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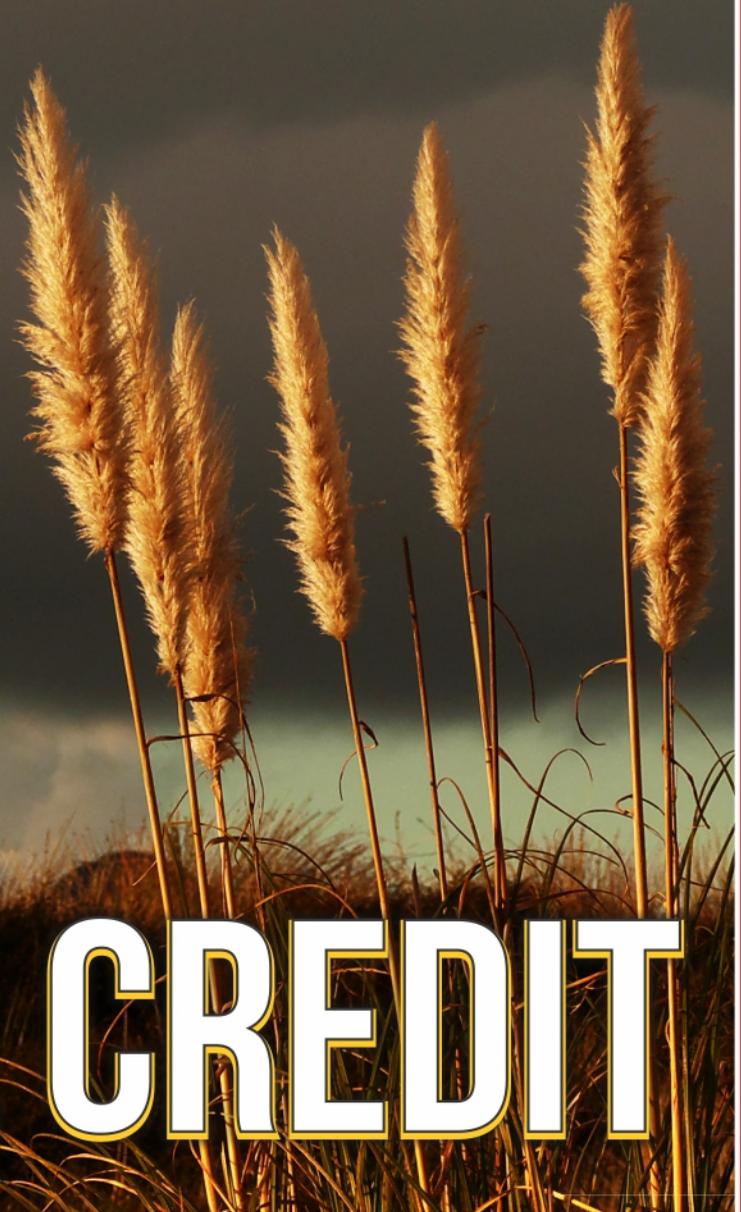
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BUILDING RURAL CREDIT

BUDGET SPECIAL

INTERIM BUDGET 2019



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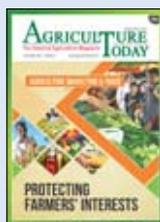
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From the Editor's Desk

RURAL CREDIT SECURITY CRUCIAL FOR INDIAN ECONOMY

Rural credit system is an important pillar in India's economy. India's hinterlands, had always had a higher dependency on the unorganized system largely manned by the moneylenders. Their exorbitant interest rates and dubious ways of recovering loans have to a large extent caused disarray and distress among the farming community.



The credit delivery system in the rural areas have seen a sea change since the entry of organized banking. Microfinance institutions, the Self-Help Groups (SHG)-Bank linkage Programme, Kisan Credit Cards, Digital banking, BHIM (Bharat Interface for Money), Micro ATMs, too have also made sweeping changes in the rural economy. Apart from these traditional categories of credit, other forms of credit has also been lending support to the farmers. Crop insurance has been able to extend the much needed financial aid to the farmers at times of distress and hence can be considered as an important source of rural credit. Subsidies also serve as an important source of credit to the farmers, although indirectly. It is the governmental financial support paid to the farmers to reduce their input expenditures and supplement their income. The government in India provide subsidies for fertilizers, power, purchase of irrigation equipments etc.

The interim budget 2019 had some surprises that were meant to spur the rural credit scenario. Pradhan Mantri Kisan Samman Nidhi scheme provides income support to farmers who will be entitled to get Rs 6,000 per year through direct bank transfer in three instalments. This broached the idea of basic income to farmers and is believed to go a long way in supporting the rural credit structure.

Despite India's inclinations to support farmers and raise their income levels, the rural credit sector is still disorganized. Rural debts are unfortunately on the increase and farmers are under immense financial distress. While schemes galore at the national level to channelize the credit flow to rural strongholds, certain pockets remain unreachable. Debt traps have become far too common and farmers suicides have not seen any let down.

Loan waivers are another category of financial support that have time and again supported the farmers. Although distorting, this financial aid bails out farmers from having to pay back their loan amount. Although the merits are temporary, this has become the favourite political instrument. Generalized loan waivers raise expectations among the farmers for such future interventions acting as a disincentive to pay back their loans. This would also raise the number of defaulters and create a crop of habitual defaulters.

Rural credit has been an important segment that exerts tremendous influence on Indian economy. The credit security of largest share of population is an important determinant of a progressive nation. Hence tremendous emphasis must be laid on to improve the existing scenario.

Anjana
Anjana Nair

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ENABLING OUR FARMERS THROUGH SUSTAINABLE MODULES

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DHANUKA ADVT

PMKSNY - Benefiting Befittingly

PMKSNY scheme assures direct income transfer to the farmers

Lack of an assured income has remained the bane of India's agriculture. Agriculture, being dependent on innumerable variables, have led to deep instability in the income earned by the farmers. This has time and again affected the productivity of agriculture. With a vast majority of population dependent on agriculture, this problem needed an absolute solution. With market corrections and support prices failing farmers repeatedly, direct income became a suitable option.

The interim budget proposed by Shri Piyush Goyal held solution to the troubled income recovery of farmers from agriculture. The budget announced the PM-Kisan Samman Nidhi Yojana (PMKSNY), a straight income transfer to farmers that would benefit farmers in its own way. The scheme proposes a benefit of Rs. 6,000 per year, payable in three instalments of Rs. 2,000 each to all the eligible farmers having a land holding of up to 2 hectares. The government of India has made a provision of Rs. 75,000 crore for this scheme, under which about 12 crore farmers of the country will be covered.

This comes at a suitable juncture when the markets have repeatedly failed the farmers in realising the price of commodities. The result of which was widely displayed in the streets across the nation. Farmer suicides and farmer protests were vivid descriptions of what is wrong in the agriculture markets. Many indirect credit support systems such as bank loans, subsidies, support prices have failed to promise the income stability, let alone, doubling farm incomes which was an important mandate of the government. This direct income support will go a long way in assuring a set amount to be credited to the bank accounts of the farmers. Not only it will be of immense benefit to the farmers in supporting their families, it also can help in enhancing the productivity of agriculture.

The extra amount can be used in investing better inputs, technology and innovation.

Besides, increasing the production of current farming operations, this will also help in investing in ancillary enterprises and expanding the income of the farmers. Thus it will increase the avenue of farmers to derive income. The same can also be used to obtain training in specialized operations or that which is intended in skill development. This again will create more avenues for income generation. In general, this direct income support positively will influence in increasing the living standards.

However, in this system of direct income support it is the farmers/land owners who are getting the benefits. Tenants/share croppers do not come under the scope of this scheme. Despite, the money owed by the tenants to the landowners as rent, they bear the expenses of crop production and survive the market risks. They are unfortunately bypassed in this scheme.

PMKSNY could have taken some lessons from Odisha's KALIA which has given primary importance to small, marginal and the landless farmers. The scheme provides financial assistance of Rs. 25000 for cultivation per farm family over five seasons to small and marginal farmers to purchase inputs, labour and other investments. The scheme also has provisions for financial assistance of Rs 12,500 to be provided to each landless Agricultural Household for agricultural allied activities. Cultivators and landless agricultural labourers are also addressed in this scheme as they are entitled of a financial assistance of Rs 10,000 per family per year to enable them to take care of their sustenance. Odisha's scheme has made provisions to address all categories of farmers and hence comprehensive.

However, with this scheme, the government has refused to give into the pressure of waiving loans, and instead has focused into providing income support to the farmers. This will lead to the overall development of agriculture.

A Pro Farmer Budget

The interim budget focuses on the welfare of the farmers

Agrarian distress remained pronounced the past year and farmers emerged as a significant force. It has become apparent now that the demands of farmers cannot be disregarded and a budget without addressing the immediate needs of the farmers would be fatal for the government. Considering the imminent elections, it was expected that government would be drawing up a plan that would be pro farmer and pro agriculture. The interim budget was necessarily a budget that allocated much importance to peoples' concerns. Minister Piyush Goyal's reiteration during the budget speech of the deep agrarian crisis set the tone for this year's budget. Farmers remained a central theme in the interim budget.

Over the years, the government has turned its focus from a production oriented programme to income support. Although many programmes have been introduced in the past to enhance income of the farmers, the prices of commodities fell sharp last year leading to deep distress in the agriculture sector. The PM-Kisan Samman Nidhi Yojana (PMKSNY), a straight income transfer scheme of the farmers that was introduced in this budget thus strived to address the income stability of the farmers. The scheme that assures basic income to the farmers, is a welcome step and opens up a new dimension in farmers' welfare. This direct income support will go a long way in assuring a set amount to be credited to the bank accounts of the farmers. Not only it will be of immense benefit to the farmers in supporting their families, it also can help in enhancing the productivity of agriculture. The extra amount can be used in investing in better inputs, technology and innovation.

Another biggest benefactor in this budget was the Fisheries segment. India is the second largest fish producing nation in the world accounting for 6.3% of global production, registering an average annual growth of more than 7% in recent years. The sector provides livelihood to about 1.45 crore people at the primary

level. Acknowledging the significance associated with Fisheries segment, provision for creation of separate Department of Fisheries was made in this budget.

Animal Husbandry was another segment which received due attention in this budget. The increased allocation for Rashtriya Gokul Mission and setting up of "Rashtriya Kamdhenu Aayog" will go a long way in upscaling sustainable genetic up-gradation of cow resources and to enhance production and productivity of cows. The Aayog will also look after effective implementation of laws and welfare schemes for cows. Another welcome measure is the proposal to expand the benefit of 2% interest subvention to the farmers pursuing the activities of animal husbandry and fisheries, who avail loan through Kisan Credit Card. This will boost the ancillary enterprises and lure the farmers towards other profit making vistas of agriculture. Diversification of agricultural income is central to giving the farmers stability and sustainability in agriculture.

The past year the country saw many natural calamities those had a direct bearing on the farmers. Under distress when they have lost their crops, it becomes difficult for farmers to repay their crop loans. The decision of the government to provide the benefit of interest subvention of 2% and prompt repayment incentive of 3% for the entire period of reschedulement of their loans, for all farmers affected by severe natural calamities, where assistance is provided from National Disaster Relief Fund (NDRF), is a commendable initiative.

The budget this year thus laid emphasis on strengthening the farmers' income and positioned to provide them with dignity and confidence in their journey towards making India food secure. Market forces have constantly eroded the element of financial stability and an invisible threat looms large over the employment prospect of agriculture. This budget reflects the general sentiment of the authorities and the future would see many such schemes that will intend to foster permanence in revenue generation.

Unimpressive Cash Doleouts

The Interim Budget fails to impress agriculture sector

The fact that the elections are around the corner was one of the biggest factors that influenced in shaping the interim budget. It held all the essential elements that were supposed to elicit a mass euphoria among the voting population. With taxes slashed and providing direct income support to the farmers, the budget came clean with minimal effort to develop a long term vision on addressing the long standing issues in agriculture.

The direct income support in the form of Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) is projected as the mantelpiece. The populist measure which basically involves transferring income directly to the bank accounts of the farmers falls short of its expectation. In comparison to Telangana's Rythu Bandhu scheme which provides Rs10,000 per acre of support, the amount declared by the government comes as a pittance. Rs. 6000 per year translates to Rs.500 per month and expecting that this amount is going to bring about income stability to the farmers is a fantasy. Besides, the help is only extended to farmers owning the land clearly alienating the landless cultivators and tenants who carry out cultivation on leased lands. The scheme is expected to cover 120 million farmers, but it has effectively left out 140 million landless tenants. The project could have borrowed a few lessons from Odisha's Kalia scheme which had dutifully included the marginal and landless farmers. The decision to begin this scheme retrospectively and to transfer the first instalment in this financial year itself is the clear indication of the political mileage this government is expecting in the coming assembly polls.

Agriculture is primarily a state subject. The role of the government at the center should be to create an enabling environment for the state governments. Having said so, cash dole outs such as this will specifically create an environment that need not necessarily translate into better agriculture

productivity. The extra amount may be diverted to other expenses or worse into unhealthy practices such as smoking or alcohol. Direct cash transfers typically entail this risk.

The budget other than being generous with interest subvention and direct cash transfers remained silent on creating any long term strategy to optimize the earnings from agriculture. No long standing strategies were directed to increase the income of the farmers organically. Instead the direct giveaways indicate the government's intention of earning praise from the farmers and not relenting on the ways to enhance incomes from following the profession of agriculture. By PM KISAN, we are looking at creating a crop of absentee farmers who will hold the agriculture lands in their names but would rely on some other profession for living. Another major fall out from this scheme is the fragmentation of land. Since the farmers owning lands above 2 ha of farm are ineligible for the PM KISAN scheme, they may divide the land to get more profit.

It is a big relief that loan waivers did not form a part of the budget. But the budget hasn't addressed the biggest problem faced by the farmers recently. Falling prices have affected the profitability of agriculture. No solution to this problem was evident in the budget. The problem of plenty without any mechanism to store the abundant agriculture produce scientifically or to transport them safely to far flung markets have exacerbated the situation. Farmers are in need of ways to expand their profit. Instead of giving them avenues to spend money, they must be given avenues to earn money. Earned money receives more prudence while spending from the farmers than the gifted money.

The interim budget was meant to woo the vote bank. It was akin to paying them to earn votes. The government should have shunned these ways and instead should have pursued more elite ways to earn the loyalty of the farmers.

Balancing for Better Agriculture

Women are the underplayed elements in Indian agriculture

“**B**alance for Better” is the theme for this year’s International Women’s day. March 8 celebrated world over hails the ‘women’ factor in different spheres of life and upholds the sanctity of womanhood.

Over the years, the world has changed and so has the status of women. They have accepted many challenging profiles and have excelled in them. Agriculture is also one such domain where they play an irreplaceable role, especially now when the sector has seen an increasing feminization. According to Census 2011, there has been a 24 per cent increase in the number of female agricultural labourers between 2001 and 2011, from 49.5 million to 61.6 million. Nearly 98 million Indian women have agricultural jobs, but around 63 per cent of them are agricultural labourers, dependent on the farms of others, according to Census 2011. But in most of the cases, women accidentally don the role of the farmers. They end up in agriculture sector following migration of the men to urban centers or due to farmer suicides.

Unfortunately, their role mostly goes unnoticed or underplayed. They toil in the farms and are under paid with unequal rights to land, credit, benefits and training. Even at the policy level, the status of women in agriculture goes unnoticed. A study on the status of women farmers in Uttar Pradesh by Oxfam International shows that only 6 per cent of women own land, less than 1 per cent have participated in government training programmes, 4 per cent have access to institutional credit and only 8 per cent have control over agricultural income.

Despite the fact that women contribute a much higher proportion of labour in agricultural sector, they rarely are given the freedom in decision making. Women in most cases play an important role in all aspects of crop production – right from sowing to marketing. Since they are loosely attached to the resources like land and capital, any change

in their situation can only be brought forward by entitlements. Ownership of land cannot only be categorized as assets in the case of women. Even women farmers with cash generating resources like fish, duck, poultry, cattle etc. should be recognized as farmers so that they can attain monetary support from the government sponsored schemes.

In all farm production, the average contribution of women is estimated at 50 per cent to 60 per cent of total labour and sometimes much higher in certain regions. Mostly the male farmers are involved in one time agricultural jobs like land preparation, planting, sowing and fertiliser application, the duration of which expires shortly. But the female farmers mostly are involved in farm operations such as weeding which last almost throughout the entire crop period.

Although women have impressed their presence in many facets of agriculture production, the society has very little to offer them in exchange for their services. A cursory glance across agricultural markets in India reveal that none of them have a rest house for women producers who come to markets. The markets lack basic facilities such as toilet blocks. Even the research wing of agriculture should evolve strategies that are gender sensitized and support feminization in agriculture. Women friendly machines that can be used in different levels of agricultural operation can increase the efficiency as well as dignity of the occupation. This needs to change and policy interventions can bring out a palpable change in the status of women in agriculture.

A change in perception of women in agriculture is crucial. Their role needs to be recognized beyond the area of farming operations. Women not only takes care of the farm but also that of a rural household, the basic unit of the rural community. Hence their well being is critical to maintain a healthy rural community. A balance should be brought about for the betterment of agriculture sector.

Sanwaria Consumer to raise Rs 500 cr

▶ Sanwaria Consumer, a mid-sized company dealing with value-added agricultural products, plans to raise Rs 500 crore in three tranches for funding its retail expansion plans. The company is in talks with various investors to raise about Rs 150-200 crore through the issue of equity share warrants, which is expected to be finalised by end of next month. Sanwaria plans to open 150 'ATM-size' retail outlets in Tier-III and Tier-IV cities of Madhya Pradesh, Maharashtra and Gujarat, which will exclusively sell over 35 products of the company including basmati rice, wheat flour, dal, edible oils and sugar. The company has already opened 50 stores in Madhya Pradesh and has seen good sales traction. Similarly, it has started operations in Maharashtra with two stores at Vidarbha before stepping into Gujarat. Anil Agrawal, Director, Sanwaria Consumer, said the funds are most likely to be raised through equity warrants as it would enable investors to take advantage of possible rise in share price over a period of time. The company's retail focus will be limited to three States, though it sells products in bulk in about 18 States.



Indofil, Italian firm Reagens team up for polymer additives

▶ Indofil Industries, KK Modi-promoted crop protection and speciality chemicals firm, on Thursday announced joining hands with Italy-based Reagens to produce green polymer additives from the former's plant at Ankleshwar, a press statement said. These speciality additives will be available from April 1. The joint venture will also construct a modern plant in Gujarat Industrial Development Corporation's SEZ in Dahej in 2019.

Punjab in pact with Virgo Corp for biofuel project



▶ The Punjab government on Monday signed an MoU with Delhi-based Virgo Corporation for a Rs 630-crore project which will produce biofuel from rice husk. The technology for the project will be provided by the US giant Honeywell. The memorandum of understanding (MoU) was signed in the presence of Chief Minister Amarinder Singh and US Ambassador to India Kenneth I Juster. The project will go a long way in containing environmental pollution due to stubble burning, besides supplementing the income of farmers by helping turn the unmanageable agro-waste into raw material for producing biofuel, Singh said.

EID Parry to shut sugar unit

▶ E.I.D. Parry (India) Ltd., one of the largest manufacturers of sugar, has decided to shut down its non-operating sugar unit in Puducherry following continuous non-availability of adequate sugar cane. The plant would not be operated in future as the expectation of revival of cane cultivation in the area is abysmally low following a variety of factors, the company said in a regulatory filing. Regarding the sugar unit's assets, the company proposes to transfer some assets to other units and dispose the remaining assets as may be deemed appropriate. The board, meanwhile, also decided to issue non-convertible debentures to raise up to Rs 250 crore on private placement basis. For the third quarter ended December 2018, the company reported a loss of Rs 31 crore against a loss of Rs 83 crore in the year-earlier period. Revenue from operations stood at Rs 479 crore against Rs 424 crore. "Performance of the company continued to be impacted on account of the depressed sugar prices together with the reduced sales volumes due to the release order mechanism. "For the quarter, the cane crush quantity has been lower compared to the same quarter of the previous year. However, the overall crushing for the sugar season is expected to be normal," said S. Suresh, managing director, EID Parry. During the quarter, the company exported 14,140 million tonnes of sugar. Also, for the first time in the quarter, the firm produced ethanol from B heavy molasses. Besides, it commissioned the back-end refinery project at Haliyal plant. The company continues to focus on cost and cash management along with product differentiation both in institutional and retail businesses, Mr. Suresh said.

UPL completes acquisition of US-based Arysta Life Science for \$4.2 bn

Agri-chemicals major UPL Ltd on Monday announced the completion of its acquisition of New York-based Arysta LifeScience Inc for \$4.2 billion. The acquisition will elevate UPL's position in the global agricultural solutions market with \$5 billion in combined sales and EBITDA of around \$1 billion. UPL had started the acquisition process in July 2018, a senior company official said. Vikram Shroff, Executive Director, UPL Ltd, told media persons that the transaction will be carried out by UPL Corp, which is a subsidiary of UPL Ltd. It is UPL Corp, which has acquired Arysta by raising a \$3 billion bank loan and \$1.2 billion equity investment from Abu Dhabi Investment Authority and TPG, a leading global alternative asset firm, he said. UPL is strong in regions such as India, Americas, Western Europe and Arysta's strength is in Africa, Russia and Eastern Europe market, therefore the new acquisition will provide a global platform for 13,000 products of the new entity, Shroff added that the transaction has received unconditional regulatory approvals from authorities across the globe. The company has already announced global, regional and country leadership teams for the integrated entity and the integration process is running ahead of plan.



Agri NBFC Samunnati raises Rs 33-crores debt from Symbiotics

Chennai-based Samunnati Financial Intermediation and Services, an agri value chain finance firm has executed the issuance of non-convertible debentures (NCDs) aggregating to Rs.33 crore for furthering expansion plans. With this investment, Samunnati becomes the first early-stage agri NBFC to raise five offshore debt investments within a span of seven months. The NCDs were subscribed by two investment funds managed and advised by Symbiotics, an impact-focused investment firm dedicated to inclusive and sustainable finance in emerging and frontier markets. The funds will be utilised by Samunnati to build the portfolio by financing the working capital requirements of small-holder farmer organisations and agri-enterprises across the value chain. Samunnati was



founded with a vision to enhancing the value of all players across the agriculture value chain by providing financial intermediation, market linkages as well as advisory services. Unlike traditional lenders who tend to focus on crop loans or agricultural input loans, Samunnati has built the expertise needed to assess smallholder farmer needs and design appropriate financial products that are not collateralised. The company leverages the relationships between suppliers and buyers to assess risk and enable financial intermediation. It offers customised financial products such as working capital loans to community based organisations (CBOs) and receivable finance to agri SMEs, respectively.

Pest attacks to deliver sales boost to agri input companies in FY19

After two tepid years, agri input companies are set to post robust growth in their top lines and bottomlines during the current financial year, following improvement in sales of insecticides and other products due to intermittent pest attacks in agricultural crops. Most agri-centric companies posted a rapid growth in turnover and profit for the October–December quarter on improvement in sales. Revenue and net profit of Insecticides India jumped by 22.6 per cent and 75 per cent to Rs 216 crore and Rs 17 crore respectively for the October–December quarter. The total revenue of UPL Ltd rose to Rs 2,216 crore for December 2018 quarter from Rs 1,942 crore a year ago.

NET SALES

	Figures in ₹ cr	FY18Q3	FY19Q3	% chg
UPL	4,194	4,921	17.33	
Bayer	479.70		29.46	
CropScience	621			
Sharda	325.46		44.86	
Cropchem	471.45			
Rallis India	390.16	417.35	6.97	
Insecticides India	175.93	215.74	22.63	

Source: Capitaline

Compiled by BS Research Bureau

MSP hiked, sugar prices to rise



▶ The government set the minimum selling price of sugar by manufacturers at Rs 31 a kg against the earlier rate of Rs 29. This is aimed at boosting the liquidity of cash strapped millers and help clear mounting cane arrears of around Rs 20,000 crore. The increase would also push up the retail price, which was in the range of Rs 36 to Rs 40 per kg. Food minister Ram Vilas Paswan informed that a mechanism will be put in place to ensure the benefit given to the industry is passed on to sugarcane farmers. The decision comes following demands from the sugar manufacturers and representation made by NCP chief and former agriculture minister Sharad Pawar to Prime Minister Narendra Modi. Paswan said that rate has been increased in view of the rising sugarcane arrears to farmers. The price revision was proposed by a committee of secretaries. In the last few years, the government has taken several measures to help cashstarved mills clear cane dues. These include increase in import duty on sugar to 100 per cent, scrapping of export duty, creation of buffer stock, and subsidy for mandatory export of 5 million tonnes in the 2018-19 marketing year.

Soon, guidelines on minor forest produce

▶ In a pre-poll assertion aimed at reaching out to the tribal belt, the government has set out an on-ground implementation plan for the recently enhanced minimum support price (MSP) for 50 non-timber minor forest produce (MFP) items across the states. To be notified any time soon by the ministry of tribal affairs, this comes in the form of detailed guidelines focussed on decentralisation so as to ensure the procurement mechanism directly reaches the tribals and they are not exploited by middlemen. Incidentally, the MSP for MFP programme of the ministry is slated for a review by the cabinet secretary on Friday. In its effort to reach out to tribals surviving on earnings from MFP to get fair prices when they sell their produce, MSP for 40 MFPs was notified in December. TOI had reported on the hike in MSP which ranged from 200% to 5.6% for 19 MFPs already on the list of 23 and 17 new items were added. Later prices of 10 more MFPs were notified. However, learning from the shortcomings that have marked the scheme since it took off in 2013-14, this time the government has entered into MoUs with states to ensure implementation of the revised MSP. The outreach involves 307 tribal districts across 27 states with 5.5 crore tribals seen as beneficiaries. The guidelines approved by minister for tribal affairs JualOram earlier this week clearly set out the role of the authorities at the central, state and district level.

Australian walnuts set to hit India's retail shelves

▶ Australia and India have concluded a market-access agreement to allow the entry of Australian walnuts in the huge Indian market. According to Australian Agriculture Minister David Littleproud, the two countries signed a market-access agreement on February 6 with the trade set to formally commence once the import conditions are officially gazetted by the Indian authorities. He said in the interim, 10 trial shipments of Australian walnuts will be sent to India before the trade doors officially open. "Many Australians don't realise a scientific market-access agreement is often the hardest part of getting access to a new market. Getting scientists from two countries to agree on how to stop any threat of diseases or pests being exported from one country to another can be very difficult," Littleproud said. "We have managed to win agreement with our Indian friends and this means our walnut growers can export their clean, green product to India," he said. The export value for Australia's agricultural commodities to India has risen by 329 per cent since 2013, and were worth \$2.6 billion in 2017. Australia gained market access for blueberries from late 2015.



Centre to give 2 instalments under PM-KISAN before polls

▶ The Centre is gearing up to give two instalments amounting to Rs 4,000 directly to eligible farmers under the newly announced PM-KISAN scheme before the Lok Sabha elections, a senior Agriculture Ministry official said. In the interim-budget, Finance Minister Piyush Goyal announced the direct income support scheme called Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) under which Rs 6,000 per year will be given in three instalments directly into the bank account of 12 crore eligible small and marginal farmers owning land up to two hectares. Goyal had also said that the scheme will be launched from this fiscal onwards and the first instalment of Rs 2,000 will be given by March. "The States are in the process of the identifying the eligible farmers. The initial list of beneficiaries should be ready soon," the official told PTI. Asked if the two instalments will be given before the Lok Sabha elections, the official said, "We are getting ready for that. We are hopeful of transferring two instalments amounting Rs 4,000 before the Lok Sabha elections." Since the scheme is being rolled out this fiscal, its implementation will not be affected when model code of conduct kicks in any time next month, the official added.



Cabinet clears Agri-Market Infrastructure Fund

▶ Almost a year after announcing the plan to set up 22,000 rural markets, connecting them with nearest APMCs and e-NAM platform, the Cabinet approved a Rs.2,000 crore fund — Agri-Market Infrastructure Fund — with Nabard. The rural markets, to be named as GrAMs (Gramin Agricultural Markets), will be eligible to avail loan from this fund at cheaper interest rates for creation of necessary facilities in the market complex. The Agri-Market Infrastructure Fund was announced in 2018 Budget for developing and upgrading agricultural marketing infrastructure in the 22,000 GrAMs and 585 APMCs. About 200 GrAMs are currently under construction from MNREGA fund and the rural development ministry has been discussing with states to scale up the number of these markets, sources said. The guidelines for GrAMs were issued in December last year after detailed consultation with states and other concerned ministries.

Govt Plans to Launch Agri Business Index

▶ The government plans to launch an index to rank states on the basis of ease of doing agri-business, the Parliament was informed. Minister of state for Agriculture Parshottam Rupala said this when asked if the government was planning to launch such an index.

Govt to Issue Price, Demand Forecasts for 5 Crops Soon

▶ The government will issue price and demand forecasts for onion, potato, mustard, wheat and chana to balance demand with supply and help distressed farmers get better prices with the help of market intelligence. It hopes to end the practice of farmers sharply increasing planting of a particular crop after prices surge, which leads to a glut and losses in the following season. The government plans to issue price and demand forecasts for commodities including price sensitive horticulture crops to enable farmers to understand market conditions, said Prasanta Kumar Swain, joint secretary (marketing). "Farmers will have beforehand information on what to grow, what the demand in the market is and how market prices will behave. This will help them decide on the crop they want to grow. We are starting with five commodities and we will expand the scope in the coming seasons," said Swain. The way India Meteorological Department (IMD) releases weather and rain forecast to help farmers plan their cultivation, Market Intelligence inputs will help prevent glut of crops curbing price crash and at the same time encourage tillers grow crops which are short in stock. The agriculture ministry has engaged ICAR National Institute of Agricultural Economics and Policy Research (NIAP) as knowledge partner and Directorate of Marketing and Inspection (DMI) as technical back stopper. The decision to conduct the study is in line with the announcement made by the government in the budget for 2018-19 to create an institutional mechanism on market intelligence for farmers. The findings of the study will come in handy in the wake of the recently launched agriculture export policy aimed at doubling the farmers' income by 2022.

Nabard pegs credit potential of Rs 3.53 lakh cr in Punjab, Haryana

► Agriculture and allied sectors of Punjab and Haryana will have a lion's share in banks' total advances in the next fiscal year. Given the dominance of agriculture sector in these two states, more than 60% of the lending potential by the banks has been dedicated to the sector in 2019-20. This will ensure credit access to farmers from institutional finance. To augment production and productivity in agriculture sector in these two states, the National Bank for Agriculture and Rural Development (Nabard) has assessed the credit potential at Rs

2.23 lakh crore out of total credit potential of Rs 3.53 lakh crore. For Punjab, Nabard has estimated credit potential of Rs 1.42 lakh crore for agriculture and allied activities out of total outlay of Rs 2.28 lakh crore during 2019-20. Other loans include MSME loans, export credit, educational and housing loans. The share of crop loan is estimated at Rs 97,577 crore — 43% of total estimated potential. Loan for agriculture infrastructure is estimated at Rs 6,490 crore, agriculture ancillary (Rs 14,963 crore) and agriculture term loan (Rs 23,407 crore).

PRIORITY SECTOR LENDING

Sector	Punjab (in cr)	Haryana (in cr)
Crop loan	₹97,578	₹54,073
Term loan and allied activities	₹44,861	₹26,949
Total	₹1,42,439	₹81,022

NABARD Survey Reveals Farmers' Income Woes In Assam

► The latest survey conducted by the National Bank for Agriculture and Rural Development (NABARD) has revealed that the monthly income of agricultural families in Assam and Tripura is the lowest among the North Eastern States. The All India Rural Financial Inclusion Survey conducted by NABARD says that while monthly income of a rural agricultural family in Assam is Rs 8,880, it is Rs 9,877 in Arunachal Pradesh, Rs 9,679 in Manipur, Rs 10,061 in Meghalaya, Rs 9,491 in Mizoram and Rs 10,002 in Nagaland and Rs 8,612 in Tripura. Even though the officials of the Agriculture department attribute such low income to farmers' reluctance, especially those from Upper Assam, to do cultivation throughout the years despite various incentives and schemes taken up by the government, sources said not getting the deserving prices of agriculture produces is the prime reason for low income of farmers in the State. Sources said the survey must be an important indicator for Assam at a time when it is going to double their farmers' income. The survey, which was conducted to assess the impact of various financial inclusion interventions of the government among the rural populace across the country, has found that the average monthly income of a rural family is the highest in Punjab (Rs 16,020) and the lowest in Andhra Pradesh (Rs 5,842). According to the NABARD survey, the surplus amount of money of a family in Assam after expenditure is Rs 2,066. The surplus is Rs 2,155 for Arunachal Pradesh, Rs 1,062 in Manipur, Rs 1,819 in Meghalaya, Rs 930 in Mizoram, Rs 1,026 in Nagaland and Rs 632 in Tripura. An official at Agriculture department said the department will encourage subsidiary incomes of farmers by encouraging them for milch cattle rearing and honeybee cultivation.



Nabard pegs lending target in Telangana at Rs 1,01,378 crore

► The National Bank for Agriculture and Rural Development (Nabard) has pegged the total priority sector credit potential for Telangana at Rs 1,01,378.60 crore for 2019-20. This represents a 9 per cent increase over the 2018-19 target, which was at Rs 83,389 crore. It has released the State Focus Paper at the State Credit Seminar. This serves as a guiding document for banks and State governments. The credit projection for the agricultural and allied sectors is estimated at Rs 70,965 crore, with lending for agri investment activities constituting 30 per cent of the total agricultural loans. For investment credit, an aggregate credit potential of Rs 21,179 crore has been estimated under agri term lending/investment credit. Vijay Kumar, Chief General Manager (CGM) - Telangana State (TS), Nabard, said that for the successful implementation of any credit plan infrastructure, new and innovative methods of cultivation, convergence of efforts of different institutions and credit support would be vital. The integration of Nabard's annual credit plan and State budgetary provisions/efforts might yield better results, he added. Through Rural Infrastructure Development Fund, Nabard has extended funding of Rs 11,881 crore so far under various schemes such as Mission Kakatiya.

'Budget '19 to increase farmers' income'

► The present government, which has been continuously working on the motto of "Sabka Saath — Sabka Vikas", has once again, with Budget 2019, reaffirmed its commitment to the all-round development of agriculture sector and enhancing the income of farmers. The budgetary allocation of the Agriculture and Farmers' Welfare Ministry has been raised by around 2.5 times from Rs 58,080 crore in 2018-19 to Rs 1,41,174.37 crore in 2019-20, which is 16.6 per cent more than Rs 1,21,082 crore during UPA (2009-14). That is why, the government in accordance with its philosophy of increasing both agricultural production and farmers' income, has created history in Budget 2019 by making provision of income support and other schemes with a focus on rural India. To provide assured income support to the small and marginal farmers, the government has launched a historic programme "Pradhan Mantri Kisan Samman Nidhi (PM-KISAN)" entailing an annual expenditure of Rs 75,000 crore. Under this programme, vulnerable landholding farmer families, having cultivable land upto 2 hectare, will be provided direct income support at the rate of Rs 6,000 per year to ensure their investment and other needs.



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m loan limit now Rs 1.6 L

► The RBI has raised the limit of collateral-free agricultural loans to Rs 1.6 lakh from the current Rs 1 lakh with a view to help small and marginal farmers. It also decided to set up an internal working group to review agricultural credit.

Direct MSP transfer to bank accounts of farmers on the cards

► The Centre is considering the option to transfer the minimum support price (MSP) directly into the bank accounts of farmers who are unable to sell their produce during procurement operations. The option to allow farmers to sell at MSP for the entire year instead of fixed few months after the harvest is also being considered. The Centre is also planning to provide short-term farm credit at zero interest rate on timely repayment. An amount of Rs.150 billion will be spent for interest subvention in 2018-19. This subsidy amount might be scaled up to over Rs.280 billion if the subvention is waived off. The Pradhan Mantri Fasal Bima Yojana (PMFBY) might also be tweaked to reduce farmers' premium burden by fully waiving it on food crops and reducing a bit on horticultural crops. All these options are at various stages of discussion and a decision is expected soon.

Rs 10K crore loans, special schemes for farmers

► Deputy Chief Minister O Panneerselvam announced a slew of measures for the agriculture sector which included extending crop loans to the tune of Rs 10,000 crore, launching of a special scheme called Chief Minister's Scheme for Augmentation of Fruits and Vegetables, setting up of special agro-export promotion cell, establishment of organic certification centres in all districts to promote organic farmers, unveiling a separate policy for forming Farmers Producers Organisations etc. "In 2018-2019, under the Pradhan Mantri Fasal Bima Yojana, 21.70 lakh farmers have been enrolled till date, which is the highest in the past three years. During 2019-2020, the government would notify more crops and expand the coverage under crop insurance. Further, cloud burst and natural fire would also be included under localised calamities in addition to hail storm, landslide, and inundation, and Rs 621.59 crore has been allocated," Panneerselvam said presenting the budget.



Maharashtra govt increases corpus for drought-hit farmers

► Keeping in mind the drought-like conditions in 151 out of 358 taluks in Maharashtra, the State government has decided to increase the corpus of the contingency fund by Rs 2,000 crore. In the event of kharif crop damage or failure, the funds would be released to the farmers. The decision to increase the corpus was taken at the weekly State cabinet meeting on Tuesday. A press statement issued by the Chief Minister's office said that the limit of the contingency fund has been temporarily increased from Rs 150 crore to Rs 2,150 crore. In a separate development, the State Cabinet has also given clearance to set up mobile teams of veterinary doctors, who will attend to cattle in 80 remote taluks of Maharashtra in the first phase. For this new venture — which has been named as Chief Minister Animal Health Scheme — Rs 16.74 crore funds have been sanctioned. Support in the form of 80 vehicles, equipment, veterinary doctors, and technicians would be provided to cattle owners in remote, mountainous and tribal areas. The statement said that many times farm animals die due to lack of medical care in these areas. The owners are also not in a position to bear the medical cost of the treatment. Since the Centre has selected Maharashtra to be a State free of foot-and-mouth disease (FMD), the mobile squads will also keep the veterinary disease in check.

Manipur plans policy to promote bamboo cultivation

► Manipur is planning to bring out a bamboo policy to promote bamboo cultivation and other conservation activities in the region by next month, Principal Secretary of Textiles, Commerce and Industries P Vaiphei said. Informing that the draft bamboo policy of the State is at the final stage, Vaiphei said, "The policy will be presented before the State Cabinet for its approval after its finalization. We will try to incorporate new suggestions and ideas coming out of the forthcoming bamboo workshop. However, the senior official of the Manipur Government did not elaborate on the details of the draft bamboo policy. Bamboo, the fastest growing and high-yielding renewable natural resource, continues to play a predominant role in the life of people of all sections and Manipur is home to more than 54 bamboo species. The North East alone contributes 68 per cent of India's total bamboo production. Kamesh Salam, former president of the World Bamboo Organisation, when contacted, said: "We need a policy support and ownership of bamboo as craft, industrial products or bamboo shoots (food), etc. Other States have dedicated bamboo development agencies or bamboo development boards to implement bamboo activities." In North East India, Arunachal Pradesh, Nagaland, Mizoram and Tripura have bamboo development boards. Meanwhile, in a bid to spread the traditional use and application of bamboo, the third edition of the World Bamboo Workshop (WBW) will be held here from February 4 to 8. This is an event organised by the WBO, USA, annually to bring all scientific, technical and traditional knowledge available around the world in bamboo at a particular place. This is the third workshop in the series after the first which was held in Mexico in 2017. The second workshop was held in Peru in 2018. The five-day event here will have lectures, hands-on training, exhibitions, cultural shows and other programmes on bamboo. Around 100 participants from 34 countries are expected to join the workshop, according to World Bamboo Ambassador DrNirmalaChongtham, Professor in the Department of Botany, Panjab University, Chandigarh. Two MoUs will also be signed between the State authorities and two international companies, she said. Besides, more than 70 stalls, including food stalls, will showcase bamboo-related items, including foodstuffs, during the event.



HT cotton: AP suspends licences of top seed firms

► The issue of illegal sowing of HT (herbicide-tolerant) cotton has surfaced again with the Andhra Pradesh government cancelling the licence of one seed company, while suspending licences of 13 other companies for one year. The State government, which was among the first States to act against the illegal spread of the HT cottonseeds last year, has noticed a similar activity this year, triggering action on the errant firms. The herbicide-tolerant cottonseed technology has not yet received permission from the GEAC (Genetic Engineering Approval Committee) — the apex Central government agency that receives and considers applications from agri-biotech companies on new technologies and traits. The RoundUp Ready technology, developed by Monsanto, gives genetic protection to cotton plants to withstand the chemical spray, while the weed, which has no defence, is killed by the herbicide glyphosate. Despite the technology not getting GEAC's approval and restrictions on glyphosate, farmers get HT seeds from unscrupulous sources. "We are cancelling the licence of Narmada SagarAgriSeeds Private Limited of Kurnool," a State government official said. Other seed majors such as Nuziveedu Seeds, Kaveri Seeds and Ankur Seeds lose their licences for one year.

Every farmer in AP to get Rs 10,000 per acre

▶ Aimed at the upcoming elections, the Andhra Pradesh government rolled out a massive financial assistance scheme to farmers across the state. Named as AnnadataSukhibava, the scheme envisages Rs 10,000 per acre to every farmer, including tenant farmers, in the state. It will be given to the farmers in two instalments of Rs 5,000 each — in Kharif and Rabi. Those farmers, who are eligible for the Prime Minister Narendra Modi's Pradhan MantriKisanSammanNidhi (PMKSN) scheme under which a farmer having less than 5 acres of land gets Rs 6,000 per acre, will get the additional Rs 4,000 from the state government. The PMKSN envisages Rs 6,000 per acre to farmers who are having less than 5 acres. The amount will be extended in three instalments of Rs 2,000 each. Agriculture minister SomireddyChandramohan Reddy said nearly 54 lakh farmers in the State are eligible for the PMKSN scheme. However, there are an additional 15 lakh farmers who are ineligible for the scheme. "The state government will extend the AnnadataSukhibava scheme to these 15 lakh-odd farmers," he said. He also added that the Centre had already asked the State about the details of farmers who would be eligible for its PMKSN scheme to disburse Rs 2,000 per acre as the first instalment of the scheme by the end of this month. "We will add the remaining Rs 3,000 to the financial assistance given by the Centre and make it Rs 5,000," Chandramohan Reddy said. "For the 54 lakh farmers who would be eligible for PMKSN in the State, the Centre would spend around Rs 1,080 crore." The AP government, however, will have to bear an additional expenditure of Rs 1,620 crore.

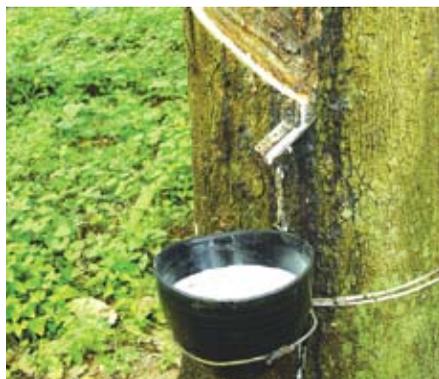
CM launches farmer's tool scheme at Dhemaji

▶ Assam Chief Minister Sarbananda Sonowal accompanied by the State Panchayat & Rural Development minister (independent) Naba Kumar Doley, Lakhimpur MP PradanBaruah and Dhemaji MLA Dr Ranaj Pegu formally launch the 'Mukhya Mantri Krishi Sa Sajuli Yojana (Chief Minister Farm-Tool Scheme) and Farmers' Credit Linked Subsidy Scheme at a function held at Dhemaji stadium. Addressing a huge gathering on the occasion, Sonowal said that his government was putting special attention for the economic development of the rural farmers through implementing farm mechanisation schemes. Sonowal also suggested to the educated youths to avail free training in the State government run Skill Training Centre and build their careers. "The State government has set up 240 Skill Development Centres (under Assam Skill Development Mission) and provides regular vocation training for the educated unemployed youths", he added. Under the scheme inaugurated, Rs 5000 will be provided to each farmer as financial assistance for procurement of farm tools and implements. The amount will be transferred directly to the beneficiaries' bank accounts through Direct Benefit Transfer mode, he informed. The Government of Assam has targeted 5 lakh farmers across the State under the scheme. Among others, MP Pradamn Baruah, Minister Naba Kr Doley and Dhemaji MLA Dr Ranaj Pegu highlighted various agriculture and financial schemes meant for poor and destitute initiated by the government.



Tripura steps in to prop up sagging rubber production

▶ Just as the Centre's outlay for rubber has shrunk by 18% from the current fiscal, the Tripura government has made a pitch to prop the country's sagging rubber production. The northeastern state enjoys a firm base in rubber wood production for building material and furniture. "What emboldens the foray is that the Bangladesh government had recently liberalised its policy to allow rubber cargo through the Agartala-Akhaura land port station. This would ease logistics and pep up rubber trade in the area," said



SK Barua, chairman, CII North East Council. Currently, Tripura accounts for only 9.4% rubber production, but it is India's second largest rubber producing state. In the north-east region, it accounts for 58% of the rubber production. Early this week, Tripura chief minister Biplab Kumar Deb had also exhorted farmers to pick a leaf from Kerala's rubber production technology. "During the rainy and odd weather seasons, we must be able to collect the entire production of latex and other produces without any loss," he is reported to have said at a seminar in Agartala. Adding to Tripura's enthusiasm, Rubber Research Institute of India (RRII), after extensive consultations with National Bureau of Soil Survey and Land Use Planning, had evaluated that about 4.5 lakh hectare of land in Tripura is suitable for rubber cultivation. This could be a big bonanza as currently the country's total area under rubber is approximately 6 lakh hectare.

Indian rose exports likely to cross Rs 27 cr this Valentine's day

▶ This Valentine's is proving to be remunerative for Indian rose farmers. According to the Indian Society of Floriculture Professionals (ISFP), roses worth Rs 27-30 crore will be exported across the world by Indian rose growers for Valentine's Day celebrations. Exports this year are higher at Rs 27-30 crore as compared to Rs 23 crore last year and Rs 19 crore in 2017 season, Praveen Sharma, president, ISFP said. The UK continues to remain the largest market for Indian roses, followed by Malaysia, Australia, New Zealand and Japan, Sharma said. Malaysia is comparatively a new market for Indian roses and a lot of demand has emerged from this country, he added. Exporters in Talangaon — a major floriculture belt of Maharashtra located in Pune — however, claimed that the sudden cold spell in the state last week impacted exports to the tune of nearly 50% since the buds did not flower in time for Valentine's Day. Shivajirao Bhegade, president, Pune District Flower Producers Association and a major flower exporter in Talegaon, stated that the production had been impacted by 50% because of a sudden cold spell.



Vegoil imports flat at 36 lakh tonnes in Nov-Jan; palm oil inflows rise on duty difference

▶ Vegetable oil imports for the period from November 2018 to January 2019 stood at 36,20,316 tonnes — nearly flat as compared to what was reported in the same period last year. According to the data compiled by the Solvent Extractors' Association of India (SEA), imports of palm oils — including RBD Palmolein and CPO — touched 23.18 lakh tonnes (t), up from 22.74 t reported in the same period last year. After Union Ministry of Finance's reduction in import duty on palm oils, the duty difference between crude and palm oil fell from 10 per cent to 5 per cent on palmolein to be imported from Malaysia. "This is likely to increase RBD palm oil imports in coming months considering the shipments lined up from Malaysia for export of RBD Palmolein to India," SEA said. Among the soft oils, soya oil imports dropped to 475,044 tonnes during November 2018-January 2019 as against 578,048 tonnes in the same period last year. Imports of sunflower oil remained steady at 601,401 tonnes. The prices of key vegetable oils — including RBD Palmolein, Crude Palm Oil (CPO) and crude soyabean oil — touched three-month high at \$570, \$538 and \$709 per tonne CIF Indian port. Rupee appreciated from the levels of 73.56 a dollar in October 2018 to 70.71 in January 2019.



India's Rice Exports Set to Gather Steam

▶ Rice exports from India are set to swing in the last quarter of this year on a rise in orders after shipments slumped 14% in the last three quarters over high input costs and tepid demand from Bangladesh. "Consignments in January are better than the previous year and the trade is likely to attain levels close to the previous year," a senior commerce and industry ministry official said. Exporters have seen a surge in demand from the UAE, Iran, Saudi Arabia and the US this quarter. The official said the supply for exports has picked up after being affected for the last few months of 2018 because of assembly polls in some states. A bumper yield in Bangladesh also took a toll on Indian exports, he said.

India's exports to China set to hit record high as market access widens

▶ India's export to China is expected to reach an all-time high this fiscal with the US-China trade spat creating new opportunities for exporters and Beijing removing some trade barriers in its effort to check the growing bilateral trade imbalance. The growth is driven by marine products, organic chemicals, plastics, petroleum products, grapes and rice, according to an official release of the Commerce Ministry. "India's exports to China have grown after several years. India is poised to achieve its highest ever exports to the country this fiscal. Between April and December 2018, exports were \$12.7 billion which is closer to last year's exports of \$13.33 billion," the release said. New Delhi, however, believes that more efforts are required for greater market penetration in China. "India is hopeful of soon signing protocols for export of Indian soyabean meals, cakes and pomegranates to China in the near future, as these are in advanced stages of discussion," the release added. Discussions are on with the Chinese for early announcement of import quotas for sugar and rice for 2019 so that Indian exporters are able to plan their exports well in time, it said. India's trade deficit with China was a huge \$63 billion in 2017-18, which was more than a third of the country's total trade deficit, with exports to China at \$13.3 billion and imports from the country at \$76.38 billion. Acknowledging the need to take steps to check the deficit, China signed three export protocols — on rice, fishmeal and tobacco — to allow imports of the three items. New Delhi is hopeful that the new protocols being discussed would boost India's exports further and rein in the deficit. Discussions are also on for early announcement of Chinese import quotas for sugar and rice for 2019 so that Indian exporters are able to plan their exports well in time.

Tea exports fall in 2018 calendar year

▶ Tea exports from India fell marginally to 249.11 million kilograms during January to December 2018, as compared to 251.91 million kilograms in the same period the previous year. Average unit price per kilo during the last calendar year stood at Rs 206.03 as against Rs 197.99 in the previous year, according to Tea Board data. Exports to the CIS bloc decreased to 61.10 million kilograms between January and December 2018, from 64 million kilograms in the previous similar period. Exports to Iran, another major importing country, increased to 30.60 million kilograms during the 12-month period as against 29.57 million kilograms in the previous similar period. The Tea Board, which had been pushing hard to boost exports to China, met with partial success as 10.22 million kilograms were shipped in 2018, as compared to 8.52 million kilograms in the previous calendar year. Exports to Pakistan saw an increase during the period and stood at 15.83 million kilograms during 2018 as compared to 14.73 million kilograms in the previous year. In case of the UAE, another major importer, exports rose marginally to 20.94 million kilograms during the last calendar year as compared to the previous 12-month period.



Rubber Imports Head for New High

▶ Natural rubber imports to India are heading for a new high with continued fall in production and rise in consumption. The imports are up by close to 35% for the nine months to December 2018 from a year ago at 4,49,088 tonnes, as per Rubber Board data. In 2017-18, rubber import stood at 4,69,760 tonnes. The production for the period showed over an 8.5% decline at 4,79,000 tonnes. Even for the usual peak production month of December, it was down by 8,000 tonnes from a year ago at 78,000 tonnes. However, rubber consumption has been going up consistently. For the nine-month period, it rose 13% to 9,21,600 tonnes, well on its way to 1.2 million tonnes targeted by the board. The production in the remaining three months is expected to be lower as the lean tapping season has begun. Usually, tapping comes to an end by January. But this time, some places, which began tapping late, are still continuing though the yield is less. "Tapping is happening in around 50% of the rubber areas even now. But demand from the tyre and nontyre sector is sluggish as imports have gone up," said N Radhakrishnan, a rubber merchant in Kochi. He said prices may not improve in the next year as the economy in China, the largest consumer of rubber, is not in good shape. "The price support scheme of the state government, which assures Rs 150 per kg, is an incentive for the grower to continue tapping," he said. Though the Rubber Board has targeted a production of 6,00,000 tonnes for the year, the trade expects it to be much less. Both import and production are expected to be around 5.5 lakh tonnes.

2018-19 horticulture output pegged at record 314 mt

▶ The production of fruits and vegetables during the current year is estimated to be 314.5 million tonnes (mt), about 1 per cent more than what the country produced in 2017-18, the first advance estimates of horticulture production released by the government said recently. Per the final estimates provided by the government, the total production of fruits and vegetables in 2017-18 was 311.7 mt. While the production of vegetables was estimated to be 187.5 mt, about 3.5 per cent more than that in 2016-17, that of fruits was 97.35 mt, up 4.8 per cent over the previous year. There is a marginal increase in the area under horticulture crops. The area in 2018-19 is estimated to be 25.87 million hectares (mh) as compared to 25.43 mh in 2017-18. In the current year, the production of staple vegetable crops – onions, potatoes and tomatoes -- is expected to be higher as compared 2017-18. While potato production is projected to go up by 6 per cent to 52.58 mt from 51.31 mt last year, that of onion is pegged at 23.62 mt, 1.5 per cent higher than the 23.26 mt in 2017-18. Tomato production, on the other hand, is estimated to be 2 per cent higher at 20.51 mt, the official statement said.



Maharashtra sugar mill takes lead in making ethanol from cane juice

▶ A co-operative sugar mill in Kolhapur district of Maharashtra has taken the lead in producing fuel grade ethanol directly from sugarcane juice in the State. The Centre had, in July last year, allowed sugar mills to manufacture ethanol directly from sugarcane juice or intermediate product called B-molasses. The decision was taken to help mills divert cane juice for ethanol manufacturing during surplus years. Maharashtra sugar commissionerate's joint director Sanjay Bhosale told PTI that Kolhapur's Tatyasaheb Kore Warana Sahakari Sakhar Karkhana Ltd is the only co-operative sugar mill in the State which has started making ethanol from sugarcane juice. Traditionally, in India ethanol is made from 'C-Heavy' molasses, but in July last year, the government gave permission to make ethanol from sugarcane juice and 'B-Heavy' molasses or B-grade molasses, he said. The fuel grade ethanol that is produced directly from cane juice is fetching Rs 59 per litre. This is going to be beneficial for the sugar industry that is facing crisis of excess stock of sugar, Warana co-operative group chairman and former minister VinayKore said. The Kolhapur-based sugar mill is producing 70,000 litres of ethanol per day, another factory official said. The government allowed fuel grade ethanol production from sugarcane juice with an aim to increase the earnings of sugar mills and help them in making full and timely payments to farmers. Cane-based ethanol can be produced in three different ways directly from cane juice, from B-grade and C-grade molasses. Molasses is a viscous product obtained from raw sugar during the refining process. Maharashtra is one of the leading sugarcane producing States.



Can 'Big Brother' technology clean up palm oil's image?

▶ Some of the world's major palm oil users, including Nestle, Unilever, and Mondelez, are trying out new satellite technology to track deforestation, as pressure grows on them to source the ingredient responsibly. They say the monitoring systems allow them to target people felling trees in producing countries such as Malaysia and Indonesia, where forests are shrinking, more efficiently than policing supply chains on the ground. "They say you're Big Brother," said Benjamin Ware, global head of responsible sourcing at Nestle. "It's not Big Brother — it's today's reality...there is nothing secret any more." Interviews with leading brands, commodity traders and plantation owners show the systems have limitations and opinions on them vary, reflecting tension within the industry over how to tackle an issue with no easy answer. Some say the technology is not enough to stop deforestation — that monitoring is not preventing. Others worry boycotting unsustainably-made palm oil just drives bad practices elsewhere.

ICAR, ICRISAT in pact to collaborate on farm research for five years

▶ A five-year plan for Indian agricultural research was finalised with the signing of a Memorandum of Agreement (MoA) between the Indian Council of Agricultural Research (ICAR) and the International Crops Research Institute for Semi-Arid Tropics (ICRISAT). This plan will focus on technologies especially suited to harsh conditions of drylands, covering grain legumes and dryland cereals — groundnut, chickpea, pigeonpea, finger and pearl millet and sorghum. The MoA representing action plans for 2019 to 2023 was signed in New Delhi today by Trilochan Mohapatra, Secretary, Department of Agricultural Research and Education (DARE) and Director General ICAR, and Peter Carberry, Director General of ICRISAT. The DGs of both organisations highlighted the long-standing partnerships between ICRISAT and ICAR and emphasised on collaborations to evolve, lead and innovate in agricultural technologies. “I value the ICAR-ICRISAT partnership greatly in the interest of farming communities of India,” said Mohapatra, adding that this would help adapt to the changing agricultural landscape in India as well as contribute towards the Centre’s priority of doubling farmers’ income. Carberry said, “Our science teams in ICRISAT have worked hard to develop these plans with support from ICAR partners. These collaborations are critical to deliver on our mission to improve livelihoods of millions of smallholder farmers across Asia and African drylands”. The two organisations will work together towards creative disruptions by thinking outside the box of existing paradigms. This requires maximising the impact of existing technologies and generating new ones to increase the efficiency of dryland agriculture production systems. The key projects they will work on include improved crop varieties, new breeding and enabling technologies, and systems and modelling tools for better farm systems and nutrition-sensitive agriculture value chains.

2018-19 will see record foodgrain production, procurement: Paswan



▶ Buoyed by an above-normal monsoon, India is estimated to achieve record foodgrain production and procurement in fiscal 2018-19, Union Minister for Consumer Affairs, Food and Public Distribution Ram Vilas Paswan said. “As per the fourth advance estimates on September 26, 2018, wheat production is likely to be 997 lakh tonnes and procurement 357.95 lakh tonnes for this fiscal against 985.10 lakh tonnes and 308.24 lakh tonnes in the last fiscal,” Paswan told reporters on the margins of the inter-session meeting of the consultative committee of his ministry. Similarly, as per the first estimates of the Ministry of Agriculture, the production of rice is expected to be 992.4 lakh tonnes and procurement 304.9 lakh tonnes in FY19, as against production of 1,129.1 lakh tonnes and procurement of 381.84 lakh tonnes in 2017–18. State—run Food Corporation of India (FCI) has developed an e—procurement module of foodgrains to allow transparency and convenience to farmers, he said.

Subsidy scheme for farmers launched

▶ Chief Minister Sarbananda Sonowal ceremonially launched the Farmers’ Credit Linked Subsidy Scheme in Assam. The scheme has encapsulated three different plans. First is the Assam Farmers’ Credit Subsidy Scheme under which all short-term crop loan availed from scheduled commercial banks, regional rural banks and the Assam Cooperative Apex Bank will be availed at 25 per cent government subsidy for any loan availed between April 1, 2018 to March 31, 2019. The government will provide subsidy to a maximum limit of Rs 25,000 per farmer for a minimum loan amount of Rs 1 lakh. Secondly, under the Assam Farmers’ Interest Relief Scheme, farmers can avail short-term crop loan up to Rs 2 lakh at zero per cent interest rate. Thirdly, the scheme will provide a one-time cash incentive up to Rs 10,000 per account for activating the overdue and NPA KCC account provided the account would be turned into a standard account. The Chief Minister said the scheme has been launched to achieve doubling of farmers’ income by 2022. At the same time, he advocated that there should be a team of farmers, bankers and government officials to provide financial help and other logistic support for the farmers to enhance agricultural output in the State and help the sector to contribute significantly to the GDP.



BUILDING RURAL CREDIT



Rural credit translates into an important input in agriculture. Although an indirect input, credit dictates the quality and quantity of other inputs and in the process affects the agriculture production to a large extent. The flow of credit to rural economy not only influences agriculture, but also the general state of country's economy. Constituting around 60 per cent of the country's population, the credit security of the farmers and those associated with agriculture is hence a serious business. Therefore the agriculture credit system in India has been dealt with utmost caution and restraint. But despite the government's deeper involvement in rural credit, far remains to be achieved to sustain credit discipline in rural credit structure.

RURAL CREDIT - THE SOURCE

Indian rural credit system is an important pillar in India's economy. India's hinterlands, had always had a higher dependency on the unorganized system largely manned by the moneylenders. Their exorbitant interest rates and dubious ways of recovering loans have to a large extent caused disarray and distress among the farming community. Although with time, more formal sources and government programmes and schemes have forayed into rural India, the clout of moneylender is largely pervasive.

The credit delivery system in the rural areas have seen a sea change since the entry of organized banking. Under the institutional



arrangement, agricultural credit is disbursed through multi-agency network consisting of Commercial Banks (CBs), Regional Rural Banks (RRBs) and Cooperatives. Short term cooperative is catered by 32 state cooperative banks and 371 district central cooperative banks operating through 14907 branches. There were 92,996 Primary Agricultural Credit Societies (PACS) as on March 31, 2014 at the grass root level.

The rural banking has witnessed many changes recently. For instance, microfinance institutions have made a positive impact on the rural banking system. Microfinance has evolved as a source of financial services for entrepreneurs and small businesses lacking access to banking and related services. Micro

Finance Institutions (MFIs) which works on relationship-based banking for individual entrepreneurs and small businesses; and group-based models, where several entrepreneurs come together to apply for loans and other services as a group, imparts security to both the loaners and loanees. India's microfinance industry clocked 47 per cent growth with a gross loan portfolio of Rs 68,789 crore in the financial year ended March 2018 as against Rs 46,842 crore in the year-ago period, according to Bharat Microfinance Report 2018. The report states that the sector witnessed 56 per cent increase in loan disbursements in 2017-18 over the previous year.

Another interesting way of lending institutional credit came into

existence with the Self-Help Groups (SHG)-Bank linkage Programme. Under this programme, SHGs come together and gain financing access through banks by pooling in their resources. The pilot project was started by NABARD in 1992 as a partnership model between SHGs, banks and NGOs. Later on, RBI approved guidelines to banks to enable SHGs to open accounts. The number of SHGs financed accounts increased to more than 73.18 lakh savings- 13 linked Self Help Groups (SHGs) covering over 9.50 crore poor households as on March 31, 2013. The total outstanding amount is Rs.39,375 crore and savings deposit of these SHGs with banks amounted to Rs.8,217.25 crore (NABARD Annual Report, 2013-14).

While all the credit delivery systems concentrated on loans, the Kisan Credit Cards (KCC) covered consumption needs of the farmers. The KCC holders could approach financial institution for simple and hassle free sanction of credit from the second year onwards. Further progress was made in later years and the passbook has been replaced by a plastic card, and the Kisan Credit Card is an ATM enabled debit card. So KCC has enabled a cashless eco system in availing banking facilities. Its use has spread over the vast institutional credit framework involving commercial banks, RRBs and co-operatives. According to the RBI, 12.84 crore Kisan Credit Cards





had been issued up to 2012-13.

More than 65% of the population remains aloof to the banking facilities. To bring them under the banking net, the Reserve Bank of India introduced a regulation in 2006 allowing banks to provide service at people's doorstep through the use of third party services. Commonly referred to as the "Business Correspondents/ Banking correspondents" (BCs), this model involves a representative authorized to offer services such as cash transactions where the lender does not have a branch. Primary role of BC is to oversee the proper development and functioning of indirect banking channels. These business correspondents are subject to RBI regulations and would have direct contact with one or more financial institutions. Banks have deployed as many as 1.95 lakh business correspondents (BCs) covering 2.21 lakh villages across the country as of March 31, 2013. Benefits to customers include instant access to banking services at doorsteps; relaxed KYC norms

for small accounts allow better possibility of opening bank accounts; lower costs and time required to access banking services.

With the recent thrust on digital transactions, rural India is yet to see many reforms. For instance, BHIM (Bharat Interface for Money) is a Mobile App developed by National Payments Corporation of India (NPCI), based on the Unified Payment Interface (UPI) which was launched recently by Narendra Modi, at a Digi Dhan programme. Named after Bhim Rao Ambedkar and intended to facilitate e-payments directly through banks, is a part of the drive towards cashless transactions. This UPI app supports all Indian banks which use that platform, which is built over the Immediate Payment Service infrastructure and allows the user to instantly transfer money between the bank accounts of any two parties. It can be used on all mobile devices. Aadhaar card could soon become a universal payment ID. The government is expected to unveil a feature for payments

through the Bharat Interface for Money (BHIM) app by simply entering the 12-digit Aadhaar number. Transactions where Aadhaar is listed as a payment ID on the BHIM app will not require any biometric authentication or prior registration with the bank or Unified Payment Interface (UPI). This will make it more mainstream since almost one-third of India already has Aadhaar numbers, which have been linked to their bank accounts.

The demonetization cash crunch has derived unique methods to circumvent the situation and one such intervention was the deployment of Micro ATMS. There are about 201861 ATMs in India, according to RBI data. Of these, 1,03,282 are onsite and 98,579 offsite, the number is still small when compared to the actual demand. Micro ATMs are card swipe machines through which banks can remotely connect to their core banking system. This machine comes with a fingerprint scanner attached to it. In other words,



micro ATMs are handheld point of sale terminals used to disburse cash in remote locations where bank branches cannot reach. Micro ATMs are similar to point of sale (PoS) terminals and are a doorstep mobile banking arrangement cum-mobile ATM device.

INDIRECT CHANNELS OF CREDIT

Apart from these traditional categories of credit, other forms of credit has also been lending support to the farmers. Crop insurance has also been able to extend the much needed financial aid to the farmers

at times of distress and hence can be considered as an important source of rural credit. India has dabbled with this category and over the years have acquainted with a number of schemes. National Agricultural Insurance Scheme (NAIS) introduced during Rabi 1999-2000 and implemented by Agriculture Insurance Company of India limited protected the farmers against the losses suffered on account of natural calamities. The Scheme was available to all the farmers both, loanee and non loanee irrespective of the size of their holding. The Scheme envisages

coverage of all crops including cereals, millets, pulses, oilseeds and annual commercial and horticultural crops in respect of which past yield data is available. The modified version has many improvements viz., Insurance Unit for major crops are village Panchayat or other equivalent unit; in case of prevented / failed sowing claims up to 25% of the sum insured is payable, post-harvest losses caused by cyclonic rains are assessed at farm level for the crop harvested and left in 'cut & spread' condition up to a period of 2 weeks in coastal areas; individual farm level assessment of losses in case of localized calamities, like hailstorm and landslide; on-account payment up to 25% of likely claim as advance, for providing immediate relief to farmers in case of severe calamities; threshold yield based on average yield of past seven years, excluding up to two years of declared natural calamities; minimum indemnity level of 80% is available (instead of 60% in NAIS); and premium rates are actuarial supported by up-front subsidy in premium, which ranges from 40% to 75%, equally shared by Centre and States. Weather Based Crop Insurance that was introduced in 2011-12 on a pilot basis with an aim to make it more convenient for the farmers to avail crop insurance appeared to have received good response from the farmers. Pradhan Mantri Fasal Bima Yojana (PMFBY)-2016 has been the most recent version of crop insurance in the country. Pooling in the important learnings from all the earlier schemes and taking into consideration of access to technology in the recent days, Pradhan Mantri Fasal Bima Yojana promises to take care of the loopholes of earlier schemes. The Fasal Bima Yojana has done away with the cap on premium. The sum insured per hectare for a farmer is now decided by the District Level Technical Committee and is pre-declared and notified by the State Level Coordination Committee



on Crop Insurance. The farmer also pays less — the premium he shells out is 2 per cent of the sum insured for all kharif crops and 1.5 per cent of it for all rabi crops. For horticulture and commercial crops, the premium is 5 per cent of sum covered. The remaining premium is paid by the government. This will be done online once the E platform is put in the place. During 2017, under Rabi & Kharif crops, 5 crore 71 lakh farmers were provided protective coverage under this scheme.

Loan waivers add an interesting layer to the credit flow in agriculture. Derided and often relegated as a populist measure, the series of loan waivers have added credit to the agriculture kitty, at the expense of an ethical credit behaviour. Eight state governments have given farm loan waivers worth Rs. 1.9 trillion since April 2017. With Prime Minister Narendra Modi promising debt relief to farmers ahead of the Uttar Pradesh elections in February 2017, a series of poll promises sprang up across the nation. The latest round of farm loan waivers was announced after Congress formed governments defeating the incumbent Bharatiya Janata Party (BJP) in Chhattisgarh, Rajasthan and Madhya Pradesh. Rs. 59,000 crore of waivers have been promised to farmers in these three states. However, loan waivers — either completely or categorically — are temporary solutions to a larger problem. The debt cycle that farmers fall in due to investing and following farming as their vocation has many underlying reasons which either work together or in isolation. Interestingly each time the farmers end up in huge losses, the reasons have remained more or less the same. Apart from rooting for loan waivers, no one seems to identify these reasons and work to give a permanent solution. Farmers are too naïve to see through this and hence are satisfied with these one time solutions. These transient measures are at the expense of all

the developmental activities that could have happened in agriculture — that could have increased the income derived from farming.

Subsidies also serve as an important source of credit to the farmers, although indirectly. It is the governmental financial support paid to the farmers to reduce their input expenditures and supplement their income. The government in India provide subsidies for fertilizers, power, purchase of irrigation equipments etc. Sometimes, the subsidies are paid directly to the



farmers and in other instances, it is paid to the companies catering to the input requirements of the farmers. The new PM AASHA (Pradhan Mantri Annadata Aay Sanrakshan Abhiyan), the Umbrella Scheme comprising of Price Support Scheme (PSS), Price Deficiency Payment Scheme (PDPS) and Pilot of Private Procurement & Stockist Scheme (PPPS) is also another means of catering to farmer demand. Individual states have also come up with schemes to financially support farmers. Bhavantar Bhugtan Yojana (price difference payment scheme) is a scheme of the Government of Madhya Pradesh whereby the government pays farmers the difference between official Minimum Support Price (MSP) and the rate at which they sell their crops or Model Price whichever is higher. The objective of the scheme is to provide the compensation to

farmers for agriculture products, whenever its price fall below the announced Minimum support price (MSP) and thereby protecting them from losses suffered on account of distress sale.

With government's focus on doubling farmers' income many schemes have been introduced with most recent one being Pradhan Mantri Kisan Samman Nidhi scheme. Introduced in the interim budget of 2019-20, the scheme provides income support to farmers who will be entitled to get Rs 6,000 per year

through direct bank transfer in three instalments. Farmers with land less than 2 hectares will be beneficiaries of this scheme. The scheme has a budget outlay for Rs 75,000 crore for FY19. Under Pradhan Mantri Kisan Samman Nidhi, Rs 6,000 per year to be given to each farmer, in three installments. The amount will be transferred directly to farmers' bank accounts for those with less than 2 hectares land holding.

CREDIT DISCREDITS

Despite India's inclinations to support farmers and raise their income levels, the rural credit sector is still disorganized. Rural debts are unfortunately on the increase and farmers are under immense financial distress. The latest survey report of the National Sample Survey Office (NSSO) avers that more than half of the agriculture households are in



debt, and the worst affected states are southern states like Andhra Pradesh, Telangana, and Tamil Nadu. The 70th round of NSSO survey says about 52 per cent of the agricultural households in the country are estimated to be in debt. Among the major states, Andhra Pradesh had the highest share of indebted agricultural households in the country (92.9 per cent), followed by Telangana (89.1 per cent) and Tamil Nadu (82.5 per cent). The report states nearly 40 per cent of households take loan from non-institutional sources like money lenders. Nearly 60 per cent of total outstanding loan is taken from institutional sources. The banks' share is (43 per cent), followed by cooperative societies (15 per cent). The survey also showed that a very small segment of agricultural households utilised crop insurance because of lack of awareness. This squarely shows the utter failure of the organized system of banking in rural India.

While schemes galore at the national level to channelize the credit flow to rural strongholds, certain pockets remain unreachable. Debt traps have become far too common and farmer suicides have not seen any let down. According to data released by National Crime Records Bureau (NCRB) 5,600 farmers committed suicide across the country in 2014. Maharashtra and Telangana, infamous for the stranglehold of private money-lenders on farmers, have kept their

dubious record intact. As many as 33.4% suicides in Maharashtra and 23.2% in Telangana were due to 'bankruptcy or indebtedness'.

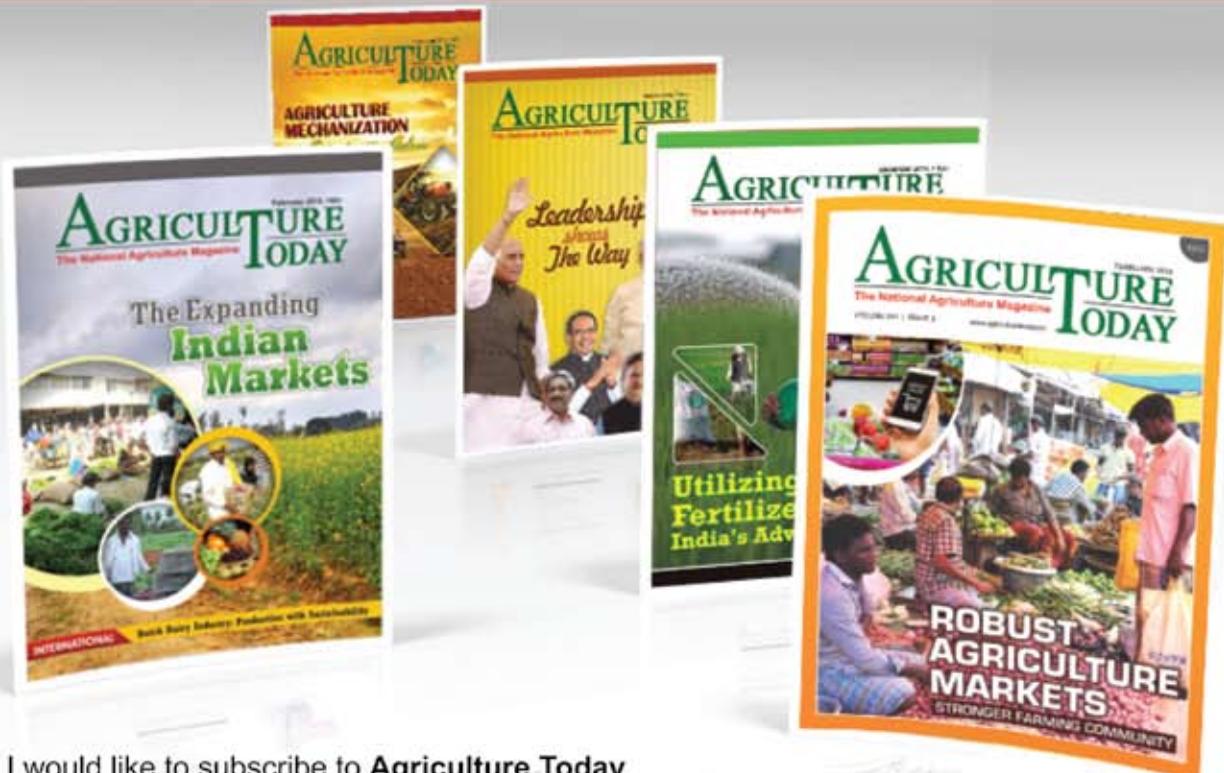
Although the entire system of credit delivery could not be blamed, certain instances suggest malpractice. The interest subvention scheme which was introduced in 2006-07, provides loans at 7 per cent interest (upper limit of Rs 3 lakh), and if payment is regular, gradually it is lowered to 4 per cent. Some states have extended loans even at zero interest rate to farmers. This has resulted in a significant increase in short-term agricultural credit, with actual disbursements consistently surpassing targets, the expense on account of it has increased from Rs 3,283 crore in FY12 to Rs 13,000 crore in FY16. It is hard to believe that the amount has percolated to farmers. There's reasonable evidence that a significant proportion of crop loans granted at subvented interest rates has quite deceptively seeped for other purposes. A beneficiary of this scheme whether a farmer or someone posing as a farmer, receives the loans at a concessional rate of 4 per cent and instead of investing that in farming he can deposit at least a part of it in fixed deposits in the bank, earning about 8 per cent interest, or even become a moneylender to offer loans at 15-20 per cent interest to those who don't have access to institutional sources of finance. Short-term credit from institutional sources reached 110 per cent of the total

value of agricultural inputs in 2014 (NAS 2015), and at the same time, AIDIS data shows 44 per cent loans were from non-institutional sources in 2013. This suspicion is reaffirmed when one looks at the month-wise disbursement of agricultural credit, which spiked to 62 per cent of annual disbursement in the last quarter of FY14, with no corresponding spike in agri-production activities. Even the RBI committee has recommended phasing out the interest subvention scheme.

Loan waivers are another category of financial support that have time and again supported the farmers. Although distorting, this financial aid bails out farmers from having to pay back their loan amount. Despite the merits being temporary, this has become the favourite political instrument. Generalized loan waivers raise expectations among the farmers for such future interventions acting as a disincentive to pay back their loans. This would also raise the number of defaulters and create a crop of habitual defaulters.

There is no dearth of loans or schemes that extend financial assistance to the farmers. But somehow not all are benefited by this scheme. Money lenders still influence the farmers. The government should raise the awareness of the farmers and they should be made aware of the existence of such schemes. This will kill the unorganized sources of credit and expand institutionalization of rural credit. ■

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AGRICULTURE TODAY

INTERIM BUDGET 2019

Finance Minister Piyush Goyal presented the Interim Budget on February 1 2019. The minister during his budget speech emphasized the role played by the farmers despite the non remunerative nature of agriculture. He reiterated the need to provide structured income support to the poor land-holder farmer families in the country for procuring inputs such as seeds, fertilizers, equipment, labour etc. and to meet other needs. "Such support will help them in avoiding indebtedness as well and falling into clutches of money lenders," he added.

The budget this year made a landmark announcement of providing an assured income support to the small and marginal farmers and as a part of this "Pradhan Mantri Kisan Samman Nidhi (PM-KISAN)" programme was launched. Under this programme, vulnerable landholding farmer families, having cultivable land upto 2 hectares, will be provided direct income support at the rate of Rs. 6,000 per year. This income

support will be transferred directly into the bank accounts of beneficiary farmers, in three equal instalments of Rs. 2,000 each. Funded by Government of India, around 12 crore small and marginal farmer families are expected to benefit from this. Made effective from 1st December 2018, the first instalment for the period upto 31st March 2019 would be paid during this year itself. This programme will entail an annual expenditure of Rs. 75,000 crore. PM-KISAN would not only provide assured supplemental income to the most vulnerable farmer families, but would also meet their emergent needs especially before the harvest season.

The budget also provided Rs. 20,000 crore in the Revised Estimates of FY 2018-19. During the last five years, for providing affordable loans to farmers, the amount of interest subvention has been doubled. The crop loan to farmers increased to Rs. 11.68 lakh crore in year 2018-19.

Animal Husbandry and Fisheries sector also have received major boost in the interim budget. The allocation for Rashtriya Gokul Mission has been increased to Rs.750 crore in the current year itself. Besides this, establishment of Rashtriya Kamdhenu Aayog" to



upscale sustainable genetic up-gradation of cow resources and to enhance production and productivity of cows was also announced. The Aayog will also look after effective implementation of laws and welfare schemes for cows. To provide sustained and focused attention towards development of this sector, the Government has decided to create a separate Department of Fisheries. Finance Minister said that through the measure, the Government wants to promote further growth over 7% to promote livelihood of about 1.45 crore people dependent on the sector. Shri Goyal announced 2% interest subvention to the farmers pursuing the activities of animal husbandry and fisheries, who avail loan through Kisan Credit Card. Further, in case of timely repayment of loan, they will also get an additional 3% interest subvention. To ensure provision of easy and concessional credit and to bring all farmers under KCC fold, the Government has decided to initiate a comprehensive drive with a simplified application form. The budget has also decided that all farmers affected by severe natural calamities, where assistance is provided from National Disaster Relief Fund (NDRF), will be provided the benefit of interest subvention of 2% and prompt repayment incentive of 3% for the entire period of reschedulement of their loans.

To provide pensionary benefits to at least 10 crore labourers and workers in the unorganised sector a new Scheme called 'Pradhan Mantri Shram-Yogi Maandhan' is announced. The Finance Minister said that within next five years it would be one of the largest pension schemes of the world. A sum of Rs.500 crore has been allocated for the Scheme. Additional funds will be provided as needed, Shri Goyal added. The scheme will also be implemented from the current year.

Agriculture Today interacted with the stakeholders in agriculture and following are the excerpts from their reflections on the Interim Budget 2019.



Dr. M S Swaminathan

Founder Chairman - M S Swaminathan Research Foundation

"Sustainable agriculture needs sustainable management of natural resources. Conservation without adequate resources will just become conversation. This is why the budget plays a key role in ensuring adequate resources for a sustainable future.

The interim budget obviously cannot introduce new schemes. Therefore the Finance Minister's statement largely summed up all the steps taken during the last four years to help farmers and farming. Acknowledging the agrarian crisis, the Finance Minister proposed a direct income support to farmers. This is a good step.

Rashtriya Kamdhenu Aayog is to be set up for the upgradation of cow resources. Also, he laid emphasis on attending to farm animals and fisheries. For accelerated fisheries development the budget has provided for the creation of a Department of Fisheries.

Several reforms were also announced with reference to agriculture credit and kisan credit cards. Additional support was promised for women farmers. A scheme called PM Kisan Samman Nidhi under which farmers owning up to two hectares will get Rs 6,000 per year will be introduced. The money will be transferred directly to accounts in three tranches.

I am happy that emphasis has been laid on the effective implementation of the ongoing schemes and for the provision of direct income support to farmers which will enable them to purchase the inputs needed for a technological upgrading of farm operation."

Sujay Ojha

Advisor, Weather Risk Management Services

"The PM-KISAN Yojna for small and marginal farmers with land holding upto 2 hectare is first positive step of recognising this vulnerable section. The Direct Benefit Transfer DBT of Rs 2000/- in three instalments i.e. Rs. 6000/- per annum, before sowing, growth and harvesting phase of a crop cycle will help in purchases of needful agri-inputs. Around 12 crore farmers to benefit from this and that too with retrospective effect will be a big benefit to this section. Land holding of 2 hectares and not 2 acres. That is equivalent to 5 acres which will cover major section of farmers".



Mr. Ajay S Shriram

Chairman & Sr Managing Director, DCM Shriram Ltd.

“In the Interim Budget presented today, there was high expectation for rural India, and the budget was not an upset. A specific drift has gone unobserved is that the dialog has moved from farm output to farm income building the capacity of the farmers, moving beyond traditional farming to becoming farmed entrepreneurs. With self-sufficiency and surplus production accomplished, the country should be assured in terms agriculture output. The big announcement was that of providing an assured income support to the small and marginal farmers, under the “Pradhan Mantri Kisan Samman Nidhi (PM-KISAN)” is truly historic.

Also the Income support, seen along with the key initiatives taken in the past such as a higher MSP on 22 crops, Pradhan Mantri Krishi Sinchai Yojna (PMKSY) Pradhan Mantri Fasal Bima Yojna (PMFBY), Soil Health Card Scheme and roll out of the national agriculture market (NAM) will provide a far reaching impetus.

The proposal of the government to extend the interest subvention for farmers affected by severe natural calamities, for the entire period of reschedulement of their loans is timely and welcome”.

Dr. K C Ravi

Head, Business Sustainability, South Asia, Syngenta India Ltd

“The measures announced in the 2019 Interim Budget for agriculture is aimed to fructify the vision of doubling farmers’ income by the year 2022. The Pradhan Mantri Kisan Samman Nidhi (PMKISAN) scheme to support small and marginal farmers through an assured income support of INR 6000 is a significant step and would hopefully ease the burden of the small and marginal farmers to access quality inputs to increase their productivity and income. Another important problem of the farming community has been the relentless cycle of Droughts, Floods and El Nino and the interest subvention scheme announced would hopefully redress their problems to a great extent. A long-term plan to accelerate infusion of new technologies like Artificial Intelligence (AI) and digitization of villages would hopefully spur agricultural growth. The allocation has also been significantly increased to INR 57,600 crore in 2018-19 and would hopefully result in creating more Public Private Partnership (PPP) opportunities. There is a need to make latest scale neutral technologies available for the farming community to increase their productivity and incomes”.



Shri Rajendra Barwale

Chairman, Mahyco Grow

“Union Budget for the forthcoming Financial year presented by Shri Piyush Goyal, Interim Finance Minister has been favorable to farming sector as expected. It is a sincere attempt to address the immediate issue of farm distress particularly keeping in view the welfare of small and marginal famers who constitute over eighty percent of our farming families. The PM Kisan scheme will support in a limited way these of better agri inputs by such farmers. In addition, the interest subvention scheme of 3 percent on the crop loans to farmers would also be helpful to those affected by natural calamities. While these measures will help to address the challenges in the short run, we will need to address the long term structural issues of better market access, and improvement in efficiency of agricultural supply chain, apart from encouraging the use of modern tools and technologies for improving our crop productivity. It is critical to address these issues, if we have to make our farming sustainable and globally competitive going forward.



Pawanexh Kohli

Chief Executive Officer, National Centre for Cold-chain Development

“Though an interim Budget, it appears to be a holistic and fiscally prudent plan for the country, in case of agricultural sector, it follows up on the previous year’s Budget and diligent thinking is evident in the proposals. For instance, the success in fisheries is not being taken for granted, but added focus is given by the setting up of a Department of Fisheries. Credit support tended to ignore farmers involved in rearing, breeding and harvesting livestock. This was addressed with 2 per cent interest subvention to farmers in animal husbandry and fisheries. To promote that credit is brought into use for commercial growth, an additional interest subvention for timely repayment is provisioned. These agricultural sub-sectors form part of the new drivers in agriculture. Keeping in mind the high risk due to weather based disasters, wherein farmers’ crop loans have to be rescheduled, extending the additional 2 per cent interest subvention for the entire rescheduled period, while also incentivising for prompt repayment is a supportive proposal. All of this, aims to encourage an enterprise mind-set while building risk management capacity of farmers. The enhanced allocation to PM Gram Sadak Yojna also ties in, as improved rural roads network will have a positive impact on trade that originates from rural India. The income support to small & marginal land holding farmers, and to other tax payers, will add general impetus to the overall economy as well. The overall focus is on promoting development and self-sufficiency in this sector. The budget presented a vision for India in 2030 and though this went beyond its interim nature, this vision is welcomed. It includes an integrated approach for modernising agriculture, declares cold-chain as a focus item, and shapes a clear agenda. This vision speaks of building India as a 10-trillion-dollar economy, digitisation of villages, improving logistics infrastructure, artificial intelligence, rural industrialisation, and more. Keeping our agrarian backdrop in mind, one can envisage greater impetus for value-added activities such as organised aggregation of agricultural produce, agri-logistics and cold-chain, and more equitable growth across the country. Likewise, an improved farm-to-fork delivery system and a more transparent fork-to-farm value sharing system is to be anticipated.

Ravindra Agrawal

Managing Director, KisanKraft

“It’s a good budget focused on implementing positive changes to the agri sector. We believe this will pave the way for the sector to see increased participation from businesses in improving farmer skills and income. In addition to Direct Benefit Transfer (DBT) and other measures to increase farmer income, agricultural inputs and machinery should also be exempted from indirect taxes bringing down costs. Businesses should be allowed to invest intelligence in the cultivation of all crops and should be encouraged to set up model farms across India. This will be a huge step in educating farmers on best practices and build knowledge pool. In addition, the Government should allow for massive investments to address issues at the ground level like soil degradation and gaps in Package of Practices. We are happy to see an increased allocation for MGNREGA in this direction.”



Dr. Rishi Bhatnagar

President-Aeris Communications & Chairman IET IoT Panel India

“With the Indian economy logging in growth rates of 8.2 per cent and 7.1 per cent in the first and second quarters of fiscal year 2018-19 respectively, the economy is witnessing a spectacular growth tangent. It is enthralling to see government of India’s plans to double the income of farmers by 2022. The PM Kisan Yojana is a great initiative to support the effort towards enabling the farmers. Alongside GOI’s step of improving seeds, irrigation facilities, providing health cards, etc, Aeris Communications as servers in agriculture technology, welcomes the decision and look forward to aid the cause. We will strive to add value to the agriculture sector by leveraging new age technologies by enabling the Indian farmers with easy access to expensive agricultural machinery like tractors through pay-as-you-use tractor service.’

FARMERS' INCOME & THEIR WELFARE

It was in the year 2015 that the erstwhile Ministry of Agriculture came to be renamed by the Government by appending the phrase 'Farmers' Welfare'. The term 'welfare' used here is translation of the phrase 'kalyan' (कृषि एवं किसान कल्याण मंत्रालय). It would be appropriate to examine the significance attached to such a change of name.

Welfare as a terminology can be defined as a minimum level of well-being with provision of social services, and support for those who do not possess sufficient current means to satisfy their basic needs.

Social welfare is defined as the safety of citizens and other eligible residents in terms of health and economic matters, as well as the organized social services provided to the disadvantaged. Social security expands on this concept especially in welfare states, by providing all inhabitants with various safeguards and social services such as universal healthcare, unemployment insurance,



student financial-aid and the like.

It would help to look at the economics definition of welfare, to add an appropriate connect to the term 'welfare', so that it is adopted comprehensively in the context of

farmers' welfare. Alfred Marshall, a pioneer neo-classical economist, viewed that economics studies all the actions that people take in order to achieve their economic welfare. In his words, "man earns money to get material welfare".

There is no gainsaying, that Indian agriculture has leap-frogged from a state of deficiency to one of surplus output over the last fifty years, throwing up in its wake challenges of monetisation in favour of the farmers, in contrast to achieving production growth of yester-years. That, this growth has not ensured income security of the farmers suggests the need for a new strategy which will advance their economic as well as social welfare. As agricultural entrepreneurs, *a la*, other business owners, farmers seek to achieve economic well-being and growth through a support that facilitates easy market access, a liberal business environment and mitigation of associated uncontrolled risks.



The higher incomes generated as a result will define his economic well-being and enable self-reliant living, a high standard of life and a state of contentment. This perspective is one that empowers the farmer in preference to gratuitous patronage, that may come by way of temporary relief from government and other philanthropists.

It is known that the average income of farmers in India, comprising farm and non-farm incomes, was a low of Rs.6,426/- per month as per NSSO's 70th round of Situation Assessment Survey (conducted during the period of July 2012 to June 2013). The same Survey showed that an average farm household incurred a monthly consumption expenditure of Rs.6,223/-, leaving the family a meagre saving of Rs.203/-. It also brought out that the farm families owning less than 0.4 ha. earned a monthly income of Rs.4,561/-, those owning 0.1 to 0.4 ha. earned Rs.4,152/- and those possessing between 0.4 and 1.00 ha. earned Rs.5,247/-. These categories of farmers obviously are constrained in balancing their incomes and expenditures, implying that their standard of living as defined by economic welfare is under stress.

In the context of economic and social connotations of human welfare, it would be important to look at farmers' welfare more comprehensively, by deploying Maslow's need hierarchy theory. Maslow says, that a human being has a hierarchy of needs, and he aims to fulfil them. These in ascending order include food security; biological security; social security; achievement and recognition; and self-actualisation. Given the low average income that majority of farmers in India earn, it is obvious that they are, as yet, perched on the lower rungs of this hierarchy.

The nation's Constitution offers the citizens 'right to life', that has been interpreted by the Supreme



Court in 1978, to mean not just a vegetative or animal existence but a dignified human life. The latter can be defined to signify fulfilment of all the needs, as laid down by Maslow in the context of farmers.

This proposition leads one to the logical conclusion, that government policy framework *vis-a-vis* the farmers needs to be expansive enough to take care of both aspects, economic and social welfare. While the earlier impinges upon the standard of living, the latter will influence the quality of living. *Apropos* this, the government's vision of doubling farmers' income is apposite, for it effects a paradigm shift from production-to income-centricity. With such an emphasis, the farmers will come to benefit from higher net returns from their farm-enterprise, and experience higher standard of living.

Since agriculture is highly risk prone at various stages of its value-system and returns may not compare as robustly with other enterprises, social welfare becomes equally important. Hence the necessity of providing the farmers access to free or/and subsidised education, health, old age pensions, crop & livestock insurance, etc. It is only when higher incomes of farmers are supplemented

by a system of social security, that farmers will realise the intended welfare. The Government's recent announcement of Supplementary Assured Income of Rs.6,000/- per annum under PM-KISAN is one such progressive step, and it is only a beginning. In appreciation of the vulnerability of Indian farmer, in the context of the agriculture sector's weaknesses and emerging challenges of climate change, the DFI Committee defined 'Farmers' Welfare as:

"a state of his general well-being, wherein, an agricultural household aided by its own farm and non-farm incomes and social security support is able to satisfy economic, social and psychological needs of all its members, besides the investments, required for sustainable agricultural operations".

Considering the critical importance of farmers' welfare, it brooks no delay to make the farmer a pivot of the strategy for agricultural transformation in India.

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GPS AND GIS IN PRECISION AGRICULTURE



Precision agriculture is about collecting timely geospatial information on soil-plant-animal requirements and prescribing and applying site-specific treatments to increase agricultural production and protecting the environment. Precision agriculture is now changing the way farmers and agribusinesses view the land from which they reap their profits. Where farmers may have once treated their fields uniformly, they are now seeing benefits from micromanaging their fields. Precision agriculture is gaining popularity largely due to the introduction of high technology tools into the agricultural community that are more accurate, cost effective, and user friendly. Many of the new

innovations rely on the integration of on-board computers, data collection sensors, and GPS time and position reference systems. The development and implementation of precision agriculture or site-specific farming has been made possible by combining the Global Positioning System (GPS) and geographic information systems (GIS). These technologies enable the coupling of real-time data collection with accurate position information, leading to the efficient manipulation and analysis of large amounts of geospatial data. In the past, it was difficult for farmers to correlate production techniques and crop yields with land variability. This limited their ability to develop the most effective soil/plant treatment

strategies that could have enhanced their production. Today, more precise application of pesticides, herbicides, and fertilizers, and better control of the dispersion of those chemicals are possible through precision agriculture, thus reducing expenses, producing a higher yield, and creating a more environmentally friendly farm.

INFORMATION PROCESSING IN PRECISION AGRICULTURE

Precision agriculture is a cyclical process. Of course, the farmer can start farming based on "sites specific" information. Farmers generally require annual planning, data collection and analysis of information in order to complete the cycle of precision agriculture.

TECHNOLOGIES IN PRECISION AGRICULTURE

GPS (Global Positioning System)

GPS - Global Positioning System - has advanced impressively in the recent past and has various applications across a number of industries. One main area where GPS has found importance is in the field of precision farming and agriculture.

GPS is a navigation technology which, by use of satellites, tells the precise information about a location. Basically a GPS system consists of group of satellites and well developed tools such as receiver. The system, however, should comprise at least four satellites. Each satellite and the receiver are equipped with stable atomic clock. The satellite clocks are synchronized with each other and ground clocks. GPS receiver also has a clock but it is not synchronized and is not stable (less stable). Any deviation of actual time of satellites from ground clock should be corrected daily. Four unknown quantities (three coordinates and clock deviation from satellite time) are required to be computed from the synchronized network of satellites and the receiver. The work of the GPS receiver is to receive signals from the network of satellites to compute three basic unknown equations of time and position. Applications of GPS in agriculture are include:

a) Soil sampling: GPS provides the necessary data to accurately determine soil variability and to establish whether a given type of soil is ideal for the growth of a particular crop. Soil sampling also helps in profiling of soils to distinguish between soils that are viable and those that are not.

b) Weed location: Using linear sampling techniques, GPS can be used to single out weed patches in vast areas of lands. Weed usually

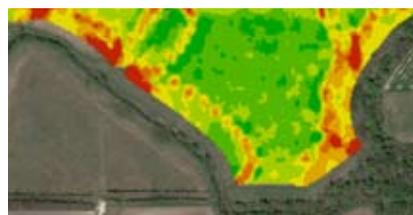


hinders the effective growth of a crop and hampers the eventual yields over a given period of time.

c) Accurate planting: GPS also comes in handy when planning the planting of a given crop. Each seed has specific spacing and depth required depending on the soil type. Using GPS, it is easier to tell what spacing a given seed requires and to what depth the seed should be planted in order to return maximum yields.

d) Determination of planting ratios: GPS can also be used in the determination of planting ratios of seeds. Some seeds have specific spaces in between them while others may be planted together with other seeds. GPS helps in determining the ratio of this type of planting.

e) Creation of yield maps: GPS plays an important role in the creation of yield maps for specific types of crops. For instance, during



harvests, GPS can be used to map out expected yields of a given crop from one piece of land based on the land characteristics and the seed characteristics.

f) Harvesting: GPS plays an important role in the determination of what area of a farm is ready to be harvested and how the harvesting will take place. The GPS will also give an estimate of the size of the area being harvested and the expected returns from the area.

g) Environmental control: Applying herbicides or pesticides based on the capacity of each square meter reduces the application amount of the pesticide being used. This allows the soil to absorb all the pesticide hence reducing the chances of runoff.

h) Farm planning: GPS plays an important role in the planning of a farmland ready for planting. GPS will give the overall size of the area and help in determining what crop will be planted on what part of the farmland using various factors such as soil characteristics and crop characteristics.

i) Field mapping: GPS gives an exact estimate of the field that is

being prepared for farming. Through this, experts can tell what part of the field will be used for farming activities and what area will be used for other non-farming related activities.

j) Soil sampling: Soil sampling is one of the most important uses of GPS in agriculture. It is important to know what type of soil is available on a given farmland as this will help in determining the type of crop to be planted on that farm.

k) Crop scouting: GPS gives an exact mapping of an area helping when scouting for crops that are grown in a particular area. Through this, experts are able to tell the nature and type of crops that thrive within a given locality and help in improving the quality of that crop.

l) Yield mapping: After a crop has been planted and is ready for harvesting, GPS can be used to make an estimation of the yield of a given farmland. This can be achieved through aerial mapping where experts can tell the quantity of a yield based on the area covered by the crop.

m) Soil property mapping: GPS plays an important role in determining the soil property of a given soil to establish its variability and suitability for a given crop. It also helps researchers identify which area of a farmland contains what type of soil and what area is suitable for a given crop.

n) Identification of swamps and other water logged areas: GPS can be used to identify swampy areas and waterlogged areas that may not be ideal for certain types of crops. This helps in determining the suitability of these types of lands for certain crops and their non-suitability for other types of crops.

GIS (GEOGRAPHICAL INFORMATION SYSTEM)

A geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data. The key word to this technology is Geography – this means that some portion of the data is spatial.

In other words, data that is in some way referenced to locations on the earth. Coupled with this data is usually tabular data known as attribute data. Attribute data can be generally defined as additional information about each of the spatial features. It is the partnership of these two data types that enables GIS to be such an effective problem solving tool through spatial analysis.

Use of GIS is fairly limited at present in Agricultural Science, but there are many acknowledged uses even where the tool is not actually being used in practice. There are many strategic advantages for potential future agriculture practice and policy and the industry is only just starting to notice them. Avoiding droughts, floods and insects by strategic planning can improve both yield and quality of a crop and changing crops as soil changes can maintain maximum yield and protect the environment.

- GIS can take the guesswork out of the crop planning management with effective collection of soil data and seasonality of topography in line with changing conditions. It allows for precision farming, permitting vineyards for example to maximize yield and quality.
- Mapping is used to find archaeological features in our agricultural land and this has for many years been a successful tool in the heritage industry. However, the same types of data will be useful for agricultural science as underlying features can affect the quality and relative height of the crop produced.
- Identifying new areas to plant crops, either to make existing yields more efficient or simply to continue to provide increasing yields for our growing global population, is presently and will continue to be the biggest challenge for agricultural science. GIS is presently being used as a crowd sourcing project to manage food security and to reorganize crops in the third world to ensure that maximum use is made from the fragile soils in some areas.
- GIS is essential in mapping areas, especially food sources, which are vulnerable to natural disasters such as drought and flood. The World Food Program, the division of the United Nations concerned with food security, is one of the biggest users of GIS data for this purpose.

Sustainable agricultural production depends on the judicious use of natural resources (soil, water, livestock, plant genetic, fisheries, forest, climate, rainfall, and topography) in an acceptable technology management under the prevailing socio-economic infrastructure. This emerging technology plays an important role in the rapid economic growth and social transformation in developing countries.

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AGRICULTURAL RESEARCH AND EXTENSION: MAKING THE LINK



In the last decade, there have been important shifts in approaches to agricultural research, education and extension. A major premise underlying these shifts is that research, extension and education need to be farmer-participatory and interactive in order to contribute agricultural knowledge and technology that results in collective learning, enhancing local capabilities and generating sustainable development processes and practices. Evidence shows that integrating agricultural research and extension can improve overall performances of agriculture. Policies are needed those facilitate structural and functional linkages among research, education and extension. In order to improve the effectiveness of agricultural innovation systems:

- Agricultural research, education and extension must be viewed as an integrated agricultural knowledge and technology system
- Focus is needed on research, education and extension functions, instead of just organisational structures
- A pluralistic approach is likely to have advantages
- Promotion of informal



- networking at many levels with an incentive system that rewards collaborations
- Strengthening and empowering farmers

Suggestions for improving Research-Extension Linkages

- **Reframe the policy objectives for agricultural development:** It is necessary that the policy framework is reformed with the objectives of developing competent farmers through enabling environment rather than just developing the technology for increasing yield.
- **Building in clarity of roles of research and extension persons:** It is necessary to specify the roles and responsibility of research, extension and farmers in the



overall process of development wherein all the three become a party to the development process rather than individual (Participatory research for technology development and diffusion – innovation system).

- **Shift in strategy of extension:** The focus of extension till now has been to operate individually with farmers or with group of certain farmers for providing technical advice. There is need for shifting the extension strategy to build the capacity of a farmer through organized groups and farmers organization at different levels (institutional innovations) so as to build in strength among the farming community.
- **Building mechanisms of linkages:** It is necessary to build in specific mechanisms for each situation and major technology to build in research-extension-farmers-market linkages based on commodities. The system is already in operation under some of the organizations like Coffee Board, Spices Board, etc. There

is a need to develop this for other sectors and areas also.

- **Reorienting research and extension staff:** The attitude of the research and extension staff needs reorientation to the framework of the objectives rather than technology. This change in their focus and role has to be brought out clearly.
- **Focus on chain management:** The emphasis of research and extension till now has been on small-scale package of technology. It is necessary to bring in the process of chain management for development of an area and its population like the watershed. This means both research and extension staff need to interact intensively with the farmers to develop and transfer technologies along with the farmers to bring in overall development of an area on a sustainable basis to be managed by the farmers in the locality itself. The role of extensions and researches could be that of facilitators.

- **Integration of efforts:** Multiple agencies in public, private, corporate and NGO sector are operating both research and extension systems for the benefit of farmers. This leads to duplication of efforts and facilities. Specific mechanisms should be worked to achieve the common objectives of development of farmers and farming community on a sustainable basis by providing out an interdependent and supporting role for each of the sectors.

Extension's role in creating knowledge and providing feedback to be used in future policy and programme design is recognized. Beyond extension's contribution in setting agendas for future research, extension's capacity to participate as a partner in the research process is also to be recognized.

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TOWARDS A BETTER FUTURE OF FARMERS



Indian traditional agriculture was unique in many aspects. Farmers were the only society that performed agriculture. Seed sources were collected and shared locally, but not under any corporate control. Fertilizer resources were obtained from their own farm, mainly by recycling waste materials and byproducts. Ancient crop varieties showed high levels of resistance to insects and diseases. Marketing was in the form of barter system. Irrigation

was mostly based on rainfall runoff water stored in structures such as ponds, lakes and dams that were subsequently distributed through the canals. Traditional production practices made the farmer as the superior server for people and they never were forced to commit suicide. Farmers were well respected in the society. Finally, farmers were the only people to direct agriculture.

However, there has been a major shift in this trend in recent times, since agricultural activities are

dominated by intermediaries such as brokers, commission agents, farm advisors, input suppliers, as well as government policies.

CURRENT SCENARIO

In general terms, present should be better than past. However, in agriculture past has been better than present and present is better than the future. Everyone knows about green revolution. It slowly purified the soil from organic inputs to inorganic inputs. Finally, purification has led to

A table showing the Area, Production, Productivity and Position of Agriculture sector in India (2015-16)

S.No	Commodity	Area(*000 ha)	Production (*000 tons)	Productivity (Kg/ha)	World ranking
1	Cereals	24,390	38523	1579	Second
2	Pulses	24,911	16348	656	-
3	Total fruits	6301	90183 (000 MT)	14.3(MT/ha)	Second
4	Total vegetables	10106	169064 (000 MT)	17(MT/ha)	Second
5	Total oilseeds	26087	25251(000 MT)	968(MT/ha)	Second in groundnut
6	Major spices	3574	6988	2.0	Second
7	Sugarcane	4927	348448	70720	Second
8	Milk	-	155.5(MT)	337 per capita availability (g/day)	First
9	Poultry(egg)	-	651104.37 (lakh no's)	-	-

Source: www.indiastat.com

contamination of soil and immediate treatment was done again with more fertilizers and resistant varieties.

The table above clearly indicates that Indian farmers are producing more and more for feeding the nation. Further, commodity export to other nations is also expanding. All these factors should make India a drought- and hunger-free nation. However, this situation is highly variable across regions. One report says that 75.6% of the Indian populations are still under below the poverty line. India's production rate in agricultural commodities is high, but the quality is not on par.

Reports also indicate that the proportion of farmers among the nation's population has declined from about 50% in 1951 to 24% in

2011, with a reduction from 40% in 2001 to 33% in 2011 in rural areas. During the same period, the agricultural labour force has increased from 19% in 1951 to 30% in 2011. This shows that a significant number of farmers have left farming and become farm labourers. During the decade 2001-11, the census results showed a fall of about 9 million farmers and an increase of about 38 million agricultural labourers. This is a critical issue that needs to be addressed for elevating Indian agriculture to the next level.

ALREADY SOLD

Farmers have almost lost the practice of saving their own seed and allowed corporates to control the seed supply. This is a concern

for the future supply of planting seed. According to Indian corporate laws, exploiting one's intellectual property is illegal. This was originally influenced by corporate industries. Today, three major multinational companies control the hybrid seed industry. These are high yielding and contain traits such as resistance to insects and diseases. It is important to note that the hybrid seeds are effective only once and the farmer has to buy the seeds from the company each year.

Genetically modified (GM) crops are another emerging trend in the seed industry. These were initially launched in cotton for Lepidopteron insect control (Bt technology), which raised cotton production to record levels and made India the 'largest producer of cotton'. While it was a great technology, there is another side of this tool. After the launch of Bt cotton, many farmers in the states of Maharashtra and Karnataka readily adopted Bt cotton in their field. Initially the price of seed was high; however, farmers did not mind the price at that time because of expectations of high cotton yields and profits. However, the reality was different. Further, some companies were blacklisted due to supply of duplicate seeds to farmers. Finally, many farmers lost their yield and ended up with bank



debts which were difficult to repay. This scenario indicates that if we lose our rights, the outcome will be pathetic.

IN FAVOR OF LEASE

Another important trend in agriculture is the change in the farm operator base. More recently, leasing and contract farming are expanding. Experts have argued in favor or against contract farming. In short, contract farming involves agricultural production being carried out on the basis of agreement between the producer and the buyer. In this arrangement, the farmer has to assume production-related risks and the price risk is assumed by the buyer. In some cases, the buyer also accepts the production-related risks.

While contract farming can go smooth generally, certain things made distress. In particular, only the seeds and inputs supplied by the company have to be used and the production risk may sometimes not be covered by the companies. Further, the output price for the produce is fixed by the companies only. Contract farming possesses some of these issues. However, the advantages mentioned above serve as the foundation for corporates to enter into the agricultural sector.

FARMER SUICIDES

High profit expectations from agriculture has resulted in farmer suicides. They struggle with loan repayment. Farmer suicides are common in cotton producing regions in eastern Maharashtra; with Vidarbha is being the epicenter for this crisis. Farmers were burdened with debt associated with falling prices and rising production costs. Estimates suggest that more than 3000 farmers have committed suicide during 2013 alone. Yogita Kanhaiya - the wife of Moreshwor, a cotton farmer who ended his life



-was expecting a baby soon. They already had a two-year old son. Her husband won't be around to see his children grow up. He committed suicide earlier in the pregnancy. Eight years back, Yogita's father-in-law, also a cotton farmer, also took his own life. Yogita said that her husband was in so much debt and was not getting any profit from cotton that he chose death over distress. He will have to do labor jobs all his life to pay the loan. She did receive compensation from the local state government after her husband's death, but it was little and wouldn't be sufficient to solve her problem. Similar to this story, there are several untold and unheard stories regarding farmer suicides due to uncontrolled debt. There have been government programs to safeguard farmers, but they rarely reach farmers' doorsteps. Farmer suicide is still ongoing.

TOWARDS BETTER LIFE

There must be growth wherever there is a change. However, in agriculture, growth rarely occurs. Following measures can revert this trend and promote growth in agriculture.

- Government has to initiate activities towards agriculture, i.e. mainly for making agriculture as a profession among our youngsters.

- Government has to establish more seed banks for providing quality seeds for low cost.
- Farmer suicides mainly happened due to failure of debt repayment to banks in time. The Non Performing Assets (NPA) report by the banking sector shows that the number of NPA was high in agriculture, but the total value is very low compared to corporate NPAs. However, the banks are forcing only the farmers to repay loan. The banking sector must allow flexibility in loan repayments for the agricultural loans.
- GM crops may have the potential to increase profits, but more research is critical to fully evaluate their benefits and risks. Moreover, illegally grown GM crops should be eliminated.
- Farmers must also come forward to adopt improved practices in agriculture, such as post-harvest processing and value addition of agricultural products, forming FPO groups, Integrated Farming System (IFS) and planning to achieve returns on capital.
- Finally, a big concern was raised by some socialists i.e. future farming will belong to corporates. If it happens, then the overall trend of farming will be only in corporate hands. However, there is some hope that it will not happen because we are now moving to double farm income by 2022 and such a situation will direct the farmers away from corporate takeover.

Crop cultivation started during 7500 B.C. and still continues. If it is not continued, then farmers will lose their career and with that our historic wealth will be lost forever. It is the right time for our government to focus on agricultural prosperity and wealth of our farmers. Then only our future generation will understand the true value agriculture.

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WHY BIO-FERTILIZERS SHOULD BE USED OVER CHEMICAL FERTILIZERS?



Fertilizers are manufactured commercial products which contain one or more essential plant nutrients. For a material to be qualified as a fertilizer it should contain nutrient in appreciable amount and in readily or potential usable form. Fertilizers can be broadly classified as organic and chemical fertilizers. They are used to enrich the soil with nutrients that it does not inherently have. They should be used strictly as a deficiency buster. Inordinate use of different types of fertilizers kill the naturally present ingredients in soil too, so it is important to use them carefully and only as per need. Fertilizers are used with the sole purpose of improving soil fertility so that it can support larger harvests. Organic wastes from dairy, poultry, or field, decomposed leaf manures, composts from cow burials, vermi-compost, Jeevamrith, panchgavya etc., and bio-fertilizers are the alternate sources used to meet the nutrient requirement of crops.

The fertilizers that are used to improve the fertility of the land using

biological wastes and biological forms are termed as bio-fertilizers. Bio-fertilizer involves the preparation of efficient strains of microorganisms capable of converting atmospheric nitrogen into nitrate or solubilizing phosphorus from the fixed form. The need for the use of bio-fertilizers has arisen primarily due to two reasons i.e. though chemical fertilizers increase soil fertility, crop productivity and production, increased/ intensive use of chemical fertilizers has raised serious concerns on soil texture, soil fertility and other environmental problems.

Advantages of Bio- fertilizers

- Bio fertilizers add nutrients to the soil through the natural processes of nitrogen fixation and solubilizing phosphorus and stimulating plant growth through the synthesis of growth-promoting substances.
- The bio- fertilizers are extremely advantageous in enriching soil fertility and fulfilling plant nutrient requirements by supplying the organic nutrients through microorganisms and their byproducts.
- The number of beneficial micro-organisms will increase when bio- fertilizers are used.
- The beneficial micro-organisms accelerate certain microbial and physiological processes which render the availability of nutrients to which the plants assimilate very easily.
- Healthy plants can be grown, while enhancing the sustainability and the health of the soil.
- Microbes such as Rhizobium, Azotobacter, Azospirillum and Blue Green Algae (BGA) have been in use from a long time as a source of bio-fertilizers.
- Other types of bacteria, so-called phosphate-solubilizing bacteria, are able to solubilize the insoluble phosphate from organic and inorganic phosphate sources.
- Bio- fertilizer secretes certain growth promoting substances that are harmless, eco friendly and low cost agro- input supplementary to chemical fertilizers.
- They increase the soil fertility, improve soil structure, porosity and water holding capacity and also enhance seed germination.
- Under certain conditions, they exhibit antifungal activities and thereby protect the plants from pathogenic fungi.
- Biofertilizers do not add traces of hazardous and poisonous materials to soil.
- Use of Bio- fertilizers is both economical as well as environment friendly and can overcome the problems that have arisen from environmental pollution.

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NBHC'S FINAL KHARIF CROP ESTIMATES FOR 2018-19



The year 2018-19 has indicated that below average and erratic distribution of monsoon rains. The rainfall season (June-September) over the country as a whole was 91 per cent of its long period average (LPA). Seasonal rainfalls over Northwest India, Central India, South Peninsula and Northeast (NE) India were 98 per cent, 93 per cent, 98 per cent and 76 per cent of respective LPA. Out of the total 36 meteorological subdivisions, 23 subdivisions constituting 68 per cent of the

total area of the country received normal season rainfall, 1 subdivision received excess rainfall (1 per cent of the total area), and 12 subdivisions (31 per cent of the total area) received deficient season rainfall. Monthly rainfall over the country as a whole was 95 per cent of LPA in June, 94 per cent of LPA in July, 92 per cent of LPA in August, and 76 per cent of LPA in September. Major states affected by this monsoon pattern were Bihar, Gujarat, Uttar Pradesh (West), Madhya Pradesh, Jharkhand, Telangana, Karnataka and Maharashtra.

In our first estimate (First Kharif Crop Estimates for 2018-19 – 25th September 2018) we had broadly concluded that in the year 2018-19, the production of coarse grains, pulses and cotton are expected to decline by 9.78 per cent, 2.68 per cent and 4.57 per cent over 2017-18. In the current assessment, the pulses and oil seeds have marginally pushed themselves further in the negative region with an expected decline of 2.68 per cent and 5.36 per cent over the last estimate.

The crop wise analysis reveals that in the group of cereals, the

rice crop was least affected by the irregularity in monsoon as it is grown mostly in well irrigated areas. For the year 2018-19, rice production was expected to decline marginally by 0.73 per cent over last year and decline marginally by 1.91 per cent over last estimate. It is to be noted that the Basmati rice production is expected to fall by about 9.24 per cent but this short fall is being compensated by the increase in the Non-Basmati rice. Maize is expected to decline significantly by about 10.41 per cent over last year. The fall in the sowing area in Karnataka & Telangana was the main cause for the decline in production. In the minor cereals, Small Millets, Ragi and Bajra production is expected to improve by 6.15 per cent, 18.40 per cent and 6.29 per cent respectively while Jowar is expected to decline by 10.59 per cent over last year.

Pulses production is projected to drop marginally to 9.10 million

The table below shows the details of the final estimate for the 2018-19 Kharif crop:

Crops	Actual Production	NBHC Estimate (2018-19)		% Change	
	2017-18	1st Estimate*	Final Estimate**	Over 1st Estimate	Over Last Year
Total Rice	97.50	98.68	96.79	-1.91	-0.73
Basmati Rice	5.71	5.30	5.18	-2.25	-9.24
Non-Basmati Rice	91.79	93.38	91.61	-1.89	-0.20
Jowar	2.10	1.92	1.88	-2.09	-10.59
Bajra	9.13	8.25	8.56	3.66	-6.29
Ragi	1.98	1.51	1.62	7.20	-18.40
Small Millets	0.44	0.40	0.41	2.13	-6.15
Maize	20.24	18.29	18.13	-0.85	-10.41
Coarse Cereals	33.89	30.37	30.57	0.67	-9.78
Total Cereals	131.39	129.15	127.19	-1.52	-3.20
Arhar	4.25	3.98	4.30	8.10	1.16
Uraddbean	2.84	2.79	2.55	-8.37	-10.11
Moong	1.44	1.82	1.59	-12.57	10.22
Other pulses	0.82	0.59	0.66	11.28	-19.51
Pulses	9.35	9.17	9.10	-0.79	-2.68
Groundnut	7.54	5.89	5.87	-0.34	-22.11
Soybean	10.98	12.32	11.96	-2.90	8.95
Sunflower	0.08	0.07	0.08	21.00	0.00
Sesamum	0.75	0.73	0.73	-0.83	-3.21
Niger	0.07	0.07	0.08	12.36	11.83
Castor	1.57	1.12	1.14	1.85	-27.16
Oilseeds	21.00	20.21	19.87	-1.68	-5.36
Sugarcane	376.91	415.00	389.17	-6.22	3.25
Jute & Mesta	10.14	10.12	10.66	5.27	5.11
Cotton	34.89	33.20	33.29	0.28	-4.57
Grand Total	576.13	616.72	553.99	-10.17	-3.84

2017-18	Actuals		
*	NBHC - R & D Estimates 1st Estimate	Cotton	Million Bales (170 Kg)
**	NBHC - R & D Estimates Final Estimate	Jute	Million Bales (180 Kg)



MT from 9.35 million MT last year due to the fall in Urad output by 10.11 per cent mainly due to the shift in acreage towards soybean in some parts of Madhya Pradesh and Maharashtra.

Total oilseeds production is estimated to be 19.87 million MT,

which is 5.36 per cent than the last year's production of 21.00 million MT. This was mainly due to falling groundnut (22.11 per cent), castor (27.16 per cent) and sesame (3.21 per cent) production in major producing states. Other oilseeds such as Niger is expected to increase

by 11.83 per cent.

In the cash crop section, cotton is found to be seriously affected by fluctuating weather conditions. The annual cotton output in India might drop 4.57 per cent due to inadequate rainfall in the top two producing states Maharashtra and Gujarat who has cut crop yields, potentially reducing exports from the world's leading producer.

Sugarcane is expected to increase marginally by 3.25 per cent on increased sowing and lastly Jute & Mesta is expected to improve marginally by 5.11 per cent amidst favourable weather conditions.

With several products in development phase, it is expected that the first commercialized genetic modified plant altered using CRISPR/Cas9 will reach market soon as USDA has approved commercial cultivation.

Dr. Hanish Kumar Sinha, Head - Research & Development, National Bulk Handling Corporation (NBHC)



GOODS AND SERVICES TAX

Products and Services Tax (GST) is one of the greatest circuitous duty changes in the nation since freedom, slated to be made pertinent in the nation from April 2016. It is relied upon to realize a 2% incremental GDP development of the nation, so far neglected to get Parliament's gesture.

The sustenance business which is a value delicate industry needs concessions. So far there is no

reasonable picture on what sort of rates will be appropriate for the business. It is felt that if subject of sustenance industry is set alongside others, it would have negative results for the business. The most recent recommendations made by boss financial counsel and head of GST board Arvind Subramanian, mirror that GST rates are prone to be finished in the scope of 16% – 20% i.e. Focal GST @ 8% – 10% and state GST @ 8% – 10%. While

these rates might be reasonable for some fields, an intensive investigation uncovers that these rates are to a great degree retrograde for nourishment items. The country is confronting with extravagant wastage's of agro-produce, low levels of preparing, vulnerabilities of atmosphere, trouble to agriculturists, high sustenance costs and swelling. There is a critical requirement for the sustenance segment to add to Make in India, ability improvement and

occupation era.

Under these unforgiving circumstances, it is not in the least legitimized to place sustenance items at 8% – 10% Central GST. This area does not have the capacity to hold up under this weight. The framework may go into a negative winding bringing on genuine emergency, further upsetting the shopper and the rancher. Since individuals on lower livelihoods spend more as an extent of their salary on sustenance – it is an expense that hits the poorest hardest. The more extensive GST plan, especially stretching out it to new food. As a result, enlarging the base of the GST would excessively affect lower wage workers. Nourishment is an existence supporting information and charges on sustenance straightforwardly affect expansion in this manner bringing on social inconvenience and agitation. It is clear that this area merits a touchy treatment in the matter of tax assessment and can't be clubbed with different parts. It has been surveyed that the family nourishment wicker container devours 40% – 60% of the income of a typical subject bringing about a noteworthy family unit burden. Moreover, sustenance is perishable by nature, has a high hazard profile, is basic to purchaser needs and along these lines, ought not be focused for income era. It should be perceived that sustenance area has the most elevated multiplier impact in producing multilevel livelihood. There is a critical need to give driving force to this area to saddle its unlimited potential as opposed to look for income from nourishment items. We need to receive a 'Nourishment Sensitive Tax Policy' in the GST structure. The GST rates being proposed by



senior government authorities right now have all the earmarks of being exceedingly backward with regards to Food Products. Nourishment incorporates an assortment of things, including grains and oats, meat, fish, poultry, milk and dairy items, products of the soil, treat and candy store, snacks, arranged suppers for home utilization, eatery dinners, and drinks. An imperative inquiry is the meaning of sustenance that would be qualified for the lower rate. To keep the base wide, and farthest point the inclination to things of utilization by the lower wage family units, the lower rate ought to be restricted to "natural" nourishment things (counting vegetables, organic product, meat, fish, and poultry). Its extension can be further confined by barring from the inclination

nourishment pre-bundled for retail deal. This definition would not be without issues, particularly where the handling esteem included is little. For instance, if wheat were assessable at 5% as natural nourishment, however flour assessable at 16% as handled sustenance, it would urge customers to purchase wheat and after that have it prepared into flour. In many wards where lessened rates or exclusions are accommodated nourishment, their extension is confined to essential sustenance things for home utilization. Be that as it may, the meaning of such things is dependably a test and constantly offers ascend to arrangement debate. In India, essential nourishment, however characterized, would likely constitute the unfathomable main part of aggregate uses on sustenance. Nourishment is an incorporated procedure, every progression includes some handling and at every progression sustenance is expended in some structure. An endeavor to characterize sustenance items into different wicker bin for use of various duty levels will prompt wild 'item and-rate-litigation's, dispersing significant time and vitality of the administration and the business.



Archana and Karteek Kumar

WHY INDIA NEEDS PRECISION AGRICULTURE

India's first green revolution in late 60s and early 70s was borne out of a severe food crisis that plagued the country in the preceding years, with widespread famine-like conditions spread around the country. As farmers in north India switched to industrial-style farming with use of mechanised irrigation, fertilizers and new seed varieties that supported higher yields, farm output shot up rapidly. In just a few years, India went from having to import food grains to feed its population, to exporting excess produce.

Decades later, as we look at a rapidly worsening agrarian crisis affecting most states of India, there are calls for another revolution in farm productivity. Agriculture remains the mainstay of our economy and the livelihood source for a majority of Indians; and yet it has not grown to keep pace with a growing population. The sector registered a modest growth of four percent in FY18, which simply cannot sustain India's population that is estimated to grow to nearly 1.5 bn by 2030. In fact, India's population and availability of fertile land remain the two biggest constraints - with only 2.4% of world land mass, India currently feeds 18% of the global population.

Agrarian land coverage has diminished in the recent years due to fast urbanisation and shifts in occupational patterns. Most of land holdings are small; the 2010-11 agricultural census noted that 67



per cent of farms in India are under one hectare; while those between 1-2 hectares make up another 18 per cent. Farmers who own such tiny holdings are perennially struggling to overcome a life of subsistence. Access to affordable capital is difficult and even when available, it can barely boost productivity in a small farm holding.

Meanwhile, a separate crisis is brewing underground as water tables across the country have reduced to 61% in the last decade, according to data from Central Ground Water Board. India uses almost twice the

amount of water to grow crops as compared to other agriculturally advanced countries like China and the USA. We can attribute this to two reasons. Firstly, generous power subsidies for sourcing irrigation water has led to the decline of water levels in India. Secondly, even though Minimum Support Prices (MSPs) have been announced for nearly 23 crops, a handful of them including sugarcane, wheat and rice have the most effective price support, thus creating a highly skewed incentive structure in favour of these water intensive crops.

Green Revolution did give us better seeds but now as high-yielding varieties of crops like wheat,



rice, sugarcane, and cotton replace the traditional mixes of crops, consumption of water has shot up alarmingly. These new artificially modified seeds have successfully given us higher crop yields, but it should also be noted that they are thirstier than traditional seeds. As per a 2016 report by PRS Legislative Research, agriculture sector accounts for over 89 percent of the total groundwater extraction.

The agricultural priorities and therefore policies, are short-sighted that in turn, has contributed to a severe water imbalance in the nation. States like Maharashtra, Punjab, and Haryana are already undergoing a severe groundwater crisis because of overdependence on certain types of crops. Earlier, farmers in Maharashtra used to grow millet, sorghum, and other cereals; but in recent years they have turned extensively to sugarcane because it generates more income. Likewise, farmers in Punjab and Haryana are growing rice and wheat, both of which are water intensive crops.

Given the challenges of small land holdings, water scarcity and shifting occupation patterns, agriculture reforms in India need to focus upon boosting farm productivity and simultaneously reducing water consumption; while taking into account the nature of landholdings that restrain and limit capital and technology infusion. Though modern technology can address the twin challenges of boosting farm productivity and reducing water usage; the fractional landholding is more of a structural challenge that is better solved by innovative economic approaches such as setting up of farmers' cooperatives that pool together multiple small landholdings for common management.

To be able to boost farm productivity, technology can be a great enabler. The application of technology in farming has created



a new approach to farming known as Precision Agriculture or Precision Farming. As the nomenclature suggests, the emphasis is on achieving precision during every stage of farming – from preparing and tilling land to sowing of seeds, using water and nutrients and ultimately harvesting the crop at the precise time and in a precise manner. Precision agriculture tools typically use GPS (Global Positioning System) and GIS (global information system) data, and combine it with locally-placed sensors or laser-based systems to 'guide' the movement of farm equipment like tractors or their implements. Other tools can monitor the health of soil and tell the farmer which nutrient to put, in what quantity and precisely at which spot in the farm/field.

The benefits of achieving precision are readily observed during all stages of farming. During land levelling and preparation, laser-guided tools can make sure the land is levelled with such accuracy that no part of it has either excess or less water. In practice, farms using

these tools have seen their water consumption go down by as much as 30%, which bodes well for water conservation.

During sowing of seeds as well as harvesting, GPS-based steering systems ensure that the tractor moves along in a precise, straight line with accuracy levels reaching a centimetre; in turn ensuring that seeds are planted with precision, and the crop is harvested with equal precision. Other Precision Agriculture tools help farmers monitor their soil's health and put only as much fertilizer or pesticide as necessary. The farmer not only thus saves money on costly inputs, but is also able to retain and nurture the soil's fertility.

When compared to other technology-enabled farming innovations, one distinct advantage of Precision Agriculture is that it is undisputedly harmless and has no negative impact on the soil, water table or the actual produce, in the long or short term. However, it is often perceived as expensive and may prove to be beyond the reach of most farmers, except Indian farmers who have larger land holdings. To overcome this economic constraint, support from policy makers at both state and central level is a must. Even private sector can and should play a role in introducing financing models/options (pay-per-use) that are targeted at smaller farmers. Multiple financing options will improve their access to precision farming technology, whether on pay-per-use basis or for outright purchase, and facilitate quicker adoption of technology in agriculture. The endgame is a win-win for all; a second, sustainable green revolution that not only boosts farmers' incomes, but also promises food and water security for people of India.

Mr. Rajan Aiyer, Managing Director, Trimble, India & SAARC

CRISPR ED CROPS

REALM AND CHALLENGES

Gene editing is modifying genome to create individuals of choice either by disrupting any gene function, adding a foreign gene or altering expression of a gene deliberately using DNA cutting enzymes. Since centuries, humans have been involved in fixing genes of choice in population by selecting individuals showing desired characters from a natural breeding population. However, mutations in nature are random and fixing desired traits takes years. Gene editing provides means to develop phenotypes of our choice in a shorter span of time with targeted effects.

Early genetic engineering approaches involved random insertion of gene segments, however, with time, researchers discovered more accurate ways of genome modifications. Introduction of Meganucleases, Zinc-Finger Nucleases (ZFNs) and Transcription Activator-like Effector Nucleases (TALENs) made genome editing more accurate. However, these techniques are complex to perform and have limitations too. Thus, the struggle to find out a simpler way continued and with the discovery of CRISPR/Cas9 it appears that this hunt has come to an end. CRISPRs were first discovered in archaea, where it was proposed to serve as part of immune system. Later on, it is adopted, modified and deployed as gene editing tool.



HOW IT WORKS?

CRISPR (Clustered Regulatory Interspersed Sequence Repeats) sequences are the snippets of invading virus genetic materials which are captured and saved by host bacteria as record in their genome to remember these invaders. These sequences serve as adaptive immune system to host bacteria and when next time same or any related virus attacks, it produces RNA segment for these CRISPR arrays and targets virus DNA.

Molecular Biologists have harnessed this novel mechanism to introduce desired changes in DNA and this is rapidly adopted by scientists worldwide owing to its ease of operation and accuracy. It is used in various sectors including

pharmaceuticals, medicine and agriculture.

CRISPR/Cas9 is a two part biological system, consisting of a piece of RNA called guide RNA (gRNA) which is a small pre-designed RNA molecule located within a longer RNA scaffold and an enzyme called CRISPR associated protein 9 (Cas9). Guide RNA is a customized RNA sequence which is complementary to the target sequence in host genome. Cas9 enzyme is an endonuclease and this molecular scissors cut at both strands of DNA at specific location, as guided by gRNA. Cas9 cuts DNA near to Protospacer Adjacent Motif (PAM) sequence, a short specific sequence essential for cleavage by Cas9. When a double-stranded DNA cut is performed, cells repair the

damage either by non-homologous end joining (NHEJ) or homology directed repair (HDR). NHEJ is faster, but more error-prone, than HDR. NHEJ repair often results in error in form of insertions, deletions or mis-pair, at the DNA strand break, causing permanently damaged DNA expressing a mutant, non-functional gene. So, when CRISPR-Cas9 is used to generate double-strand breaks in DNA in a large population of cells, some of the cells will mis-repair the damage and have permanent loss-of-function mutations in the targeted gene (Fig. 1). It can also be used to insert new segment of DNA by HDR.

IT IS EVERYWHERE

By virtue of its simplified construction and high precision, it is rapidly adopted by scientists worldwide and there is hardly any sphere left in biological sciences which is not touched by this revolutionary tool.

What makes this technology so novel is its ease of use as it can be repurposed easily. Earlier known gene editing technologies like TALENs and ZFNs are complex to apply and more expensive than CRISPR/Cas9.

Though genome editing have so far been used mostly in scientific research, its potential applications are much wider. As with genome editing any DNA sequence can be altered, whether in a bacterium, plant, animal or human being, it has an immeasurable range of promising applications.

From treating single gene genetic disorders to complex diseases like cancer, creating non browning mushrooms, breeding drought tolerant crops, producing dehorned cattles, saving endangered species, potential of CRIPSR is being explored everywhere.

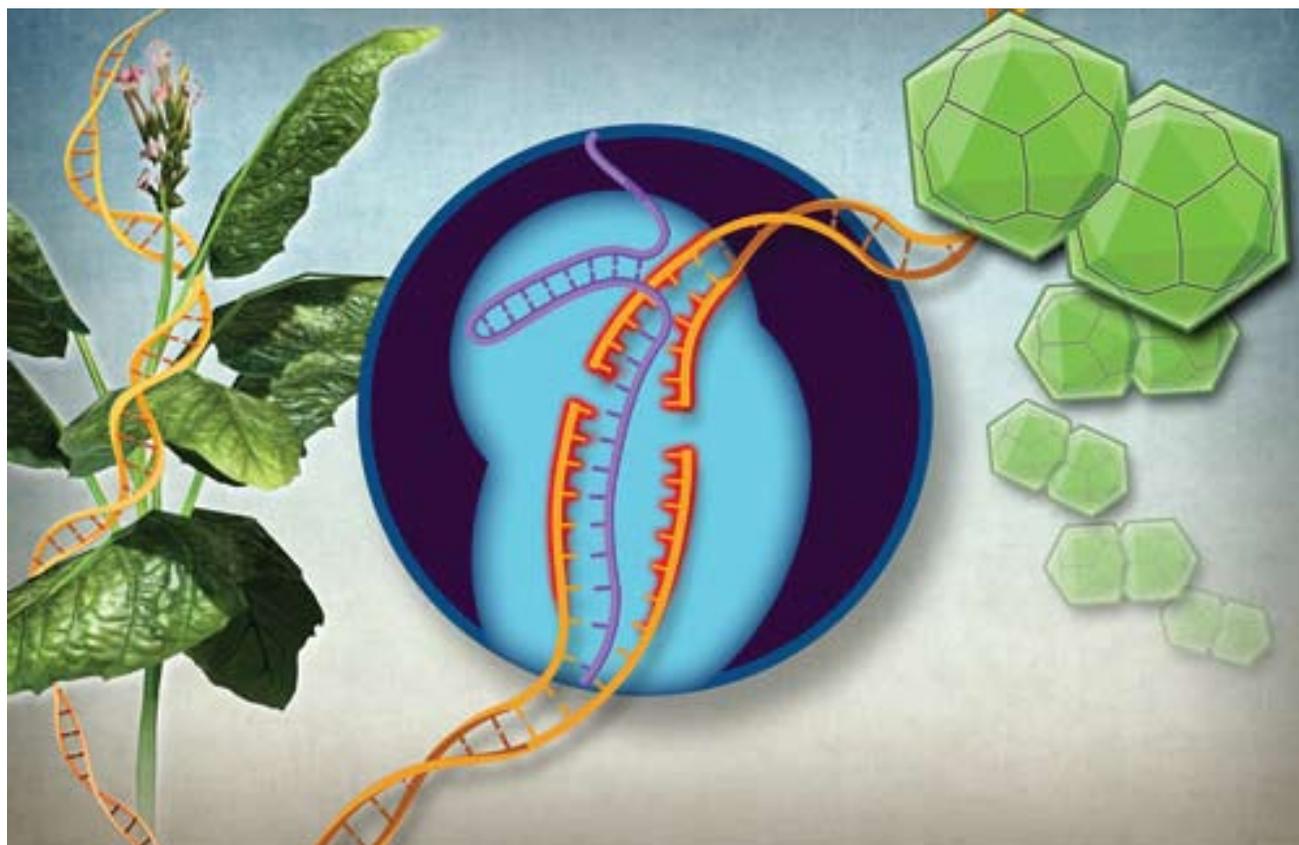
AS A TOOL IN AGRICULTURE

Most of the research in CRISPR

technology is primarily focused on its applications in pharmaceutical and healthcare sector, however, it is rapidly entering in field of plant breeding where it is more relevant as in plants, modification in valued traits, mostly, need no foreign gene. CRISPR, which utilizes the potential of host own genome, can rapidly generate transgene free improved varieties.

For years, crop improvement relied on spontaneous mutations, random mutagenesis or genetic recombination followed by selection and subsequent fixation of favorable genes. These approaches were time consuming and unpredictable where getting desired results were a matter of chance. Increased gene sequencing developments paved the way towards genetic modification approaches to speed up crop improvement programmes with added precision.

Applicability of CRISPR/Cas9



system is reported by several studies with its first application in crop engineering dates back to 2013. Since then, it has been experimented in several plants species. It is not only being used to impart yield enhancing traits and stress tolerance, but also being employed to incorporate value addition traits and to save plants which are threatened to get extinct because of climate change/ to make plants climate resilient. In a more expanded approach, genome editing can be used to expand the crop germplasm pool by modifying genomes of wild or minor crops.

With several products in development phase, it is expected that the first commercialized genetic modified plant altered using CRISPR/Cas9 will reach market soon, as USDA has approved commercial production of CRISPR edited waxy corn without regulation as GMO. Other commercial products in pipeline are non-browning mushrooms, powdery mildew resistant wheat, high oleic acid soybeans, high fiber wheat, reduced gluten wheat, lower saturated fat canola, and the list goes on.

Though this technology is still in nascent stage with respect to its applications in agriculture sector, its potential benefits are extensive which are indicated by the large investments being made in private companies using CRISPR/Cas9 in agri-sector leading to significant growth in product development. Increasing number of public and private partnerships, are creating new market segments. As this technology is cheaper and needs no large investments, it is seen that startups are emerging at product development level, a case contrary to transgenic crops where only big large agri-giants were involved. However, market in agriculture is dominated by a handful of companies. Dow-DuPont, Monsanto, Syngenta and BASF are the major players in CRISPR

market in agriculture sector.

Market projections shows that global market for gene editing will grow at a compound annual growth rate (CAGR) of 36.79% from 2018 to 2026 and expected to generate \$7955 million in revenue by 2026. Major revenue generating sectors are therapeutic and agriculture. Asia Pacific is important particularly, as it is the fastest growing market for CRISPR, specially related to its applications in animal breeding and agriculture.

ARE WE PREPARED?

Though it seems clearer than ever that CRISPR technology will gear up pace of agriculture, but it is more likely that it may face biggest roadblock due to government regulations and public non acceptance.

CRISPR may escape the regulations imposed on transgenic plants as it works within constrictions of existing genome and produce nature identical traits. However, regulation of CRISPR edited food products is a subject of debate. World seems to be divided on viewpoint of regulations of CRISPR edited food products. Scientists debate that CRISPR-Cas9 should be considered targeted mutagenesis, just like irradiation, as it does not involve insertion of foreign gene and thus, be unregulated. It is a process of genetic modification where the result is not genetically modified. But a second lobby, opposed to GM organisms, contend these products should fall under the directive as it induces deliberate nature of alterations in genomes.

In a welcoming move, USDA states that it will not regulate plants that have been developed through new genome editing tools as long as they are not plant pests or developed using plant pests. However, a major setback is faced by supporters of gene editing technologies in Europe as European Union decided to pose

same stringent regulation on CRISPR edited crops as GMOs. However, individual countries, reaction to EUs decision may vary. Gene editing developments are enabled and controlled in each country differently and therefore, needs to be evaluated individually.

Acceptance of CRISPR edited food products by public is another big concern to researchers as they are not assured of getting market for their products. However, this can be overcome by adding transparency to CRISPR breeding strategies which will help in acquiring public trust and influencing regulatory bodies.

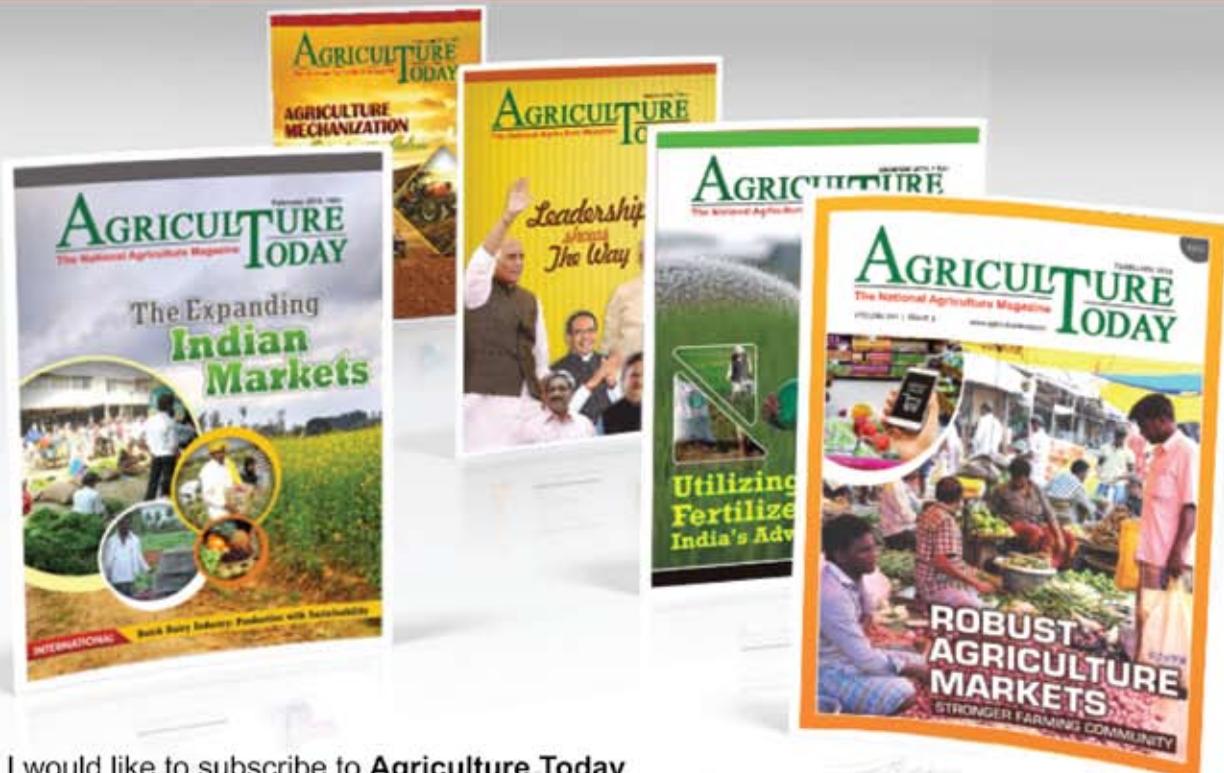
Another important issue which needs attention are unintended genetic changes that might accidentally arise from CRISPR gene editing, as stated by several studies. It is still an emerging technology that is yet to be proven for its safe applications. Additionally, impact of gene edited food on human, environmental and socio-economic impacts are other concerns which needs to be addressed before giving green signal.

WAY FORWARD

Biotech governance in India has yet to come up with a regulatory framework for gene edited food crops. It is imperative that above mentioned concerns are factored before policy makers takes stance on determining the ideal regulatory approach. Indian Govt. stand in allowing gene editing in food crops will be a matter to be seen. A diverse approach could be to go slow in order to provide conducive environment to grow this technology in India to its potential and to rule out it's off target effects before drawing inference.

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AGRICULTURE TODAY

'INDIA IS AN IMPORTANT TRADING PARTNER FOR MALAYSIA'

India and Malaysia have strong cultural and trade relations. Trade between the two countries has been on an upward trend – increasing more than four fold in the 2003-12 period. Malaysia's main exports to India were palm oil, electrical and electronic products, crude petroleum, chemicals and transport equipment. Indian exports to Malaysia are refined petro products, live animals and meat, agri-produce and cereal. However, there are still several potential areas of trade between the two countries. In an interview with Agriculture Today, H. E. Mr. Datoâ Hidayat Abdul Hamid, Hon'ble High Commissioner, High Commission of Malaysia shared his views on India-Malaysia trade relations and the challenges encountered.



What is the volume of the current trade in agriculture products between India and Malaysia? Which are the agro products of Malaysia that have good market in India?

Total trade for agriculture products between Malaysia and India in 2018 amounted to USD 1.943 billion. The top three agriculture products that Malaysia sells to India are palm oil, cocoa and cereals. In fact, India is our largest market for palm oil, accounting for 11 percent of Malaysia's annual palm oil production. On the other hand, Malaysia's agriculture import from India is valued at USD 749 million. Among the top products include meat & poultry, vegetables (onion, chili) as well as spices.

Which are the areas in agriculture where Malaysia actively cooperates with India, other than trade?

Malaysia's economic development has transformed from a predominantly agriculture-based in 1970s (33.6% of the GDP) to a more diversified economic structure, such as manufacturing and services. By 2016, agriculture accounted for 8.1% of Malaysia's GDP. Malaysia excels in many research & development of its agriculture products especially palm oil. Oil palm is a very productive oil crop, the productivity of which is 6-10 times higher than other oil crops. In addition, the olein properties are ideally suited for different applications in the food industry. At the same time,

Malaysian and Indian food palate and liking have many similarities, with heavy use of oil in our cookings. Malaysia signed a Memorandum of Understanding (MoU) with India in April 2017 to collaborate in technology development in the field of palm oil. The MoU was concluded between the Malaysian Palm Oil Board (MPOB) and the Institute of Chemical Technology (ICT). As such, both organizations are looking for suitable ways to integrate the oil palm into the huge food industry in India.

What according to you are the challenges in agriculture trade with India? What changes do you expect to see in our policies that would be helpful to increase the trade flow in agriculture products between India and Malaysia?

One of the main challenges in agriculture trade with India is the sheer size of the market itself. The large number of local and international industry players are trying to capture a slice of the market makes it highly competitive. However, Malaysian agriculture products have its own advantages, due to its high quality and standards. As for value for money, we have kept them competitively priced. Malaysia and India have concluded two key trade agreements, namely the Malaysia India Comprehensive Economic Cooperation Agreement (MICECA), as well as the ASEAN India Free Trade Agreement (AIFTA). Another multilateral pact known as the Regional Comprehensive Economic Partnership (RCEP) is in the pipeline. However, many importers have not availed themselves the incentives offered under these FTAs. Still, there are teething issues with some local authorities, which sometimes fail to understand the underlying principle of the agreements, which is to facilitate trade between Malaysia and India for the mutual benefit of both sides.

Which are the under explored areas and potential areas of trade and cooperation

with India for Malaysia?

India is an important trading partner for Malaysia. Three major export products from Malaysia are Electrical and Electronic Products, Palm Oil and Palm Oil based agriculture Products and Manufactures of Metal. Major import products from India to Malaysia are Petroleum Products, Metal, and Iron and Steel Products. Energy, oil & gas and its downstream sectors are potential areas that are under-explored. Malaysia's Petronas has been in India for more than 20 years and would like to expand their business here. At present, there are more Malaysian investments in India. We encourage Indian companies to explore the many opportunities available for Indian companies to invest in Malaysia. There are ample opportunities in sectors such as infrastructure development and services. Malaysia have also developed expertise in many areas, such as in construction and township development.

How do you view India as an investment destination in agriculture?

India has a huge agriculture sector, and offers many potential areas for modernization in production. Malaysia itself has moved into high-tech agriculture industry. Key agriculture sector remains an economic force. As such, Malaysia has built its own expertise in various agriculture-related fields, such as palm oil plantation, rubber, tropical fruits etc. Aquaculture is also Malaysia's forte. I believe that if both Malaysia and India are willing to explore further in these three areas, I am confident that Malaysia is more than ready to share its expertise within these fields, and would be able to invest not only in the traditional sense, but also provide value-added agriculture products to the Indian market. There are millions of industrious Indian farmers out there who will benefit from investment and systematic farming technology. However, the Indian Government should make it conducive for foreign investors to invest.

THE TOP THREE AGRICULTURE PRODUCTS THAT MALAYSIA SELLS TO INDIA ARE PALM OIL, COCOA AND CEREALS. IN FACT, INDIA IS OUR LARGEST MARKET FOR PALM OIL, ACCOUNTING FOR 11 PERCENT OF MALAYSIA'S ANNUAL PALM OIL PRODUCTION.

“Loan waivers would have been easy and convenient for us too. We could also have distributed ‘revari’ for political and election benefits, but we can’t commit such a sin. Loan waiver benefits only a select few”

NARENDRA MODI
Prime Minister



“It is our endeavour to increase India’s exports from the current \$321 billion to almost double in a few years. One of the principal potential areas for export is fisheries, especially at a time when for the first time, the country has come out with an agricultural policy”

SURESH PRABHU
Commerce and Industry Minister

“The Rs 500 a month to poor farmers under PM Kisan Samman Nidhi is an insult to the farmers. Farmers believe in their labour and want remunerative price of their produce but BJP mentality to give them little monetary help is atrocious and arrogant. BJP has failed to fulfil their promise”

MAYAWATI
BSP Chief



“Across the nations, the producer support for farmer’s are very high. The recent OECD study mentioned that the producers support in India is quite low. And this segment is the one which feeds 125 crore people and we have a population that is increasing at less than 1 % while food production is growing at greater than 3%”

K V SUBRAMANIAN
Chief Economic Adviser (CEA)