Volume 1 - No. 2 - November 2021

CMA
Agri Bulletin

AGRICULTURE TASK FORCE

THE INSTITUTE OF COST ACCOUNTANTS OF INDIA

Statutory Body under an Act of Parliament

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VISION STATEMENT

"The Institute of Cost Accountants of India would be the preferred source of resources and professionals for the financial leadership of enterprises globally."

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The Institute of Cost Accountants of India is a statutory body set up under an Act of Parliament in the year 1959. The Institute as a part of its obligation, regulates the profession of Cost and Management Accountancy, enrols students for its courses, provides coaching facilities to the students, organises professional development programmes for the members and undertakes research programmes in the field of Cost and Management Accountancy. The Institute pursues the vision of cost competitiveness, cost management, efficient use of resources and structured approach to cost accounting as the key drivers of the profession. In today's world, the profession of conventional accounting and auditing has taken a back seat and cost and management accountants are increasingly contributing toward the management of scarce resources and apply strategic decisions. This has opened up further scope and tremendous opportunities for cost accountants in India and abroad.

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THE INSTITUTE OF COST ACCOUNTANTS OF INDIA

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CMA P. Raju Iyer	Vice-President

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MESSAGE

CMA Biswarup Basu
President
The Institute of Cost Accountants of India

I delighted to note that the Agriculture Task Force of the Institute is bringing out 2nd edition of its Bulletin. Agriculture is the backbone of the economic system of our Country. In addition to providing food and raw material, agriculture also provides employment opportunities to a very large percentage of the population. Hon'ble Prime Minister Shri Narendra Modi has said that agriculture has a major role to contribute in Atmanirbhar Bharat Abhiyan and self-reliance in Agriculture targets at making farmers producer as well as entrepreneurs. We believe that the Government is on track to achieving the target of doubling farmers' income by 2024 and recent farm reforms announced amid the COVID-19 crisis, constitutes the continuous effort of the government towards liberalisation of the agriculture sector.

The 'Agriculture Task Force', under the Chairmanship of CMA P. Raju Iyer, Vice President of the Institute is working extensively in the terms of preparing concept papers on agricultural costing, awareness programmes and discussion sessions on pan-India basis to analyse the current situation and advising on the steps to be taken in order to achieve the objectives set by the Government for augmenting farmers' income.

I would like to acknowledge the sincere efforts of all the Members of Agriculture Task Force in the achievements of the Task Force. I also express my gratitude to our resource persons for their valuable inputs and contribution in this bulletin.

I wish Agriculture Task Force all the success in its initiatives.

With warm regards,

Biswarup Basu

CMA Biswarup Basu

MESSAGE

CMA P. Raju Iyer
Vice-President &
Chairman, Agriculture Task Force
The Institute of Cost Accountants of India

The Government of India has adopted several developmental schemes, reforms and policies that focus on doubling farmer's income. With a focus on enhancing farmers' income and creating an enabling environment that promotes farming, allied and off-farm activities as sustainable and productive livelihood options, the Institute has been arranging various discussion sessions, awareness programmes and webinars to augment the role of Indian farmers and also carrying out various research activities for enhancing farmer's income.

I wish to inform you that the Agriculture Task Force of the Institute observed and celebrated Agriculture month in the month of May 2021 by organizing various webinars and discussion sessions across the country.

The Agriculture Task Force had organized four National Webinars on very important topics, viz.

- Agri Financial Institutions facilitating Augmentation of Farmers' Income on 4th May 2021
- Rural Development and Augmenting Farmer's Income on 11th May 2021
- Academic Institutions Catalyzing the Augmentation of Farmers' Income on 18th May 2021
- Agriculture Cost Management on 25th and 26th May 2021.

I have the pleasure to inform that Shri Narendra Singh Tomar, Hon'ble Union Minister for Agriculture & Farmers Welfare, Rural Development, Panchayati Raj, Food Processing Industries, Government of India addressed as the Chief Guest in the National Webinar on "Agriculture Cost Management" held on 26th May 2021.

I am very much thankful to the entire team members of the Agriculture Task Force of the Institute and Institute officials for arranging the National Webinars in a grand way.

I also feel privileged to place before you the 2nd Edition of ***CMA Agri bulletin – November 2021 issue***. I would like to convey my sincere gratitude to the entire team members of Agriculture Task Force, Institute officials and to the resource persons for their valuable inputs and contributions in this bulletin.

With warm regards,

CMA P. Raju Iyer

EAST AND WEST – FARMER IS THE ALMIGHTY

CMA Dendukuri Zitendra Rao
B.Com.,FCMA,FCA, DIISAC
Member – Agriculture Task Force, The Institute of Cost Accountants of India
Member - SIRC of the Institute of Cost Accountants of India (2015-2019)
Practicing Cost and Management Accountant

CMA N Krishnan
Practicing Cost Accountants
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Introduction

It is a fact that the welfare of farmer is talked with more volumes than what we witnessed over the last 3 to 4 decades. There were Loan waiver calls which are apparently a political slogan. The Indian farmer is exposed to varied dimensions of interferences that most of the times enables the farmer to absorb all shocks. The dimensions can be can be put in an abbreviated form as **YIELD**. Y stands for Yield; I stands for Inputs; E stands for Environ; L stands for Listed Prices and D stands for Declarations by Government. If a term VUCA is to be coined – everyone would get connected to the situations of Volatility, Uncertainty, Complexity and Ambiguity that the Industry is exposed to. It is a fact that YIELD should be also digested by all in the same spirit when it comes to agriculture. After all every human being is digesting whatever the Anna Daatha is producing. Whether it is East or West – the policies and approach of the governments seem to be well aware of these aspects and putting their best efforts to protect the precious specie called FARMER. India being biggest democratic country representing East and US being the big lead player in terms of governance representing West are taken for a study and the approaches are discussed herein.

Point wise analysis

Guest is First. So let us glance at the policy related aspects of United States. A policy document viz., **The Agriculture Improvement Act of 2018**was enacted in December 2018 which is said to expiring in 2023 which means that the government is positioning itself to have a relook at its policies periodically . In fact the cited enactment has been succeeding Agricultural Act of 2014. Broadly the initiatives can be understood under 12 titles with various programs in each title. Taking a cue from that an attempt is made to present what is been also endeavored in India. After explaining the perspective of US – the Indian approach under the same broad head is discussed.

1. **Commodities:** Aims at Providing farm payments when crop prices or revenues decline for major commodity crops viz., wheat, corn, soybeans, peanuts, and rice; Includes disaster programs to help livestock and tree fruit producers manage production losses due to natural disasters; Other support includes margin coverage program for dairy and import barriers for sugar. In **India** the Commission for agricultural costs and Pricing is trying to address the pricing aspects on selected 23 products which essentially include Wheat and Paddy. Prestigious schemes like RythuBandhu and RythuBharosa and PradhaanManthriKisaan Samman Nidhi providing direct cash support to the farmer to augment the farm expenses is been implemented for the last 3 years.

2. **Conservation:** Provides assistance to agricultural producers in addressing environmental resource concerns on private land through land retirement, conservation easements, working lands assistance, and partnership opportunities. Due to the typical socio and economic conditions and the low land holding by individuals –

perhaps in **India** these aspects are left to the local people by providing some focused research studies at designated agri research centers by the government.

3. **Trade:** Supports U.S. agricultural export programs and international food assistance programs. Major programs include those that support agricultural trade promotion and facilitation and international food aid. Other provisions address program changes related to World Trade Organization obligations. Coming to **India** the recent The Farmers (Empowerment and Protection) Agreement of Price Assurance and Farm Services Act, 2020 is intended to ensure these objectives in a more transparent manner. However – the farming community expressed certain apprehensions and are agitating

4. **Nutrition:** Provides nutrition assistance for low-income households through programs including the Supplemental Nutrition Assistance Program and The Emergency Food Assistance Program. This point requires detailed analysis of what the US is intending for. Coming to **India** probably the farmer welfare mechanism does not have any such programme. It is a common programme for the public at large including the farmer community as well.
5. **Credit:** Offers direct government loans to farmers/ranchers and guarantees on private lenders' loans. Eligibility rules and policies prioritize and increase assistance for beginning and socially disadvantaged farmers. In **India** the District Level Monitoring committees ensures to have the crop loans be available to the farmers at an appropriate time. Scheduled Banks have been advised to participate to support the farmer for the nation's cause. At times the loan waivers are also announced by the both the state and central governments.

6. **Rural Development:** Supports rural business and community development programs. Establishes planning, feasibility assessments, and coordination with other local, state, and federal programs. Programs include grants and loans for infrastructure, economic development, broadband, and telecommunications. In India novel schemes are been taken up on this front by both State and Central Governments. For Example: Rythu Vedika (Point of rendezvous) is been planned in all the villages. The local farmers are encouraged to offer required land for this purpose – so that the building can be named after the fore fathers of the Donee Farmer. **RythuBharosaKendras** (RBK) a village level set up is equipped with 'Digital Kiosks for the Farmers'. Many such initiatives are on ground.

*Photo of Rythu Vedika at the Native Village (near popular temple town Bhadrachalam) of one of the writer of this article

7. **Research, Extension, and Related Matters:** Supports a wide range of agricultural research and extension programs that expand academic knowledge about agriculture and food and help farmers and ranchers become more efficient, innovative, and productive. In **India** each of the clusters is supported by the

officers of agricultural department to guide the farmers on the yield aspects . But the extensive research is happening more as a staff function and at times by the Input sector – the corporate bodies supplying Seeds and Fertilizers etc..

8. **Forestry:** Supports the management of public and private forest land through research, financial and technical assistance, and policy amendments.In **India** – this is taken as a parallel activity and the concern for greenery by both state and Central Governments are yielding good results if not significant.,

9. **Energy:** Encourages the development of farm and community renewable energy systems through grants, loan guarantees, and feedstock procurement initiatives. Provisions cover the production, marketing, and processing of biofuels and biofuel feedstocks, and research, education, and demonstration programs. In **India** – solar based pump sets are encouraged with substantial subsidies towards capital equipment.

10. **Horticulture:** Supports specialty crops, including fruits, vegetables, tree nuts, and nursery products, through market promotion, plant pest and disease prevention, and research. Provides assistance to support certified organic agricultural production and locally produced foods, and authorizes a regulatory framework for the cultivation of hemp. In **India** with the small Farm holders occupying the substantial portion of the Farmers – the conventional crops are being practiced. Horticultural crops are proving to be cash guzzlers and the support seem to be not to the required extent.

11. **Crop Insurance:** Amends the permanently authorized federal crop insurance program that offers subsidized policies to farmers to protect against losses in yield, crop revenue, or whole farm revenue. In **India** – since the agriculture is the baby of state government predominantly – the approach needs to be standardized. With different agro climatic zones giving varied crop yields and as well losses – there is a practical issue in this regard.

12. **Miscellaneous:** Covers other programs and assistance, including livestock and poultry disease preparedness and animal health. Includes programs for beginning farmers and ranchers and limited-resource and socially disadvantaged farmers. In India the livestock development has taken a back seat with mechanization of agricultural activities. Only the dairy aspect is being taken care – thanks to the white revolution initiated at Anand of Gujarat. The culture needs to be reinvented – by certain innovative ways and means to have the live stock and to have them be productive too.

In Conclusion…

Finally…when the approaches of the governments at both US and India appear to be concerned at the welfare of the farmer. The policy initiatives are highly commendable. There are limitations and fall outs of these initiatives at times may end in unexpected events. Still it is really commendable the thought process goes on and on….. "Anna Daatha .. Sukhibhava…"

SUPPLY-CHAIN LOGISTICS FOR AGRICULTURAL REVIVAL

Dr. K G Karmakar
Professor, SPJIMR (2011-2017) and
Former MD, NABARD (2006-2011)

Introduction:

The rural economy is buzzing with activity, business is diversifying, the rural services growand the organised retail business can be the real game changer for the rural sector, enabling farmers to secure better margins for the back-breaking labour put in by them, year after year. With the entry of FDI in retail marketing, farmers have revived hopes of better financial returns at last. Organised retail business is broadly classified as under:

1) Food + Groceries	(54%)
2) Consumer Durables	(7%)
3) Apparel	(7%)
4) Pharmaceuticals	(2%)
5) Others	(30%)

[Ernst& Young Report, 2007]

Food is big business and the organised retail chain can provide the required thrust to the entire food sector. India is a major food producer due to congenial environmental conditions, both climatic and weather and social conditions. But because of a huge domestic market, the export market has been sadly neglected and an opportunity lost for export of cereals and spices and perishables like fruits and vegetables. Countries like Thailand, Costa Rica, Philippines,and Viet Nam which have organised their production systems to meet requirements of export markets, have invested in meeting supply chain gaps and in building appropriate infrastructure. India looses more than Rs. 58,000 crore worth of agricultural food items every year due to poor infrastructure and operational inefficiency, poor quality of products short shelf-life, poor warehousing systems, lack of pre-cooling chambers and cold storages, refrigerated / reefer vans for transportation, improper packaging and distribution systems, low quality air- conditioning technology, etc.

The reasons for post-harvest losses for perishables, is the lack of a temperature – controlled supply chain so as to maintain desired quality, safety and taste. Cold chains are able to adopt technical measures in the process of collection, procuring, packaging, storage, transportation and sales, cut down the spoilage in quality of goods and maintain product quality. There is a large gap in infrastructure for rural areas as regards roads and bridges, enabling market connections, electricity (constant supply load factor) for cold storages and processing units, warehouse, all of which would boost the rural economy immensely. The entire focus has remained on pre-harvest practices in a bid to boost production but post-harvest technologies and rural infrastructure did not get requisite attention and hence the continued wastage of agricultural produce and lack of quality produce for domestic markets. About 20% of fruits and vegetables grown in India (40 million tonnes costing US $13 billion) are wasted annually due to gaps in the logistics chain, outlined earlier. This results in instability in prices and farmers not getting remunerative prices, rural impoverishment, resulting in farmers frustrations in not getting better margins and also suicides, when there is no way out.

Warehouse Logistics and Smallholder Farmer Margins

The smallholder farmer in India suffers from many disadvantages but among the major disadvantages are lack of appropriate infrastructure, poor credit flows and poor marketing facilities. With 60% of the farmers dependent on monsoons for irrigation, farming is very risk-prone and the lack of a proper supply chain adds to the marketing risks of the farmers. 80% of the farmers' risks are at the production stages and hence the entire focus of research is on pre-harvest technologies to boost production levels, ignoring the poor infrastructure, post-harvest technologies and poor supply chain logistics. India is the 2nd largest producer of fruits/vegetables but annually 19% of the produce is lost due to supply chain gaps. Continued wastage due to inappropriate packing and handling and lack of quality processing leads to lower prices, impoverishment and even suicides. Lack of cold storage chains and warehousing facilities, urgent need for electricity with constant supply load factor, modern warehouses, market connectivity and limited agri-processing facilities ensure that smallholder farmers (82% of farmers with landholdings less than 5 acres) are not able to leverage on existing agricultural subsidies like subsidized diesel/ electricity, fertilizers, water and cheap credit which are wasted.

Need for Improved/ Quality Logistics and Warehouses

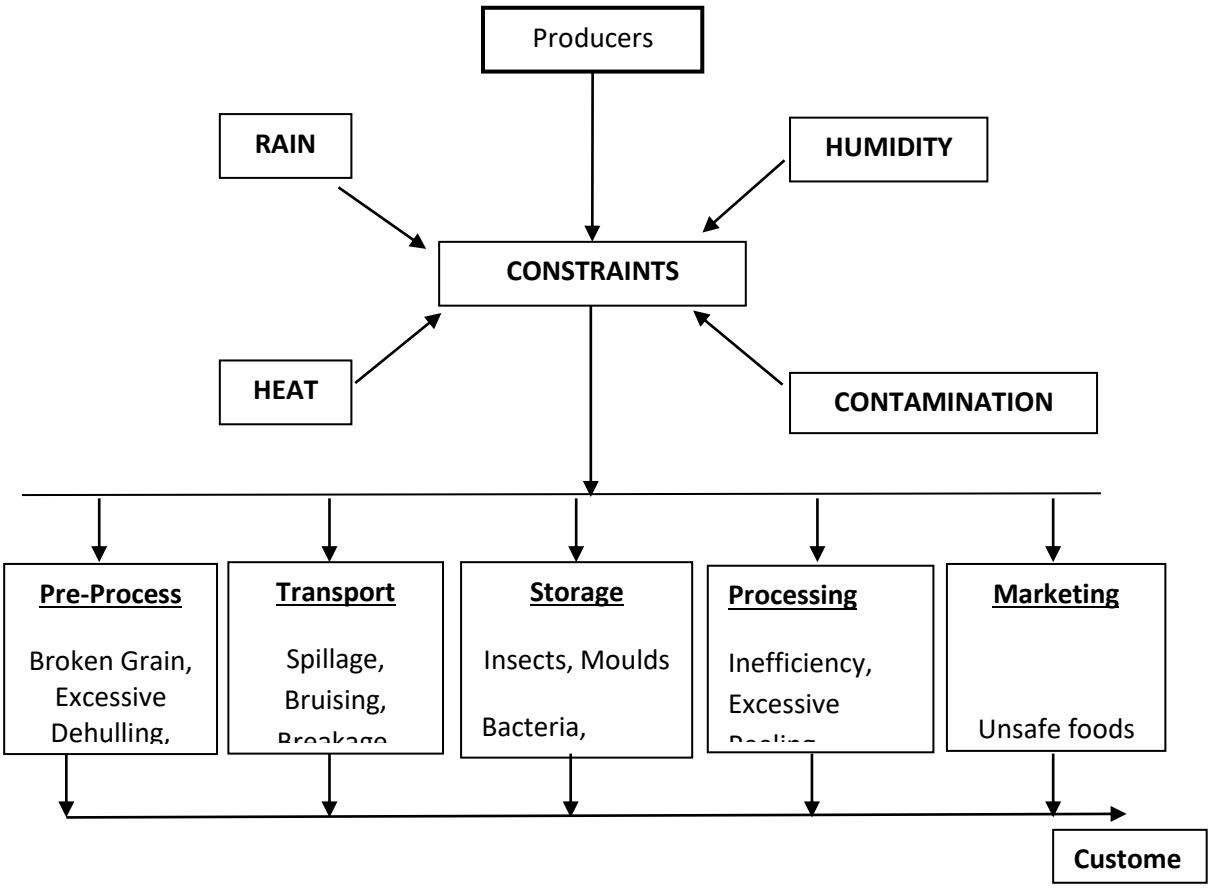
54% of all retail trade is for food/groceries and the rising food prices in onion, vegetables, etc. have highlighted the vulnerability of the consumers to organized profiteering depending upon temporary shortages. The entry of FDI in retail marketing revives farmer hopes to meet domestic market needs and improve export trade volumes. Countries like Thailand, Costa Rica, Vietnam, Philippines, Malaysia, Kenya, and Sri Lanka have organized production supply chains for exports and are able to ensure cost efficient supplies. Our farmers are not organized and post-harvest losses are estimated at Rs. 58,000 crore annually due to poor infrastructure, inefficiency, short shelf-life of produce, lack of pro-cooling chambers, warehouses and cold storages , reefer vans, zero-energy chambers, poor transportation and handling, lack of market access, road/bridges, modem air-conditioning technology .New service providers, technology upgrades, innovative processes are needed to improve market logistics and our logistics cost at 23% are very high and should be brought down to 13% if our agricultural produce is to remain competitive in various domestic and export markets.

Logistics cost are high due to inefficiencies, low truck speeds, high turnaround times, supply chain gaps and continued wastages at different stages of the food supply chain. To reduce wastage, an in–depth analysis of all factors responsible, needs to be undertaken of the pre-processing stages such as transportation, storage, processing and marketing, technology, etc. The reason for post-harvest losses for perishables is the lack of a temperature-controlled supply chain so as to maintain desired quality, safety and taste. Cold chains are able to adopt technical measures in the process of collection, procuring, packaging, storage, transportation and sales, cut down the spoilage in quality of goods and maintain product quality. There is a large gap in infrastructure for rural areas as regards roads and bridges, enabling market connections, electricity (constant supply load factor) for cold storages and processing units, warehouse, all of which would boost the rural economy immensely.

The entire focus has remained on pre-harvest practices in a bid to boost production but post-harvest technologies and rural infrastructure did not get requisite attention and hence the continued wastage of agricultural produce and lack of quality produce for domestic markets. About 20% of fruits and vegetables grown in India (40 million tonnes costing US $13 billion) are wasted annually due to gaps in the logistics chain, outlined earlier. This results in instability in prices farmers not getting remunerative prices, rural impoverishment, resulting in farmers' frustrations in not getting better margins and also suicides, when there is no way out.

The Logistics Industry

Logistics is the interplay of infrastructure, technology, and new types of service providers and defines how the industry will help its customer reduce logistic costs, inventory holding costs, transportation, warehousing, packaging, losses and administrative costs which have been estimated at 13-14% of GDP which exceeds that in USA (8%) and China (21%). This is due to higher level of inefficiency in the system, lesser truck speeds and high turnaround times at ports and delays. The problems of the cold storage sector, the warehousing sector and the packaging and distribution networks, deserve to be studied in-depth. We need to study the wastages in different stages of the food chain and try to reduce waste.The major constraint is quality warehouses and this deserves a detailed study. MANAGE, Hyderabad had done a detailed assessment of the warehouse storage gap (between requirements and availability) as existing and also of projections up to 2014-15, of all major commodities such as rice, wheat, jowar, bajra, maize, other coarse cereals, tur, gram, other pulses, nine major oilseeds, tobacco, areca nut, cashew nut, twenty-two varieties of spices, and the major supply gaps for these major traded commodities in the country are set out below, as under:



Year	Storage Req.	Availability	Gap in lakh MT
2007-08	1075.8	653.6	422.1
2008-09	1119.0	677.5	441.5
2009-10	1155.5	693.4	462.1
2010-11	1204.1	725.0	479.1
2011-12	1198.0	761.0	437.0
2012-13	1228.0	802.0	426.0
2013-14	1240.9	848.6	392.3
2014-15	1217.6	901.6	316.0

WAREHOUSE REQUIREMENTS

Issues, which need to be addressed as regards the lack of adequate warehousing facilities, are:

a) Creating adequate warehousing capacity in the country urgently
b) Creating a legal/policy framework, which facilitates availability of institutional credit to farmers and giving them more choices in selling their produce and thereby empowers them?

For creating adequate warehousing capacity in the country, there are several schemes of the GoI, which rely mainly on providing financial incentives for the entrepreneurs. As regards the issue of creating a legal/policy framework, the Warehousing Act, was passed by Parliament in 2007, has been made effective from 25 October 2010. A Warehousing Development and Regulatory Authority was also established with effect from 26 October 2010.

Need for licensed warehousing

- Farmers in India realise just about 30 to 35% of the value of their produce vis-à-vis 65 to 70% in the developed economies.

- Therefore, need was felt to establish a negotiable warehouse receipt system for all commodities including agricultural commodities.
- On the one hand it will make warehouse receipts a prime tool of trade and facilitate finance against it throughout the country, thus helping the farming community and
- On the other hand, it will allow banks to improve the quality of their lending portfolio in respect of goods deposited in the warehouses.

Existing Warehouse receipt system

Warehouse receipt is a document of title to goods as per the Sale of Goods Act, 1930

The warehousing receipt at present does not enjoy the fiduciary trust of depositors and banks as there is fear of not being able to recover the loans in events such as fraud or mismanagement on behalf of the warehouse or insolvency of depositor. The available legal remedies are also time consuming and inadequate. Further, the format of warehouse receipt used in the country is not uniform. Thus, there are impediments in the negotiability of warehouse receipts creating difficulties for farmers.

Objectives and Expected Benefits

The 2007 Act facilitates availability of institutional credit and gives farmers choices in selling their produce and thereby empowers them by setting up a National Warehousing Authority for:

a) Setting standards for construction of warehouses
b) Accreditation of Warehouses/Conferring negotiability characteristics for warehouse receipts

Any warehouse, either in the public or private sector, which adheres to the technical standards set by the Authority, would be eligible for accreditation. The warehousing receipts issued by any accredited warehouse would be treated as negotiable instruments and therefore can be negotiated by endorsement and delivery. This would mean that a farmer in Maharashtra can sell his warehouse receipt in Tamil Nadu or any other State for that matter, by endorsing and delivery and obtain the value towards the goods stored in the warehouse. Another option available to him would be to take these receipts to any bank and obtain loans. Thus the farmer is now empowered because as against the only choice available to him earlier (of going to the Mandi and selling his produce at the rates offered), he now has many choices like availing loan from banks against the hypothecation of his Warehousing receipt, selling his produce in other parts of the country without actually taking it there. Further, the introduction of a negotiable warehouse receipt would increase liquidity in rural areas and would give a safety net to farmers against distress sales. Though the minimum support price operations take care of a number of crops, the ability of the farmer to keep his surplus goods in scientific warehouses and obtain institutional credit on the basis of such receipts, has been hampered due to absence of an appropriate legislation which enables the same.

Impact on Agri Business

The Act will have following impact on Agri Business:

a) Customers would be encouraged to store their produce in registered warehouses.
b) Grading and quality standards of agricultural commodities will be encouraged.
c) Better return of their produce will be assured.
d) There will be demand for scientific warehouses in rural areas.
e) Reduction in storage losses
f) Safeguard against cheating in weight and quality
g) Trading on warehouse receipts shortens the market chain, increasing the farmers' margins.
h) Increased confidence due to well laid accountability

Some of the other benefits are:

1) **Benefits to lenders**

a) Reduced risk
b) Reduced cost of lending
c) No service location limitations
d) Assurance of quality and quantity to ease the funding process

e) Easy disposal of goods

2) **Benefits to traders**

a) Access to markets
b) Low transaction cost
c) Higher profits
d) No extra cost involved in logistics warehousing and handling
e) No extra cost involved in risk perception

3) **Benefits to Government**

a) Assured quality and quantity of buffer stock
b) Reduced procurement and distribution costs
c) Efficient operations
d) To carry less inventories of the agricultural produce

4) **Facilitation for Food Security**

a) Good infrastructural warehousing facility
b) Appropriate legal mechanism like warehouse receipt
c) Provision of marketing platform
d) Efficient linkages between producers and market

Challenges

There is a need to create awareness about the scheme among farmers, Govt. officials, traders and Banks. A time bound awareness creation program is required to educate the farmers about the advantages of the scheme. The accreditation of the vast warehousing network by the authority within a short time is a major challenge. Once the system stabilises, the credit requirement against the pledge of warehouse receipts is likely to increase substantially. The controlling offices of the Banks will have to ensure that the guidelines for financing against warehouse receipts reach the Branch Managers and they are able to sanction the loans without delay. As per the information available APMC Act has been amended in 25 states. The remaining states have to take urgent steps to amend the APMC Acts.

Credit Requirements

With the passing of the Act and establishment of the Authority, it is expected that there would be substantial credit requirement against warehouse receipts. Considering the ground level credit flow for crop loans, it is estimated that the additional credit requirements against receipts may reach a level of Rs.5000 crore over a period of time. NABARD may have to earmark short-term credit requirement against warehouse receipts as Cooperative Banks and RRBs may seek additional the credit limits from NABARD for their lending operations.

Ongoing Schemes of GoI for creating storage space

Currently, there are four schemes of GoI under which subsidy/concessions are available for construction of Godowns. Essential details of these schemes are as under:-

a) CISS for Rural Godowns - MoA Scheme implemented through banks and NABARD.

The scheme has been in operation since 2001-02. Under the scheme, 15% back ended capital subsidy for individuals and corporates, 25% for general candidates and 33.33% for special categories (SC/ST, NE and hilly regions) is available. Upper limit for subsidy is Rs.62.50 lakh. As on November 2010, an amount of Rs.633 crore has been disbursed as subsidy through NABARD for construction of 18847 rural Godowns helping in capacity creation of about 2.35 crore MTs. Loan disbursed to the entrepreneurs for the purpose is of the order of Rs.2756 crore.

b) CISS for Rural Godowns-MoA Scheme implemented through NCDC

The scheme is primarily meant for Cooperative Societies. The quantum of subsidy under this scheme is same as in case of the scheme mentioned at 2 (b) above. Capacity created under the scheme is of the order of 1.49 crore MTs.

c) Construction of Rural Godowns under FCI (Ministry of Food and Civil Supplies)

The scheme provides for assured rentals of the godowns constructed by private parties for 10 years. Another benefit available under the scheme is the rebate on investments made in the construction of the godowns under section 35 AD of the IT Act. In its current form the scheme has been launched recently and is likely to help in augmenting the existing capacity of FCI. The scheme is not credit linked.

d) Construction of Rural Godowns under Agri Marketing Infrastructure Scheme of (MoA)

The scheme is in operation since October 2004. Under the scheme many activities which help in creation of marketing infrastructure can be taken up. Construction of Rural Godowns is also one of the eligible activities. Under the scheme 25% back ended capital subsidy is available for general candidates and 33.33% for special categories. Upper limit for subsidy-Rs.50.00 lakh. Separate data on the number of godowns constructed / to be constructed under the scheme, is not readily available.

e) Support to Farmers' Clubs, Federation of Farmers' Clubs, Joint Liability Groups, NGOs for setting up of small Rural Godowns

Presently there are about 54800 Farmers clubs functioning in the country. These clubs have been formed by banks/NGOs, under the scheme formulated by NABARD. Many of the clubs are undertaking processing/marketing activities of agricultural produce in rural areas. In many districts, the Farmers' Clubs are also formed into Federations. The scheme of Joint Liability group of Farmers, which was launched by NABARD a few years back, has also ensured that banks make credit available to families engaged in agricultural activities without insisting for collaterals. It is expected that by March 2011, there will be about 1 lakh JLGs in the country.

A scheme for construction of Rural Godowns-specially for Farmers' Clubs, Federation of Farmers' Clubs, JLGS, and NGOs, is likely to benefit a large number of small and marginal farmers in the country. Salient features of the scheme could be as under:-

- Small Rural Godowns of size 100 MT to 2000 MT will be eligible.
- The scheme will be credit linked.
- Back ended capital subsidy @ of 50% of TFO will be provided uniformly.
- Margin money required will be limited to 5%
- Bank Loan to be repaid in 9 years with a moratorium of up to 2 years.
- Apart from storing produce, custom hiring and tie up SWC/FCI etc. will be allowed.
- For units, which are regular in repayment, managerial subsidy would be made available every year for initial 5 years, which will be adjusted in the loan installments.
- NABARD will be the nodal agency for the implementation of the scheme
- 2000 small Rural Godowns to be constructed during 2011-12.

Assuming an average size of 500 MT, the requirement of subsidy at the rate of 50% for proposed 2000 godowns @ of 3000/- per MT would be Rs. 150 crore and an amount of approximately Rs.15 crore per year shall be required for providing managerial subsidy. Thus about Rs.165 crore will be the fund requirement for the proposed scheme.

f) Creation of a Separate Fund for Refinance Assistance to Banks

Under the CSS for Rural Godown about Rs.2800 crore have been provided for 18847 schemes since inception of the scheme. The details of loans provided for rural godown under AMI Scheme and loans availed by cooperative institutions under NCDC scheme are not available. Discussion with banks and also prevailing PLR indicates that the loans for godowns generally carry interest ranging from 12% to 15%. Even with the subsidy, the rural godowns function with narrow margins. In order to encourage credit flow for this important sector and also ensure to viability of the scheme, there is a need to make credit available at interest rate not above 10%. At the prevailing cost of funds and PLR, banks will not be in a position to lend at low rates. It is, therefore, proposed that a dedicated fund may be set up in NABARD for providing 100% refinance to banks at 5% interest rate. Banks could lend to all eligible beneficiaries under the above schemes at 9%. Funds for on lending by NABARD may be made available by Government of India out of budgetary sources. Alternatively, NABARD may be allowed to access funds from market and the difference between the actual cost of funds and 5% may be

reimbursed by Govt. of India out of budgetary sources. It is estimated for the year 2011-12, the actual credit requirement may be of the order of about Rs. 250 crore.

It is proposed that under the recently launched scheme of FCI also, there would be substantial credit requirement although the scheme is not credit linked one. Though data on the likely credit requirement under the scheme is not assessed, it is estimated that funds of the order of about Rs.250 crore may be required for this purpose in the initial year.

g) Introducing Special Project for Financing Warehousing Infrastructure in Partnership with the Food Corporation of India (FCI) and State Warehousing Corporations

Inadequate storage infrastructure for food grains and the resultant losses have been a major concern in recent years. As a part of its strategy to support the efforts of the GoI to ensure food security in the country, NABARD proposes to support incremental storage facility for food grains across the country through a program for institutional partnership with the FCI and good working State Warehousing Corporations.

Under the present Private Entrepreneur Guarantee (PEG) Scheme 2008, FCI specifies standards of construction and capacity requirements for warehouse construction by private entrepreneurs. This scheme has recently been extended to state warehousing corporations. Maintenance regulations are also stipulated. In turn, FCI guaranteed state corporations rent for a period of nine years for new warehouses at a predefined rate, if its standards are met. This scheme is meant to improve the viability and spur additional infrastructure development. The State Warehousing Corporations are required to access funds independently for setting up the storage facility, which could be repaid from the assured rent from the FCI for the storage facility offered for 9 years.

A typical project under this scheme was analysed in detail by NABARD, to establish its bankability. It was found that it was possible to enhance the effectiveness of the FCI scheme by providing long-term finance with cost-effective funding support. It was also seen that State Warehousing Corporations found it difficult to access commercial funds due to viability issues arising out of high cost of debt. Keeping this in view, the following scheme is proposed in this in view, the following scheme is proposed in this regard:

1) Long term Loan: NABARD will provide long-term assistance of 10 to 15 years tenure, to good working eligible State Corporations for warehouse construction for warehouse construction under the FCI scheme.

2) Source of Funds: NABARD may be given access to cost effective funding sources from the market for the year 2011-12 (April-March) in any or all of the following ways put together to the extent of Rs. 10,000 crore, for supporting State Government and other agencies, which set up rural infrastructure with government participation and permission (including the present proposal to partner with the FCI for warehouse development):

a) NABARD may be designated as the national level agency to access funds from long-term debt markets through issuance of Capital Gains Bonds (CGB).

b) A dedicated fund or assisting rural infrastructure may be set up in NABARD for Rs. 10,000 crore, with the financial resources augmented annually by the pension and insurance funds as per the statutory requirements

c) NABARD may be permitted to raise funds to the extent of Rs. 10,000 crore from the bonds market through infrastructure bonds, which carry a GoI guarantee, for which a normal guarantee fee of 25 bps may be levied, as in the case of IIFCL.

3) Sustainability of Investment: The interest rate structure, moratorium for repayment, tenure of loan and repayment schedule, etc. will be structured suitably by NABARD to ensure timely and effective setting up of the warehousing infrastructure. Ensuring long-term sustainability of the investment also will be kept in view.

4) Eligible SWCs: Loans will be sanctioned only to those state warehousing corporations requiring financial assistance, which have strong financial condition with a track record f execution f works and delivery of services to the satisfaction of FCI and other agencies concerned. Contract terms between NABARD and the State Corporation will ensure adequate risk mitigation, and will be done in consultation with the concerned state government.

5) Rent payments by FCI: The rent payments for the storage infrastructure created, as per scheme, will be paid by the FCI to NABARD, on behalf of the warehousing corporation financed by NABARD. Any gap between rent amounts and loan payments due will be covered by the State Corporation through escrow accounts and/or state government guarantees r any other suitable arrangements.

Conclusion

Thus, demand for rural infrastructure is huge, requiring at least Rs. 4,35,349 crore during the11th Five Year Plan period. Even after taking into account the likely funds made available under Bharat Nirman and RIDF during the 11th Plan period, there still exists a gap of Rs. 2,00,000 crore. The estimated investment in infrastructure projects during the 12th Five Year Plan is around Rs.45 lakh crore and assuming the same share of rural infrastructure as in the 11th Five Year Plan, Rs. 15 lakh crore is needed. The annual requirement works out to Rs.3 lakh crore. This will be a challenge that planners and financial institutions have to meet comprehensively.

Another worrying factor is that there is a critical shortage of warehouses to store surplus food grain, As per national requirements, the surplus food grain stock should ideally be 35 MT, but due to underemployment and unemployment in rural areas, mass poverty persists and is responsible for reduced demand for food even when economic growth was high (2003-2008). The food grain stock with FCI is very high at 71.75 MT and is 27% higher than stock levels of 56.3MT in 2010-11. Another important factor is that states like M.P, Chattisgarh and Odisha have decided to purchase all food grain produced by their farmers and being non-traditional surplus states, do not have adequate warehouse space to store grain! The tremendous wastage of grains year after year, is unbelievable in a country where millions of poor people are malnourished or starving. Many more warehouses are urgently needed as a huge portion of the food grain stored in the open, rots and is unfit even for animal consumption.

In view of the limited resources available and other committed priorities, the Central/State Governments alone cannot bridge the gigantic gap in rural infrastructure and the role of the private sector becomes more critical and important in narrowing this gap, given the leverage of resources and its implanting capacity. To quote the Prime Minister “it is imperative that we explore avenues for increasing investment in infrastructure through a combination of public investment, public private partnership and occasionally, exclusive private investments wherever possible.” The set of reforms and strategic actions suggested will help in further strengthening development of infrastructure for Rural India, creating new opportunities for maintaining the growth tempo and more rural livelihoods. Thousands of small farmer godowns need to be constructed and liberal credit facilities sanctioned for storing food grain, to benefit small/ marginal farmers, without hampering the interests of Banks as 80% risks are at the production stage only.

AGRICULTURAL REVIVAL IN INDIA: INNOVATIVE TECHNOLOGIES AND APPROACHES

Introduction

Over a billion people belong to the "below poverty levels" as defined by the income criteria of US$1 per day and if adjusted for inflation at US$2 per day, many more people will be included. Asia including India and China has about 50% of the world's poor people and child malnourishment and severe hunger levels. Especially in the rural areas, starvation and poverty alleviation needs to be urgently tackled. In early 2008, food riots broke out in many developing countries in South America, Africa, etc., primarily due to the high oil prices at US$156 per barrel. As oil prices inch towards US$115 per barrel, food security issues will recur due to (i) abysmal productivity especially in food crops, (ii) poor quality rural infrastructure especially in rural connectivity, cold storages, godowns, electricity, etc. (iii) impact of climate change and (iv) population growth and urban migration.

While the growth of biotechnology in the pharmaceutical industry has been phenomenal, its use has been rather limited in the agriculture sector. The major challenges for people in rural India are (i) food security, (ii) financial inclusion and (iii) poverty alleviation. Use of Agro-biotechnology has the potential to address all these rural challenges effectively by promoting appropriate technology to ensure better productivity and production, bettering income margins and profit of so as to enable financial inclusion and also ensure poverty alleviation, eventually. In line with the country's mandate to promote integral rural development, the challenges are (i) maintaining volume and flow of rural credit for small and marginal farmers and rural artisans, (ii) improving the financial margins of rural people through technology introduction, institutional development and appropriate training, (iii) creating appropriate rural infrastructure, support mechanism like farmers clubs and joint liability group, SHGs etc., and (iv) planning for equitable rural growth and promoting rural employment and food security especially in underdeveloped areas.

China's Agricultural Success

Today, China's economic success especially in the industrial and small scale industries sector is well known. What is not equally well known is its agricultural productivity in all-major crops, which is 2 times to 3 times that of India's. And this was possible due to extensive use of agro-biotechnology. In 1978, when China decided upon its reforms program, it decided to strengthen its agricultural production base and policy interventions were taken as under:

1) Abolished farm collectives and permitted small land-holder agricultural policy, to ensure crop productivity
2) Used biotech – led initiatives supported by massive World Bank technology aid programs such as SPARK, FLAME and TORCH in the later 1980's which were great successes.

Today the bigger and better organized Chinese farms are able to produce and sell hybrid / improved seeds to small-holder farmers reflecting the spread of agro-biotechnology on commercial lines.

India's Agriculture Hopes

Despite the decline of agriculture's contribution to GDP to only 18% from 60%, over the last 50 years, 67% of the population is dependent on agriculture for livelihood. Indian agriculture is beset with technological fatigue and production stagnation, threatening the country's food security. Unless the productivity of small fragmented, largely rain-fed land holdings of about 120 million Indian farm families is increased, inclusive growth may not be feasible and sustainable for food security to feed the ever growing present and future generations. There are three major areas for improvement before Agriculture in India can really contribute to food security, financial Inclusion and poverty alleviation. The first major initiative is in agriculture biotechnology and enhanced investments in bio-technological interventions hold the key to improving productivity and enhance food production, besides ushering in the 2nd Green or Evergreen Revolution. The second major initiative is to concentrate on innovative technologies which are not dependent on the technologies of the 1940's and improve upon the technologies which ushered in the Green Revolution and which are not cost-effective today for small-

holder farmers. Finally, the major challenge is to bring in commercially-viable farming and ensure bank credit and weather-based crop insurance for our farmers and ensure better financial margins for them and not for traders who prey on them.

The basic problems of improving the net incomes of smallholder farmers, ensuring adequate credit flow for crop loans and weather-based crop insurance facilities, better market access and communications, modern market facilities which benefit the farmer more than the trader, are all absent and ignored. De-risking of the small-holder farmers and why scientific breeding of indigenous cattle and other domesticated animals along with fish-farming to boost farm incomes, have not been actively implemented, are all major mysteries. The use of ICT to inform and aid farmers, use of mobiles to provide better knowledge about Government schemes relating to improved technologies, prices, weather and marketing information, quality inputs at reasonable prices, better use of KVKs and ATMAs, are all quietly ignored.

The question of climate changes, protection of bio-diversity and improving the financial margins of farmers has not been adequately covered. The rampant availability of fake seeds, fertilizers and pesticides, lack of innovations in farming practices, lack of farmer education facilities and training, lead one to question the role played by the State Agriculture Departments and their role in the Agrarian Distress scenario. Farm extension services have been given a quiet burial and handed over to the "pirate" (or is it the private?) sector. NABARD and the entire banking sector seem to have abandoned the formation of Farmers Cubs and Farmers Associations which could act as 'aggregators' and 'segregators' as per quality standards and norms, as cooperatives have largely failed.

However, it appears that Joint Liability Groups have proliferated and this could help the Tenant Farmers and Oral Lessees. Somehow vested Interests have created an impression that the farmer in India is a 'beggar' who needs loan write-offs, free electricity, subsidised credit and fertilisers, other inputs, etc. Farmers are not looking for free hand-outs but they expect the state to support them and stop freebooters and carpet-baggers from plundering them. On the frail shoulders of the Indian farmer, rest India's hopes for a sustained economic revival. A delayed or poor monsoon and the distress of the farmers is all too evident with a bonfire of hopes, some suicides and a horde of farmers abandoning their farms for an uncertain future in the city slums. Growth today is restricted to the services (tertiary) sector and is either falling or stagnant (in the agricultural/industrial sectors). With rising oil prices (which shoot up the prices of nitrogenous fertilizers and diesel-oil etc.), the input costs of farmers has risen threefold within a decade.

Water has been very important as 60% of our farms are rain-fed and continue to be risk-prone for Farmers. Despite spending massive sums on Dams and other minor/micro irrigation structures, especially after 1947, only 44% of our farms are irrigated. With global warming and climate changes, water is a major problem and a single bad monsoon can finish off our economic growth for years. The widespread use of SRI techniques for paddy cultivation developed by a Jesuit priest Henri de Laulanie in Madagascar and popularised by Dr. Norman Uphoff of Cornell University, USA has now over 5 million farmers who use this technique world-wide. Benefits include lower costs, better soil health and the ability to withstand pests and diseases and climatic pressures. Even though introduced in Tamil Nadu in 2000 and also widely used by innovative farmers in A.P and Tripura, due to pressure from agronomists and rice-breeders, ICAR is yet to officially endorse this technology, despite demonstrated high productivity and considerable savings in input costs and use of water.

The average production is 8 tonnes per hectare instead of the 2.1 tonnes per hectare got using conventional /traditional methods. As this technology benefits only the innovative farmers, there is no official endorsement of this grass-roots technology. Also, the successful Gujarat model of water-harvesting needs to be replicated if the ground-water levels are to rise in the country. The "Wadi" concept of tribal development has been very successful and has been widely replicated in many tribal areas of the country. More of such successful models need to be taken up by NABARD in other tribal areas after interaction with the tribal communities, their leaders and their NGOs.

With poor quality infrastructure, non-availability of low-cost credit, poor technical knowledge, lack of market access and price information, poor storage facilities, lack of transportation, poor collective bargaining skills, the Indian farmer suffers in silence with only 30% of the profit margins accruing to him for his production risks, weather-risks and marketing-risks, in addition to his back-breaking labour and shrinking farm-land availability, while the traders pocket a neat 70% of the profits with much less risks.

The Indian farmer is born in debt, lives in debt and dies in debt, bequeathing debt to his children. He lives in the shadowy depths of our minds, an anonymous and forlorn figure unhonoured by all, poverty-stricken and uncared

for, even though he is the sole custodian of our environment and the protector of our bio-diversity. It is his children who join the armed forces, maintaining vigil on our borders and keeping our enemies at bay. On his frail shoulders, rests the responsibility for food-security of our country. It is his hard labour, perseverance and nurturing skills that have made India self-sufficient in food.

Poor Policy Initiatives:

The Central Government and most States have let down the farmers and the farm sector by continuous neglect since 1985. The PL-480 Fund which built up the ICAR research institutions and agricultural universities enabled scientists to contribute to the "Green Revolution" and led India to self-sufficiency in food despite a burgeoning population. The Agri-research systems built up over the years have ensured that our seed-scientists are among the best in the world. But, there is a major disconnect. When agriculture is a state subject, why not build up state-specific and farmer-friendly infrastructure to boost agricultural productivity? Instead, the Centre and the States have parallel institutions and policies which add to all round confusion. Further, if specific targets have ever been given to these huge research institutions built up over the years, then it is a closely guarded secret. No political leaders have ever set specific attainable targets for each of these research institutions. The last Prime Minister to take some interest in Agriculture was Rajiv Gandhi, who set up 6 Technology Missions in the 1980s for Telecommunications, Water, Literacy, Immunisation, Dairy and Oilseeds all under the leadership of Sam Pitroda.

While the Technology Mission on Telecommunications was a smashing success, the others came a cropper. Today, we have the largest irrigation system in the world, the 2nd largest country with arable land and over 51% of our labour force is in agriculture. The contribution of Agriculture sector to GDP has reduced to 14% and is reducing over the years. Over 82% of our farmers have landholdings of less than 2 hectares. In fact, the average landholding is about 1.25 hectares only and further fragmentation is on. Uniform policies at the State or Central level are meaningless in the above context and only specific district-level or block-level agriculture plans implemented over a period of 5 years, will make sense.

Agri-biotech Benefits

Agri-biotechnology is defined as advance technology that allows making precise genetic changes to impart beneficial strains to improve the crop plants. The tools of modern biotechnology allow plant breeders to select genes that produce beneficial traits and move them from one organism to another. These technologies are more precise and selective then traditional cross breeding techniques, e.g. BT crops like cotton, golden rice, etc. Agricultural biotechnology investments hold the key to:

(i) improving productivity through modern technological innovations (ii) enhancing food production (iii) providing designer food through modern processes involving cost effective technology (iii) IPR issue for bio-technology products (iv) certification norms ensuring quality products particularly for biotech exports (v) providing world-class services on innovative technology and extension work through adequate infrastructure developments (vi) introduce environmental friendly biotechnologies in various traditional agriculture activities (vii) capacity building measures for farmers for improving productivity. Agriculture biotechnology has tremendous potential to reduce the bad environmental impact of farming.

Crops designed to resist pests and tolerate herbicides, have already reduced chemical usage on farms significantly and the herbicide-tolerance trait promotes conservation agricultural practices like no-tillage farming that reduce soil erosion, prevents water loss, and even limits release of greenhouse gases. Future crops can be designed to tolerate environmental stresses, especially rising temperatures and carbon increase. Biotechnology can also be used to produce renewable plant-based energy and industry products and biological agents to clean up contaminated soils.

Food and Nutritional Security

Scientists who use genetic engineering techniques for food production have the same goals as traditional breeders, making our food supply safe for consumers and the environment and less expensive to produce. The current state of global food security raises serious concerns as the number of hungry people has surpassed 1billion and emerging trends are future threatening global food supply. The forces challenging food security include population growth and demographic changes, high and volatile food prices, land and water constraints and climate change. The concept of nutrition security ensuring access to food that is nutritional as well as sufficient, is increasingly being used to stress the importance of food quality for people of all ages. Poor

nutrition and under- nutrition weakens immune systems and contributes to half the deaths associated with infectious diseases among children aged under five in developing countries. In the future, scientists hope to develop crops that can be used to create new materials or energy sources, provide more nutrients, treat diseases or serve as vaccines to prevent diseases. Low productivity in agriculture is a major cause of poverty, food insecurity, and poor nutrition, resulting in low income for farmers and farm workers, and a low-income rural economy. Small farmers are facing pre-and post-harvest crop losses due to pests and droughts. These result in low and fluctuating yields, besides low incomes and food availability. The application of biotechnology can potentially improve desired traits such as insect disease/ virus resistance, herbicide tolerance, stress tolerance, oil improvements and delayed fruit ripening. Plants can develop tolerance to adverse weather climates and by improving yields, pest resistance and nutrition, particularly of staple food crops. Thus, application of biotechnological tools for crop improvement, are complementary to conventional breeding in three ways:

1) Creating genetic variability through plant tissue culture.
2) Speeding up the process of conventional plant breeding through molecular breeding,
3) Evolving novel genotypes through genetic engineering technology.

Conventional plant breeding has limitations as breeding is possible only within sexually compatible plant species and when plants are crossed, many traits are also transferred with those traits that may have undesirable effects on yield potentials. There is also along gestation period for producing any plant variety.

Success Stories for Agriculture Biotechnology

Over the years, the biotechnology sector has contributed as under:

1) Mass multiplication of elite genotypes including rootstocks.
2) Production of disease free plants
3) In-vitro germless conservation
4) Production of secondary metabolites through cell culture
5) Genetic diversity analysis through fingerprinting
6) Gene-pyramiding and molecular breeding based on marker-aided selection
7) Protein and DNA based disease diagnosis kits
8) Plant transformation and genetic engineering of crops
9) Isolation of useful genes for genetic engineering for superior crop plants and pharmaceuticals
10) Structural and functional genomics for understanding key development and production pathways in crop plants.

Bio-technology Goals.

Some of the major works-in- progress for the agro-biotechnology sector are:

I. “Golden rice”, enriched with beta-carotene, will help combat vitamin- A deficiency, a major cause of blindness in the developing world. (A similar strain of rice has been enriched with iron to ward off anaemia).” Golden-mustard” also yields pro-vitamin A- enriched cooking oil.
II. New varieties of corn, sorghum and wheat are being developed to provide more lysine, an important dietary protein.
III. “Pharma- foods” are being developed that may help prevent or cure diseases such as cholera and diarrhoea, the leading causes of infant mortality in developing countries.
IV. Plants that resist viral pests, such as a new variety of African sweet potato, wards off the feathery mottle virus, can improve yields of important staple crops. Viral resistance also is being imparted to high value cucurbit crops grown throughout Southeast Asia.
V. Foods that resist toxic or salty soils will increase the areas available for farming in many regions of the world.

These are just a few examples of what biotechnology can do to improve the lives of the people in the developing world. While not a solution, biotechnology can play an important role in helping developing countries achieve food security.

What was the Green Revolution?

In 1970, the Nobel Peace Prize was awarded to Dr. Norman Borlaug an American scientist who is rightly hailed as the Father of the Green Revolution. Working in Mexico in the 1940's, he did not get much encouragement in USA. He developed new disease resistant and high yielding varieties of dwarf wheat which combined with new mechanised agricultural technologies, enabled Mexico to harvest record yields of wheat. Mexico which like the USA, used to import 50% of its wheat, started exporting wheat in the 1960's and the Mexican-based technology success story spread far and wide. The USA too benefited and became self-sufficient in wheat in the 1950's and a major exporter of wheat by the 1960's. The Chinese debacle in 1962, The Indo-Pakistan war in 1965 and the disastrous droughts in 1964 and 1965 forced the devaluation of the rupee in 1966 and Indian had to beg for PL-480 food aid from USA which came with strings attached. Most Indians are not aware that the PL-480 shipments had actually started from 1955 onwards and continued till 1971 when President Nixon with his infamous "Gunboat Diplomacy" tried to come to the aid of Pakistan. But India survived as a nation in the 1960's thanks to the poor quality wheat and maize made available due to the generosity of President Eisenhower and the American people. Somehow Indians tend to downgrade the strong support given by Republican Presidents and that is possibly the legacy of Robert McNamara of the World Bank and the superb Ambassadors J K Galbraith and Daniel Moynihan. A portion of the entire PL 480 food repayments (totalling US $3.1 billion) were used to build up ICAR research institutions and many agricultural universities which have served India well and enabled us to be self-sufficient in food. The Ford / Rockefeller Foundations and Government agencies around the world funded further research in Dr. Borlaug's pioneering work and the CIMMYT was set up in Mexico in 1963. The researchers led by Dr. Norman Borlaug also launched the Green Revolution in India.

Funds given by the Ford Foundation and the personal initiative of Dr. Borlaug helped in developing the IR8 variety of dwarf paddy that produced more grain per plant when grown with irrigation facilities and high dosage of fertilisers. The IR8 paddy variety spread all over Asia and variants have helped China and India and other Asian countries to feed their hungry millions and shove them on the road from perpetual poverty to relative prosperity. Today India exports rice and is one of the leading exporters of basmati rice. Without detracting from the accolades heaped on Dr. Borlaug whose pioneering research enabled hundreds of millions in impoverished countries in Asia, Africa, South America to grow their own food and lead a more civilised existence, we need to seriously consider alternate paths as times have changed as have priorities and all countries are facing economic problems. Technology fatigue also seems to have set in and we all have to move on. Let us always honour the great Dr. Borlaug and his team who developed the dwarf varieties of wheat and paddy and fed the hungry millions, all over the world. But let us also seriously consider the structural changes which have occurred in the world economy since then and the price of crude oil per barrel, today and try to opt for technologies which do not depend on nitrate fertilisers based on fossil fuels, huge water inputs, costly HYV seeds modified for high-dosage fertilisers and above all involving costly credit resources.

Critically Reviewing the Green Revolution Technologies

Let us face facts. The Green Revolution Technology is now over 60-70 years old and while we may continue to heap praise for the technologies unleashed by Dr. Borlaug, we need to remember that these technologies were for a different era when oil was less than US $ 3 per barrel and the agricultural inputs were available at cheaper costs. The high yielding varieties of plants were domesticated plants bred specifically to respond to chemical fertilisers and produced an incredible amount of grain per acre planted. After selective breeding of the plants, the seed scientists evolved the characteristics of larger seeds which created more grain yields and heavier above ground weight which was very important as it led to increased photosynthate allocation. By maximising the seed or food portion of the plant, these HYV plants were able to use solar-induced photosynthesis processes as the solar energy available was used directly to boost the food portion of the plant. Further selective breeding of plants that were not sensitive to day length (solar exposure) by scientists enabled doubling of crop production as the plants were not limited to certain areas solely on the amount of sun-light as also soil characteristics available to them.

Water-soluble fertilisers also made the Green Revolution possible but they forever altered agricultural practices world–wide, irreversibly and these nitrate fertilisers are the culprits today. Today, at least 3 generations of farmers are hooked onto chemical fertilisers and have forgotten about age-old agricultural practices, using 'dhaincha' or green manures and even organic fertilisers like cow-dung, etc. The HYV seeds which have been developed since the 1960's, cannot grow without the help of nitrogen fertilisers. Irrigation was also important now as earlier agriculture was limited to areas with good rainfall or assured water and quality soil availability, due to the monsoons. To address the need for irrigation, steps were taken to store water in dams, tanks, and pumped from underground aquifers. Thus, major, medium and minor irrigation sources were developed using

wasteful diesel pumps and electric pumps which were operationally cheaper, were ignored. Water was dragged by canals over long distances to drier areas & enabled more land to be used for optimum agricultural production, thus increasing crop yields all over the country. In India, all states started improving agricultural production systems and huge agricultural surplus yields are possible. Oil Prices @ US$ 100 per barrel today, impacts nitrate fertiliser costs and diesel oil costs adversely. Today our technology needs change and fast. Traditionally, the grain-surplus states were Punjab, Haryana, Western UP and A.P. and grain warehouses were built there by the FCI, CWC and State Warehousing Corporations. The optimum buffer stock of food grains required was 35 million tonnes but today 80 million tonnes of buffer stock grains are purchased due to the leaps in agricultural productivity. The politically fixed prices of paddyand wheat and theapathy for minor millets, ensures that even farmers do not eat jowar, bajra, nachni and ragianymore. With no planning for warehouses, this explosion in buffer food stocks leads to30% of the stored grain (much of it in the open) rotting in open silos or is destroyed by rats. This is a crying waste especially as many of the 480 million people still go to bed hungry and millions of tons of grains rot, due to lack of planning and warehouses.

Excessive Use of Fertilisers and Water

Recently, a 5 yearlong study commissioned by the Agriculture Department in Maharashtra and conducted by the Gokhale Institute of Politics and Economics, Pune brought some inconvenient truths to light. Most soils in Maharashtra had poor humus and nutrient content due to natural decline, mono-cropping pattern of farming a single HYV crop. The poor soil quality increased farmers' dependence on fertiliser usage, in the hope of bumper yields and enhancing farm profitability. Also, over-use of water creates soil salinity and water-logging due to poor drainage systems. Soils were over 60% deficient in micronutrients but overuse of fertilisers contaminated the groundwater and reduced both crop quality and yield. Excess water use led to excess salinity and this also affected crop quality by reducing overall primary metabolites like amino-acids, sugar. The end-product in food is thus, less nutritious. This underwrites the need for all farmers to get the soil-health of their farms tested every year as also the quality of water being used for agriculture. This enables the state to build up soil fertility indices on a village-wise basis and this will be a boon for smallholder farmers. As micronutrient testing in costly, all states may consider carrying out micronutrient testing on a village-wise basis especially for the small-holder farmers.

Why this Nitrogen-Fixation?

Ever since settled agriculture started over 10,000 years back, farmers realised the value of good quality seeds, water usage and crop husbandry techniques for boosting crop yields. Three very important scientific principles made this possible.

(i) The photosynthesis process using solar energy
(ii) Absorbing nitrogen from the soil
(iii) Ability to draw water from the soil through roots by osmotic pressure.

Nitrogen is the largest component in the air but plants cannot absorb it from the air directly and depend directly on nitrogen from the soil and hence the need for water-soluble nitrates in the soil. Only legumes like peas, beans, lentils have a method of absorbing nitrogen from the air through nitrogen-fixing bacteria. Also, nitrogen and nitrates occur naturally but cause no harm to humans.

But in their haste to garner massive profits, farmers applied high concentrations of nitrogen from synthetic fertilisers to crops, resulting in nitrate pollution. A study in Punjab by Green Peace India in Nov. 2009 revealed that an average application of 320 kgs of nitrogen per hectare (higher than the average rate of 210 kgs. per hectare, as per Fertilizer Association of India). This has contaminated all groundwater and even drinking water and is the cause of high rates of cancer. Overuse of fertilisers is prevalent in Punjab, Haryana, U.P and coastal areas.

Zero use of Nitrogen Fertilisers?

Professor Edward Cocking, Director of the Centre for Crop Nitrogen Fixation, at the University of Nottingham and his team have developed a unique method of doing away with all nitrogen fertilisers by putting nitrogen fixing bacteria into the cells of plant roots. A specific strain of nitrogen fixing bacteria discovered by Dr. Cocking can colonise all major crop plants on an intra-cellular basis. This enables every plant cell to fix atmosphere nitrogen and could be used for all nitrogen needs of crops. Goodbye to costly nitrate - based water-soluble fertilisers. Indiscriminate use of nitrogen-based fertilisers pollutes the air and water resources and is

estimated to have caused damage of $60 - $ 280 billion annually in Europe alone. Plant seeds will be coated with these bacteria to create a symbiotic mutually beneficial relation with nitrogen from the air.

This will finish off the unhealthy and ever increasing reliance on synthetic nitrogen fertilisers from fossil fuels with its high economic cost due to environmental pollution and high energy costs. The 'N-Fix' is neither a genetic modification nor involves bio-engineering. Regulatory permissions and field trials are being planned in UK, Europe, Canada and Brazil and this technology is expected to be available widely, after 2-3 years. This will ensure that N-fertilisers, ground-water and HYV seeds are not required, drastically reducing farm costs which went up post the Green Revolution.

Cost Implications

The cost implications for Indian agriculture are enormous and this technology may be made open source and freely available in India to boost organic farming and will reduce farming costs drastically as the farmer does not need to pump up ground-water using diesel pump-sets (from depths of 50 – 1000 ft), need not purchase HYV seeds as he can retain his best seeds and coat these with the nitrogen-fixing bacteria and need not use much water (for water soluble fertilisers) as the nitrogen-fixing bacteria will be able to absorb atmospheric nitrogen. This will help enhance food security and stop further poisoning of food due to indiscriminate use of fertilisers, pesticides and hormones. But the greatest benefit to all mankind will be stopping of production of chemical fertilisers if this technology stabilises.

Using N-Fix technology and SRI techniques as adopted for use in India, our farmers who are adept in pre-industrial agricultural practices, would be able to enhance crop production and productivity immensely as irrigation costs would be minimised by 40% while output would be enhanced at least by 20-25%. Rampant air and water pollution by N-fertilisers would be stopped. The only fear is that the oil cartels and their all-powerful lobbies may wreck this initiative which can revive our agriculture.

Why is it not possible to concentrate the country's slender technical and financial resources on research for a few major crops, like Paddy, Wheat, Maize, Cotton, Soya bean, Oilseeds (groundnuts, mustard, sesame etc.), Pulses (Moong, Arhar, Masoor etc.) and Minor Millets (Bajra, Jowar, Ragi) with assistance in the form of technical expertise from USDA? Why not set annual district-level targets for cereals, oilseeds and pulses? How about encouraging peri-urban vegetable cultivation and horticultural crops for improving the farmers' margins? And if quality seed or productive-levels have not improved, remove the deadwoods who presently adorn the research institutions and agricultural universities. The Central Govt. must set productivity and production levels for each State and each State in turn will set the same for each of its respective districts with adequate fixing of accountability at all levels for non-performance. This will however require allocation of adequate inputs and financial resources. The KVKs and the ATMAs have failed to meet the genuine needs of the farmers. Why there is no emphasis on Biotechnology and it's applications in agriculture (except maybe, in bananas)? Why is our agri-productivity poor in comparison to China, USA, Vietnam, and Costa Rica?

Why are spurious seeds, fertilisers and insecticides destroying the lives of farmers? Why is there no agricultural extension system which meets the requirements of improving the financial margins of the farmers as also the crop productivity? How about de-risking the smallholder farmers who bear the production risks (80%) and the marketing-risks (20%) without any real help from the various crop-insurance schemes? The farmer's needs are few and he requires good seeds (with germination rates of about 90%), rain-water harvesting structures on the lines of the Gujarat model, appropriate rural infrastructure (including modern warehouses, cold storages, transportation and market connectivity as also technical advice in case of emergencies such as droughts, pests, etc.). Can we not ensure these minimal requirements for our farmers? Can we not give dedicated 11 KVA lines for agriculture so that efficient electric pump-sets are used for groundwater extraction, instead of inefficient diesel pump-sets which should be banned?

Access to Affordable Credit for Agriculture

Let us praise the poor Indian farmer. On his frail shoulders rest the country's hopes for economic revival. A delayed or poor monsoon due to climate change and the distress of farmers is all too evident with some suicides and a horde of farmers abandoning their rural homes for an urban livelihood and the doubtful security of urban slums! One poor monsoon leaves the entire country's economy in shambles.

Today, economic growth cannot be restricted to the industries and services sectors alone as it is the country's rural economy that feeds and sustains the people besides ensuring our march to prosperity. With rising oil

prices, the farmer is faced with a three-fold increase in input costs while they continue to lead a hand to mouth existence. This is due to information non-availability, poor storage / marketing facilities as also poor communications, lack of transportation and poor collective bargaining power. Lack of affordable prices coupled with global warming, climate changes, groundwater depletion etc. make farming in India, one of the riskiest of professions. Most farmers would not want their children to take up farming as a profession. With small land-holdings, it is increasingly difficult to ensure better financial margins especially for the smallholder farmers. Many left-oriented economists believe that the LPG (liberalisation, privatisation, globalisation) policies followed post-1992 in India, have succeeded in proliferation of urban slums due to encouragement to the builders lobby who have increased land prices and reduced farmers to near-penury, forcing them to commit suicide. There are other major problems to ponder upon: Do we have the technologies to ensure that on small farms with land-holdings less than 1 hectare, a farmer is able to support his family, given that assured sources of irrigation are lacking in 55% of the farm lands in the country? The relevance of sustainable farming practices, alternate livelihoods and innovations for ensuring a steady income for the farmer is also acutely felt. How do we ensure appropriate support systems for the farmer to boost production in agriculture, such as affordable credit availability in time, essential and quality inputs and insurance, marketability besides storage, transportation etc? There is already an infrastructure in place for delivery of financial services. What is required now is not creating new institutions for extending outreach but finding ways and means to improve the existing rural credit delivery mechanisms and evolve new models for extending outreach in far-flung rural areas. Credit has to be an integral part of an agricultural program aimed at improving productivity, putting in place an appropriate credit delivery system to meet the needs of smallholder farmers and must go hand-in-hand with efforts to improve farm productivity. This requires cooperation among all stakeholders, convergence of efforts of the banking system and various Government Departments, which are aimed at improving the income levels of the farmers. To achieve this, it is absolutely essential to make the rural financial outlets, more pro-poor and farmer-friendly. The attitude of the people managing these branches, play a key role in re-defining the rural banker-borrower relationship into a successful working model as was done in Korea in the mid-1960's for their cooperative banking model. In today's world just providing credit or micro-credit may not help in enabling the poor to escape the clutches of poverty. Proper guidance to the borrowers and appropriate technical assistance to the borrowers and at times, even financial support, would be required for the rural clients of banks, all these put together in a package. Having more touch points either in the form of branches or BC's, is another factor which needs to be addressed to enable smoother and faster credit flow. New private sector banks are not the answer to financial inclusion.

Along with this, rural banking procedures need to be simplified. UID/Aadhar should ensure that KYC norms make rural banking easier. Product innovations to suit the rural / urban poor and enable them make productive use of credit, would play a key role. Bankers need to consider more products for the poorer micro-segments in our rural society, designed and tuned to their needs. One loan product does not meet all rural requirements for farmer clients! Technology today influences every part of rural life and banking with the poor certainly needs better technology to reduce transaction costs both for rural clients and banks. As may be observed, most of issues stated above have to be taken care of using technology-enabled financial services. This also enables the banks to scale-up operations and service more farmers at lesser costs. These are demand-side Issues of farmers.

Bankers' Agri-credit Issues

If farmers tend to blame bankers for their inability to secure crop/ term loans or even consumption credit, bankers too have serious and very fundamental agri-credit issues. As per agricultural lending fundamentals, prior to sanctioning agricultural loans, bankers should have data-sheets on a farmer-wise basis, containing the following:

1) Prior Production History
2) Personal & Business Credit History
3) Financial Records- Balance Sheet, Inventories, Income projections, Tax Returns
4) Farming/Business/Marketing Plans
5) Repayment of Loans Plan based on:
    a) Production or Management Plan
    b) Marketing Plan
    c) Projected Cash Flow
    d) Collateral and Equity
    e) Off-farm Income Streams

The Indian farmer is unable to provide any of these documents as he is often illiterate, has small land holdings and is able to secure crop loans against hypothecation of standing crops which is no security for the banker. The banker is also unable to mortgage farm land and the land titles continue to be in a mess as land records are not 100% computerized. In the North-East, all land is tribal property and cannot be mortgaged as bank security. Over the years we have allowed an agricultural lending system to develop which cannot be justified as wholly rational. In all other countries, bankers are able to lend as per banking laws, norms and practices, but in India, this is not so. A banker has to assess the following before sanctioning any loan:

1) Cash Flow
2) Capital or Capital Assets
3) Collateral
4) Conditions specific to the Loan and
5) Character of the Borrower and his relationship with the bank

Based on the financial data as available, the banker calculates the 'Sweet Sixteen' Ratios to assess the Borrower's Repayment capacity from the Project being funded by the Bank.

1) Liquidity- Cash Flow to assess repaying capacity
2) Solvency- Capital invested as Equity investment in enterprise
3) Profitability- Collaterals offered to bank as security for the loan
4) Repayment Ability-Risks Assessment, weather cycle and economic macro-picture
5) Financial Efficiency- Assessment of success of enterprise

Every banker would wish that farmers prosper, prepare their financial statements and secure loans for commercial farming. In the absence of reliable operating data, bankers tend to take the easy way out and sanction crop loans to farmers to meet their 18% agri-lending targets. Term credit for agriculture is being drastically reduced due to lack of credible data and this is the major reason for lack of agricultural productivity growth in the country. Also, the inexplicable delay in revamping of the Long Term Co-operative Credit Structure (SCARDBs and PCARDBs) as per Vaidyanathan Committee–II recommendations and the lack of major agricultural programs to boost agricultural productivity has ensured falling agricultural productivity levels, even by Asian standards. Only about 11% of our farmers have access to institutional credit, which is subsidised by Central/State Governments and the effective interest works out to 4% p.a., if prompt loan repayment is made. Lack of proper land records (computerisation which started in 1975, is still going on!), lack of farm accounting records, lack of transparency in sanctioning loans to farmers, the failure of the Co-operatives, lack of rural ATMs and Rural Credit Bureaus have all added to the farmers' woes. There is some flow of credit for crop loans (6-15 months), but long term loans (exceeding 3 years) are only about 15% of the estimated Rs. 6 lakh crore of agricultural credit disbursed in 2013-14. Thus, while production increases, productivity in Indian agriculture is waning and this decline is attributed to the lack of long term credit availability for land improvements, mechanisation and farm modernisation. Why the Vaidyanathan-II funds for cleansing the Long-Term Cooperative Credit Structure were not made available since 2007, is an enduring mystery which only successive UPA-II Finance Ministers can answer.

The least that can be done by the RBI/NABARD is to ensure that all farmers with landholdings be entitled to a 5-year tenure KCC (Kisan Credit Card), which is chip-based for swift and secure funds-transfer. For oral lessees and tenant farmers, the Joint Liability Group credit facilities are available. The present KCC is a mere pass-book with three year tenures and is not very useful for farmers. The 5-year KCC tenure takes care of the normal crop cycle of two good crops, two average crops and one bad crop year over the 5-year period. The crop-insurance scheme (and not the present crop loan-insurance scheme) must be redesigned on a weather-based model and subsidised adequately, so that farmers do not have to commit suicide in case of crop-failures. The draconian APMC provisions must be done away with to enable and incentivise farmers to achieve better productivity levels.

The only initiative in the country to help farmers prepare detailed accounts of their seasonal farming operations on a scientific basis, is the E-Kutir model (financed by Intel, USA and Grameen Bank, Bangladesh) being implemented as a robust ICT model , without any subsidy. Many such initiatives are needed by Farmers and Bankers! Commercial and Intensive Agriculture and not Subsistence Farming, will enhance the slender margins of farmers while the Supply-Chain Model will help Bankers identify gaps in agricultural financing. A review of Agricultural Credit systems by GOI/RBI is long overdue if we wish to help our farmers and stop the spate of farmers' suicides. Most farmers suffer from cash-flow management problems with no way out or any help from the system.

Food Security Issues

A comprehensive policy and investment agenda for achieving sustainable food security is needed to: i) improve smallholder productivity and market access; ii) keep trade open; iii) promote productive social safety nets for smallholder farmers and agricultural labourers; iv) integrate climate change into strategies at all levels; and v) coordinate food security and sustainability policies.

Some areas of risk assessment considered with our present biotechnology crops include

i) The potential of genes moving from genetically engineered crops into wild plants;
ii) Pests eventually developing resistance to pest-resistance crops;
iii) Introducing allergy-causing compounds or changing food nutritional composition

There are many obstacles to building efficient food safety systems. Food safety as a local health and development problem is still rarely acknowledged by decision makers in many developing countries. It is also clear that one major obstacle to improving food safety systems, particularly in developing countries, is the lack of data on the cost burden of food-borne diseases. Such data is critical to establishing evidence-based national food safety policies. We have little hope of achieving the Millennium Development Goal of reducing child mortality by two-thirds by 2015, unless developing countries recognise the need for and invest in improvements for water and food safety and nutrition to be systematically introduced into mainstream food system policies. Producing safe food is not simply a tool for boosting agriculture or trade; it is an essential ingredient for public health and preventing malnutrition for our children who are at grave risk today. We cannot barter away their future. In India, Agriculture is a state subject and unless the state really cares for its farmers and their farms and protects its small-holder farmers by ensuring better returns, the future of all farmers continues to remain bleak. Each state must set stiff R& D targets for the various Agricultural Universities and Laboratories and agricultural scientists including the KVKs / ATMAs set up in various districts. Breakthroughs in research are badly needed in oilseeds and pulses production and in scientific pure-line breeding of indigenous dairy animals. Alternate sources of income include animal husbandry and fisheries as a means of risk reduction for all farmers.

Better scientific technology including use of biotechnology is urgently needed to reduce input costs of farmers and to enhance productivity. This will help farmers combat climate change effects with confidence as very little seems to have been done in India when compared to Bangladesh and Sri Lanka. A comprehensive policy and investment agenda for achieving sustainable food security is needed to:

i) improve smallholder farm productivity and market access ii) keep trade open iii) promote productive social safety nets iv) integrate climate change into strategies at all levels v) coordinate food security and sustainability policy vi) ensure food is available at sustainable prices for poor people vii) ensure proper food grains storage and transportation and viii) credit availability. Climate change and globalisation are two major processes of global change, and it is assumed that both have major impacts on Indian agriculture. Yet, their combined impacts are rarely studied in conjunction with understanding the regional and local dimensions of vulnerability are essential to develop appropriate and targeted adaption efforts. At the same time, such efforts must recognise that climate change impacts will not be felt in isolation, but in the context of multiple stresses. The dramatic economic and social changes associated with globalisation, present new risks as well as opportunities.

National food security has become crucial in the context of climate change, scarce natural resources and also on account of rapid increase in population. To ensure food security, the technology and research efforts have to be on adaption and mitigation measures. The accelerating pace of climate change, combined with global population and income growth, threatens food security everywhere. Agriculture is extremely vulnerable to climate change. Higher temperatures eventually reduce yields of desirable crops while encouraging weed and pest proliferation. Changes in precipitation patterns increase the likelihood of short-term crop failures and long-term production decline. Although there will be gains in some crops in some regions of the world, the overall impact of climate change on agriculture is expected to be negative, threatening global food security. Poverty alleviation and achieving the 8 major MDG goals by 2015 will be an empty pipe-dream, if India is unable to develop its agro-biotechnology to better farm productivity norms, immediately. Also, food security compulsions leave us with no choice except to ensure that smallholder farms and farmers ensure better crop productivity standards, using scarce resources as are available.

De-risking the smallholder farmer is a priority by diversifying into horticulture, animal husbandry and fisheries. The farmer does not require handouts or subsidies and should be given due respect in Indian society. Efforts should be made to enhance the knowledge-base and skill-sets of all farmers, as farming increasingly becomes more scientific. The farm sector continues to be unviable for the smallholder farmers with increasing land fragmentation reducing outputs, leading to a vicious cycle of reduced access to modern technologies and credit at subsidised rates.

Imbalances in fertiliser usage due to subsidies and subsidised electricity, all have their own attendant problems. The smallholder farmers should be enabled to build up their coping mechanisms with better rural infrastructure. The RIDF

(Rural Infrastructure Development Fund) which has been successfully administered by NABARD for about 20 years is reportedly under threat from the Ministry of Finance and the RBI for obscure reasons, which should not be allowed. To ensure better productivity for the farmers, long-term credit flow, infusion of bio-technology, better quality farm equipment, low-cost poly-houses, drip-irrigation systems, balanced fertilisers and micro-nutrients as per soil-tests, are all essential. If Agriculture is really a priority and the plight of farmers is to be reduced, mere lip-service to the farmers' cause will not do and this is a time when actions speak louder than words. Who will plead the smallholder farmers' cause and give a helping hand when required?

Perspectives

With 56% farmers in India depending on favourable monsoons for good crops and not having access to assured irrigation sources, all crops are a gamble and in a production cycle of 5 years, it is assumed that farmers will have two good crop-years, one bad crop-year and two average-crop years and that an average farmer should be able to repay agri-credit dues. With 55% of the country's work-force engaged in agriculture (largely under-employed except during planting and harvesting seasons), the economy is heavily dependent on the primary agricultural sector. With 82% of the farmers being smallholder farmers (average size of land-holding less than 2 hectares), there is a basic fight for survival as they rarely have access to quality inputs, irrigation, credit, agri-marketing infrastructure, insurance and 80% risks are at the production stages while 20% risks are at the marketing stages. With fake seeds, fake fertilisers and fake pesticides flooding the market, the smallholder farmer fights a losing battle for survival with climate changes, cloudbursts and droughts and non-availability of cheap credit and global warming. The smallholder farmer has little access to subsidised credit (@4% for prompt repayment) no access to long-term credit or to equity options and is often at the mercy of money-lenders and agents who manage to siphon off 80% of the profits while the farmer with all risks and back-breaking labour, barely manages to have 20% of the profits. With increasing land salinity, land-fragmentation, loss of ground-water, rising cost of inputs, it is indeed a harsh life for the farmers in India. The only way out of increasing pauperisation of the farmers, is de-risking strategies and commercial agriculture with emphasis on fisheries, animal husbandry, vegetable cultivation and horticulture. But commercial agriculture involves high-value infrastructure and inputs such as cheap poly-houses, drip irrigation, cheap credit, market access, quality seeds and inputs, reliable transportation and much-improved storage facilities (ware-houses, cold-storages, reefer vans, etc.) which smallholder farmers are unable to afford and hence for all their risks and back-breaking labour, the farmer is unable to break even and is unable to meet the requirements of his family. On his frail shoulders rest the hopes for sustainable farming, crop diversity and food security for the entire country!

New Technologies which help to reduce costs and risks, better access to storages, fair spot markets, commodity exchanges where farmer producer organisations co-exist with traders, cheap credit are all essential for commercialising agriculture. Diversification into fruits and vegetable crop production requires a change in mind-sets, skills, knowledge and practises and even more exposure to risks besides costlier inputs and sufficient credit resources. For all the production risks, weather risks, market risks the farmer's margins are very thin as the traders' margins are ever-increasing with hardly any risk! This only ensures leaner and starving farmers and their families and fatter agents, aadtiyas, money-lenders and traders. With chemical fertilisers poisoning the soils and groundwater (the tragedy of Punjab) there is need to go in for rain-water harvesting, watershed development and intensive drip irrigation so as to conserve scarce water resources. Agricultural extension services and organic farming practices are like fairy-tales today. Without proper post-harvest facilities, farmers will find it very difficult to enhance their profit margins.

The State APMC Acts and Essential Commodities Act and a host of outmoded Acts need to be consigned into oblivion as soon as is feasible as these have outlived their utility value. More efficient and modern warehouses, cold storages and private mandis are all essential today. For the smallholder farmer, diversification into animal husbandry and fisheries in ponds is an essential need and not an option so as to diversify risks. More Farmer Associations, Farmer Producer Groups and Joint Liability Groups are needed today to offset the pernicious strangle-hold of traders and agents and ensure better margins for themselves. Capital Investment for enhancing land productivity, building up the assets base and diversifying from subsistence farming into commercial farming, is essential if the smallholder farmer is to survive. Climate changes and global warming due to heavy carbon and methane emissions have reduced farm yields and productivity.

With all these plethora of problems, sustainable farming for smallholder farmers is easily forgotten and in the mad struggle for survival by smallholder farmers and their families, the goal of food security is often forgotten. The smallholder farmers need a helping hand by creating more agri-market infrastructure and small warehouses so as to be able to store food grains for some time so as to get better prices after 2-3 months when prices are not likely to be depressed. Also Warehouse Receipts need to be encouraged by registered warehouses and banks so that farmers are able to get better margins. Finally, the smallholder farmers need a helping hand by creating better agri-market infrastructure and institutional assistance as and when required.

FARMER FURORE OR POLITICS?

The Covid-19 pandemic has destroyed lives, livelihoods and entire economies worldwide! In 2017, the Dalwai Committee on Doubling Farmers' Incomes observed that rural income levels have either remained stagnant or worsened, leading to a spate of suicides. In an agrarian economy where 69% of the population is based in rural India and depends on agriculture as the primary source of income, this is a tragedy as the whole story of economic Liberalisation, Privatisation and Globalisation was sold in 1991-92, on the premise that opening up the economy as per the IMF/World Bank dictates, would improve the entire economy. It has helped the rich become richer while the Smallholder Farmers have suffered. The ongoing farmer agitations at Delhi are led by Adtiyas and not by the smallholder farmers, worried about their dominance in the APMCs are going to end. In any case, Agriculture continues to be a State subject and getting fair prices for their produce/products is a matter for States to manage and not the Centre. The Centre is more concerned with fair agricultural prices, better agri-reforms and ensuring fair markets for Farmers across the country.The APMCs are a 150 year –old colonial construct designed to serve British interests and deserve a fresh review.

On an average, the difference between the rural inflation rate (as measured by CPI) and the growth rate of agricultural wages, was merely 2 % since 2000. Between 2012 and 2017, the monthly average income of an agricultural household was less than Rs. 8000, increasing by 9.5% while the inflation rate was 7.5 %. This implies that 80 % of income growth was consumed by increasing farm expenditure. Worse, the agricultural sector contribution to GDP which was 51% in 1950-51, dived to 15% in 2016-17. Thus the pauperisation of the agri-economy-labour force reduced from 70 % in 1950-51 to 54 % in 2016-17. Farmers have no worthwhile lobby to press for their demands but the continuing spate of suicides, three-fold increase of farm input prices and costs due to LPG economic reforms and APMC mismanagement leading to farmers retaining only 18-30 % of farm profits, while traders received 70 % of the profits, with minimal risk-taking! Farmers should retain 70% of the crop profits as they own the land, put in hard labour, take on weather /credit /production /market risks. Their profits are minimal

It must be remembered that farmers have been unable to enhance income levels and their low and fluctuating farm incomes are due to plateauing crop yields(output per hectare) since the 1980's and increasing farm-level risks leading to crop losses or output reduction due to weather variations, pest infestation, animal attacks and input price increases. The major policy instruments are credit policies (flow at affordable interest rates), crop insurance and the MSP (Minimum Support Price). While production risks are taken care by credit policies and crop insurance, market risks are met by sustaining farm incomes against fall in market prices. About 86% of farmers are small-holder farmers with an average unsustainable land-holding of only 1.54 acres! How to help the small farmers access affordable credit, crop insurance, steady input prices, low storage/transportation costs and secure over 50% of the profits to feed their families, is the real question posed by farmers.

The Three Contentious Farm Bills

Article 246 of the Constitution places Agriculture (entry 14) and markets and fairs (entry 28) in the State List. The Centre has powers to regulate inter-state trade and commerce (entry 42) but entry 33 in the Concurrent list covers trade and commerce in all foodstuffs, cattle fodder, raw cotton and jute, including within states. The Centre has somehow decided that the Centre take the lead in ensuring farm sector reforms. The role of the Centre should have been to incentivise States and farmers to carry out much-needed agricultural reforms. Between February 2020 and June 2020, why the Central Government decided to ram through the agri-reforms and pass Ordinances, is a big mystery. For reasons best known to the Government, three agriculture Ordinances were promulgated and became Acts in September 2020. Desultory discussions have been on-going as also recommendations from various Committees/ Task Forces/ Working Groups but in June 2020, hardly any discussions were held and the Ordinances were passed without proper voting norms as the Opposition parties were bent on scuttling government moves on agri-reforms.

What is the fuss all about? Let us simplify the names of these three Acts. "The Farmers Produce Trade and Commerce (Promotion and Facilitation) Act, 2020" is The APMC Bypass Act. Similarly, the "The Essential Commodities (Amendment) Act, 2020" is The Freedom of Food Stocking Act and "The Farmers (Empowerment and Protection) Agreement on Assurance and Farm Services Price Act, 2020" is the Contract Farming Act. There was much consternation as Punjab and Haryana saw widespread protests against the proposed Bills. The BJP government even lost one of its oldest allies, the Shiromani Akali Dal, and why farmers

are unhappy with these legislative changes, is not clear. Despite the pushback, PM Modi has reiterated that farmers will benefit from the changes mentioned in the Atmanirbhar Bharat Abhiyan package.

The first Act allows farmers to sell their produce at places other than the APMC-regulated mandis. It is critical to note that there is no intention to shut down APMCs, and expands market options for farmers. If a farmer feels that a better sale-price is possible with some other private/ corporate buyer, then instead of compulsorily selling his produce in the APMC-mandi, he can now opt out and sell elsewhere. The smallholder Farmer has no reason to be beholden to the APMC Mandis dominated by Adtiyas/ Big Farmers and the absence of smallholder farmer representatives from FPOs/JLGs. The second Act allows farmers/agents/ agencies to stock food articles freely without the fear of being prosecuted for hoarding, as are being done today. The District authorities routinely ban the sale of crops beyond the district boundaries and hence smallholder farmers are forced to sell at APMC-determined prices. The smallholder farmer lacks holding capacity and is unable to carry back his produce even if prices are unremunerative. The third Bill provides a framework for farmers to enter into contract farming. Contract farming is being routinely done since the mid-1980s, with corporates like Pepsico/ Wimco / others encouraging contract farming, with varying degrees of success. The bogey of corporates seizing the lands of farmers is unwarranted.

The entire idea behind all three agri-reform Bills is to liberalise the existing colonial-style farm market mechanisms in the hope that doing so will render the whole system more efficient and allow for better price realisations especially for the smallholder farmers and finally, the consumers. The over-riding concern, presumably, is to make Indian farming a more remunerative enterprise than what it is right now and it is being discussed ad-nauseam over the last 15 years, without any initiative to change the systems. Where the BJP erred is not having discussions in Parliament and the political management systems appear to have broken down with the anti-CAA agitations and now the anti-Farm Bills agitations, which are non-issues but are now being blown up by destructive forces into full-scale agitations on vague fears about APMCs being shut down and MSP to be eased out and farmer's lands being seized by Corporates! These appear to be fears being spread by fertile brains addled by Opium/Heroin and are totally irrational. More worrying is the fact that the three Ordinances are sought to be reversed before any meaningful talks can be held by Farmers with the Central Government. And fringe political parties are jumping into the fray to keep the agitation alive! What is actually going on?

There are many ways to look at these proposed changes. One is to believe that the paper reforms will operationalise perfectly, in real life. This results in farmers being able to escape the clutches of the monopoly APMC-mandis and rent-seeking behaviour of the traditional intermediaries (called Adtiyas). A farmer can now pick and choose who to sell and at what price, after making an informed decision about prices elsewhere. And, most crucially, when he does this, he can earn more than what he did in the past due to the exploitative Adtiyas and APMC-mandis. The contesting viewpoint, which the protesting farmers have, is to see this move towards free markets, as a game-plan of the Central government to move away from being the guarantor of minimum support prices (MSPs). The MSPs do matter in the regulated APMC mandis, but not in private deals. The farmers from areas where MSPs are more efficient, are suspicious of what the markets will offer in the future and how the so-called "big companies" will deal with them. Big farmers can influence the most powerful governments through the electoral process but confronted by big corporates, they are exposed as minor players, incapable of 'effective' bargaining. There are no easy answers as neither view is correct, and there is a lot of gray matter in between the black and the white.

The proposed laws are not shutting down APMC-mandis, nor do they imply that MSPs will not be functional. It is also true that across sectors of the rural economy, liberalisation has expanded the size of the economy and improved growth and GDP. But farmer wellbeing is a different matter. Why are more farmers committing suicide after LPG (since 1992) and that too in the more agriculturally developed States? This is a reality which has yet to be faced by the political system and should have been examined in depth rather than be ignored as is being done today. But why not enable the farmer to have more selling or storage choices? If the private deal is not distinctly better, a farmer can carry on as it is. If corporate farming does manage to weaken the APMC-mandi system then it would only be because hordes of farmers chose corporate farming or selling outside existing mandis. Could it be the case that the Adtiyas and existing elites are the ones who are threatened by this reform? Moreover, there is an unwarranted fascination with MSPs in India. The last Agriculture Census (2015-16) showed that 86% of all land holdings were small and marginal (less than 2 hectares). See chart below. These are such small plots that most farmers dependent on them are net buyers of food. As such, when MSPs are raised they tend to hurt the farmers the most!

Access to Institutional Credit / Crop Insurance

Most farmers are unable to access the subsidised credit generously made available (7 % due to Central Govt. subsidy and complemented by State govt. subsidies @2-4% for prompt repayment of dues), due to lack of land-titles after property sub-divisions of agricultural properties, due to deaths. Only about 12 % of farmers get access to credit and they are mostly mid-level and big farmers. The loan transaction costs are very high for smallholder farmers who mostly do not have land titles registered in their names or are oral lessees or tenants or agricultural labourers and they are forced to borrow from adtiyas or mandi agents or money-lenders at rates starting from 5% per month! What has happened to the computerisation of land holdings started in 1975? After 45 years only Karnataka and AP have completed the exercise. Other states have failed to do the needful due to opposition by vested interests. This is a shameful reflection on what is wrong with our rural economy!

From June 2020, crop insurance is no longer linked to crop loans (a very welcome initiative) but now crop insurance is only 3% of crops grown as the NAIS is not viewed favourably by farmers as repayments are too little and too late and are not village–based but area-based and official crop-cutting trials are always late, and with State Govts. not funding in time, crop insurance is an exercise in futility for smallholder farmers. Also the latest farm reforms brought out the fact that only 6% of farmers are using the APMC-MSP framework in Punjab, Haryana, and 3.6% in Western UP and to a limited extent in AP and Maharashtra. Other farmers depend on private mandis and corporate buyers and adtiyas. Over 85% of farmers are unable to access the subsidies, safety nets, benefits and infrastructures created by the Government only for farmers. Thus only big/medium farmers avail of the benefits meant for farmers. Thus only 15 % of farmers may benefit from the massive subsidies for credit, power, fertilisers, MSP benefits, etc. What about the benefits which were supposed to come to the economy after the LPG economic reforms? Maybe urban India has benefited but certainly not rural India with the pauperisation of farmers and rising suicides, a blot on humanity!

Short-term credit or crop loans are meant for inputs purchase like HYV seeds, fertilisers and pesticides and commercial banks, short-term cooperative credit institutions and Regional Rural Banks, medium- term credit needs of farmers are met by commercial banks/RRBs while the infrastructural investments were met by the long-term cooperative credit structure which is in total disarray, due to non-availability of the Vaidyanathan–II reforms package, in 2008. The RBI had assessed that only 7.2 % of farmers had access to institutional credit in 1951. The NABARD All India Rural Financial Inclusion Survey (2016-17), showed a direct relationship between asset holdings and formal credit access. Thus the availability of scarce subsidised credit for farmers is skewed against the poorer sections of society, the smallholder farmers who need it the most. An ICRISAT study was conducted among about 1000 farmers each in semi-arid areas of AP, Maharashtra, Gujarat, Karnataka and MP depending upon formal and informal credit sources between 2001 and 2014. Credit access was modelled as a function of three sets of variables, representing credit-worthiness of farm households-1) land-ownership status 2) household demographics and 3) asset holdings.

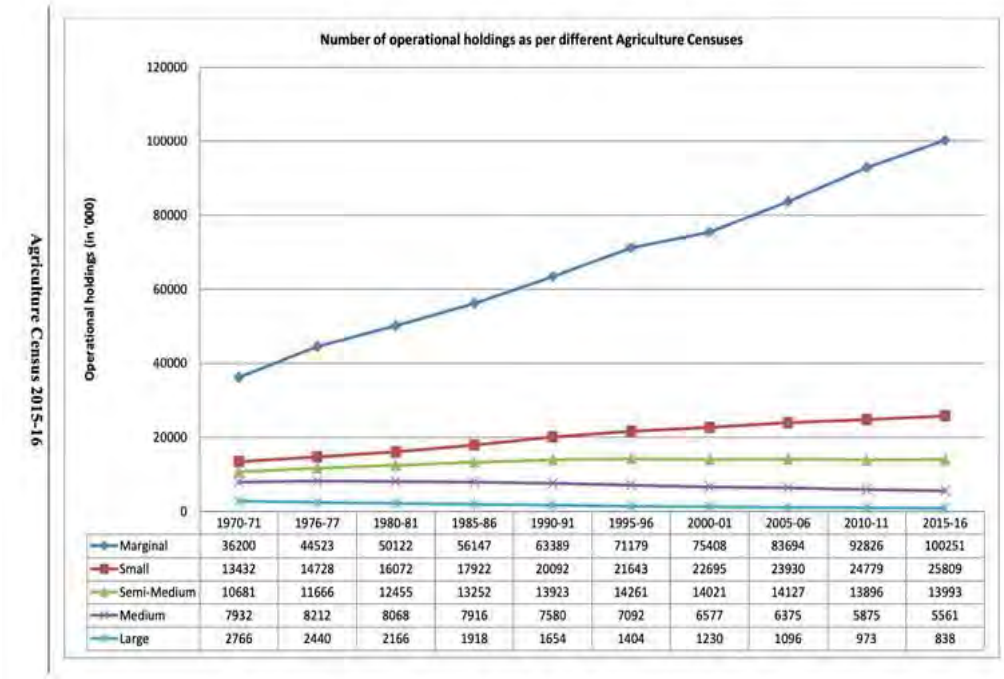
The results were interesting: farmers owning land were 1.4 times more likely to secure formal credit and 1.2 times credit from informal sources, relative to landless farmers. Every additional piece of land increased the accessibility of credit by 1.2 times. Thus smallholder farmers owning 48 % of land in semi-arid areas and agricultural labourers lose out on formal and informal credit. Soil quality also played an important role as land holdings with eroded soils reduced credit access by six times as compared to healthier soils with humus and clay contents. Social hierarchies are good predictors of credit access with caste, education, age and wealth factors linked to credit access. Forward caste farm households are 1.3 times more likely to get farm credit from formal/informal sources when compared to those from the backwards castes. The 2012 agricultural census revealed that SC/ST farm households accounting for over 20 % of landholdings in the country received less than 12 % loans under the KCC scheme. Wealthier households with older and more educated heads were more likely to secure credit, possibly due to better social and economic networks. Also evidence of significant differential access existed among the five States studied, with the wealthier southern states showing better credit access than the western states.

Thus we surmise that the formal agricultural credit system is unable to disrupt social and economic barriers to credit access by farmers. This also reveals that agri-insurance (prior to June 2020), was also not easily accessed by poorer farmers from weaker sections of society. Developing affordable and effective risk management systems that are accessible to all farmers especially the smallholder farmers irrespective of social and economic status, is urgently needed as also access to institutional credit at subsidised rates and access to better market rates, as is small storage yards for farmers produce as also transport systems for produce to access better prices. More Farmers Clubs for technology dissemination as also Joint Liability Groups/Self-Help Groups for credit access and Farmer Producer Organisations are needed to enhance credit inclusion efforts. The need for localised

production systems from seeds to vermicomposting to pest control systems cannot be over-emphasised, during the Covid-19 lockdown. The lessons to be learnt are many but where are rural champions to take up the cause of the voiceless and suffering farmers.

Uneconomic Size of land holdings

This is notwithstanding data that shows more and more farm produce is being sold to private players, instead of the government via MSPs, already. On the other hand, one can understand why farmers are so sceptical about markets. A good example is what happened when the government enforces a ban on onion exports and especially during elections. In doing so, the government prioritised the interests of the consumers over the interest of the farmers (the producers). This is not the first time.



	1970-71	1976-77	1980-81	1985-86	1990-91	1995-96	2000-01	2005-06	2010-11	2015-16
Marginal	36200	44523	50122	56147	63389	71179	75408	83694	92826	100251
Small	13432	14728	16072	17922	20092	21643	22695	23930	24779	25809
Semi-Medium	10681	11666	12455	13252	13923	14261	14021	14127	13896	13993
Medium	7932	8212	8068	7916	7580	7092	6577	6375	5875	5561
Large	2766	2440	2166	1918	1654	1404	1230	1096	973	838

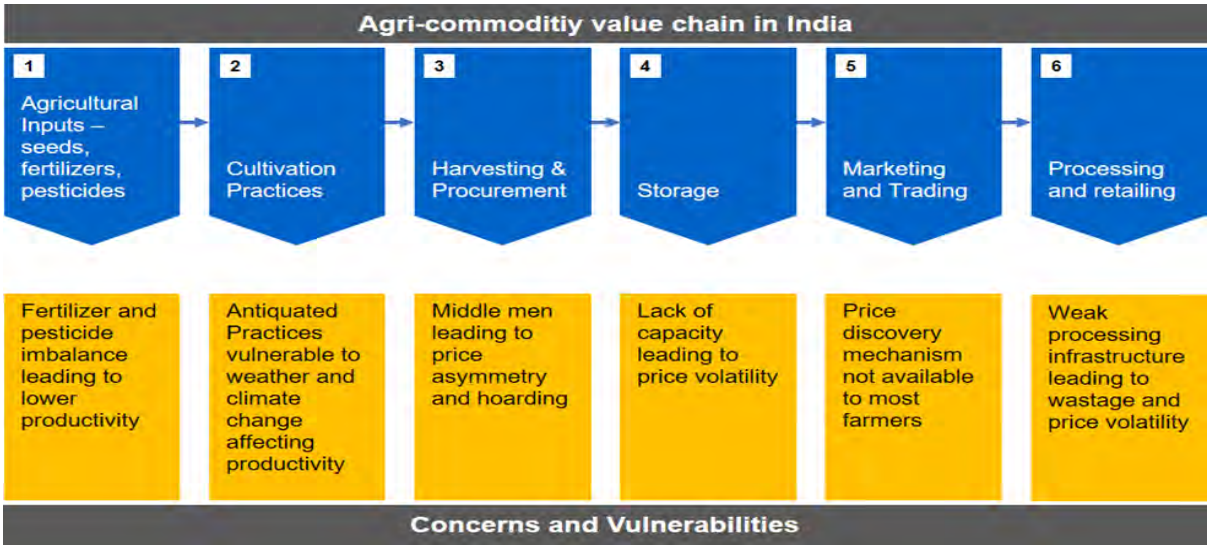
Global Agricultural Exports: India vis-à-vis Major Exporting Countries

India ranks among the top ten exporters of agricultural products in the world. The country's share in global agricultural exports increased from 1.1 % in the year 2000 to 2.2 % in 2017, valued at $39 billion, but fell to 2.1 % in 2019, valued at $37 billion. The annual percentage change in 2019 from 2018 was -4 %. While USA witnessed a decline in its share of global agricultural exports from 13 % in 2000 to 9.3 % ($165 billion) in 2019, Brazil's share increased from 2.8 % to 5.0 % ($89 billion), and that of China increased from 3 % to 4.6 % ($82 billion). In 2019, all the major exporting countries (except Mexico), witnessed decline in agricultural exports from the previous year.There are innumerable examples when the government's decision to protect the consumers from higher prices has resulted in farmers being robbed of the higher prices a free market could have provided them. The milk powder fiasco is another example as is the problem of potato availability. In fact, the MSP, it can be argued, is the embodiment of this distrust. Another underlying structural problem is the lack of information with farmers, which inhibits their ability to make the best decision for themselves. For instance, what is the right price for their produce? Similarly, in the absence of adequate infrastructure to store or transport their produce, they may never have the capacity to bargain effectively even if they knew the right price. Clearly more reforms are needed. The failure to join RCEP is a setback as costly subsidies for agriculture will clearly continue and these do not help improve production and productivity, especially of smallholder farmers.

Ecosystem crucial for benefits of Precision Agriculture

Increasing the share of price realisation to producers: Current low levels of price realisation to farmers (as low as 20% in fruits and vegetables) are primarily due to ineffective price discovery and dissemination mechanisms supply chain intermediary inefficiency and local regulations. Predictive analytics using AI tools can bring more accurate supply and demand information to farmers, thus reducing information asymmetry between farmers and

intermediaries. As commodity prices are interlinked globally, big data analysis becomes imperative. Data from e-NAM, Agricultural Census (with data on over 138 million operational holdings), AGMARKET and over 110 million Soil Health Samples provide the volumes required for any predictive modelling. But how will price discovery help the smallholder farmer in realising better prices for his produce? Suppose he is able to access better prices at private mandis or corporates (ITC, Reliance, etc.), does he command resources to enable him to transport his produce to faraway markets by rail/road?



Our agri-supply chain is severely disrupted and instead of transport costs reducing, they are rising due to inefficiencies in storage, spoilage and rising costs of diesel oil. Rising diesel oil costs also are affecting pumpset operation charges for groundwater extraction. Unless the smallholder farmers form Joint Liability Groups which are federated into Farmer Producer Groups, all these farm reforms translate into nil benefits for them. At the policy formulation level, data availability and AI algorithms can ensure better policies at the District/State and Centre levels. And most important is the upgrading of rural infrastructure like markets (one for every 500 square kms.) roads and bridges, small warehouses for storing farm produce, cold storages, reliable electricity supply, and farmers cooperatives supplying quality inputs at affordable prices(localised seeds/pesticides/fertilisers / farm equipment hire, etc.) Increasing farm mechanisation is now needed as MNREGS availability has ensured that labour when needed is not readily available. Lack of village common lands and lack of fodder as also availability of pure indigenous cattle breeds and fish fingerlings, make it difficult for alternate occupations for farmers. The need to retain educated young men and women, at villages and small towns, in non-farm and off-farm sector jobs, throughout the year is imperative and the rural non-farm sector has to be built up.

Agricultural Value Chain for Smallholder Farmers: Concepts and Systems

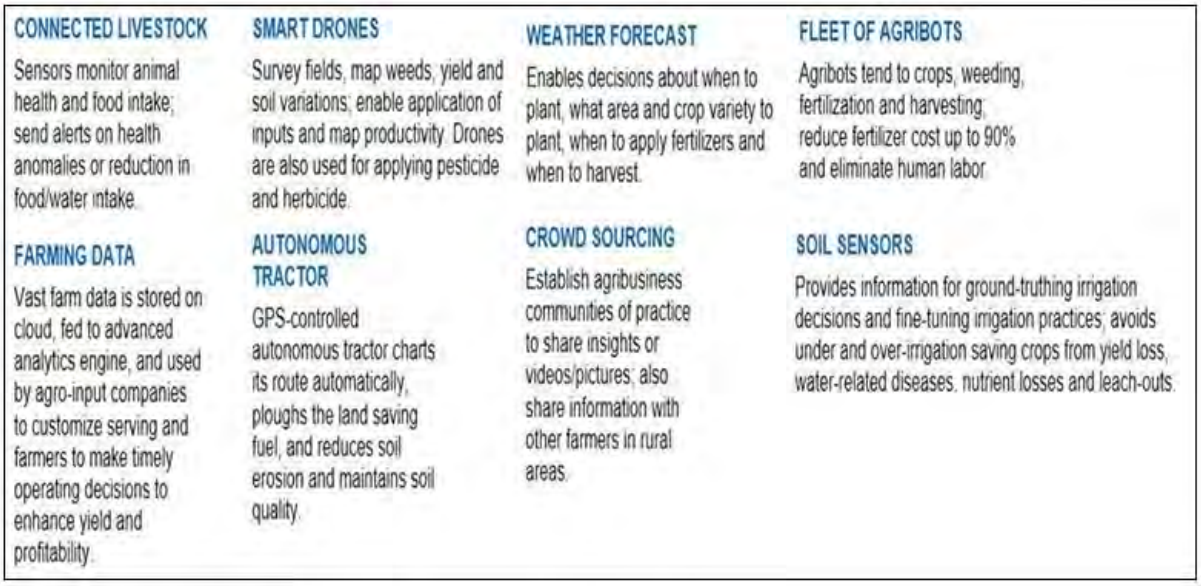
Without proper post-harvest facilities, farmers find it very difficult to enhance profit margins. The State APMC Acts and Essential Commodities Act and a host of outmoded Acts have outlived their utility value and more efficient and modern warehouses, cold storages and private mandis are all essential today. For the smallholder farmer, diversification into animal husbandry and fisheries in ponds is an essential need to diversify risks. ! New Technologies which help to reduce costs and risks, better access to storages, fair spot markets, commodity exchanges where farmer producer organisations co-exist with traders, cheap credit are all essential for commercialising agriculture. More Farmer Associations, Farmer Producer Groups and Joint Liability Groups are needed today to offset the pernicious strangle-hold of traders and agents and ensure better margins for themselves. Capital Investment for enhancing land productivity, building up the assets base and diversifying from subsistence farming into commercial farming, is essential if the smallholder farmer is to survive. Organised retail (though as yet only 3% of the total retail market) is expected to double its share every three years or so and therefore is likely to play a profound role in influencing the nature of future agricultural markets. Other game-changers are the National Food Security Bill, which will be sourcing huge volumes of foods from domestic producers and the National Marketing System for agricultural produce as announced in the Union Budget for 2015-16. Traditional production and supply arrangements are unlikely to prove adequate in meeting challenges posed by these three major developments. An integrated project should provide end-to-end support to producers of high-value agricultural produce [fruits & vegetables (F&V), milk (dairy) and sheep, pigs, goats, poultry (animal rearing)]. The key activities which will help smallholder farmers are project production support, aggregation of produce, value-addition of produce, trading and marketing (product development, packaging,

branding, distribution, and retailing), better financial services. Subsidised credit for farmers, trade credit, warehouse receipts and contract farming arrangements by the financing banks are needed to reduce banks' credit risk and result in better financing of smallholder farmers. Small-scale warehouse may be designed and financed as farmers can hold on to their stocks when the markets are flooded with stock arrivals, store in cold storages/godowns and sell when market prices are more advantageous. Contract farming for smallholder farmers can increase their productivity and gain access to high-value markets but unnecessary players in the value chain need to be removed to reduce costs

Perspectives

Crop insurance or the use of other risk management tools may change what a lender considers adequate. Farmers in the lower end of the income spectrum, will feel financial stress first as margins tighten, while other farmers with incomes that fall more comfortably within guidelines, tend to have the staying power to weather the downturns. An Income/Expenditure app (mobile-based) enables farmers to assess their finances at regular intervals. Financial ratios measure their profitability progress over time, besides meeting bank requirements and benchmark themselves against peers.

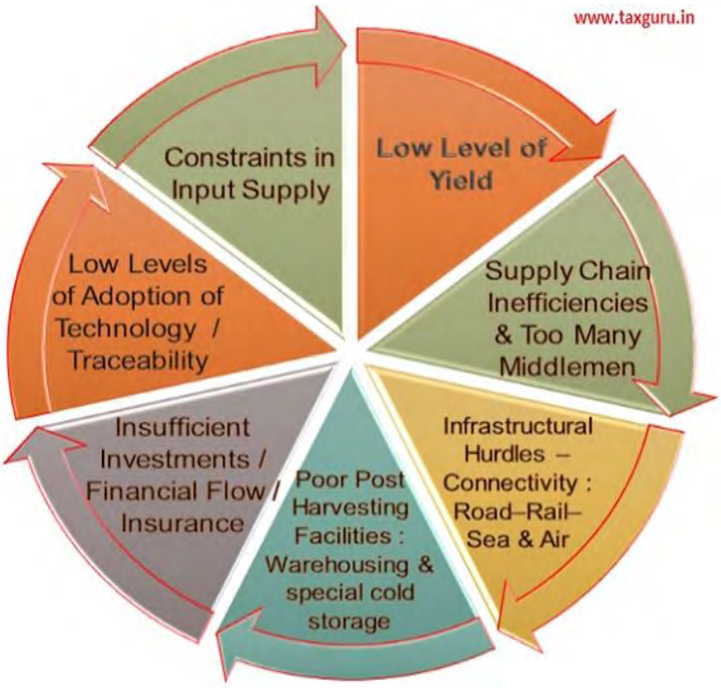
In the end, what will determine the results of this latest set of reforms will be their implementation. If farmers feel robbed and exploited when they participate more fully in the market, they will blame the political masters but if they taste success via better returns on a sustained basis, one that allows them to afford better standards of living, then long-standing doubts being created by some vested interests, will melt away. With the advent of affordable technology, there is a need to inculcate hi-tech solutions which will benefit all farmers and also encourage educated and trained youngsters to remain back in rural areas and work in the farm/nonfarm sectors of the rural economy; some instances of these hi-tech interventions are given below:



Challenges in Indian Agriculture

In a land where roughly 70% of the population resides in rural areas and half of the nation's population farms for a living, the importance of India's agricultural sector cannot be overstated. Despite these massive numbers, the country's agricultural output has been unable to keep pace with growing demands and global competition. According to the World Bank, India's rice yields are one-third of China's and about half of those in Vietnam and Indonesia. With the exception of sugarcane, potato and tea, the same is true for most other agricultural commodities. There are multiple reasons for this productivity gap, but one significant one is glaring inefficiencies in India's agricultural supply chains. Logistics play a critical role in any economic sector, but when goods are perishable, the supply chain becomes that much more important. Much of the blame for these inefficiencies has been placed on the government. The NY Times reports that critics accuse policymakers of focusing on more glamorous, urban industries like information technology, financial services and construction, at the expense of the rural economy.

Another factor is the overall lack of consolidation that has occurred in the agricultural sector, with the majority of production still operating at the single farmer level. The farmers in India are clearly ignoring the problems that reduce their income levels and need to shift their attention to an entirely different set of priorities, as under:



The Cycle of Inefficiencies that are the Bane of Indian Agriculture

Indian Agriculture is clearly tilting at windmills and the real issues that the entire system should be addressing are being swept away under the carpet. After over 70 Years after Independence, farm sector reforms are at the centre of attention possibly for the wrong reasons. The entire farm sector reforms need to be reviewed and a package of measures need to be drawn up and implemented, to benefit all farmers. The Adtiyas and agents also have a role to play in the rural economy but must instead ensure that the rural economic pie is expanded to benefit all stakeholders and the Farmers.

RESOLVING THE CRISIS IN INDIAN AGRICULTURE

Introduction

On the frail shoulders of the Indian farmer, rest the country's hopes for a sustained economic revival. A delayed or poor monsoon and the distress of the farmers is all too evident with a bonfire of hopes, some suicides and a horde of farmers abandoning their farms for an uncertain future in the city slums. Growth today is restricted to the services (tertiary) sector and is either falling or stagnant (in the agricultural/industrial sectors). With rising oil prices (which shoot up the prices of nitrogenous fertilizers and diesel-oil etc.), the input costs of farmers had risen threefold within a short span of a decade while output prices were controlled to meet the needs of urban labourers and led to increasing pauperisation of farmers.With poor quality infrastructure, non-availability of low-cost credit, poor technical knowledge, lack of market access and price information, poor storage facilities, lack of transportation, poor collective bargaining skills, the Indian farmer suffers in silence with only 30% of the profit margins accruing to him for his production risks, weather-risks and marketing-risks, in addition to his back-breaking labour and shrinking farm-land availability, while the traders pocket a neat 70% of the profits with much less risks.

The Indian farmer is born in debt, lives in debt and dies in debt, bequeathing debt to his children. He lives in the shadowy depths of our minds, an anonymous and forlorn figure unhonoured by all, poverty-stricken and uncared for, even though he is the sole custodian of our environment and the protector of our bio-diversity. It is his children who join the armed forces, maintaining vigil on our borders and keeping our enemies at bay. On his frail shoulders, rests the responsibility for food-security of our country. It is his hard labour, perseverance and nurturing skills that have made India self-sufficient in food.

Poor Policy Initiatives

The Central Government and most States have let down the farmers and the farm sector by continuous neglect since 1985. The PL-480 Fund which built up the ICAR research institutions and agricultural universities enabled scientists to contribute to the "Green Revolution" and led India to self-sufficiency in food despite a burgeoning population. The Agri-research systems built up over the years have ensured that our seed-scientists are among the best in the world. But, there is a major disconnect. When agriculture is a state subject, why not build up state-specific and farmer-friendly infrastructure to boost agricultural productivity? Instead, the Centre and the States have parallel institutions and policies which add to all round confusion. Further, if specific targets have ever been given to these huge research institutions built up over the years, then it is a closely guarded secret. No political leaders have ever set specific attainable targets for each of these research institutions. The last Prime Minister to take some interest in Agriculture was Rajiv Gandhi, who set up 6 Technology Missions in the 1980s for Telecommunications, Water, Literacy, Immunisation, Dairy and Oilseeds all under the leadership of Sam Pitroda. While the Technology Mission on Telecommunications was a smashing success, the others came a cropper. Today, we have the largest irrigation system in the world, the 2nd largest country with arable land and over 51% of our labour force is in agriculture. The contribution of Agriculture to the GDP has reduced to 14% and is reducing over the years. Over 82% of our farmers have landholdings of less than 2 hectares. In fact, the average landholding is about 1.25 hectares only and further fragmentation is on. Uniform policies at the State or Central level are meaningless in the above context and only specific district-level agriculture plans with a minimum tenure of 5 years will make sense.

Problems of Technology Choices for Farmers

Why is it not possible to concentrate the country's slender technical and financial resources on research for a few major crops, like Paddy, Wheat, Maize, Cotton, Soya bean, Oilseeds (groundnuts, mustard, sesame etc.), Pulses (Moong, Arhar, Masoor etc.) and Minor Millets (Bajra, Jowar, Ragi) with help in the form of technical expertise from USDA? Why not set annual district-level targets for cereals, oilseeds and pulses? How about encouraging peri-urban vegetable cultivation and horticultural crops for improving the farmers' margins? And if quality seed or productive-levels have not improved, remove the deadwoods who presently adorn the research institutions and agricultural universities. The Central Govt. must set productivity and production levels for each State and each State in turn will set the same for each of its respective districts, with adequate fixing of accountability at all levels for non-performance.

This will however require allocation of adequate inputs and financial resources. The KVKs and the ATMAs have failed to meet the genuine needs of the farmers. Why there is no emphasis on Biotechnology and it's applications in agriculture (except maybe, in bananas)? Why is our agri-productivity level suffering in comparison to China, USA, Vietnam, Costa Rica etc.? Why are spurious seeds, fertilisers and insecticides destroying the lives of farmers? Why is there no agricultural extension system which meets the requirements of improving the financial margins of the farmers as also the crop productivity? How about de-risking the smallholder farmers who bear the production risks (80%) and the marketing-risks (20%) without any real help from the various crop-insurance schemes?

The farmer's needs are few and he requires good seeds (with germination rates of about 90%), rain-water harvesting structures on the lines of the Gujarat model, appropriate rural infrastructure (including modern warehouses, cold storages, transportation and market connectivity as also technical advice in case of emergencies such as droughts, pests, etc.). Can we not ensure these minimal requirements for our farmers? Can we not give dedicated 11 KVA lines for agriculture so that efficient electric pump-sets are used for groundwater extraction, instead of inefficient diesel pump-sets (which should be banned)?

Non-Availability of Credit

Only about 11% of our farmers have access to institutional credit, which is subsidised by Central/State Governments and the effective interest works out to 4% p.a., if prompt loan repayment is made. Lack of proper land records (computerisation which started in 1975, is still going on!), lack of farm accounting records, lack of transparency in sanctioning loans to farmers, the failure of the Co-operatives, lack of rural ATMs and Rural Credit Bureaus have all added to the farmers' woes. There is some flow of credit for crop loans (6-15 months), but long term loans (exceeding 3 years) are only about 15% of the estimated Rs. 6 lakh crores of agricultural credit disbursed in 2013-14. Thus, while production increases, productivity in Indian agriculture is waning and this decline is attributed to the lack of long term credit availability for land improvements, mechanization and farm modernisation. Why the Vaidyanathan-II funds for cleansing the Long-Term Corporate Credit Structure were not made available since 2007, is an enduring mystery which only successive UPA-II Finance Ministers can answer.

The least that can be done by the RBI/NABARD is to ensure that all farmers with landholdings be entitled to a 5-year tenure KCC (Kisan Credit Card), which is chip-based for swift and secure funds-transfer. For oral lessees and tenant farmers, the Joint Liability Group credit facilities are available. The present KCC is a mere pass-book with a 3-year tenure and is not useful for farmers. The 5-year KCC tenure takes care of the normal crop cycle of two good crops, two average crops and one bad crop year over the 5-year period. The crop-insurance scheme (and not the present crop loan-insurance scheme) must be redesigned on a weather-based model and subsidised adequately, so that farmers do not have to commit suicide in case of crop-failures. The draconian APMC provisions have also to be done away with to enable and incentivise farmers to achieve better productivity levels. Some gaps in our agricultural policies exist and need urgent attention (Annexure)

Assisting the Farmers

De-risking the smallholder farmer is a priority by diversifying into horticulture, animal husbandry and fisheries. The farmer does not require handouts or subsidies and should be given due respect in Indian society. Efforts should be made to enhance the knowledge-base and skill-sets of all farmers, as farming increasingly becomes more scientific. The farm sector continues to be unviable for the smallholder farmers with increasing land fragmentation reducing outputs, leading to a vicious cycle of reduced access to modern technologies and credit at subsidised rates. Imbalances in fertiliser usage due to subsidies and subsidised electricity, all have their own attendant problems. The smallholder farmers should be enabled to build up their coping mechanisms with better rural infrastructure. The RIDF (Rural Infrastructure Development Fund) which has been successfully administered by NABARD for about 20 years is reportedly under threat from the Ministry of Finance and the RBI for obscure reasons, which should not be allowed. To ensure better productivity for the farmers, long-term credit flow, infusion of bio-technology, better quality farm equipment, low-cost poly-houses, drip-irrigation systems, balanced fertilisers and micro-nutrients as per soil-tests, are all essential. If Agriculture is really a priority and the plight of farmers is to be reduced, mere lip-service to the farmers' cause will not do and this is a time when actions speak louder than words. Who will plead the farmers' cause and give a helping hand when required?

Urgent Needs of Indian Farmers

40% of Indian farmers are over-indebted and over the past 10 years, 2 lakh farmers have committed suicide. About 60% farm-lands are rain-fed and either droughts or floods affect 40% of all farms in the country. Crop insurance does not provide adequate cover to even 10% of our farmers. Farmers are increasingly impoverished as growing cereals and pulses on a 5-Acre farm, provides only about Rs. 4000 pm to the farmer family. The rural infrastructure is poor and educated rural youngsters are seeking career options in urban areas due to lack of livelihoods. Per capita land-holding has reduced from 0.63 hectares to 0.27 hectares. Agriculture is a very risky business due to monsoon vagaries, input shortages and rising prices, lack of market price and weather advisories and poor extension systems. There are more than

1) 7.5 crore agricultural labourers who are not even classified as Farmers!
2) 7.6 crore Marginal farmers (<2.5 acres) with average holding of 1 acre
3) 2.2 crore Small Farmers (>2.5 and <5 acres)with average holding of 3.5 acres
4) 2.2 crore Large Farmers with holdings exceeding 5 Acres.

The Farmers have serious problems with no focus on rain-fed farming, spurious seeds, fertilisers and pesticides proliferating in the market, middlemen, agents and traders harassing farmers, defunct grass-roots level cooperatives, money-lenders and adtiyas providing credit at usurious terms to farmers as banks are wary of NPAs. Farmer's risks are not being covered and compensation for natural calamities is slow, subjective and inadequate. Rural electric supply is inadequate and subsidies do not reach the farmer. The largest private sector in the country is the Agriculture sector and farm profitability is less than 5% for all major crops and recurring droughts over the last two years has created havoc in farm income levels. The focus must remain on marginal Farmers and agricultural Labourers as they constitute 80% of farmer households. How to ensure their livelihoods, enhance production, their financial margins and agricultural productivity are the pressing needs today. Managing agricultural inputs such as quality seeds, fertilisers, canal water, electricity, credit, insurance and farmer-friendly markets, quality rural infrastructure, and enhance net profits of farmers are all very relevant today. Reducing input costs, increasing investments in Agriculture both public and private, focusing on water management, agri-market reforms and providing weather-based crop insurance are very important issues today as is drought-proofing of Indian agriculture. All the years of neglect and lip-service to Agriculture have virtually killed the Indian Farmer! The Indian Farmer is not a beggar and steps like Farmer Clubs and Associations, Producer Organisations, Joint Liability Groups and innovative Krishi Vigyan Kendras are needed as is financial inclusion and compensation systems with Direct Benefit Transfers to farmers' accounts. Let us give the Farmer his just Dues. Some of the necessary initiatives are:

- Concentrate on building small, decentralised irrigation infrastructures at the village level and improve the storage capacities of existing dams to capture the incoming precipitation and runoff water, especially with increasing frequency of intense rain in short time.
- To treat and reuse wastewater and build better drainage systems in rural areas
- To ensure recharging of groundwater storage basins and watersheds when water is plentiful.
- To adopt drought-resistant seeds and planting materials suited for the local conditions as part of climate-change mechanisms.
- To ensure crop better yields, appropriate crop selection / diversification from existing crop to crops most suited in the agro-climatic zone needs to be implemented.
- More emphasis needs to be given to de-risking with allied agricultural activities like animal husbandry, fisheries, poultry and dairy, floriculture and horticulture to get more produce out of the land, water & other resources, as also to diversify and increase farmers' income.
- To organise local leadership, Self Help Groups (SHGs) and Farmer Producer Organisations (FPOs) to facilitate various needs of the farmers as also to avail benefits of various schemes of Central / State Governments meant for farmers & rural communities.
- Role of Biotechnology and re-cycling of Natural Resources (Bio-waste) should be encouraged as also selecting suitable crop varieties with KVKs taking the lead.
- Skills development and training of farmers should be considered by the local farming community in view of severe Global Warming and Climate Change effects
- Weather forecasting, prompt dissemination of market information and crop advisory should be ensured to each farmer, through mobile phones.
- Appropriate farm mechanisation, including establishment of "Tool Banks" owned by JLGs & FPOs, should be encouraged to reduce avoidable costs, drudgery and to increase productivity.

- Access to credit, insurance and various Government schemes as also computerisation of land Records are essential to the farmer as is accessibility to markets. The State Governments should try to facilitate the creation of FPOs, JLGs, SHGs and Farmer Associations to assist Farmers.

Emerging ICT-based Supply Chain Solutions

Comprehensive agriculture logistics solutions: Private players like Star Agri that provide integrated post harvest management solutions have entered the space to fill these gaps. Apart from providing warehousing services, Star Agri, which recently raised funds from IDFC PE, provides collateral management and other value added services (quality testing, agri-insurance, bulk procurement and rural retailing) to its clients. Sohan Lal Commodity Management, which raised funds from Nexus and Mayfield and Shree Shubham Logistics are other comprehensive agri-logistics solutions players providing services across the spectrum.SV Agri is another player that provides end-to-end solutions for the potato supply chain.Other major players include, National Collateral Management Services andNational Bulk Handling Corporation.

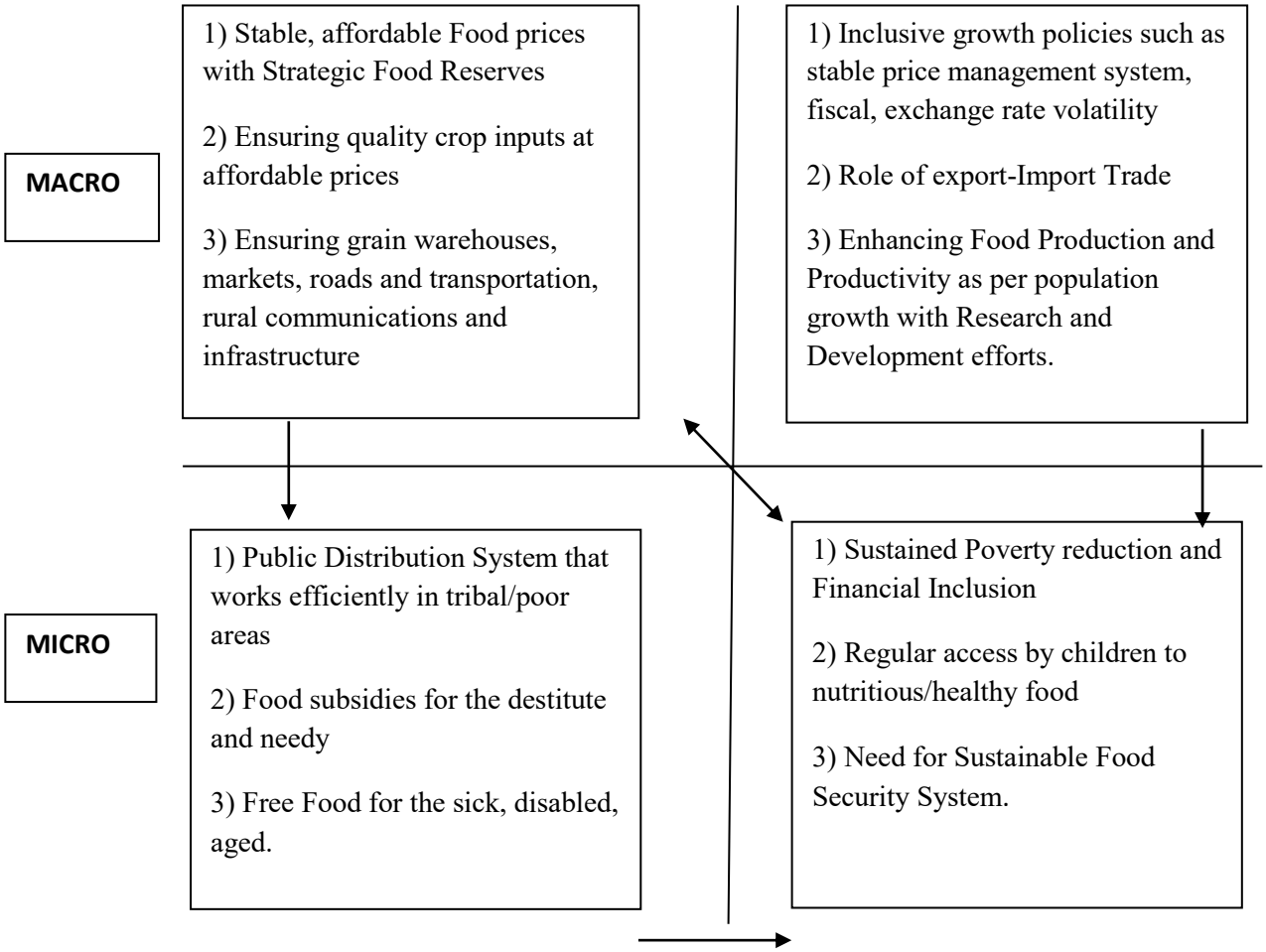
- *Integrated cold chain solutions:* Cold Star Logistics provides customised solutions for cold storage and refrigerated transportation across India for fresh and frozen commodities. Promoted by Tuscan Ventures, a logistics-focused investment firm, their services include specialised refrigerated storage¸ warehousing¸ transportation¸ distribution and logistics.
  LEAF is another unit which works with small holder vegetable farmers in South India. LEAF provides integrated cold chain logistics comprising post-harvest transport, cold storage, processing, and supply through refrigerated-trucks to the distribution center and retail store. Apart from this, LEAF is also involved in contract farming and agro processing, working on improving income realisations for small farmers through yield improvements, productivity increases, and consistent produce pricing.
- *Alternate market places:* A young innovative company, eFarm, is providing a way to bypass the long chain of intermediaries by directly connecting buyers and sellers of agricultural produce and allied services, via a web and mobile based information exchange platform. This is a B2B (Business to business) model and aims to connect all stake holders in the supply chain: from farmers, to buyers, to suppliers of services like labour and transportation. The portal currently has over 5,000 products.
- *Reducing the information asymmetry:* Riding on the high mobile penetration in rural India, Reuters Market Light and Fasal Intuit are working on the problem of information asymmetry for agricultural producers, by making personalised agricultural market information available to the farmers at minimal costs, through a mobile based service. Since inception in 2009, Fasal claims to have helped close to a million people and created additional value for farmers of over Rs 135 crore According to a 2009 study by ICRIER, RML increased incomes by 5-25% for users.
  TCS' mKRISHI platform offers personalised advisory services to farmers, via mobile phones (SMS and IVR), enabling them to access important information on pesticides, fertilisers, soil and water conservation, and improving access to markets for them.
- *Innovative ICT tools for supply chain management:* Logistimo is a hosted web service for supply chain management, which can be accessed via basic mobile phones and web browsers, which render it uniquely suitable for rural markets. It is a configurable service which offers customers the ability to capture and share data in a simple, low-cost way, empowering them for better logistics decisions.
- The critical factors for success of the E-Kutir model were the quality of training to the social entrepreneur in ICT use, the quality of the individual farmer business plan, soil-testing facilities, financial support for entrepreneurs and the wealth distribution approach. Some factors for failure were lack of liquidity with smallholder farmers, unwillingness on the part of service providers to join in and lack of finance with entrepreneurs. Also various computer application tools are being prepared and field-tested and these tools would be very powerful tools for aiding the smallholder farmer. Some of the work in progress includes:

  1) Farm Resource Management Tool for Crop Planning
  2) Farmer Risk Analysis Tool
  3) Crop Protection Tool
  4) Harvest and Marketing Management Tool
  5) Crop Certification Tool
  6) Impact of MRITTAKA Crop Production Tool

The E-Kutir array of tools being readied for introduction in the market would enable the smallholder farmer to benefit from ICT interventions and would enable them to boost productivity and take steps to enhance agricultural incomes, significantly in the near future. Although it's still early days, these farmer-friendly

solutions should lead to better supply chain management in Indian agriculture, reducing inefficiencies and increasing farmer margin and productivity as well as curbing food waste.

FOOD SECURITY FRAMEWORK FOR THE POOR IN INDIA



Perspectives

There has to be a sound food security framework for the poor so as to stop all starvation and malnutrition deaths. The poor production and productivity levels of farmers reveal the state of continuing neglect of the farm sector and farmers. Food security is of utmost important and all initiatives in agricultural development are welcome. Sustainable, low-cost innovations can unleash the hidden potentials of our farmers. The need for restructuring the rural economy is acute and we are running short of time. Access to timely and hassle free credit as also micro-insurance, is the need of farmers as is access to the latest technology, market prices and weather advisories. All states need to assist in building up essential rural infrastructure so as to develop resource- poor regions which could fall prey to forces out to destabilise the country's march towards peace and progress. An **inclusive model of agricultural development** must enable growth for all rural sectors, with none left behind. Since 2002-03, the rate of growth of Animal Husbandry and Fisheries Sectors has far outstripped the Crop Sector growth and wiser farmers are turning away from cereal crops to vegetable and fruit cultivation, dairy farming, small animal rearing and inland fisheries for diversifying income sources and as de-risking mechanisms. This could harm Food Security in India.

Annexure:

Gaps in Agri-Governance: Suggestions for Consideration

A) Agri-Input Issues

1) Ways of increasing water availability with micro-irrigation and suitable agronomy practices to use water better and not waste our water advantage.
2) Farmers choice when it comes to seeds, fertilisers and pesticides (right product at right prices and at right time). Challenges for balanced usage of fertilisers by farmers, increase in the usage of micronutrients as per soil health card deficiencies identified. Wellness approach in farming v/s curative approach, enabling farmers to identify crop problems, with effective ICT tool solutions.
3) The major benefits of better post-harvest management to farmers are required to meet the storage gap for food-grains? Is the existing incentive structure adequate to build small godowns at Panchayat/villages?
5) Funding to farmers thru' Kisan Credit Cards and institutional lending and interest subsidies to continue. Can Farmers have equity options rather than only debt instruments?
6) More commercial farming with horticultural (vegetables/flowers/ fruits) for quick returns and enhancing smallholder farmer margins.
10) Affordable and accessible farm Credit through KCC (chip-based) should be available for a 5-year crop cycle so that farmer returns are evened out.

B) Agricultural and Governance Issues

1) Five year District infrastructural plans and agricultural Plans are essential for planned development and sound rural infrastructure is essential.
2) Gram Sabhas to be given the powers to decide on MGNREGS works such as tanks, water bodies' maintenance, etc. with proper monitoring at grass-roots, avoiding funds wastage.
3) Quality inputs like local/acclimatised seeds, fertilisers, as per soil health cards, pesticides should be available to farmers and traders to manage the inputs supply chain.
4) Rain-water harvesting structures to be mandatory in all villages as per Micro-watershed Model with PPP inputs. Acquifer Recharge to be compulsory in areas notified as dark/grey.
5) KVKs/ATMAs to raise farm productivity: concentrate on Bio-technology and Bio-diversity.
6) Renewable Rural Energy from Bio-mass and use of bio-diesel and Ethanol to be encouraged and supported as in Germany and Brazil.
7) More rural Warehouses to be built and smaller warehouses by cooperatives and Panchayats to help smallholder farmers.
8) Organic and sustainable Farming using SRI Techniques to be encouraged

C) Post-Harvest Issues

1) The scope for weather based agro advisory services and agri-insurance products for the benefit of farmers in view of the key uncertainties faced by farmer and their commercial feasibility.
2) Weather-based crop insurance schemes which benefit the smallholder farmers due to easy and faster pay-outs, should be encouraged in all rain-fed areas with subsidies for smallholder farmers.
3) Scientific study of Post-harvest losses of Farmers to be done by all Agricultural Universities, with innovative solutions to reduce wastage and improve farmers' margins.
4) Technology-based Commodity/Spot Exchanges with FPOs also as Members are necessary to empower smallholder farmers.
5) Use of ICT especially Mobile-based for giving various information to farmers including mandi prices, State/Central schemes, technical assistance and accounting back-up data, would help farmers do better costing management
6) All farmers linked to supply-chains through Farmer Clubs /Joint Liability Groups/ Farmer Associations. APMC Acts to be phased out as they are not farmer-friendly organisations.
7) Farmer Pension/ Health Insurance Schemes (Karnataka Model) to be launched.

AGRICULTURE IS BEEN LEVERAGED TO NEW HEIGHTS IN TELANGANA

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Introduction

The majority of the Indian people live in villages. Agricultural and allied activities continue to be major livelihood work in rural areas of India for a substantial section of people. Apart from being the major source of employment, the agricultural sector undoubtedly plays a crucial role with regard to the food security of the nation. Adoption of modern technology in crop cultivation is a very important feature of agricultural development in Independent India. Telangana – the youngest state of India has no different Tune. Not that the activity is new to sons of its soil. But certainly the present Tune is a Remix filled with energy; that prompted us to pen down few thoughts of the "on ground scenario" in Wanaparthy District of Telangana

Objectives of the study:

- To study agriculture activities in Wanaparthy District of Telangana state.
- Toemphasize on studies for agriculture costing of the various crops
- To study technological up gradation in agriculture
- To suggest suitable policy measures based on the study

Geographical History

As a policy initiative of Government of Telangana post bifurcation the then united Andhra Pradesh to increase the number of districts - Wanaparthy District was formed (out of the erstwhile Mahbubnagar district) and operated from 10-10-2016. Wanaparthy district is located between 16° 36' latitude and 78° 06' longitude. The district consist 224 Villages. Agriculture is the main occupation of the people in the district. About 75% of the total workers are engaged in agriculture. The main crops grown in the district are Paddy, Groundnut, Jowar, Maize, Red gram, Castor, Cotton and Chilies. The total area of 1,78,702 Acres has been cultivated during last year under different crops. The target for the ongoing year is pegged at 2,60,356 acres. (Source: agri.telangana.gov.in)

Soil and Climatic particulars:

Major portion of the land is covered by Red sandy and Sandy loam Soils (89%) which have got characteristic feature of less water retentive capacity, and as such most of rain water goes as run off. Only 11% constitute Black Cotton Soils. The district comes under Southern Telangana Agro Climatic Zone and the annual normal Rainfall is 579.60 mm.

Pro farmer Welfare measures

Revolutionary RythuBandhu Scheme where in the farmers are given Cash Support to meet the cultivation costs at Rs.10,000/- per acre ; Rythu Bhima - Farmers Group Life Insurance Scheme; supported by infrastructural support such as Free Power for Cultivation ; Farm Mechanisation; Soil Health Card Scheme (SHC); created lot of excitement in the thought process of Farming Community. Aptly Pradhan Mantri Kisan Sammann Nidhi (PMKSN) also known as PM Kisan Yojna, an initiative by the government of India also enhanced the enthusiasm. Departments of Agriculture and Cooperation of the state Government has given the required support by hand holding the Farmers.

Image: Paddy and Groundnut fields in wanaparthy District of Telangana state

Ideal Components of Cost of Cultivation of various crops

The costs normally include both the "paid–out costs" and the "imputed costs". The items Covered under "paid–out costs" are predominantly - Hired labour (which includes human, animal and machinery), Maintenance expenses on owned animals and machinery, expenses on material inputs such as seed (home grown and purchased), fertilizer, manure, (owned and purchased), pesticides and irrigation expenses, Land revenue, Rent paid for leased-in land and Miscellaneous expenses. The Imputed Costs such as Value of family labour, Managerial input of Family and Rent of owned land and Interest on owned Fixed Capital for which the Farmer does not incur any cash expenses data are to be analysed. Ideally Depreciation element on implements and Farm buildings such as cattle sheds , machine sheds, storage sheds also required to be included in COSTS. As per the Data from Directorate of Economics and Statistics ,Government of India the average Cost of Cultivation per quintal over the last 5 years for the crop Paddy and Ground Nut (the principal crops in this district) are Rs.1,460/- and Rs.4,360/- respectively. On critical examination of the cost components discussed above – it is a matter of judgement whether the costs reported reflect the actuals or not.

Conclusions:

- The farm sector of India needs a clear Policy and heavy Investment directions for the country to achieve consistent food security and optimal productivity. The district of Wanaparthy of Telangana is no an exception – particularly the irrigational facilities
- The efforts should be made to cover the entire farming gamut i.e water management, use of information technology to improve returns to the farmers, strengthening of the extension services, marketing, infrastructure development, diversification of agriculture and promotion of allied activities are to be strengthened further.
- More importantly ensuring Optimal price to farm produce with special focus on the small and marginal farmers is the need of the hour so as to engage the Village force in an activity that feeds the country and to keep them comfortable with the activity they perform.
- A more scientific approach is required to measure the COSTS so that the monitoring and optimisation of costs is possible.

Finally….

Having selected the Wanaparthy District for our Agri-costing studies; we shall keep the track of the COSTS incurred for the forthcoming seasons. In the process a 360-degree holistic picture can be drawn on the **"cost benefit analysis"** from the perspective of different stakeholders viz., the Farmer and the Society. End of the day – we have to ensure smile on the farmer's face so as to keep the living beings happy forever. "Anna Daatha .. Sukhibhava…"

FROM RURAL LIVELIHOOD SECTOR TO A MODERN BUSINESS ENTERPRISE: A PARADIGM SHIFT OF INDIAN AGRICULTURE SECTOR

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ABSTRACT

The growth in Indian Agriculture sector is not confined to one effort, rather it is because of several small steps that have been taken for the benefit of agriculture and allied activities. It is because of these steps that Indian Agriculture which was considered as a sector of livelihood only for the people living in the rural areas is now considered as the sector for modern business enterprise. People connected with agriculture used to see it as subsistence farming only have now started to see it as the profit-oriented business sector. The article presents how the Indian Agriculture Sector has shifted from just the means of livelihood to the profit-oriented business sector. The discussions, facts and figures, presented in the article are sufficient to prove that the Indian Agriculture Sector has undergone a drastic shift from just a farming for lively hood to modern business enterprise.

(Key Words: *Indian Agriculture, Means of Livelihood, Subsistence Farming, Paradigm Shift, Business Enterprise)*

Introduction:

The Economic Survey 2020-21 says that after 17 years the contribution of Agriculture to India's GDP has remained 19.9%. It was 17.8% in the year 2019-20. The last time when contribution of agriculture sector to the GDP was 20% was in the year 2003-04. It means that almost after 17 years, the agriculture sector could achieve the level of 20%.

Due to CORONA Pandemic and other adversities in the economy, all the other sectors have fallen down, where as agriculture was the only sector which could perform well even in the time of adversities.

The growth in Indian Agriculture sector is not confined to one effort, rather it is because of several small steps that have been taken for the benefit of agriculture and allied activities. It is because of these steps that Indian Agriculture which was considered as a sector of livelihood only for the people living in the rural areas is now considered as the sector for modern business enterprise. People connected with agriculture used to see it as subsistence farming only have now started to see it as the profit-oriented business sector. This paradigm shift is the result of several steps. In this article, we are making an effort to unveil these efforts so that it can be easy to understand how this paradigm shift has taken place.

Review of Literature:

Adnan, N., Nordin, S., M., Rahman, I., and Noor, A., (2018), [1] have made an analysis of the effects of knowledge management and knowledge transfer on the decision making by the farmers. According to them, knowledge transfer makes a great impact on farmers' decision making for sustainable agriculture practices. Knowledge of green fertilizer technology is very important for the agriculture development.

Deichmann, U., Goyal, A., and Mishra, D., (2016),[2] have explained the importance of digital technology in the development of agriculture sector. According to them, the development of agriculture sector in developing countries can be achieved through the digital technology. Applying digital technology in the agriculture sector can enhance the farm production and can be helpful in increasing the farmers' income.

Weersink, A., (2018),[3] has made an analysis of heterogeneity in the growing pattern of the farmers. The author says that if the farmers adopt heterogeneous cropping patterns, they can get more output. The author suggests that farmers should grow various crops in their farms so that they can get more output. A combination of cash crops and grains can be used to get more production.

Faulkner, A., and Cebul, K., (2014),[4]have explained the implications of robotics in the agriculture. According to the authors, using robotics and other smart technologies in the agriculture sector can be more beneficial to the farmers. To increase the agricultural production and resulting income, the famers should use the modern technologies and robotics.

Research Methodology:

This article is basically descriptive in nature. The data and information used in the article are secondary in nature. The authors have used the information from various journals, magazines, newspaper, research papers and articles. The article presents how the Indian Agriculture Sector has shifted from just the means of livelihood to the profit-oriented business sector.

Objectives of the Study:

Following are the objectives of this study:

- To identify the problems that existed in Indian Agriculture.
- To check the government's efforts for modernizing Indian Agriculture.
- To list government's recent initiatives of agriculture development.
- To identify the achievements in the Indian Agriculture.
- To highlight private sector initiatives for the development of Indian Agriculture.

Problems Existed in Indian Agriculture:

In spite of India being an agrarian economy, the growth of agriculture sector has remained sluggish for so many years. Around 65% of the population is engaged with the agriculture sector, still the contribution of agriculture to the GDP of India is only about 20% in the year 2020-21. The last time when contribution of agriculture sector to the GDP was 20% was in the year 2003-04. It means that almost after 17 years, the agriculture sector could achieve the level of 20%. In the previous years, there were some factors responsible for the slow growth of Indian Agriculture. Following factors are responsible for the slow growth of agriculture in India.

- **Heavy Dependence on Nature:**

Indian agriculture was heavily dependent on the rain. The situation of draughts and floods both mar the growth of agriculture in India. Moreover, non-availability of information about the natural disasters makes the situation more vulnerable.

[1]Adnan, N., Nordin, S., M., Rahman, I., and Noor, A., (2018), "The effects of knowledge transfer on farmers decision making toward sustainable agriculture practices: In view of green fertilizer technology", World J. Sci. Technol. Sustain. Dev., 15, PP., 98–115.
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- **Lack of Infrastructure:**

Non-availability of agricultural infrastructure was also a big problem for Indian agriculture. Traditional techniques used for farming, irrigation and storage could not make the most for the farmers.

- **Lack of Irrigation Facilities:**

Proper irrigation has always remained a problem for Indian Agriculture. The farmers did not get enough water supply for their farms. Because of lack of water supply, the farmers could not grow more than one crop throughout the year.

- **Lack of Finance:**

Availability of finance was also a factor hampering the growth of agriculture in India. The farmers who wanted to buy modern farm equipment, did not have enough finance or loan facilities. So, they could not modernize their farms. Whatever finance was available was from the money lenders and shahukars. These money lenders and shahukars charged heavy rate of interest and the farmers could never come out of indebtedness.

- **Illiteracy:**

Because of illiteracy, the farmers did not have awareness of the modern farming techniques as well as the prevailing market conditions. Because of that, they could neither modernize their farms nor sell their products at the best market prices.

- **Lack of Proper Marketing Channel:**

The farmers did not have proper guidance for marketing their produce. They could not connect directly with the customers. The intermediaries and middlemen charged heavy commission for their produce to sell in the market. The farmers did not get the fair price of their produce.

- **Lack of Proper Storage:**

Non-availability of the proper storage facility was also a big problem for the Indian farmers. As a result, their 60% to 70% grain got wasted or rotten. So, they did not get proper return of their toil.

As can be seen from the above discussion that the Indian Agriculture sector faced so many problems. As a result, the agriculture sector could not grow and the farmers used agriculture only for their subsistence. Agriculture sector could not be commercialized and the farming was considered just the means of livelihood for the rural people. As of 2011, Indian agriculture accounted for 16% of the GDP and 10% of export earnings. India had cultivable land area of 159.7 Million hectors which is the second largest in the world after USA[5]. In spite of having a very large cultivable land, India could not make the optimum utilization of the same.

Government's Efforts for Modernizing Indian Agriculture:

In order to overcome the above discussed problems and to modernize Indian Agriculture sector, the government has made many sincere efforts which can be discussed as follows:

- **Virtual Agriculture Market:**

In order to provide an easy marketing facility, the government has created a virtual electronic platform for marketing the farm produces. This platform will enable farmers to sell their produce to the customers anywhere in the country. The government has invested around Rs. 200 Crore for creating National Agriculture Market Online Trading Portal.

- **Rashtriya Krishi Vikas Yojana:**

This program has been set up by the central government to encourage the state governments to invest more fund for the growth of agriculture and allied sectors.

[5]https://en.wikipedia.org/wiki/Agriculture_in_India#:~:text=India's%20arable%20land%20area%20of,the%20largest%20in%20the%20world.

- **Implementing Crop Insurance Scheme:**

In order to protect the farmers from the loss due to crop failure, the government has implemented the PradhanmantriFasalBima Yojana. A nominal insurance premium of 2% of the sum insured for the Kharif crops and 1.5% of the sum insured for the Rabi crops will be charged from the farmers and the remaining premium will be borne by the government. This scheme provides great protection to the farmers and the farmers' confidence in the agriculture increases.

- **Implementing Plans for Irrigation:**

Pradhanmantri Krishi Sinchai Yojana is a great initiative by the government for expanding irrigation facility in the country. The government has decided to spent Rs. 50,000 Crore for irrigation projects in the rural areas. This will reduce the dependence of agriculture on monsoon and the farming activity can be done throughout the year.

- **Developing Institutions for Supporting Agriculture:**

In order to support the agriculture in India, the government has established many institutions such as state agriculture universities, Krishi Vigyan Kendra, Regional Research Institutes, etc. for the development and support of agriculture sector.

- **Providing Finance to the Farmers:**

Finance was the biggest problem in agriculture sector. In order to remove this problem, the government has established NABARD and RRBs for providing credit at the low interest rates to the farmers.

Government's Recent Initiatives for Agriculture Development:

Recently, the government of India has undertaken so many positive steps for developing and modernizing Indian Agriculture. A highlight of the same is presented here:

- The government inaugurated Mega Food Park in Punjab covering the land area of 55 acres with the investment of Rs. 107.83 Crore in November, 2020.
- Tribesindia.com is an e-market place for the organic products sourced from tribes across India. In October, 2020, The Tribal Cooperative Marketing Development Federation of India (TRIFED) included 100 new forest products for selling on this e-market platform.
- NABARD has proposed to set up a subsidiary to provide guarantee for agriculture loans.
- PradhanmantriFasalBima Yojana, PM-Kisan and the Soil Health Card Scheme will be integrated through a common data base along with the land records.
- The government has planned to invest Rs. 20,000 crore in 21 states in the coming 4-5 years for the Pradhan Mantri MatsyaSampada Yojana, e-Gopala App and other developments for fisheries, animal husbandry and agriculture.
- Government has created a Fund of Rs. 15,000 Crore as Animal Husbandry Infrastructure Development Fund in May, 2020.
- In order to boos the export from agriculture, the government has come up with the Transport and Marketing Assistance Scheme (TMA) which will provide financial assistance for agriculture export.
- The Agriculture Export Policy, 2018 was approved by the government in December, 2018 with the aim of achieving agriculture export of US$ 60 Billion in 2022 and US$ 100 Billion in next a few years.
- The government is set to provide Rs. 2000 Crore for computerization of Primary Agriculture Credit Society (PACS) as a movement towards digitalization.
- As a permanent solution of draught, the government is ready to invest Rs. 50,000 Crore for the Pradhan Mantri Krishi Sinchai Yojana (PMKSY) for providing permanent irrigation for the farmers.
- The government has allowed 100% FDI under automatic route for the marketing of food products and food products E-Commerce.

The Achievements in the Indian Agriculture:

With the sincere efforts of the Government of India, the following milestones have been achieved in Indian Agriculture:

- In April, 2016, the government had launched The Electronic National Agriculture Market (e-NAM) which created a unified national agriculture market. It had 16.6 million farmers and 1,31,000 traders registered on the platform till May, 2020. Over 1000 mandis are linked with e-NAM and more 22000 mandis are expected to be linked by 2021-22.
- During FY 2020, the export of tea was US$ 709.28 million and that of Coffee was US$ 742.05 million.
- In 2019, the sale of tractors was 8,04,000 units with the export of 80,475 units.
- Out of 37 Mega Food Parks announced, 21 are already operation as of November, 2020.

Highlights of Private Sector Initiatives for the Development of Indian Agriculture:

Besides the government's efforts, private sector companies also have come forward for the development of agriculture in India. Following points highlight the private sector efforts for Indian Agriculture:

- ITC, an Indian Business Group started "e-Choupals" in June, 2000 to make agriculture supply chain more efficient.
- TATA Group has stated TATA Kisan Kendra which provides various services like agro input service, farm equipment leasing, agronomy service, bulk blending, providing training, pesticides, fertilizers, etc.
- DCM Shri Ram Consolidated Ltd. Has launched Hariyali Kisan Bazaar which runs agri-input retail stores and also provides financial services, market linkages and warehousing facilities.
- PepsiCo India started informal contract faming in India in 1998. Today, PepsiCo India's Potato farming connect more than 12000 famer families across 6 states. PepsiCo provides timely high-quality seeds and other farm inputs free of charge.
- Future Consumer Enterprise Ltd. A subsidiary of Indian Business Group has started India Food Park in Tumkur near Bengaluru City in Karnataka.
- In December, 2020, Godrej Agrovet acquired a land of 28,164 hectare in Telangana with the aim of cultivating oil palm.
- Rallis, a subsidiary of TATA Chemicals is one of the India's leading crop care companies. The company has more than 2300 distributors which reach more than 40,000 retail counters across India for providing crop care solutions.
- Britannia set up an integrated mega food park in Maharashtra in 2018.

These are just a few highlights. There are many more such ventures by the private companies in India to make the Indian Agriculture a modernized, world class agriculture sector.

Conclusion:

From the above discussions, facts and figures, it can be seen that the Indian Agriculture Sector has undergone a drastic shift from just a farming for lively hood to modern business enterprise. The farms are now looking to the agriculture not just as a means of livelihood but they are now doing farming activities with the modern techniques, scientific methods and with the aim of achieving optimum output of their efforts. The farmers' attitude has changed and they are looking their farms as the business enterprise.

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THE STORY OF UNFULFILLED EXPECTATIONS OF INDIAN AGRICULTURE: PLIGHT TO PANACEA

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Abstract

This paper delves into the problems faced by the agricultural sector of India, namely, inefficient organization of markets, labour productivity and curbing of the technological advancement of production methods. Presence of intermediaries reduces the incentive to implement modern technological as it adversely affects the profit of the farmers. Furthermore, the traditional markets create divergence between what the farmers are able to produce and the demand of agricultural commodities on part of consumers. Despite the several ill-effects of Covid-19, one can be optimistic of its consequences for Indian agriculture by ringing in favourable behavioral amendments, both for suppliers and demanders. Lastly, a short review of the policies put in place to address these issues has been discussed.

"No race can prosper till it learns there is as much dignity in tilling a field as in writing a poem"
-Booker T. Washington

Introduction

Indian agriculture has long been a victim of low profit margin being accrued to the farmers with the lion's share of what comes out of consumer's pockets getting channeled to the intermediaries. This impedes the incentivization of commercialization of agriculture whereby higher profits could have motivated the producers to ensure the composition of their agricultural commodities and corresponding distributional arrangements keep pace with the tastes of the consumers. Commercialization of agriculture has to be analyzed from two broad dimensions. First is the dissection of backward linkages between agricultural commodities and the factor markets. The second consists of the market access for the producers where they can sell those to the potential consumers. Focusing on the latter aspect of the two, one of the key features of Indian agriculture from the demand-supply viewpoint is the divergence between the organizational structure and diversification of agricultural supplies and the consumer needs. While the Indian agricultural market is predominantly comprised of traditional spot markets, the demand for the commodities from the perspective of consumers is far from being monochromatic. Preference for variety was already on the rise, which trend is further stimulated by the Covid-19 pandemic. With the onset of the second wave of this pandemic, the need for upgrading of supply chain system for agricultural products is hard to be overemphasized. Such a transition via remedying of the loopholes and enhancing agricultural market efficiency is highly likely to result in substantial reduction in costs, both production and distribution, the fruits of which would be realized by the farmers as well as the consumers. This creates scope for addressing another long-standing issue of Indian agricultural apparatus which strives to achieve stability in prices of commodities and equity in access to the same. Therefore, the strategic management of agricultural cost of production is the call of the hour and the avenues for bolstering this transformation is

broadened due to the behavioral changes on part of producers and consumers of these products with the onset of Covid-19.

Increasing the Organizational Efficiency of Indian Agriculture: Shift from Traditional Market to Retail Stores

The traditional spot markets are by and large unorganized markets lacking the infrastructure necessary for satisfying the changing demand for quality requirements, health, safety and differentiation of products on part of the commodity purchasers. A natural implication of this reality is the rising need for retail agricultural markets which provide an organized structure for selling and purchasing of these goods. In the context of Indian agri-markets, according to Global Agricultural Information Network (GAIN) Report, 2018, the Indian food and grocery (F&G) retail market was estimated to be USD 380 billion, of which 98% is attributable to the traditional retail outlets like neighbourhood stores or kirana stores. The remaining 2% of the share is catered by modern market structures like supermarkets and hypermarkets. The share of modern markets was expected to double by 2020 in reply to the dynamic changes in consumers' demand. With the advantage of hindsight, we can adopt a comparative perspective and analyze the progress made by Indian agri-market structure in terms of increasing the contribution of the modern stores. According to GAIN Report, 2020, approximately 10% of the F&G retail market (which is in turn nearly 65% of total retail business in India) is served by e-commerce and other modern grocery retailers. This signals that India has overachieved in terms of its aim of modernisation of agricultural business.

Some major developments that have contributed to this favourable scenario have been the increasing competition between the foreign as well as domestic businesses to serve the market. A noteworthy development in post-Covid Indian F&G retail market has been the increased industrial consolidation. For instance, Reliance, which boasts to be the largest food retailer in India, with help of WhatsApp of Facebook has been able to tighten its grip over Indian e-commerce market. In the process, it linked various traditional stores to the online platform. This seems to be a precursor for large-scale country-wide transformation of the mechanism of conducting agricultural business in India.

Exploitation and Agony of Farmers: The Famers and Intermediaries

The role of technology-linked agricultural market has far-reaching favourable implications not only for the organizational efficiency and the better fulfilment of consumer needs, but also for mitigating the miseries of farmers in the form of exploitation by intermediaries. This exploitation often manifests itself in the form of the farmers being unfairly starved of their deserved claims and control over the revenue that is earned from selling the commodities at the market. The already low and dwindling profit margin for the farmers, sometimes even producing at a loss due to incorrect anticipations about resultant proceeds from the harvests, naturally inflicts injury to their aspirations. The incentive for innovation, adoption of better technologies to augment output, uplifting the health standards of commodities, increasing the production efficiency, are conditional upon the farmers enjoying a sizable profit margin.

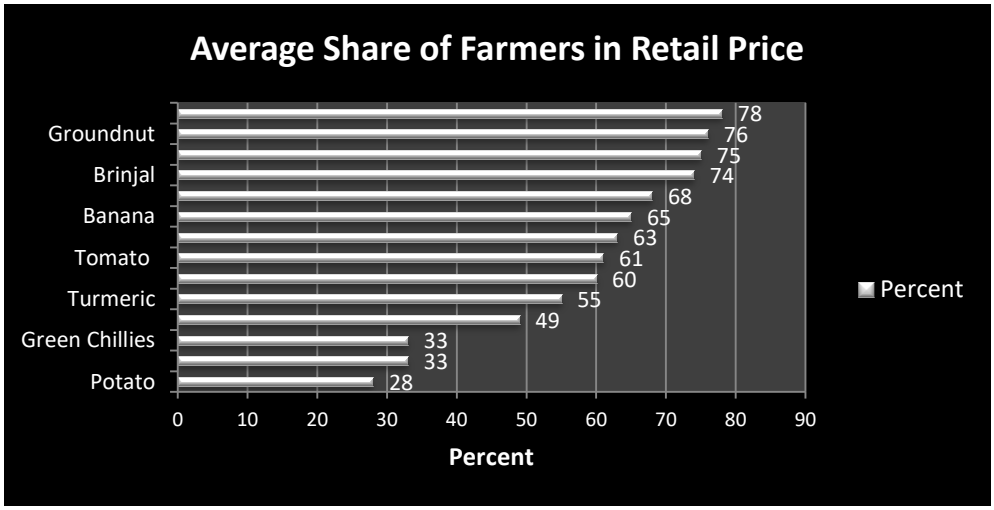

Figure 1. Average Share of Farmers in Retail Price as of 2019
Source: RBI Bulletin, 2019.

Having emphasized the underlying significance of studying the fraction of retail price pocketed by farmers, we turn our attention to some data to have an overview of the prevailing situation of farmers in India. The horizontal bar diagram in Fig. 1 represents the share of farmers, on average, in retail prices across 14 major crops in India in the year of 2019. This can be taken as an indicator of the relative bargaining power of farmers as against the traders and retailers in the event of price formation.

The graph depicts that the bargaining power is far from being homogeneously spread out across the crop varieties. While the farmers command a high share in case of non-perishables, the scenario for perishables (like onions and potatoes) is bleak. Naturally, there is plenty to be done on this front to improve the control of farmers over their produce which is the primary determining factor of innovation in agricultural practice of India which is plagued with inefficient methods of farming.

Indian Agriculture analyzed through the lens of Agriculture Growth Enabling Index

The disparity in the share of Indian population engaged in agriculture and its corresponding contribution to the Gross Domestic Product (GDP) of India suggests urgency for improving productivity of agricultural workers. According to the World Bank's World Development Indicators (WDI), 2018, for the period 2000-2016 the productivity of labourers (measured by value added per worker in USD constant 2010) in service sector is four times, and manufacturing is twice of what it is in Indian agricultural sector. This emphasizes the need for studying the prospect for growth of agricultural productivity in India using reliable index.

Conducive environment for agriculture has positive effects for upgrading agricultural value chains, incentives for augmenting farm infrastructure, and improving economic capacities of these agri-businesses. To that end, the Organisation for Economic Co-operation and Development (OECD) jointly with International Food Policy Research Institute (IFPRI) has constructed the Agriculture Growth Enabling Index (AGEI). The importances of the key components of the index are varied. While economy-wide governance, availability and investment in capital for agriculture, and market operations' efficiency each account for 20% of the index, agriculture/sustainability gets the remaining $2/5^{th}$ weight. Out of 32 countries for which the index is constructed, India stood at 16 on 2015. Its AGEI score is slightly above average. Therefore, boosting efficiency in Indian agriculture is still an unfinished prospect.

Criticisms and Policy Perspective:

Now we consider an overview of some of the policies that have been undertaken for addressing the issues pointed out in the preceding sections of the article. They involve advancing the market structure for transaction of agricultural products, sustainable agriculture, organic farming, as well as crop insurance.

1. **E-NAM (National Agriculture Market):** E-NAM is a pan-India programme. It aims to unify the agricultural market of India. Furthermore it would use real-time data on demand and supply to provide better information and linking the mandis with the electronic platforms.

2. **National Mission for Sustainable Agriculture (NMSA):** In terms of raising agricultural productivity in rain-fed areas, this project is a breakthrough. It is directed towards attaining nutrition management, water use efficiency, and diversification of livelihood. Expectations are that such policy can better the daunting progress regarding agricultural productivity.

3. **Paramparagat Krishi Vikas Yojana (PKVY):** As mentioned in the beginning of this article, there is dynamic evolution in the demand from consumers for agricultural products. One of it involves the desire for commodities being produced through organic farming. The policy PKVY is thus hopeful of propelling the adoption of organic farming in Indian production structure. This would enable sustainable farming as well as ensure the welfare of animals.

4. **Pradhan Mantri Fasal Bima Yojana (PMFBY):** Lack of insurance for crops is an impediment to providing cushion to farmers against uncertainties involved with production and harvesting of commodities. Since the forecasts about the expected revenues are usually inaccurate, therefore the farmers are hit hard when the revenues fall short of the cost. To that end, the PMFBY which is a government sponsored crop insurance programme, has hopes to promote innovation in agriculture. As the farmers are protected from the adverse consequences associated with uncertainties, they are empowered to invest in new technologies to improve their agricultural output.

The preceding policies indicate that the problems persisting in Indian agriculture is not because of the passive attitude of policymakers. Rather various policies have been adopted to improve the agricultural story of India. What is needed is a reassessment of the loopholes in the policies.

Conclusion

The article pointed out the backwardness of Indian agricultural organization, its adverse productivity level, as well as the exploitation of famers at the hands of intermediaries. It has made big strides in terms of overcoming the traditional spot market system for agricultural markets by increasing the share of transactions occurring through modern retail stores, in which aspect it has exceeded expectations. As far as the labour productivity in agriculture is concerned, there is sufficient reason for being concerned about finding ways of improving it. There is wide divergence across sectoral productivity level with the largest employment generating sector of the country lagging far behind. Moreover, the innovation in agricultural method has long been due. It, nevertheless, needs an enhancement of the profit margin of the farmers as well as their coverage against uncertainties to empower them to take the next step and switch to modern agricultural procedures. Evidence suggests that the condition for the perishable goods producers is miserable since they are most discriminated against by the intermediaries. This impedes the adoption of advanced technology in producing the perishables.

On the policy front, there is ray of hope since there have been persistent attempts to ensure betterment of farmers as well as the upgrading of agricultural system. The crop insurance scheme is a huge step in boosting agricultural innovation. Moreover, the drive for organic farming has favourable implications for the dynamic changes in consumer demand. Sustainable farming practices via reduction in reliance on natural sources for water has potential for achieving stability in Indian agriculture. Furthermore, everything is not gloomy with Covid-19 as far as Indian agriculture is concerned. The pandemic has stimulated behavioral changes among producers and consumers which have tilted the market towards being more open to modern forms of agricultural business through electronic platforms. This would improve the efficiency of markets which would have favourable effects for boosting India's AGEI score.

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- Global Agricultural Information Network Report (2018, 2020)
- McCullough, E. B., Pingali, P., and Stamoulis, K. G. (2008): Small farms and the transformation of food systems: An overview in E. B. McCullough, P. L. Pingali, & K. G. Stamoulis (Eds.), The transformation of agri-food systems: Globalisation, supply chains, and smallholder farmers, pp. 3–46. Rome: FAO
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IN QUEST OF LEARNING ABOUT AGRIBUSINESS

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The phrase "Agribusiness" is reported to be first used by Prof. Ray Goldberg and Prof. J H Davis[6]. According to them, "Agribusiness is defined as all the activities concerned with agriculture including farming, management, financing, processing, marketing, growing of seeds and nursery stock, manufacture of fertilisers, chemicals, implements, processing machinery, transportation equipment and the process of transportation itself. Agribusiness is thus the sum total of all operations involved in the manufacture and distribution of farm supplies; production activities on the farm, storage, processing and distribution of farm commodities and items made from them".

A definition of Agribusiness often referred to is from Food and Agriculture Organisation (FAO), which is: "Agribusiness denotes the collective business activities that are performed from farm to fork. It covers the supply of agricultural inputs, the production and transformation of agricultural products and their distribution to final consumers. Agribusiness is one of the main generators of employment and income worldwide. Agribusiness is characterized by raw materials that are mostly perishable, variable in quality and not regularly available. The sector is subject to stringent regulatory controls on consumer safety, product quality and environmental protection. Traditional production and distribution methods are being replaced by more closely coordinated and better planned linkages between agribusiness firms, farmers, retailers and others in the supply chains"[7]

The Agribusiness Council of Australia while adopting Prof. Goldberg's definition of agribusiness further states that 'Agribusiness is the world's largest industry, it is complex, and so too are the variants of the word and its meaning in use'.

The economists often state that Agriculture's share in GDP of India as a percentage has been declining. However, some countries from across the globe have begun reporting share of agribusiness in their respective GDPs which is reported to be rising for some countries like Thailand, Indonesia, Malaysia and Chile. This is highlighted by World Development Report 2008 from The World Bank.

A reading of the above suggests:

i Agriculture can be construed as part of agribusiness and further that farmers can be referred to as "Agripreneurs".
ii Referring to literature accessible in the public domain and otherwise helps in bringing change in the perceptions on Agriculture; and help gain scientific and rationale insights.

[6] J H Davis and Goldberg, A Concept of Agribusiness, Harvard University
[7] FAO's Agribusiness Development program

The objective of this contribution is to share some such literature and sources of information for the benefit of those who are keen to enhance their awareness about or insights on Agribusiness (including Agriculture, as inferred).

A. Books:

1. A Concept of Agribusiness by John Herbert Davis, Ray Allan Goldberg
2. Agribusiness: Fundamentals and Applications by Cliff Ricketts, Kristina Ricketts
3. Agribusiness: Principles of Management by Van Fleet, D. D., Van Fleet, E. W., & Seperich, G. J.
4. Financial Management for Agribusiness by Wesley John Obst, Rob Graham, Graham Christie
5. Agribusiness Management by Freddie L. Barnard, Jay T. Akridge, Frank J. Dooley, John C. Foltz, Elizabeth A. Yeager
6. Principles of Management in Agribusiness by Kenneth D Deft
7. Inclusive Value Chains in India by Malcolm Harper
8. The Oil Palm Complex – smallholders, Agribusiness and the State in Indonesia and Malaysia by Rob Cramb and John F McCarthy (to illustrate the significance of agribusiness in shaping an economy and the influence of the economy on the sector).

B. Reports of Commissions; Policies

1. Report of Royal Commission on Agriculture in India (1928)
2. Report of National Commission on Farmers, led by Dr. M S Swaminathan (2004)
3. Report of High Powered Committee for Formation and Conversion of Cooperative Business into Companies, led by Dr. Y K Alagh (2000)
4. Food Processing Policies of GoI and respective States

C. Publications/Reports

The following publications/reports are suggested with focus only on agriculture and agribusinesses, (this list is at best like a sample!).

1. Agribusiness – Key concepts and their Implications, Prof. Anil K Gupta (IIM A)
2. Agribusiness – an International Perspective, Prof. Anil K Gupta (IIM A)
3. World Development Report (2008) – Agriculture for Development, The World Bank (World Development Report is an annual publication from The World Bank with specific theme of focus each year; the theme under focus for year 2008 publication was Agriculture)
4. The State of Food and Agriculture (This is an annual publication from FAO with specific theme of focus each year)
    a. Women in Agriculture (2011)
    b. Investing in Agriculture for a Better Future (2012)
    c. Food Systems for Better Nutrition (2013)
    d. Innovation in Family Farming (2014)
    e. Social Protection and Agriculture – breaking the cycle of rural poverty (2015)
    f. Climate Change, Agriculture and Food Safety (2016)
    g. Leveraging Food Systems for Inclusive Rural Transformation (2017)
    h. Migration, Agriculture and Rural Development (2018)
    i. Moving Forward on Food Loss and Waste Reduction (2019)
    j. Overcoming Water Challenges in Agriculture (2020)
5. The State of Food Security and Nutrition in the World (FAO Annual publication)
    a. Building Climate Resilience for Food Security and Nutrition (2018)
    b. Safeguarding against Economic Slowdowns and Downturns (2019)
6. The State of World Fishery and Aquaculture, FAO
7. The State of Agricultural Commodity Markets, FAO
8. The State of World Forests, FAO
9. Global Food Policy Report, IFPRI (Annual publication)
10. State of Indian Agriculture (Annual publication from MoA,CnFW, GoI)
11. Sustainability Assessment of Food and Agriculture Systems – Guidelines, FAO (2014)
12. Developing Sustainable Food Value Chains – Guiding Principles, FAO (2014)
13. Towards a Water and Food Secure Future, FAO (2015)
14. Global Review of Water Pollution from Agriculture, FAO-IWMI-CGIAR (2018)

15. The Role of Women in Agriculture, FAO (2011)
16. A Report on Indian Agro Chemical Industry, FICCI (2016)
17. Private Sector Solutions for Helping Small Farmers, GAFSP (2015)
18. Gender in Agriculture – Closing the Knowledge Gap, IFPRI (2014)
19. Gender in Agriculture, IFAD (2009)
20. FAO Policy on Gender Equality – Attaining Food Security Goals in Agriculture and Rural Development (2013)
21. The State of World's Biodiversity for Food and Agriculture, FAO (2019)
22. Digital Financial Services for Agriculture, IFC (2018)
23. Women in Agriculture, Using Digital Financial Services, The World Bank (2021)
24. Agricultural Value Chain Finance Strategy and Design, IFAD (2012)
25. A Regional Strategy for Sustainable Agriculture Mechanisation, FAO (2014)
26. Managing Agricultural Production Risk, The World Bank (2005) (May be read with Principles of Risk Management and Insurance by George E Rejda and Michael J McNamara
27. Building a common vision for sustainable food and agriculture, FAO
28. Contract Farming for Inclusive Market Access, FAO (2013)
29. Global Food Losses and Food Waste, FAO (2011)
30. India and FAO Achievements and Success Stories, FAO (2011)
31. The Benefits and Risks of Solar Powered Irrigation – a Global Overview, FAO (2018)
32. Doubling Farmers Income – Rational, Strategy, Prospects and Action Plans, NITI Ayog (2017)
33. State of India's Livelihoods Report (Annual publication from Access Development Services)
34. Indian Agribusiness – Cultivating Future Opportunities, BCG (2012)
35. Agriculture 4.0 The Future of Farming Technology, WGS (2018)

D. Websites

The websites of the following institutions are suggested to visit and benefit, among others:

1. World Bank Group
2. Food and Agriculture Organisation (FAO)
3. International Fund for Agriculture Development (IFAD)
4. International Food Policy Research Institute (IFPRI)
5. Consultative Group on International Agriculture Research (CGIAR)
6. World Food Programme (WFP)
7. Organisation for Economic Cooperation and Development (OECD)
8. International Labour Organisation (ILO)
9. NITI Ayog, India
10. National Bank for Agriculture and Rural Development, India (NABARD)
11. Indian Council of Agricultural Research (ICAR) and Research Institutes under ICAR.
12. State Agricultural Universities within Indian States
13. Ministry of Food Processing, GoI
14. APEDA, MPEDA, Spices Board, Coconut Board and such others
15. Rainforest Alliance, Olam International, Louis Dreyfus Company and such others
16. Agribusiness Council of Australia
17. Food and Drug Administration (FDA); Global G.A.P; Eurogap, Fair Trade, AAA and such others
18. International Food and Agribusiness Management Association (IFAMA)
19. CSR Initiatives of corporate/businesses
20. Ministry of Agriculture, Cooperation and Farmers Welfare, GoI
21. NGOs/Development Organisations:
    a. PRADAN: https://www.pradan.net/
    b. BAIF Development Research Foundation: https://www.pradan.net/
    c. Dhan Foundation: https://www.dhan.org
    d. MYRADA: https://myrada.org
    e. Others

Celebration and Observance of Agriculture Month – May 2021

The Institute celebrated and observed May 2021 as Agriculture month and organized a series of four National Webinars and several local webinars across the country covering multiple topics relating to "Augmentation of Farmers' Income".

NATIONAL WEBINAR ON "AGRI FINANCIAL INSTITUTIONS FACILITATING AUGMENTATION OF FARMERS' INCOME" – 4TH MAY 2021

The first National Webinar during the Agriculture month was organized by Agriculture Task Force of the Institute in association with Nagpur Chapter of Cost Accountants on the theme "Agri Financial Institutions facilitating Augmentation of Farmers' Income" on 4th May 2021 wherein Dr. G. R. Chintala, Chairman, National Bank for Agriculture and Rural Development (NABARD) has graced the event as Chief Guest. Dr. G. R. Chintala addressed about the vicious circle in which Indian farmers are going through, highlighted the role played by the financial institutions for helping the farmers like giving timely credit at a reasonable cost to the marginal and small farmers, credit being given to women cultivators. He also highlighted the role of Agriculture Infrastructure Fund for helping the farmers and for boosting the Agri exports. He further narrated about the regulations and compliances and Role of FPOs in the agri sector, role of new Rural Infrastructure Development Fund, importance of AtmaNirbhar Krishi and AtmaNirbhar Kisan.

The welcome address was delivered by CMA Kaushik Banerjee, Secretary, ICAI and introductory address was delivered by CMA Anil B. Verma, Chairman, Nagpur Chapter of Cost Accountants, ICAI. CMA P Raju Iyer, Vice President & Chairman – Agriculture Task Force, ICAI delivered his address about observance of May 2021 as Agriculture month, activities of Agriculture Task Force and also highlighted the role of CMAs in agricultural sector. CMA Neeraj D. Joshi, Council Member & Chairman - Management Accounting Committee, ICAI addressed on Cluster Based Business Organization Value Chain and Role of CMAs in agriculture. CMA Biswarup Basu, President, ICAI delivered the Presidential address. Speakers of the technical session - CMA Santosh Sharma, Member, Agriculture Task Force ICAI addressed on Agriculture 5.0., Dr Vinayak Deshpande, Ex Vice Chancellor, RTM Nagpur University, Nagpur addressed about Might & Plight of Indian Farmers, Mr. Rajiv Bahety & Dr. Arun Joshi from Narmada Valley Rural Development, Foundation Trust addressed about

Augmentation of Farmers' Income, Mr. Amit Nafde, Director, Krushi Vikasvagrameen Prashikshan Sansthan, Buldhana, Maharashtra addressed on Role of FPOs in improving Farmers' Income, CMA P V Bhattad, Past President, ICAI and CMA Dr. Sreehari Chava, Member of Agriculture Task Force, ICAI addressed on need for Agriculture Cost Management. CMA Shriram Narayan Mahankaliwar, Regional Council Member, WIRC, ICAI summed-up all the speeches. CMA Chittaranjan Chattopadhyay, Council Member and Chairman Indirect Taxation Committee & Banking, Financial Services & Insurance Committee, ICAI and CMA (Dr.) K Ch A V S N Murthy, Council Member and Chairman Journal & Publications Committee & Regional Council & Chapters Coordination Committee, ICAI also addressed in this Webinar. Mrs. Jyotsna Rajpal, Agri Cell Coordinator, Nagpur Chapter moderated the entire session. CMA Vijay Kumar Murthy, Secretary - Nagpur Chapter of Cost Accountants, ICAI concluded the programme with vote of thanks.

NATIONAL WEBINAR ON "RURAL DEVELOPMENT AND AUGMENTING FARMER'S INCOME" – 11TH MAY 2021

The 2nd National Webinar was organized in association with Bangalore Chapter of Cost Accountants on "Rural Development and Augmenting Farmer's Income". Dr. K S Murali, Executive Director, MS Swaminathan Research Foundation graced the webinar as Chief Guest. Dr. Murali talked about the challenges in Augmenting farmer's income, areas that require attention for augmenting farmer's income and pathway for doubling the farmer's income. The welcome address was delivered by CMA Manjula B.S, Chairman, Bangalore Chapter of Cost Accountants, ICAI.

CMA Raveendranath Kaushik, Member, Agriculture Task Force, ICAI delivered the introductory address and moderated the whole session. CMA P Raju Iyer, Vice President & Chairman-Agriculture Task Force, ICAI delivered address on observance of Agriculture month & activities of Agriculture Task Force. CMA (Dr.) K Ch A V S N Murthy, Council Member and Chairman Journal & Publications Committee and Regional Council & Chapters Coordination Committee, ICAI highlighted the Role of CMAs in Agriculture sector. CMA Biswarup Basu, President, ICAI delivered the Presidential address. Dr. G.V. Ramanjaneyulu, Executive Director, Centre for Sustainable Agriculture & Expert Director at Sahaja Aharam Producer Company addressed as Guest of Honour in this webinar. Speakers of the technical session - Dr. H.M. Chandrashekar, Director & Associate Professor - Department of Agri-Business Management, Institute of Development Studies, University of Mysore, Dr. Pramod. M. Chandakavate, Faculty, Abdul Nazir Sab State Institute of Rural Development and Panchayat Raj, Government

of Karnataka, CMA Dr. Sreehari Chava, Member, CMA Dendukuri Zitendra Rao, Member, CMA N Raveendranath Kaushik, Member, Agriculture Task Force, ICAI delivered their address. CMA H. Padmanabhan, Council Member and Chairman, Committee for Accounting Technicians and AAT Board, ICAI and CMA Chittaranjan Chattopadhyay, Council Member & Chairman Indirect Taxation Committee and Banking, Financial Services & Insurance Committee, ICAI also shared their valuable thoughts and ideas. CMA Satish. R, Secretary, Bangalore Chapter of Cost Accountants, ICAI offered the vote of thanks and concluded the programme.

NATIONAL WEBINAR ON "ACADEMIC INSTITUTIONS CATALYZING THE AUGMENTATION OF FARMERS' INCOME" – 18TH MAY 2021

The 3rd national webinar was organized in association with Guwahati Chapter of Cost Accountants on "Academic Institutions Catalyzing the Augmentation of Farmers' Income" on 18th May 2021. Prof. Nageshwara Rao, Vice-Chancellor, Indira Gandhi National Open University (IGNOU) was the Chief Guest. Prof. Nageshwar Rao discussed the Agriculture Scenario in India, Agriculture education, Educational Programmes available for the farmers. He highlighted the advantages of the need based programmes in agriculture and allied sciences, innovative Agriculture Programme, etc. The welcome address was given by CMA Rana Bose, Chairman, Guwahati Chapter of Cost Accountants, ICAI and the introductory address by CMA (Dr.) K Ch A V S N Murthy, Council Member and Chairman Journal & Publications Committee and Regional Council & Chapters Coordination Committee, ICAI. CMA P Raju Iyer, Vice President & Chairman – Agriculture Task Force, ICAI delivered address about activities of Agriculture Task Force for augmenting farmer's income. CMA Biswarup Basu, President, ICAI delivered the Presidential address. The webinar was graced by Shri S S Saha, CGM, NABARD as Guest of Honour and Dr. R S Deshpande, Former Director, Institute of Social & Economic Change, Bangalore as technical speaker. The event was also graced by CMA B.B. Goyal, Former Addl. Chief Adviser (Cost), Government of India and CMA Kunal Banerjee, Past President, ICAI, CMA Dr. Sreehari Chava & CMA Santosh Sharma, Members of Agriculture Task Force, ICAI as speakers. CMA Vijender Sharma, Council Member and Chairman, Professional Development Committee &

International Affairs Committee and CMA Chittaranjan Chattopadhyay, Council Member and Chairman Indirect Taxation Committee & Banking, Financial Services & Insurance Committee, ICAI also shared their valuable views and thoughts on the said topic.

CMA (Dr.) K Ch A V S N Murthy, Council Member and Chairman Journal & Publications Committee and Regional Council & Chapters Coordination Committee, ICAI moderated the whole session and CMA Ria Chowdhury Assistant Director & Secretary-Agriculture Task Force introduced the Chief Guest and the speakers. CMA Rupom Sharma, Secretary, Guwahati Chapter of Cost Accountants, ICAI offered the vote of thanks and concluded the programme.

WEBINAR ON THE THEME "AGRICULTURE COST MANAGEMENT" – 25TH MAY 2021

The Agriculture Task Force organized the 4th webinar on the theme "Agriculture Cost Management" on 25th May 2021. Prof. Vijay Paul Sharma, Chairman, Commission for Agricultural Costs & Prices, Ministry of Agriculture & Farmers Welfare, Government of India graced the Webinar as Chief Guest. He highlighted the fact that policy formulation emphasis being shifted from production centric approach to income centric approach in addressing the farmers' issues. CMA Vijender Sharma, Council Member & Chairman, Professional Development Committee and International Affairs Committee, ICAI delivered the welcome address and moderated the whole session. CMA Rakesh Singh, Past President, ICAI and CMA Balwinder Singh, Immediate Past President and Chairman, Training & Education Facilities and Placement Committee & Cost Accounting Standards Board, ICAI delivered their valuable thoughts & ideas on the said topic. CMA P Raju Iyer, Vice President & Chairman – Agriculture Task Force, ICAI delivered address about the Role of CMAs in Agriculture Cost Management. CMA Biswarup Basu, President, ICAI delivered the Presidential address. Dr. A. R. Khan, Chief General Manager, National Bank for Agriculture and Rural Development, Kolkata addressed as Guest of Honour and CMA Gopala Krishna Ayitam, Management Consultant & expert in areas of agribusiness, value chain management, Farmer Producer Organisations (FPOs) addressed on need of Agriculture Cost Management in augmentation of farmer's income. CMA Kishore Bhatia and CMA Dr. Sreehari Chava, Members of Agriculture Task

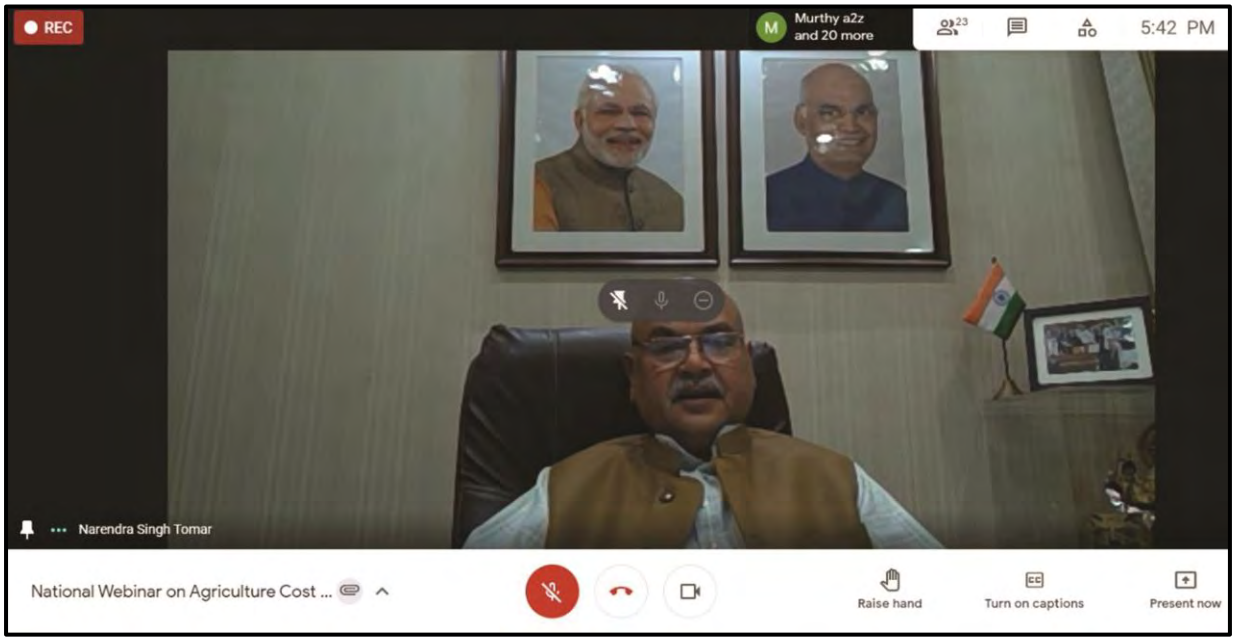
Force, ICAI delivered their presentation on Role of CMAs in Agriculture Cost Management. CMA Chittaranjan Chattopadhyay, Council Member and Chairman Indirect Taxation Committee and Banking, Financial Services & Insurance Committee, ICAI summed-up all the speeches. CMA (Dr.) K Ch A V S N Murthy, Council Member and Chairman Journal & Publications Committee and Regional Council & Chapters Coordination Committee, ICAI concluded the programme with the vote of thanks.

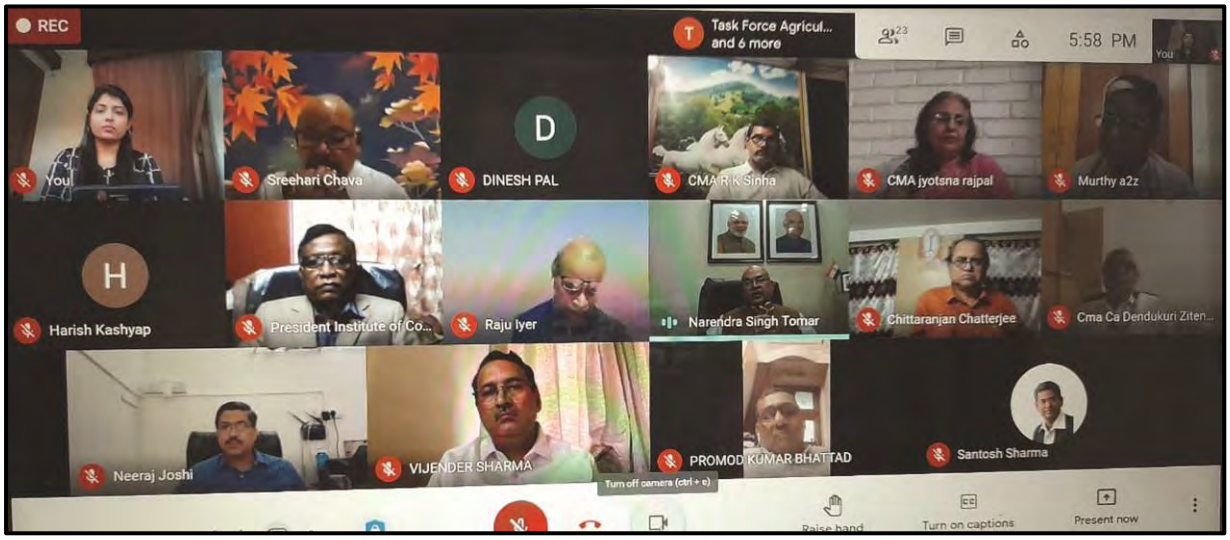
NATIONAL WEBINAR ON THE THEME "AGRICULTURE COST MANAGEMENT" – 26TH MAY 2021

Agriculture Task Force of the Institute concluded this historic Agriculture month with a National Webinar on "Agriculture Cost Management" on 26th May 2021 wherein Shri Narendra Singh Tomar, Hon'ble Union Minister for Agriculture & Farmers Welfare, Rural Development, Panchayati Raj, Food Processing Industries, Government of India addressed as the Chief Guest in this National Webinar. The Hon'ble Minister reiterated the intentions of the Government to ensure that agriculture turns profitable. He appreciated the fact that the Institute has come forward to render its services to the Agriculture Sector and desired that the momentum be taken forward. He was hopeful that the collective efforts will definitely bring in the desired results and increase the income of the farmers. CMA P Raju Iyer, Vice President & Chairman – Agriculture Task Force, ICAI delivered the welcome address. CMA Biswarup Basu, President, ICAI delivered the Presidential address. CMA Dr. Sreehari Chava, Member, Agriculture Task Force, ICAI delivered the presentation on the activities and roadmap of agriculture task force and how Institute and its CMA members can contribute on the growth & development of agriculture sector and in augmentation of farmer's income. CMA (Dr.) K Ch A V S N Murthy, Council Member and Chairman Journal & Publications Committee and Regional Council & Chapters Coordination Committee, ICAI summed-up all the speeches. CMA Vijender Sharma, Council Member and Chairman, Professional Development Committee & International Affairs Committee, ICAI delivered the vote of thanks of the inaugural session. CMA Chittaranjan Chattopadhyay, Council Member and Chairman Indirect Taxation Committee & Banking, Financial Services & Insurance Committee, ICAI addressed in the technical session. CMA Santosh Sharma, Member, Agriculture Task Force, ICAI addressed in the technical session on Agriculture Costing & Pricing, Agri 5.0, Agriculture Value Chain Management and Role of CMAs in Agriculture Cost Management. CMA Jyotsna Rajpal, Coordinator, Agri

Cell, Nagpur Chapter, ICAI moderated the entire session. CMA H. Padmanabhan, Council Member and Chairman-Committee for Accounting Technicians and AAT Board, ICAI offered the concluding remarks of the technical session and concluded the webinar.

All the webinars were participated and viewed by a large number of students, members and other stakeholders. Concepts relating to Agri Cost Management and also the role of CMAs in Augmenting Farmers' Income have been extensively deliberated in all the webinars. The members of the Institute have shown keen interest to gear up themselves to extend their professional contribution to the Agriculture Sector.





Glimpses of National Seminar on Role of Skill Development for Youth Empowerment & Nation Building on 7th November 2021 at Bankura, West Bengal

Lightning of Lamp by Dr. Subhas Sarkar, Hon'ble Union Minister of State, Ministry of Education, Government of India, Shri Niladri Sekhar Dana, MLA, Bankura West Bengal, CMA Biswarup Basu, President, CMA P. Raju, Iyer, Vice President, CMA Balwinder Singh, Immediate Past President and Chairman, T&EF and Placement Committee, CMA Chittaranjan Chattopadhyay, Chairman, BFSI Board & Indirect Taxation Committee of the Institute, CMA Subhash Chandra Samanta, Chairman, Bankura Chapter, CMA Gour Bandhu Gupta, Secretary-Bankura Chapter and CMA Abhijit Dutta - Jt.Treasurer, Bankura Chapter of the Institute in the National Seminar of Role of Skill Development for Youth Empowerment & Nation Building held on 7th November 2021 at Bankura, West Bengal.

Releasing of 2nd Edition of CMA Agri Bulletin in the National Seminar of Role of Skill Development for Youth Empowerment & Nation Building held on 7th November 2021 at Bankura, West Bengal by Dr. Subhas Sarkar, Hon'ble Union Minister of State, Ministry of Education, Government of India, Shri Niladri Sekhar Dana, MLA, Bankura West Bengal, CMA Biswarup Basu, President, CMA P. Raju, Iyer, Vice President and Chairman - Agriculture Task Force, CMA Balwinder Singh, Immediate Past President and Chairman, T&EF and Placement Committee, CMA Chittaranjan Chattopadhyay, Chairman, BFSI Board & Indirect Taxation Committee of the Institute, CMA Dr. Debaprosanna Nandy, Sr. Director - Advanced Studies & Studies, CMA Subhash Chandra Samanta, Chairman, Bankura Chapter and CMA Gour Bandhu Gupta, Secretary-Bankura Chapter of the Institute.

Speech by Dr. Subhas Sarkar, Hon'ble Union Minister of State, Ministry of Education, Government of India in the National Seminar of Role of Skill Development for Youth Empowerment & Nation Building held on 7th November 2021

Behind every successful business decision, there is always a CMA

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