamation of warehousing expertise and technological process that result in saving the losses by 9.5% on industry standards. Agri-Reach, which is a process under patent, is a proven model as also described in a FICCI study as well.

With our decade old expertise, we have displayed capabilities that helps SLCM prevent post harvest losses not only in designated warehouses but also in all spaces agnostic to the structure, location, climate, crop, etc, even if it means managing any open space with same efficiencies within 48 hours. It is a model which is not dependent on electricity, infrastructure and perfectly manages through defined processes, its execution & monitoring for any deviation.

We have time and again proved that through out-of-box thinking and continuous innovation, we can address the concerns of the sector. Our innovations like bar-coded Storage receipts; securitized seals, real time monitoring of the warehouses, constant check on moisture levels, etc. have minimized the risks to the health of the crop and even avoid pilferage, theft, etc.

The Group prides itself as the Innovators in this field and over time demonstrated its capability in rolling out new and efficient products and services that benefit the agri logistics environment. Be it our process AGRI REACH (patent pending) which reduces post harvest losses or Kissandhan (Group's wholly owned NBFC to offer Warehouse Receipt Financing) which has changed the paradigm of agriculture financing to bring real "Financial Inclusion".

What are the services offered by SLCM?

Sohan Lal Commodity Management Pvt Ltd is an ISO 9001: 2008 & ISO 22000: 2005 Certified, Post harvest Agri-Logistics Group. SLCM warehouse management is equipped with technology to offer storage and protection services for the entire range of agri-commodities. The Group today provides one-stop solution to the end user with diversified portfolio of services ranging from Warehouse Management, Agriculture Financing, Collateral Management to Procurement. As on August 2015, we have been managing the commodities worth Rs.1100 crores on daily basis.

The Group has imparted its services to a globally reputed clientele including Ruchi Group, Madhya Pradesh State Warehousing Corporation, Bihar State Warehousing Corporation, Glencore, Sharp to name a few. In India, SLCM has partnered with 8 leading banks and financial institutions for collateral management like Bank of India, Central Bank of India, State Bank of India, State Bank of Patiala, Ratnakar Bank Limited, ICICI Bank Limited, Edelweiss Commodities Services Limited, L&T Finance Limited in India. In Myanmar, SLCM has partnered with three leading banks for collateral management that is Yoma Bank, C B Bank and United Amara Bank through our wholly owned subsidiary SLCM Ltd. In fact, the subsidiary in Myanmar has enabled loan disbursement of about 680 Mn Kyats on agricultural commodities through Yoma Bank association.

Our wholly owned NBFC in India christened as "Kissandhan" which has changed the paradigm of collateral financing by disbursement of loans across diversified agri products whilst being agnostic to balance sheet or net worth of the borrower yet complying with the prudential norms of RBI. In a short tenure of a year, Kissandhan has already financed more than Rs 210 plus crore across 7 states and multiple commodities across India.

How significant is warehousing in India?

Precisely, India loses about Rs 80,000 crs of agriculture produce every year during the post harvest period. Being an agriculture centric nation and as one of the largest producers, it becomes crucial that not even a morsel is wasted and all efforts should be made to prevent this. Even if we continue to increase our production by different scientific methods, we will keep losing the 10% of the produce or even more after the harvest; so addressing the problem of post harvest losses becomes essential.

The problem lies in the post harvest period where we see a huge loss that varies from 10% to 40% of the total production for different commodities. If we work towards reducing this percentage, there is a lot of scope in growing and coping with the nation's biggest challenge of "Food Security". SLCM has addressed the problem of post harvest losses since its inception. Today, we have proven that our defined SOPs under "Agri Reach" can bring down the post harvest losses to merely 0.5% which in turn given savings of about Rs 76,000 crs, if practiced on the entire crop production (food grains only)of India.

Has SLCM been able to bring about a positive change in the warehousing scenario of India?

The Group has definitely brought positive and scientific change in the warehousing scenario of India. With a view to address the problem of post harvest losses, SLCM initiated a significant shift to change the perception from infrastructure driven to scientific warehousing processes. This has been clearly visible in the recent policy change that government has brought with its inclination towards scientific warehousing & its promotion.

As the pioneers of agri-logistics domain, we have been constantly calling for a perception change and have adapted the same in our operational model as well since inception. At SLCM, we provide the warehouse management services to our clients in their own or nearby locations as we are not dependent on the infrastructure. Our team does a survey of the provided space and makes the space into a warehouse within 48 hours with its scientific management for an expense of Rs 35,000 only. This prevents the farmers to travel from a distant place in search of storage spaces & saves on the logistics cost incurred to transport the commodities.

Our shift from infrastructure based model to process oriented model has helped us in servicing the clients in remotest loca-

tions. It has proved to be effective and proved that there is actually no shortage in storage spaces but one need to take a call on the operational model.

Adding to the value chain & being the flag bearer of innovation in the sector, SLCM incorporated its own agri-financing unit by the name of "Kissandhan" in March 2014. The finance is provided against their harvested crop that they store at our facilities which is used as collateral & cuts down the wastage which helps the borrower to avoid distress selling of their crops below MSP.

The same model has also been adapted in Myanmar where we provide similar activities through our wholly owned subsidiary SLCM Ltd. In Myanmar, SLCM Ltd. is managing 110,000 sqft of space, 15 different commodities with a throughput of approx. 4 million MT.

What is the market share of SLCM?

We can talk about how big we are but I would rather talk about how small we are compared to the size of the market we are addressing. India annually produces 255 Milliion MT of food grains alone. To top it up there is an enormous portion of imports and then we have other perishable products. For NBFC, the agri warehouse receipt financing market is more than Rs 90,000 – 95,000 crores approximately.

In this, SLCM services a network of 760 warehouses, generates employment to over 60,000 people (Including Direct & Indirect Employees), engages approx. 12,000 trucks, services 157 commodities and in last 3 years managed a network of 240 MMT. In the last 1 year, Kissandhan has disbursed loans of Rs 210 crores across 44 locations and 8000 storage receipts. In a way, we can conclude the potential is huge to grow & we are just tip of the iceberg looking at these figures.

How does AGRIREACH operate?

Agri Reach can be defined as an algorithm which combines series of processes, audits and real time tracking of the facilities to give error free results and deplete the risk of crop damage. It uses techniques like geo-fencing to real time tracking, bar coded storage receipts to avoid thefts, 40 internal audits along with a checker and maker policy at each level. In short, we can say, it is culmination of defined processes, its execution without any deviation & finally the monitoring for overall control.

It is indeed a form of solution that the sector needs to move and initiate implementing scientific methods of warehousing to avoid post harvest losses. Through Agri Reach, we have proved that post harvest losses can be saved from 10% to merely 0.5% which is also accredited by a detailed FICCI Study.

How is the investment climate in this segment? Is there still a fear factor for the investors in investing in this area?

The sector is steady and positive. The exponential growth and tremendous potential coupled with innovations like Scientific Warehousing, GPS tracking, Real Time Monitoring, etc. is bringing confidence amongst the stakeholders which is bringing in a lot of interest from investors as well.

Are you happy with the government support in this sector?

Earlier in 2014, the Finance Ministry, had allocated Rs 50 billion towards scientific warehousing to minimize post harvest losses. India, for example, is the world's largest producer of fruits and vegetables but it has been estimated that inadequate post-harvest storage and transportation cause losses of around 30-40% of the entire produce. This means that only 7% value addition takes place and only about 2% of production is processed commercially. For designing a supply chain for any Agriculture product, it's important to know which kind of agriculture product it is, and accordingly a responsive supply chain is designed. Agri-logistics is fast emerging as a strategic function which denotes the complete value chain. The Indian agriculture sector is now moving towards another green revolution. The transformation in the sector are being induced by factors like newfound interest of the organised sector, new and improved technologies, farming becoming more mechanised, new markets and demands, easy credit facilities, rapid growth of contract farming, agriculture friendly policies from the government, etc. Agriculture is now evolving from just a traditional way of life to a professionally managed industry. The Government is moving in the right direction and we would welcome more Public-Private Partnerships to share knowledge to benefit the sector.

What policy changes do you wish for in this sector?

While there has been a significant increase in production of food-grains and other agri-produce in the recent past, there are formidable challenges that the sector is facing. The thrust areas to enhance the sector will be increasing investment through PPP model and making it more accountable towards delivery, improving value chain including storage, transport, processing and market facilities. Constant innovation can help in improving productivity and competitiveness, whereas enabling policies are necessary to bring knowledge, technologies and service to farmers. We suggest relaxation in Indirect taxes for operations as the industry is devoid of taxes on agriculture services but we are liable to pay our service tax though involved in agriculture allied activities like warehousing & agri-financing. Another suggestion would be to change the tendering process which right now favours the lowest bidder. It will be better to change to performance based bidding and proper comparison would be made in the Service Level Agreements for the betterment of the crop protection. For e.g. if X is charging Rs. 5 per MT and saving on 10% of the crop value but there is Y who is charging Rs. 3 per MT but may give losses as low as 10% of the crop value. The choice should not be the Y but the higher bidder which is X as it is giving savings of 10% of the crop value which is higher.

What are the future plans of SLCM in this area?

We started SLCM with a mere corpus of Rs 16 lakhs in 2009. We have been posting positive EBITDA growth consistently since FY2012. From one warehouse at inception, SLCM today is standing tall with a network of 760 managed warehouses.

In 2014, after tapping the business opportunities for expansion and identifying the regions which match the DNA of our country, we zeroed down a few places internationally. Our first destination was Myanmar which is a major exporter of pulses to India and we started operations there in March 2014 through our wholly owned subsidiary SLCM Ltd. Since then, we have enabled disbursement of loans worth 680 Mn kyats and managed 110,000 sq feet of space. Our next destination is Malawi in South Africa and we are in advanced stages of discussion to start operations there.

PI Agri Input

Bringing Innovations to Farmers...

PI Industries Ltd
Udaisagar Road, Udaipur - 313001, Rajasthan
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Conservation agriculture an opportunity and future aspects for eco friendly agriculture

Till the seventies of the last century, Indian agriculture was in a poor condition. The agrarian economy was largely consumption oriented and there were poor irrigation facilities and simple agricultural implements. Agricultural yield was very low and dependency on nature was very high. The food grains were not enough to feed the population.

With a view to augment the yield, the Indian government had no option but to introduce Green Revolution. The Green Revolution was a movement towards excessive mechanization, fertilization and application of pesticides of agriculture. Slowly, the adverse effects of excessive pesticides, fertilizers and machines started manifesting on the environment, soil and human health. Indian agriculture, today has negatively affected the environmental and soil health due to excess and imbalanced use of fertilizers and machinery. Conservation agriculture involving zero or minimum-tillage, furrow irrigated raised beds panting technique and innovations in crop residue management (CRM) to avoid straw burning should assist in achieving sustainable productivity and allow farmers to reduce nutrient and water inputs, and reduce risk due to climate change.

"Conservation agriculture is a holistic and sustainable farming approach that applies three interlinked principles to mimic natural ecosystem processes, minimum soil disturbance through reduced or no tillage; permanent organic soil cover through cover crops, mulch and residues; and diversified crop rotations and associations"

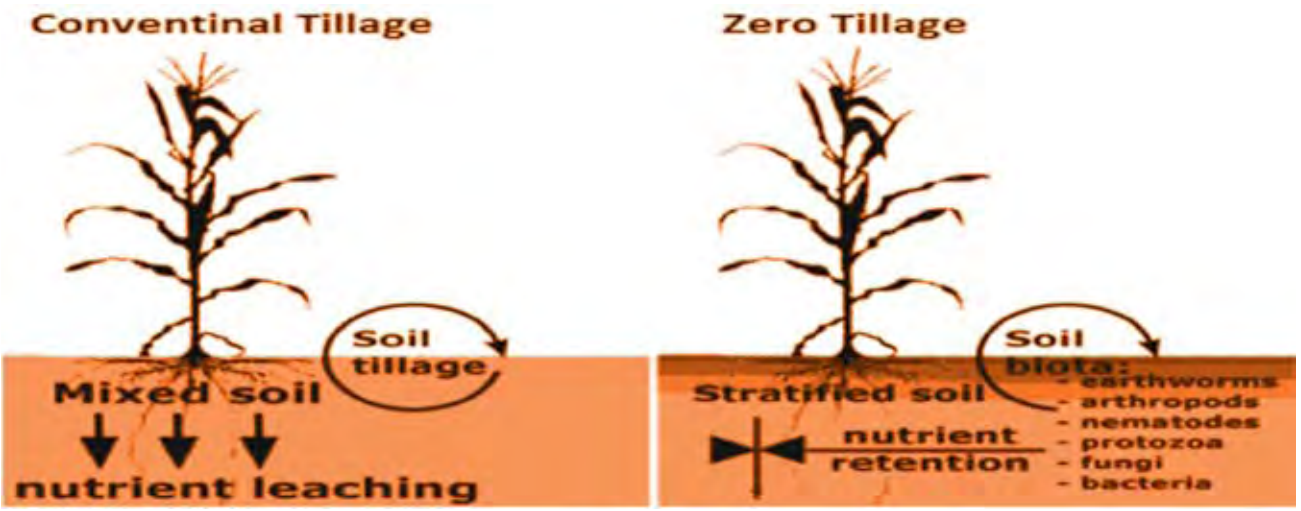
Zero tillage

No-till farming (also called zero tillage or direct drilling) is a way of growing crops from year to year without disturbing the soil through tillage. No-till is an agricultural technique which increases the amount of water that infiltrates into the soil and increases organic matter retention and cycling of nutrients in the soil. In many agricultural regions it can reduce or eliminate soil erosion. It increases the amount and variety of life in and on the soil, including disease-causing organisms and disease suppressing organisms. The most powerful benefit of no-tillage is improvement in soil biological fertility, making soils more resilient. Farm operations are made much more efficient, particularly improved time of sowing and better trafficability of farm operations. There several benefits of zero tillage.

- Reduced labour costs
- Reduced fuels costs
- Reduced machinery costs
- Reduced irrigation
- Increased yields due to higher water infiltration and storage capacity
- Less erosion
- Improvement in soil quality
- No tillage pan means roots can grow deeper
- Smaller, lighter tractors can be used which reduced compaction

Furrow Irrigated Raised bed Planting

Furrow irrigation avoids flooding the entire field surface by channelling the flow along the primary direction of the field using 'furrows,' 'creases,' or 'corrugations'. Water infiltrates through the wetted perimeter and spreads vertically and horizontally



to refill the soil reservoir. Furrows are often employed in basins and borders to reduce the effects of topographical variation and crusting. The distinctive feature of furrow irrigation is that the flow into each furrow is independently set and controlled as opposed to furrowed borders and basins where the flow is set and controlled on a border by border or basin by basin basis.

Furrows provide better on-farm water management flexibility under many surface irrigation conditions. The discharge per unit width of the field is substantially reduced and topographical variations can be more severe. A smaller wetted area reduces evaporation losses. Furrows provide the irrigator more opportunity to manage irrigations toward higher efficiencies as field conditions change for each irrigation throughout a season. This is not to say, however, that furrow irrigation enjoys higher application efficiencies than borders and basins. However, we hypothesize that many other potential benefits will lead to increased productivity and profitability through the furrow irrigated raised beds.

- Management of irrigation water is improved is simpler, and more efficient. On an average it uses, 30% less water than flat bed methods and improves crop yields by more than 20%.
- Better upland crop production is possible in the wet monsoon because of better drainage.
- Fertilizer efficiency can be increased because of better placement including top dress applications.
- Reduce seed requirement of a range of crop compared with flat surface.
- Reduced lodging can have a significant, positive effect on yield
- Weeds between the beds can be controlled mechanically, early in the crop cycle.
- Herbicide dependence is reduced, and hand weeding and rouging between rows are easier.
- On raised beds, border effects allows the canopy to intercepts more solar radiation, providing directly effect on crop growth.
- Yield potential is enhanced through improved nutrient-water lodging.
- Compaction of soil is limited only to the furrows used as tramlines (tractor tracks)

Residues

Crop residues, in general are parts of the plants left in the field after crops have been harvested and threshed. These materials at times have been regarded as waste materials that require disposal, but it has become increasingly realized that they are important natural resources and not wastes. The recycling of crop residues has the advantage of converting the surplus farm waste into useful products for meeting nutrient requirement of crops. It also maintains the soil physical and chemical condition and improves the overall ecological balance of the crop production system.

- Increase soil productivity (Yield)
- Improve soil organic matter
- Control soil erosion
- Increase water infiltration rate
- Conserve soil moisture
- Recycle plant nutrients
- Provides habitat and an energy source for soil organisms including earthworms and microorganisms.
- Reduces surface runoff and decreases sedimentation
- Improves water quality by denaturing and filtering of pollutants.
- Mitigates flooding by holding water on the land rather than allowing it to run off into streams and rivers.

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Extension for Agriculture and Farmers' Welfare

Dr. Rita Sharma

A highlight of the Prime Minister's Independence Day address to the nation was the spotlight on kisaan kalyan or farmers' welfare. This was clearly in response to the prevailing farmers' distress. The 70 year old Agriculture Ministry is being renamed as the 'Ministry of Agriculture and Farmers' Welfare'. This will signal to the farming community that the government proposes to focus not only on agricultural production and productivity but also in bringing to the centre-stage issues of farmers' welfare.

The nature and scope of agricultural extension and delivery systems has been undergoing transformation over the past two decades. Earlier the systems were geared primarily towards increasing production, improving yields, training farmers and transferring technology, especially for staple crops. By embedding "Farmers Welfare" firmly into the nomenclature of the Ministry, it is expected that a more holistic approach will be taken towards extension.

A more inclusive agricultural extension service would be responsive to farmers' demands related to (i) applying most appropriate science and technology options; (ii) optimizing use of inputs; (iii) sourcing reputable input suppliers; (iv) diversifying farming systems; (v) developing value chain interventions; (vi) identifying quality specifications for produce; (vii) assessing consumer and market demands for products; (viii) facilitating access to remunerative markets, price information and trade; (ix) working with farmers toward sustainable natural resource management practices; (x) helping build resilience against weather variability and coping with climate change; (xi) improving access to loans and credit; (xii) developing human and social capital;(xiii) planning for food and nutrition security; (xiv) enhancing skills and knowledge for production and processing; (xv) organizing farmers and producer collectives; (xvi) providing information regarding various government economic and welfare schemes; (xvii) facilitating business plans, building entrepreneurial skills and exploring off-farm employment options; (xviii) assisting in insurance coverage; (xix) providing social security, safety nets, pension; (xx) dealing with natural disasters (xxi) obtaining a fair compensation in the event of land acquisition; (xxii) receiving entitlements under the National Food Security Act, and such others.

It is clear that in this expanded role, the canvas of information that agricultural extension needs to cater to — through provision and facilitating access and sharing—is much wider. The question is, where will we find such a single super-extension service to effectively perform these multiple roles, which not only addresses issues of enhancing production but is also responsive to the welfare needs of farmers?

The answer lies in recognizing and coordinating the multi-agency extension service providers existing today, each with their own expertise, strengths and niche areas of operation. As the nature and scope of agricultural extension undergoes fundamental changes, and financial constraints force governments to shrink their state extension bureaucracies, agro-service delivery is reforming from a primarily public sector monopoly to a pluralistic system comprising of a mix of public and private sector actors, as well as public-private partnerships. A parallel explosion in information and communication technologies has provided a potent tool for leap-frogging over the old, inter-personal mode of imparting information and knowledge.

Technology transfer and provision

of other agri-services to farmers is occurring increasingly through five categories of service providers besides the well-established public sector, namely, (i) farmer collectives, member-based agencies, e.g., farmers' organizations, cooperative societies, self-help groups (SHGs), water users' associations, farmer producer companies (FPCs), etc.; (ii) private for-profit firms, e.g., corporate sector, input suppliers, agri-businesses, small agri- startups, contract farming arrangements; (iii) private not-for-profit agencies such as community based organizations, NGOs, foundations and trusts (iv) public-private partnerships, e.g. progressive farmers as extensionists, para-extension workers; (v) mass media and ICT, e.g. radio, television, mobile telephony, internet, kisan call centres, information and extension portals, e-chaupals, print media etc. The latest is the 24x7 dedicated Kisan Channel on Doordarshan.

Farmer collectives have burgeoned into a major player. Cooperative societies have played and continue to play a significant role in the delivery of agricultural inputs as well as in the marketing of farm produce. Cooperative milk procurement and marketing is an old and successful example. There are some 6 lakh cooperative societies with a 25 crore membership. Some 25 lakh SHGs under the National Rural Livelihoods Mission and NABARD are involved in skill development, capacity building and management of micro-finance to small producers for both on-farm and off-farm activities. The Water User Associations under the Integrated Watershed Management Programme are practicing conservation agriculture. About one lakh mitra kisans or "farmer friends" under the Agriculture Technology Management Agencies (ATMAs) are undertaking farmer-to-farmer extension which is found to be very effective. Government proposes to mobilize a further 6 lakh "farmer friends" in the next 2-3 years. The latest entrants are FPCs, supported by the Small Farmers Agribusiness Consortium (SFAC) and NABARD to provide comprehensive extension services to their members, making forays into the latest in organic farming and labeling of produce. Presently there are about 1000 registered FPCs. NABARD is facilitating another 2000. The Panchayati Raj Institutions empowered under the National Rural Employment Guarantee Scheme (NREGA) are creating employment for the rural poor and also facilitating creation of rural assets through rejuvenation of the natural resource base -- water conservation, land development and tree plantation.

NGOs, publicly or privately funded are increasingly being mobilized for technology transfer and other extension services. Their strength lies in awareness creation, grassroots' capacity building, hand-holding and mentoring. Para-extension workers,providing artificial insemination services at farmers' doorsteps, supplement the stockmen centres of the government animal husbandry department and fill the historical gap in livestock extension. Agri-businesses being set up by agri-entrepreneurs privately or through support under the State's Agri-clinics scheme, provide a whole gamut of agri-services to the farmers, including assistance in obtaining credit, insurance and other welfare services for a fee. Innovative, performance-linked small agri-businesses and start-ups are finding expression in the new enabling environment.

In an era where mere technology transfer will no longer suffice and farmers seek a more comprehensive set of services for their empowerment, public extension systems are gradually reorienting themselves into new pathways. Proliferation of an increasingly complex, pluralistic institutional environment is redefining government's role, away from direct intervention in production, service provision and markets, towards one of coordination, facilitation, collaboration,convergence, partnerships and empowerment. In an expanding universe of service providers both suppliers and consumers will benefit fromthe Government's initiatives in creating an enabling environment and level playing field through suitable legislation, norms and regulation, guidelines and protocols, effective enforcement, impartial conflict resolution, and quality control.

Government's role as coordinator, regulator and facilitator is not all about control mechanisms, but more about promoting exchange of information, providing a platform for discussion, creating a forum for interface, collaborating with partners and bringing different actors together to address common issues of farmer empowerment through technology transfer and other livelihood requirements. The ATMAs at the district level were envisaged to perform this function.

Part of the changing role of the government would also be to address the downside of the expanding world of private service delivery. Not all extension needs will be covered in the new emerging dispensation, as firms and agri-businesses enter markets only when there is profit to be made. Remote and backward regions as well as poor and marginal farmers will continue to require services of the public sector. The latter in its reformed avatar will be leaner, but more sharply focused towards the disadvantaged areas and vulnerable communities.

The challenge before the new Krishi Evam Kisaan Kalyan Mantralaya will be to trigger the metamorphosis of the old linear and supply driven extension service into a multi-dimensional "Agricultural Extension and Farmer Advisory Service" (AE&FAS). The idea is to coordinate and interlink various players to achieve the twin objectives of sustainable agricultural production and a heightened orientation to farmers' welfare. This is a step towards ushering in achhe din for our farmers.

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"I WANT TO GO ORGANIC, BUT GIVE ME THE RIGHT SOLUTION"

Over the last two years, I have travelled across the length and breadth of the country. The journey began from my first meeting with Mr. Jayanivas, a farmer from the outskirts of Bengaluru. He has 10 acres of land and grows sweet corn and vegetables as the demand is higher and the crops fetch better returns. Mr. Jayanivas is popular and a thought leader for farmers around his villages. He had set a benchmark for practising organic farming among other famers and advises farmers on the advantages of going organic. "I want everyone to adopt organic farming', but Jayanivas emphasizes, "Where is the solution?"

We have witnessed the impact of historic green revolution in India, but are yet to regularise the organic movement in India. With changing landscape and climate, the mindset and belief of people also vary accordingly. The practise of organic farming is different in each region, and it is as per the availability of solutions in the respective location.

Some of the basic organic solutions used by farmers are derived from neem plant and animal manure. The biggest challenge here is that they are non-standardised hence unreliable, difficult to mass produce and offers no assurance on the outcome. Hence, yields are adversely impacted as these solutions may not offer full control over the pest or disease attack. Similarly, the production costs are distributed over a smaller yield making it expensive for the consumers. Many farmers in India grow crops organically for self -consumption and the crops for commercial sale are grown using chemical inputs.

We still have great challenges to address, the first one is to come up with a standard organic solution for residue free farming practices. Introduce policies to encourage organic farming, increase focus on R&D and popularise organic solutions among farmers in India. The Govt. should initiate programs to explore the new age technologically advanced bio-products. It needs to establish performance parameters and quality standards which industry players need to adhere to.

Globally, the agriculture industry is looking at Secondary Metabolites based inputs as an alternative to replace chemical inputs. Similarly, the Indian Government should also encourage farmers in adopting Zero Residue farming by guiding them with right solutions and source to procure

Such measures will build trust amongst the farmer community towards organic solutions which at present is marred due to rampant promotion of spurious bio-products.

Over the time I met more farmers from different states and I came across similar stories like the one that Jayanivas narrated. I realised the huge gap between the truth and what we like to believe.

Later when I travelled globally to understand trends in the agriculture sector, I interacted with many leading academicians and scientists from renowned universities on their agri-inputs research based on microbial extracts. The entire scientific community looks at microbes as a viable replacement to chemical alternatives.

Based on my experience, I would say India is blessed and we have got the best talents in the world. From capturing the space technology and joining the nuclear circle, India is poised to become one of the super powers. Similarly, we also enjoy equal success in our agriculture space, as India has also pioneered the technology of Secondary Metabolites based input solutions derived from microbes.

Secondary Metabolites are basically extracted from microbes after putting them under stress. Each Secondary Metabolite is identified based on the capacity to react against pest affecting the crop or the farmland. The biocides (Organic Pesticide) are combination of multiple Secondary Metabolites with different characters which infect pest in multiple ways. This way the pest fails to develop resistance against these biocides. These biocides are target oriented and do not kill other beneficial organisms which enhance soil condition.

Farmers in India are engaged in exporting produce and have adopted Zero Residue farming, a concept wherein the farmers use inputs derived from Secondary Metabolites. Since the international standards are set with stringent specifications, the concept helps to maintain the residue level and crop quality accordingly. Year-on-year, farmers have also witnessed an improvement in the soil condition. Overall Zero Residue farming can help India to go organic in an efficient manner.

Institutions in India are studying the feasibility of having appropriate input solutions to cater to the masses. Similarly, Coconut Development Board in Kerala has initiated a research on developing biocide to gain control over red palm weevil infesting the coconut plantation. Some of the major institutions from Kerala have advised their members to use Secondary Metabolites based inputs solutions, as it provides a cost- effective organic solution with longer shelf life and equally effective in all geo-climatic conditions.

Globally, the agriculture industry is looking at Secondary Metabolites based inputs as an alternative to replace chemical inputs. Similarly, the Indian Government should also encourage farmers in adopting Zero Residue farming by guiding them with right solutions and source to procure. This will help to bridge the gap between emerging technologies and ground level practices.

Mr. Santosh Nair
CEO, Camson Biotechnologies Ltd.

The Submerging Paddy Farmers

The pledge of farmers is to produce more healthy food for themselves and support regional food security and also to sustain the land in healthy condition for future generations. The challenge faced by the farmers in materializing this goal is the changing weather condition which has been particularly acute with recent rainfall. This has adversely affected production of paddy and other agriculture products. The unfavorable policy of both central and state government has only lowered the morale of farmers and forced them to switch their profession and migrate from rural to urban areas for other jobs. The major constraints faced by the farmers are low level of productivity with high cost of production, capital inadequacy, deficient storage and processing facilities, lack of infrastructural support, and non-availability of labour force on time.

In the Kollengode Block Panchayath in Palakkad district, paddy is the most important crop covering a gross area of 5688 Ha. The Block is the largest producer of seeds in Kerala with 354 ha of land. There are 20 Paddy Field Group [Padasekara Samithy] with 1600 farmers and the major occupation of the area is paddy cultivation. The Palacode Padasekara Samithy in Kollengode block constitutes 103 farmers. The farmers cultivate paddy twice – in Kharif and Rabi season. Kerala Matta (also known as Rosematta rice, Palakkadan Matta rice, Kerala Red rice, or Red parboiled rice) is produced in large scale. The farmers in the Palacode Padasekara are confronted with a serious threat from Bacterial leaf blight (BLB).The debilitating and a serious disease turns the leaves yellow and then to straw-colour which later results in wilting resulting in drying up of the whole seedlings. According to Agriculture officer Mr. V S Dileep Kumar of Kollengode Krishi Bhavan, the disease occurs in both tropical and temperate environments, particularly in irrigated and rainfed lowland areas. In general, the disease favors temperatures at 25 – 34°C, with relative humidity above 70%. The other reasons identified are heavy rainfall and speedy wind which injures plants and aid in the spread of the pathogenic bacte-

ria, Xanthomonas oryzae. The disease occurs at early stage and hence higher the chance of yield loss. The expected yield per hectare was 5000 kg and due to bacterial infection the yield loss is expected to lower by 50 to 60 percentage. With an aim to produce better seeds, the Kerala government has started Registered Seed Growers Program (RSGP) and Kerala State Seed Development Authority (KSSDA) provides seeds to the farmers and procure seeds at the rate of Rs 36 per kg. The farmers are now not able to provide seeds back to KSSDA due to the disease. The seeds are not further used. This is not only the case of Palacode Padasekaram but also across other Padasekarams in Kollengode Block.

The government is providing assistance of Rs.11,500 per hectare for all members in Padasekara Samithy for activities, such as tractor rent, fertilizers, weed control and need-based nutrient application. The Bank is also providing interest-free loans of upto to Rs one lakh for one year for paddy cultivation. The state procures rice at a rate of Rs. 19 per kg through supplyco, where the center is providing Rs. 13.60 per kg for paddy procured; the remaining amount was disbursed by the State government as subsidy.

The current dilemma of Kollengode and in particular Palacode farmers is how to make repayment. The whole seeds sown have been affected by bacteria and they will not able to supply the required quantity of rice seeds to the state which will have serious impact on economic and ecological development and rice production. Most of the farmers have taken loan of upto Rs. one lakh from cooperative or scheduled banks and will not be able to make repayment on time. The bank will charge interest of 12% after the due date. What farmers need for their survival is income and to for repaying their loan, either bank should waiver the interest or give more time. It will be of great help if supplyco could make payment within 20 days of procurement of rice and also clear the pending payment. The most distressing factor is that government delays payment for the rice it procures. Two to three months' delay is the usual norm.

Government Crop Insurance Scheme was not very attractive and useful to paddy farmers in Kerala. While farmers who have taken agriculture loans from banks and approved financial institutions are covered under the scheme only for natural calamities. The premium is of Rs 100 per hectare. Farmers will only be benefited if their crops are covered for infestation of plant diseases and pest attack, along with natural calamities.

Kerala cabinet has introduced a pension scheme for farmers above 60 years of age in the state, which is a relief for the farmers. The farmers who have registered under 'Kisan Abhiman' scheme will get Rs 600 per month. The request from farmers is to increase the pension amount and pay the amount every month without delay.

There has been a major emphasis on mechanization of paddy cultivation in the villages of Palakkad. Panchayats are trying to purchase combined harvesters, paddy transplanters, weed cutters, bush cutters, cultivators, insecticide sprayers and hay-bailing machines as part of the mechanization drive. The mechanization can't solve the problem but it also requires skilled labourers. The MGNERGS force is to reconstitute and solve labour problems in agriculture sector. Paddy fields are a vital part of Kerala's environment and ecological systems. They provide natural drainage paths for flood waters, conserve ground water, and are crucial for the preservation of a rich variety of flora and fauna. Kerala has always been a food-deficit state where required quantity is 4 million tonnes of rice a year to feed the population compared to 0.56 million tonnes it produces. The farmer and Chairman of Agriculture Development Policy 2013, Shri Krishnankutty the former MLA of Chittoor Constituency has suggested many steps such as to change farming into profession such as rice farmers are eligible for ecological incentives because they serve society by retaining the fields and crop. About four million tonnes of rice is sold every year in the open market in the state. Tax of just one rupee per kg of rice will fetch the state Rs 4,000 million which should be distributed for the farmers welfare. Besides, for every value-added product from rice, farmers need to get avakasalabham, a right on the profit. Only this type of calculated measure can serve the farmers and encourage young generation to choose agriculture as a profession thereby ensuring financial and social security to farmers and farm labourers. There is the need for having a separate agriculture budget to ensure sufficient investment, welfare measures and popularizing and supporting newer technologies in production.

The government should find a proper solution to all problems faced by paddy famers by their timely interference and wise policy decisions.

SREENI K R

DIGITAL INDIA PROJECT AND AGRICULTURE

Government of India announced "Digital India" project on 1st July 2015 that envisions empowering citizens with e-access to government services and livelihood related services, among others. The project has three core components, viz., digital infrastructure, digital services and digital literacy. Mobile phone is the preferred delivery medium with focus on mGovernance and mServices. The mAgriculture and mGramBazar, out of the seven components covered under mServices, directly impact agricultural extension and marketing services. The 'National Digital Literacy Mission' to be launched will make 10 million people digitally literate in five years and digitally empower at least one person in every family.

The project, inter alia, has several aspects to benefit small farmers viz., It seeks to [i] transform rural

India into a digitally-empowered knowledge economy [ii] provide universal phone connectivity and access to broadband in 250,000 villages by 2019 [iii] extend better services to farmers with the use of information technology and its tools [iv] enhance efficiency in agricultural governance through programs that include digital literacy and electronic delivery of services. This article briefly highlights the initiatives already undertaken by the government of India and private sectors in this respect and suggests the need for harnessing potential of digital India for agricultural development in the light of current agricultural scenario when mobile phone penetration in rural India has been fast increasing.

Potential of ICT

Information and Communication Technology (ICT) has the potential to revolutionize Indian agriculture in terms of raising crop productivity and profitability per unit area and resources. Several apps are now available and many more can be developed which can help farmers access authentic, accurate and timely information related to high-yielding variety seeds, production-enhancing & cost-minimizing farming practices, efficient use of water including micro-irrigation system, integrated nutrient and pest management, post-harvest management practices, measures to mitigate adverse impact of climate change and marketing of farm produce in domestic and international markets.

Government's initiatives

• The government has proposed a National Broadband Network, which will essentially lay out a fibre-optic cable across the country to achieve last mile connectivity and encourage private operators to make services available in hitherto untouched areas. For this, the government has

committed about $4 billion to build the network to connect 250,000 village headquarters.

• Government has already put in operation three portals viz., farmer portal, kisan[farmer] call centre and mkisan portal to facilitate farmers take informed decisions for efficient farming under varying agro-climatic conditions. Farmers can reach the nearest buyers and sell products directly and thus can avoid post-production storage and transportation cost. Social media can help farmers all over the country to connect buyers with sellers directly and remove middlemen.

• Farmers' portals: This portal aims at serving as One Stop Shop for all farmers for accessing information on agricultural activities. Besides, giving links to appropriate pages of 80 portals already developed so far, the farmers' portal links the location of the farmer with the concerned National Agricultural Research Project zone to which he belongs. This facilitates him to access crop-specific technical information including package of farm practices, pests & diseases; dealer network for seeds, fertilizers, pesticides, machinery & tools, weather advisories etc.

• Farmers Call Centres: This initiative aims at providing farmers toll-free information in their local language throughout the country…

• Under the eGovernance program, soil health card software has been standardized and web-based software developed to provide integrated nutrient management recommendations using soil test crop response method for eight states.

• National e-Governance Plan in Agriculture [NeGP-A]: Under NeGP-A information is provided to farmers through multiple channels including Common Service Centres Internet Kiosks and SMSs. Currently, 12 identified clusters of services provide information on [i] weather [ii] soil health [iii] seeds, nutrients, pests [iv] irrigation [v] crops, good agricultural practices, farm machinery[vi] marketing infrastructure [vii] farm commodity prices, arrivals, procurement points, interaction platforms [viii] electronic certification for export & import [ix] drought relief & management [x] livestock, fisheries management [xi] training [xii] monitoring implementation and evaluation of schemes. The first phase of the project is under implementation

in seven states out of 28 in the country

- Strengthening IT Apparatus in States [AGRISNET]: Under the scheme, computers are provided up to the sub-district level throughout the country and state-specific software packages have been developed to disseminate information to farmers. Availability of required hardware and locally suitable software package has resulted in quick retrieval of data, dissemination of information to farmers and provision of farmer-centric services.

Private sector

Very few private sector, NGOs and social groups have also been using ICT in agriculture to supplement the efforts of the Government for efficient delivery of a variety of services to farmers. Following two, most prominent are briefly described which have unique methodologies and content to enable farmers to access a plethora of services for agricultural development.

e-Choupal: It is a business initiative that leverages the power of Information and digital technology and the internet to empower small farmers with a host of services viz. agricultural knowhow and best practices, timely weather information, order supplies of inputs, transparent discovery of farm prices, questions &answers section which enables interaction with company's agricultural experts. The company is, also, partnering with banks to offer farmers access to credit, insurance and other services.e-Choupal is built on three elements, an internet-enabled computer located at a "focal point farmer," an internet connection via phone lines and services through the echoupal.com portal. Each internet connection serves 10 villages in a 5 km radius, reaching 600 farmers on average. e-Choupals not only connect farmers with markets but also allow for a virtual integration of the supply chain. Farmers have received higher profit because of increased crop-productivity, better quality farm commodities, and farmers are no longer forced to sell through a middleman. Company benefits because its simplified and intensified supply chain system increases business and profits. It has 6500 e-Choupals computer stations in 40,000 villages serving 4 million farmers of 10 States in India.

RML Information Services Pvt. Ltd: Following nearly 18 months of market research prototyping and market trials, RML was launched in Maharashtra in 2007 and in Punjab in 2008. RML delivers customized, localized and personalized agricultural information to farmers from pre-sowing to post-harvest stages including information on weather, farm prices through SMS on mobile phones in local language. About 1.4 million farmers from about 50,000 villages have been using this service across 18 states. Following are RML's key ICT products:

» RMLdirect - SMS based personalized agricultural information service on crops from pre-sowing to harvest and selling of crops
» Krishidoot - Connecting farming communities and marketplace for agricultural value chain system
» R-Edge - Market Information
» RMLpro - Analytical and communication tool providing data, insights and intelligence on farmers' organizations, farmer groups, commodity prices
» myRML - Comprehensive agriculture information application for farmers

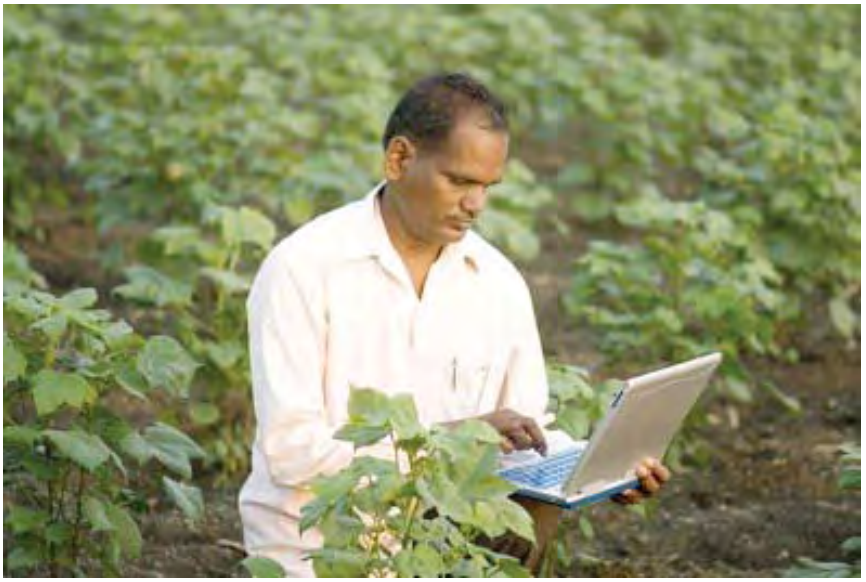
RML has empowered farmers with actionable information which enables them to take informed decisions and reduce their production and marketing risks, thereby directly improving their livelihood. According to ICRIER study [2009], RML users had 5% to 25% increase in their income. The World Bank study [2010] revealed 8% increase in price realization to farmers selling directly to traders. The USAID study [2011] observed that farmers accessing RML services realized Rupees six to eight more per kg on their crop. Around 80% farmer-users improved alignment of farm output to market demands, ensuring improved productivity and better quality of produce.

Current Indian Scenario

- **Low crop productivity & profitability:** According to "Situation Assessment of Indian Farmers", only about 28% of all farmers use any kind of agriculture-related information that is available rather than what they need. While about 72% of farmers do not have any source of information that can help them adopt latest technology, most farmers are unable to access credit, insurance, marketing services from the established institutions. This is primarily responsible for farmer's low crop productivity and profitability. Despite India having the largest irrigated land and ranking second in terms of arable land, the yield of crops is 20%-40% of the world's best levels. Yield of rice in India in 2011 was 3.2 tonnes per hectare as against 7.5 tonnes in USA, 6.7 tonnes in China and 4.3 tonnes for the world's average. Average yields of coarse cereals were 1.0 tonne per hectare in India as compared

to 2.7 tonnes in USA and 2.1 tonnes in China. The Indian Council of Agricultural Research study showed that the yield gap between the yield of demonstration plots in farmers' fields and the average yield of the area varied by a factor 3 to 6. Integrating agricultural credit with technology and production inputs, farmers can increase wheat production by around 40% and double paddy production at current levels of technology. Efficient agricultural extension agency and support service providers can bridge the existing gap between the actual crop yields at field level and the potential yields. The post-harvest losses exceed 25% annually. For marketing, small farmers have to deal with multiple layers of middlemen. For example, farmers sell 85% of wheat and 75% of oil seeds in Uttar Pradesh, 70% of oil seeds and 35% of cotton in Punjab, and 90% of jute in West Bengal in village itself. These middlemen take away about 47% of the price of rice, 52% of groundnut and 60% of potatoes. On an average, Indian farmers realize only 20% to 25% of the value paid for by consumers. as compared to 40% to 45% in developed countries.

• **Rural households:** [i] India has 73.5% rural households of which less than 50% are engaged in agriculture and 25 % have no access to irrigation [ii] In case of 74.5% of rural households, the highest-earning member earns less than US $75 per month [iii] 36% of the 884 million people are illiterate; of the 64% literate, more than 20% have not even completed primary school, only 5.4% have completed high school and 3.4% have graduated from college; 23.52% rural families have no literate adult above 25 years [iv] 122.4 million [68.32%] have mobiles which suggests mobile connectivity has become a basic service.



• **Small farmers:** Indian agriculture has been characterized as farms of "small and marginal" size. Small and marginal farmers owning less than two hectares constitute 85.9% of the total. Though small farmers are efficient in production, their increasing number and shrinking farm size raises questions about their economic viability, sustainability and producing marketable surplus. Disadvantages they face are economies of scale and inadequate access to technology, production inputs, institutional credit, insurance and marketing services. Small farmers are concentrated in rain-fed areas and cultivate crops under a high risk environment, often confronted by frequent droughts, floods and soil erosion.

• **Land Degradation:** More than 57% of the total reporting area in India is characterized as degraded land as against 17% at the global level. Nearly 120.72 million hectares of land is degraded due to soil erosion and about 8.4 million hectares are affected by soil-salinity and water-logging problems. Annually India is losing about 0.8 million tonnes of nitrogen, 1.8 million tonnes of phosphorus and 26.3 million tonnes of potassium impacting adversely on soil fertility and crop productivity.

• **Mobile penetration in rural areas:** India has about 69% rural population. By June, 2014, rural India had about 122.4 million [68.32%] households with mobiles exhibiting mobile connectivity has become a basic service in rural areas. Rural mobile subscriber base is growing twice as faster compared to urban subscriber base. As of March 2015, the national teledensity was 79% and rural teledensity 46.5%. Telecom Policy aims to increase rural teledensity to 60% by 2017 and 100% by 2020.Study of the IAMAI revealed 80% using it for communications, 67% for online services, 65% for e-commerce and 60% for social networking.Mobile phones can be effectively utilized for purposes including generating, processing, transmitting, disseminating, sorting, archiving and retrieving critical information and data relating to agriculture. Mobile phones are omnipresent and cost effective means to revolutionize agriculture in India. Farmers' timely access to farm output related minute information right from the selection of seeds for planting to marketing of produce in domestic and international markets is a must.

Meeting Farmers' Specific Needs

For India, at a time when national, regional and international research institutes have already developed technologies, farmers need motivation and encouragement to adopt these proven yield-enhancing, cost-efficient and environment-friendly technologies. Acknowledging the slow impact of the ICT initiatives of the government and private sector, the digital India project should pay undivided attention to provide accurate information from authentic sources to farmers on time on various aspects as identified by various field studies, viz. [i] details of location-specific crop production technology [ii] economics of crop, livestock and fish farming [iii] authorized sources of timely availability of standard quality inputs [seeds, fertilizers, pesticides etc.] farm equipment, sprinklers, drippers, among others, along with costs [iv] post-harvest management technology and facilities including transport, storage, processing, preservation, packaging and marketing [v] commodity prices, weather, measures to minimize impact of drought and climate change [vi] detailed procedure for availing bank credit, crop and livestock insurance cover, government subsidies, land records etc. [vii] government's programs providing subsidy and other facilities to develop irrigation potential, rainwater harvesting, soil and water conservation measures, soil and water testing facilities, prevention and control of pests and diseases, bio-gas, minimum support prices [vii] contract farming, value chain system, warehouse receipt [viii] reclamation of degraded, saline & alkaline land [ix] mechanism to redress grievances. Accordingly, farmers need ICT-enabled portals for following purposes which can be developed, rigorously field tested and made available to farmers.

- Technology: Production-enhancing proven crop-specific technologies [from pre-sowing to harvesting and post-harvest management] based on soil & water analysis. Separate for dry land & irrigated farming focusing efficient use of seeds, fertilizers, water, pesticides, farm equipment & labour; and reclamation of degraded, saline & alkaline land.
- Production inputs & farm equipment: Crop-specific reasonably priced standard quality production inputs [seeds, fertilizers, pesticides, etc.] and farm equipment and machinery along with sources of availability
- Post-harvest services: Storage, transport, processing, packaging,
- Institutional services: Land records, farm credit, insurance, marketing, weather, farmer-producers' organizations, market yards, procurement centres
- Government facilities: Availability of subsidies, assistance available to mitigate effects of climate change, drought, floods, earthquake, cyclones

Institutions: State government's department of agriculture, state agricultural universities, farmers' science centers, regional research institutes, farmer- producers organizations, corporate/ industrial/business houses and multinational companies engaged in manufacturing/ production and distribution of farm inputs, farm equipment& machinery, rural financial institutions, insurance companies, among others, have a significant role and added responsibility to contribute their professional knowledge to develop digital ecosystem for agriculture and make them available to farmers.

Focused Attention:The effective implementation of digital India project would enable the country to increase agricultural growth rate by 4% in three years. It can, also, generate annually 40,000 to 50,000 employments for rural youths who are trained in agriculture & computer technology by state agricultural universities. For this, following areas need focused attention.

• Immediate need is to conduct a nation-wide[separately for each agro-ecological region] evaluation study to assess the impact of ICT initiatives on agriculture already developed and put in place by the government and private sector in respect of [i] number of farmers regularly receiving & using mobile-enabled agricultural information services [ii] feedback from users about content,

timeliness, utility, satisfaction, changes required, their grievances [iii] increase in productivity, output and income of benefitted farmers [iv] increase in price realization in farm commodities sold, direct selling without dependence on middlemen [v] reduction in costs of transactions[vi] mechanism to redress grievances.

• The study of the Asia-Pacific Research Centre of the Stanford University on ICT Initiatives under the project" Agriculture & Rural Livelihood" in India concluded that the usage of ICT was sparse compared to its significant potential and substantially constrained by factors viz. illiteracy, inadequate infrastructure [particularly connectivity], low level of awareness of usage, availability of very few digital programs, central site location, and government regulations. This suggests the greater need now than before to make coordinated and concerted efforts by all stakeholders to create a national agricultural knowledge repository in digital form which is nurtured daily through feeding, weeding, pruning and enriched and disseminated among farmers.

• For successful designing digital ecosystem for agriculture, the system design should have all desired features of higher user satisfaction, viz. [i] ease of access [ii] updated content [iii] layout, design, consistent themes [iv] easy navigation [v] higher interactivity [vi] access through multiple media (particularly voice) [vii]higher use of non-textual information [viii]language options[ix]lower cost of transaction.

• A professionally managed ICT platform in public private partnership mode can bring various pieces of agricultural value chain system together and design solutions with 'mobile-first' approach to maximize on-ground adoption and create visible impact.

• Regulatory & Development Authority need to be in place to ensure [i] increase in farmers' easy, timely and reliable access to agricultural information system [as per farmers' needs] throughout the country in a systematic & planned manner [ii] development of need-based appropriate digital models for agriculture under public & private sector which conform BIS & available at affordable cost [iii] improving general and digital literacy and computer skill and digital infrastructure in rural India in line with digital India vision and [iv] prevention of fake models and fraudulent practices

Dr. Amrit Patel

HERBAL FOOD PRODUCTS

The consumer's interest in healthy nutrition has changed considerably. Earlier, good nutrition meant avoiding products with high calorie, salt and fat content. Today, more attention is being paid to positive/preventive nutrition owing to the choice of food products with the desired functional components and contents. Value-addition of regular foods by medicinal and aromatic plants to make them herbal foods is gaining popularity, especially to an industry which has for long remained traditional. According to a recent report the total market for nutraceuticals in India is growing at 21 percent per annum. It is currently valued at INR 44bn (€621 m), but could be worth more than INR 95 bn in four years.

Many researchers have standardized the process and developed various types of value added food products. Food products have been developed by adding herbal ingredients (only edible medicinal and aromatic plants) those are important from nutritional and therapeutic point of view. The demand for herbal based food products namely herbal bakery and confectionary products, herbal dairy products, herbal beverages and herbal meat products, etc. are increasing day by day. The production of such type of herbal food products is more economical and profitable in the interest of health care.

Processing of herbs for preparation of herbal products

Medicinal principles are present in different parts of the plant like root, stem, bark, heartwood, leaf, flower, fruit or plant exudates. The medicinal principles are separated by different processes; the most common being extraction. Processing of medicinal plants includes harvesting, cleaning, washing, grading, cutting, drying, grinding, extraction, processing, storage and packaging. The following techniques for preparation of herbal products have been reported

Herbal paste - Herbs are cleaned, balanced properly and then ground in a grinder to get a fine and smooth paste.

Herbal powder - Herbs are normally dried in a tray drier at 60°C + 5°C temperature for 5-6 hours. The dried herbs are crushed in a grinder and strained to obtain fine uniform size powder.

Solvent extraction - Ethanol/food grade hexane is used to extract the phytochemicals from the herbs. After extraction, the solvents are evaporated and herb's extract is used in preparation of many foods, sweets, beverages, etc.

The most commonly used process is the herbal paste and mechanical dried herbal powder. Among the paste and tray dried herbal powder, the paste can retain more nutritional and anti oxidant properties than that of powder. Freeze drying and solvent extraction techniques are laborious and expensive.

Herbal Food products

It includes a long list of products which includes herbal breads developed with supplementation with aloe vera, herbal bakery and confectionary products and many others.

Herbal bread using cumin was developed using cumin and it was found to have superior quality attributes compared the control variant. In Herbal cakes medicinal herbs (anise, black cumin, rosemary and sage)were used as natural antioxidants and antimicrobial to increase shelf life of some bakery products. The method to produce flour confectionary for low calorie products and foods with alternative sweeteners are being developed worldwide. The method of producing the Herbal flour confectionary included preparing the emulsion including a sweetner, kneading dough, forming it and baking dough products. Stevia leaf extract is also used as it is a natural sweetner. The stevia extracts substitute sugar and reduces food caloric content. Some edible medicinal plants like lemon grass, tulsi, ginger, curry leaves, menthe, cardamom, etc have been used to manufacture Herbal dairy products. Various dairy products such as salted spiced buttermilk, whey-vit, flavoured milk, ginger ice cream, medicinal ghee, and whey based mango herbal beverages are relatively new development in the dairy field. These products help in curing physiological disorders, certain diseases and other inborn defects of metabolism in children, young ones and older people.

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AGRICULTURE TODAY

FROM DELHI TO BEING INDIA'S DOCTOR SAAB

Doctor Saab, as he is fondly called has won the hearts and health of the people. A polio eradication champion, Dr. Harsh Vardhan was a natural choice to be India's Health Minister. As once quoted by Atal Bihari Vajpayee, Dr. Vardhan joined politics with the laudable objective of using his considerable medical knowledge and experience for serving the common man. His transparent manners of functioning gave him enough supporters among the elected and the electorate. In his new assignment as the Minister of Science and Technology, Dr. Vardhan is to begin a new epoch in his eventful political career.

Dr. Harsh Vardhan is the incumbent minister at Ministry of Science and Technology and Ministry of Earth Sciences in the BJP-led NDA government of Prime Minister Narendra Modi. Representing Chandni Chowk in Delhi in the 16th Lok Sabha, Dr. Vardhan was the Chief Minister candidate for the BJP in the 2013 Delhi assembly election and an acclaimed Health Minister of Delhi.

Born on December 1954 as the second child of Om Prakash Goel and Sneh Lata, Shri Vardhan finished his schooling from Anglo Sanskrit Victoria Jubilee Senior Secondary School, Daryaganj, one of the oldest educational institutions in northern India, founded in 1869. His passion for serving people was evident in the choice of his profession. He wanted to pursue the noble profession of medicine and so he attended Ganesh Shankar Vidyarthi Memorial Medical College, Kanpur, where he graduated in 1979 with a Bachelor of Medicine, Bachelor of Surgery. He earned his Master of Surgery in Otorhinolaryngology from the same college in 1983.

A member of the Rashtriya Swayamsevak Sangh since childhood, his entry into the wide world of politics was a natural progression. But his political ambitions never swayed towards personal gains but were directed towards the greater good of humanity. The trust of the electorate elected him as their representative throughout his political career. In 1993, he was elected as a member of the Delhi Assembly representing Krishna Nagar. He was appointed as the State Minister of Health and Minister of Law for Delhi. He later became the state Minister of Education in 1996. Dr. Vardhan has been re-elected from the same constituency in the 1998, 2003, 2008 and 2013 elections.

During his tenure, Dr. Vardhan etched his role as Delhi'sState Minister of Health remarkably. He pioneered the Pulse Polio programme in India. He launched the programme first in Delhi, which later on became a movement that the whole of India embraced. In 1994, on October 2, he organised the mass immunisation of 1.2 million children, a massive immunization drive unparalleled in India's history.A year later, the programme was extended to the rest of India. On 28 March 2014, India was declared polio-free by the WHO, as there had been no reported cases for three years.

In 1997, under his bold leadership, the Delhi Prohibition of Smoking and Non-Smokers Health Protection Act was passed. The Supreme Court passed an Order asking all states and the Centre to follow suit. Soon, other states followed Delhi's example, culminating in a Central legislation banning smoking in public places in 2002. The World Health Organisation has recognised his contribution to society and awarded him the Director-General's Commendation Medal at a prestigious function held in Rio de Janerio, Brazil, in May 1998, an honour previously bestowed on the likes of US President Bill Clinton. In January 2001, Prime Minister Vajpayee honoured him with Rotary International's "Polio Eradication Champion Award". He is the first Indian to receive this prestigious award, which earlier went to former British Prime Minister John Major, former President of USA Bill Clinton, former UN Secretary-General Kofi Annan and a galaxy of other famous international personalities.

His political acumen had earned him a respectable position in his party as well. He was the President of the Delhi Pradesh unit of the BJP four times. In late 2003, he was nominated President of the Delhi unit of the BJP. He rebuilt the party's structure from the grass roots to the top most level. In April 2007, the party recaptured the Municipal Corporation of Delhi and in 2008, the Delhi Cantonment Board. Under his leadership Party won 7 out of 7 Loksabha seats in 2014 Parliament election and scored maximum number of assembly seats in 2013 elections when he was projected the Chief Ministerial candidate by the Party. After the 2013 elections, BJP emerged as the single largest party winning 31 out of the 70 seats in the Fifth Legislative Assembly of Delhi.

As Health Minister in the Narendra Modi government for five months, he initiated many reforms in the public health system of the country. He took over as Minister for Science &Technology and Earth Sciences in November 2014 with the confidence of the Prime Minister who earlier held this portfolio. He is committed to set a roadmap for the implementation of the "Make in India" programme by building a robust R&D infrastructure and promoting synergies between industry and scientific research institutions.

"We have benefited from the first Green Revolution. But the country cannot wait for the second Green Revolution. We are already late. We need to prepare plans to achieve second green revolution"

NARENDRA MODI
Prime Minister

"Help any distraught farmer. Try to solve his problem or bring a public representative to him. Don't allow anyone to commit suicide. "

RAJNATH SINGH
Home Minister

"It is wrong to designate the limited support given to farmers (in nations like India) as subsidy... It will be more appropriate to refer to the assistance as support to sustainable farming"

PROF MS SWAMINATHAN
Renowned Agriculture Scientist

"We are not listening enough to science as it should determine our policies. We are not becoming a knowledge society. We are becoming a knowledge proof society"

DR. SUNITA NARAIN
DG, Centre for Science & Environment

"All economists agree on the importance of rural sector in the economy... Our government is seriously working towards developing rural areas and agriculture. The country can never progress if the villages are not developed,"

AKHILESH YADAV
Chief Minister, Uttar Pradesh

"Climate change is no longer a matter of debate. While our contribution to global warming is not much, there is no other country which is more affected by climate change. It is something that we have to be proactive on and not reactive to"

JAIRAM RAMESH
MP and former Minister for Environment

"Agriculture is no longer a profitable venture as its input cost have increased manifold whereas the farmers are not getting remunerative prices of their harvest,"

PRAKASH SINGH BADAL
Chief Minister, Punjab