

September 2019



Sowing the policy seeds of a flourishing agriculture sector

Table of contents

Executive summary	3
Messages from ASSOCHAM and PwC	4
Setting the context	8
Policy landscape of Indian agriculture sector: Current scenario, key gaps and strategic interventions	16
Conclusion	44



Executive summary

With the rising population, food insecurity and malnutrition have become serious threats. The world's population is expected to reach 8.5 billion by 2030 and 9.7 billion by 2050; therefore, it is necessary to take measures to tackle these growing threats. Agriculture is the foundation for ensuring food security, and therefore, has been the focus of policy formation. Some common policy measures to strengthen the agriculture sector have been input subsidies, access to finance, price stabilisation, risk management, land policies, consumer-related subsidies, food safety net, trading and market development policies.

In India too, over the past decades, various reforms have been undertaken to harness the potential of the Indian agriculture sector fully. Agriculture is a key driver of the Indian economy and continues to be the source of income for the majority of its population. Therefore, these reforms have been in the form of favourable policies, infrastructure development, extension and knowledge support, financial and input support. However, certain challenges persist in the sector, such as low productivity, sub-optimum price realisation by farmers, lack of market connectivity, post-harvest losses, etc. In a recent initiative to empower farmers, the Government of India presented the agenda of "Doubling Farmers' Income" by 2022. The initiative focuses on farmers at its core, and requires strengthening measures across sub-sectors.

This paper focuses on these sub-sectors, namely, agricultural inputs, agriculture logistics and storage, farm mechanisation and irrigation, agricultural finance, agricultural marketing, agricultural exports, food processing and agribusiness investment and innovation. These sub-sectors play a major role in strengthening the overall agriculture ecosystem of the country; however, they face certain gaps, which it is necessary to address, for development. Multiple policies across these sectors attempt to push them towards growth and sustainability. While these policies consider overall sectoral development, there is scope to further strengthen and streamline them as per the rising demand for change.

It is necessary to optimise farmers' income, strengthen market linkages, and create a more transparent marketing environment to double farmers' income. Further, it is necessary to strengthen India's global position in agriculture through interventions in agricultural export promotion, increasing crop productivity, promoting agribusiness investments and creating an environment conducive to research and innovation.

These interventions, if implemented timely and efficiently, can ensure sustainable growth in the sector and make India a global leader in the agriculture sector.

Message from ASSOCHAM



Balkrishan Goenka

President
ASSOCHAM

Agricultural growth is the source of livelihood for over 50% of the country's population and is thus central to India's economic development. Over the past few years, the agricultural sector in India has witnessed significant changes due to climate change, technology development, and availability of updated and affordable agriculture machinery, among other factors. The Indian government has also supported the strengthening of the agricultural sector through policy measures such as input subsidies, access to finance, knowledge support and market development policies. These form part of the government's larger agenda to 'Double Farmers' Income by 2022'.

With agriculture being the key driver of the Indian economy, it is expected that these measures would collectively harness the full potential of the sector. However, for these measures to take effective shape, certain challenges would need to be addressed. These pertain to irrigation, soil conservation, domestic marketing of products, R&D, certification, availability of quality inputs, infrastructure (including warehousing and cold storage), price realisation by farmers and financial support, among others.

A changing scenario also gives rise to many opportunities for integrating the agriculture chain more efficiently. These opportunities can be precipitated by encouraging the use of technology with modern cultivation methods, effective water

channelisation to water-parched areas and ensuring better gains for farmers. There is a need for comprehensive research on crops, farming systems and markets for agro-produce, with a focus on increasing food production and meeting future demand. The government has also outlined its National Mission for Sustainable Agriculture for guidance on specific dimensions of conserving natural resources, integrated farming, crop diversification, etc.

The white paper has been prepared with the objective of providing impetus to the agriculture sector in India and attaining the position of a global leader.

I hope the pertinent issues of the sector will be deliberated upon at the conference, and it provides an excellent forum for the exchange of ideas and concepts for implementable solutions.

I extend my best wishes for the success of the conference.

Message from ASSOCHAM



Jaidev Shroff

Chairman, ASSOCHAM's National Council on Agri Inputs and Farming Practices and Global CEO, UPL

Agriculture continues to play a primary role in the Indian economy, with a majority of the population dependent on this sector for livelihood. With almost 17% contribution in the GDP, the agriculture sector remains a priority area for the Government and policymakers. Government initiatives, such as Doubling Farmers' Income, electronic National Agriculture Market (eNAM), Pradhan Mantri Annadata Aay Sanrakshan Abhiyan (PM-AASHA) and Pradhan Mantri Fasal Bima Yojana, are driving the sector to become more profitable for farmers and create a suitable policy environment. However, growth in this sector is fluctuating, necessitating the development of infrastructure and logistics, R&D, value addition and market linkages. In addition, there is a need to increase awareness about technology adoption in efficient water management, and reducing food wastage across the value chain. India must also harness its production capacities to generate more export-oriented produce.

Thus, it is necessary to complement the structural changes required in the agriculture sector in India with policy re-orientation and re-alignment.

This paper resonates with the idea of identifying the necessary policy and structural changes, which the Government can consider for the betterment of the sector and align it with the Government's growth strategy for agriculture.

I am confident that this joint effort by ASSOCHAM and PwC India will be instrumental in highlighting the major bottlenecks in the sector and recommending key areas for restructuring to address them, which would drive this sector towards growth in the coming years.

Message from ASSOCHAM



Saurabh Sanyal

Deputy Secretary General
ASSOCHAM

It gives me immense pleasure to note that ASSOCHAM, in its endeavour to contribute to the well-being of the people of India, is organising a conference on 'Indian Agriculture – Agenda for Inclusive Growth' on 19 September 2019 in New Delhi.

Agriculture is the primary source of livelihood for about 58% of India's population. The gross value added by agriculture, forestry and fishing is estimated at INR 18.53 trillion (US\$ 271.00 billion) in FY18.

India is expected to achieve the ambitious goal of doubling farmers' income by 2022. The agriculture sector in India is expected to generate better momentum in the next few years due to increased investments in agricultural infrastructure such as irrigation facilities, warehousing and cold storage. Furthermore, the growing use of genetically modified crops will likely improve the yield for Indian farmers. India is expected to be self-sufficient in pulses in the next few years due to concerted efforts of scientists to get early-maturing varieties of pulses and the increase in minimum support price.

Keeping the above in mind, this conference is being organised to promote investments in agri and allied sectors, enhance

the 'Make in India' initiative and exports, boost research and development in the agri sector, reduce post-harvest losses effectively, increase opportunities in micro irrigation and to promote business potentials in this sector. It will also provide a platform for national and international stakeholders, representatives from union and state governments, investors, policymakers, industry leaders, trade bodies and associations, agro technologists and agri experts to share their expertise in this area. A key aim of the conference is to brainstorm on various actionable ideas for the development of the agriculture sector in India.

I am confident that the deliberations and suggestions at this conference will benefit all stakeholders.

ASSOCHAM sincerely thanks PwC for bringing out a very comprehensive study. This extensively researched publication will highlight the challenges in agriculture and allied sectors and the way forward.

I also appreciate the support received from the corporate partners and the efforts of ASSOCHAM's team led by Mr. Chetan Vij.

Message from PwC



Ajay Kakra

Executive Director
PwC India

Indian agriculture is gradually evolving, changing its focus from basic foodgrain production to becoming a profitable and export-oriented economic activity. Although self-sufficiency and food security continue to be critical components of the sector because of increasing population and rapid urbanisation, there is also a focus on increasing farmer profitability. In addition, it is important to keep pace with the global food and agriculture trends that call for inclusion of technology, research and development, and innovation. The need for development is further underlined by global agricultural challenges, such as the rising threat of global food insecurity, malnutrition, resource insufficiency and climate change. In response, agricultural policies are undergoing changes.

India is also undergoing policy transformation with multiple policies in place to support various agricultural and allied sub-sectors. There is an increasing focus on doubling farmers'

income, developing market linkages, ensuring quality and timely input supply, promoting investments and technology integration. While the policies are well designed to tackle the challenges in this sector, certain aspects require a review to achieve sustainable development and a holistic agricultural economy that is conducive to all stakeholders.

This white paper has been developed considering the major sectors driving the agriculture sector. It aims to examine some of the key challenges that exist in the identified sectors: agricultural inputs, agri-storage infrastructure, farm mechanisation and irrigation, agricultural finance and marketing, agri exports, food processing and investments. It is important to tackle these challenges sustainably and this paper attempts to identify some solutions that can be further developed and explored.

Setting the context

Global agricultural context and policies

As its population continues to rise, the world faces the daunting challenge of a global food crisis. World population is expected to reach 8.5 billion by 2030 and 9.7 billion by 2050,¹ and therefore, this looming crisis further intensifies the need for timely and appropriate mitigation measures to tackle a global food crisis. Development of the agriculture sector is crucial for tackling these growing global threats. However, the sector faces several challenges, which are necessary to address, for sustainable growth in future.

Agricultural productivity: With growing demand for food, it is necessary to increase resource use efficiency. The non-judicious use of inputs has impacted productivity, which has not kept pace with global requirements. The 2018 Global Agricultural Productivity Index™ (GAP Index™) reveals that for the fifth straight year, global agricultural productivity growth is not accelerating sufficiently to sustainably meet the food, feed, fibre and fuel needs of nearly 10 billion people in 2050.²

Shrinking resource base: The growing population is increasing pressure on available natural resources. Studies show that 15 out of 24 ecosystems are already being degraded or used unsustainably.³ Even with sufficient land reserves, limitations exist that might not enable complete conversion to cultivable land. Besides land, fresh water resources and biodiversity are also facing similar challenges that need to be addressed.⁴

Climate change: Climate change presents a major threat to world agriculture affecting production, resources and livelihood. It is estimated that by 2050, because of climate change, an additional 120m people will be at risk of undernourishment.⁵ Further, global mean crop yields of rice, maize and wheat are projected to decrease 3% to 10% per degree of warming and impact livestock through reduced feed quantity/ quality, pest and disease prevalence, physical stress.⁶

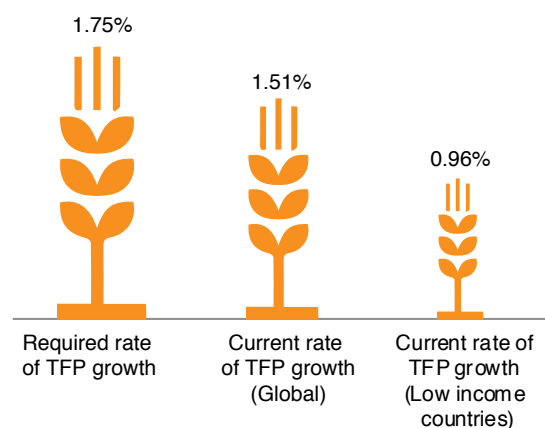
Price volatility: With the growing challenges of resource shrinkage, urbanisation and climate changes, there are high chances of price instability. Globally, markets for agricultural

commodities have exhibited volatility that is asymmetric in nature, demonstrating larger quantum of upward price spikes than of downward price decline.⁷ This makes it necessary to take immediate mitigation measures to avoid high commodity prices.

Rapid urbanisation and evolving food habits: There is an increase in urbanisation, with the expansion of young populations. It is estimated that by 2050, more than two-thirds of the global population will be living in urban areas. This will affect food habits with increasing demand for processed and high-energy foods. This would also impact the population engaged in agriculture, affecting the overall development of the sector.

Besides the above global challenges, FAO has identified the major trends that with these rising challenges will shape the global agricultural landscape. These trends are bound to influence the structural, governance and policy changes at the national and international levels (Figure 2).

Figure 1: The Global Agricultural Productivity Index



¹ World population projected to reach 9.7bn by 2050, UN report

² Tracking productivity: The GAP Index™

³ Millennium Ecosystem Survey

⁴ How to Feed the World in 2050, FAO

⁵ The future of food and agriculture – Trends and challenges, FAO

⁶ The State of Agricultural Commodity Markets: FAO

⁷ Policy options paper on Agriculture and Food Security: New Challenges and Options, World Economic Forum for International Policy

These identified trends are connected to growing challenges in the agriculture sector, which make it imperative to focus on growth and development in the agriculture sector. Increasing population would require an increase in agricultural production, especially in developing nations to combat hunger and malnutrition. The FAO estimated that feeding the world population in 2050 would require raising overall food production by some 70% from 2005-07.

Considering food consumption and population projection, it is necessary to boost the production of key agricultural commodities. Annual cereal production is required to grow by around 1 billion tonnes, meat production by over 200m tonnes, with 72% in developing countries.⁸ Therefore, although the agricultural practices and environment vary across countries, the common challenges span geographies. A key consideration to sustain this tremendous growth requirement would be favourable and informed agricultural policies, which need to be assessed and developed by individual countries.

Evolution of global agricultural policies

With the evolution in agriculture to tackle global issues and development, the policy environment for the sector has also evolved accordingly. There has been tremendous progress in the past few decades in terms of increasing production to address the needs of growing population, such as rise in global production of rice, wheat and maize, which has almost tripled since 1960. This has led to corresponding decrease in food prices. Investments in R&D leading to increase in yield during the green revolution have helped in the judicious use of natural ecosystems. In terms of tackling global hunger, success was achieved in reducing the hunger (protein-energy malnutrition) from about 1 billion people in 1990-1992 (18.6% of total population) to about 870m in 2010-2012 (12.5%).⁹ However, in recent years, there has been a rise in hunger. Factors such as climate variability affecting rainfall patterns and agricultural seasons, and climate extremes such as droughts and floods, are among the key drivers behind the rise in hunger, together with conflict and economic slowdown.¹⁰

Thus, it is necessary to examine and assess global policies and their relevance to the current challenges in the agriculture sector. The global food crisis of 2007-08 has led to some policy measures across developing countries to improve the agricultural ecosystem. These policy trends are shown alongside:¹¹



Figure 2: Major drivers of change: Trends in the 21st century

	Population growth, urbanisation and ageing
	Global economic growth, investment and trade
	Increasing competition for natural resources
	Climate change
	Agricultural productivity and innovation
	Transboundary pests and diseases
	Conflicts, crises and natural disasters
	Poverty, inequality and food insecurity
	Nutrition and health
	Structural change and employment
	Migration and agriculture
	Changing food systems
	Food losses and waste
	Governance for food security and nutrition
	Development finance

Source: FAO. 2017. The future of food and agriculture – Trends and challenges

⁸ Global agriculture towards 2050, FAO

⁹ Solutions for Sustainable Agriculture and Food Systems, Sustainable Development Solutions Network

¹⁰ Global hunger continues to rise, Article by World Health Organization

¹¹ These policy trends have been identified by FAO across 71 developing countries

Policy measures to support producers

Input subsidies: Input subsidies are targeted at farmers to reduce their cost of input and promote use of quality inputs at affordable prices. In Asia and the Latin America and the Caribbean (LAC), input subsidy programmes have been adopted by almost 90% of the nations, while in Africa, 76% to 81% of the nations have taken up these programmes.¹² Both small-scale or ad hoc subsidy programmes and large-scale programmes have been adopted by nations in Asia, Africa and LAC.

Agricultural finance support: Lack of access to finance can be a major gap in agricultural value chains affecting the availability of other resources to the producers impacting the production and quality. Some major financial support measures for producers are:

- Credit expansion
- Interest subvention or subsidy
- Credit guarantee schemes

Price stabilisation and support policies: These policies have been designed to provide a minimum price based on proper price estimations that are supported by the Government to

safeguard farmers when commodity prices drop. The primary objective of these policies is to retain self-sufficiency in primary commodities, support farmers' income, and build grain stock for public distribution.

Risk management policies: Agriculture is a high-risk activity with dependency on weather and climate conditions. Thus, countries are taking initiatives to develop insurance and risk sharing schemes with participation of private players to reach out to producers and increase their risk appetite. A majority of the risk management policies cater to insurance aspects such as public insurance, public-private insurance, reinsurance, premium subsidy, technical support and disaster risk management.

Land-related policies: Land forms an integral resource in agriculture. Land policies are designed to improve access to land for smallholders and marginalised farmers. In Africa, the focus has been on equitable access to land, promoting land tenure security, especially for smallholder farmers, and providing legal recognition of customary property rights. In LAC, the focus has been on implementation of land distribution or broader land reforms, while in Asia, the focus has been on legislative and administrative reform frameworks, e.g. amendment of the Land Acquisition Bill in India.

¹² Food and agriculture policy decisions, FAO



Policy support measures for consumers

Consumer-related subsidies: Consumer-related subsidies are set up to provide fair access to commodities to all households. These subsidies can be direct or indirect in nature. Direct food subsidies are a common practice in Africa. In Asia, India, Indonesia, the Philippines, Bangladesh have large targeted food subsidy programmes. Direct subsidy programmes are less popular in the LAC region. Indirect subsidy programmes being implemented through tax exemptions or price reductions are prevalent in all regions to some extent.

Food-based safety net programmes: Food-based safety net programmes have been designed to tackle hunger and malnutrition. These can be implemented through three methods: free food distribution and nutritional support to weaker sections, school feeding and food-for-work programmes.

Cash-based consumer support programmes: Cash-based consumer support programmes have been taken up in over 90% of Asian and LAC countries and in about 80% of African countries. These programmes can be conditional and unconditional cash transfers, cash vouchers (for food) and cash for work programmes. In India, the Mahatma Gandhi National Rural Employment Guarantee Scheme is a large-scale programme wherein cash is being provided in exchange of labour to combat poverty and unemployment.

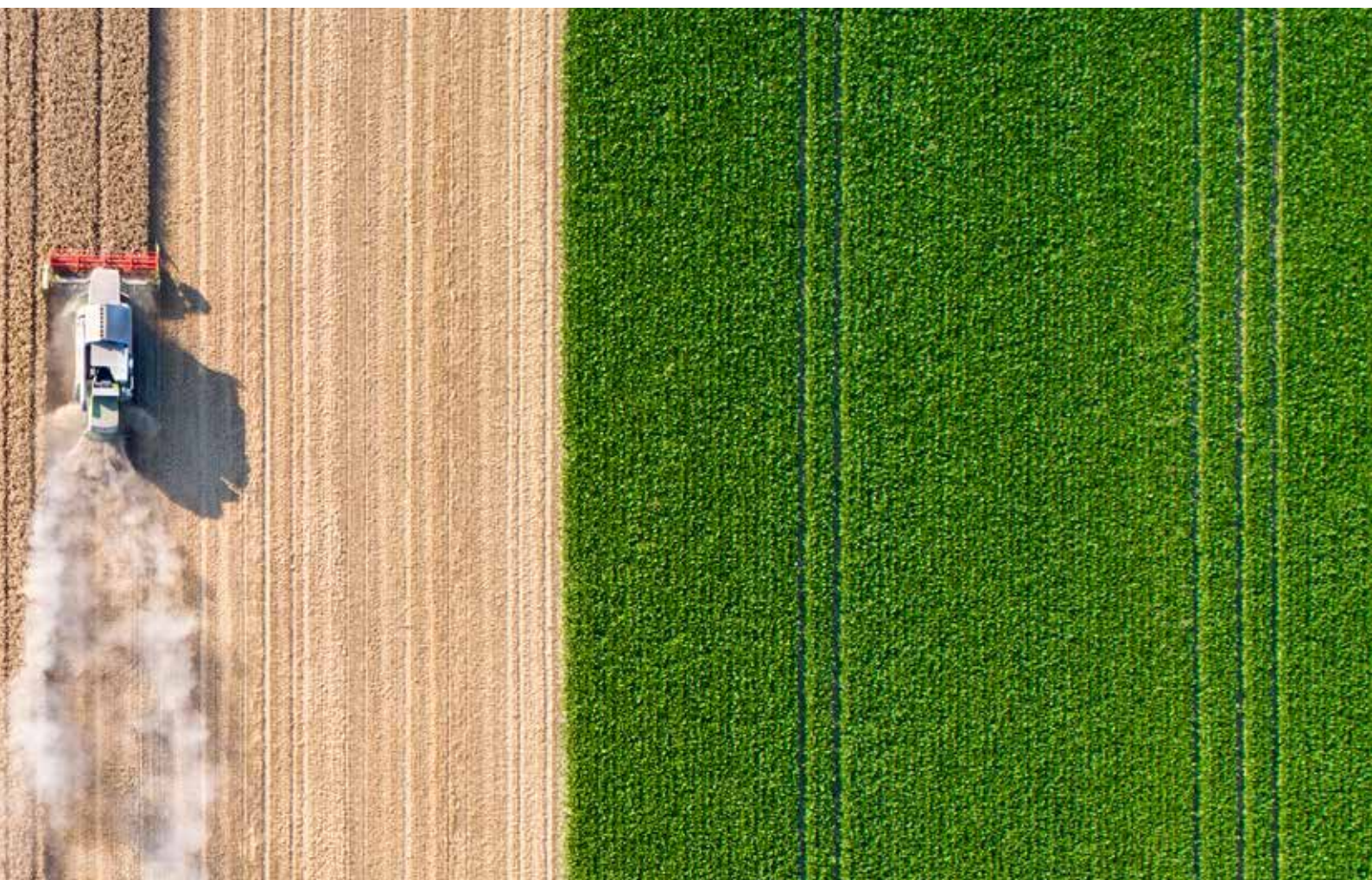
Trade and market development policy measures

Trade policies

Import and export policies: There have been certain changes in import and export policies after the 2007-08 food crisis, although some countries kept their policies unchanged. Some of the ways in which import and export policies have been changed are:

- Tariff reduction or suspension
- Reintroduction of import tariffs
- Ad hoc import bans
- Quota systems
- Export bans on key commodities
- Restricted export through export taxes, Minimum Export Prices (MEP) and quotas

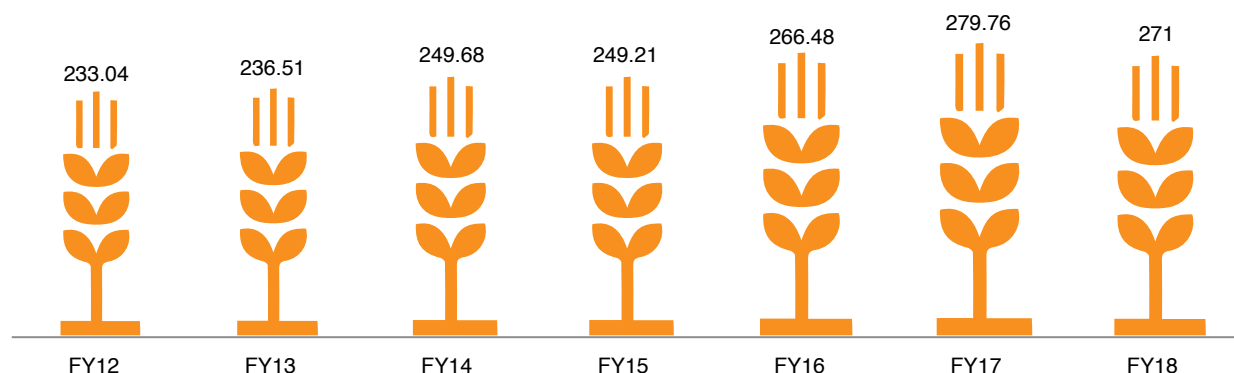
Market development policies: These policies have been developed to address stock management and secure food supplies to prevent price fluctuations and tackle information asymmetry through establishment of modern market development institutions.



Agriculture sector in India: A brief overview

Agriculture forms the mainstay of the Indian economy with more than 50% of the country's population dependent on the agriculture and allied sector and contributing about 17% to the country's Gross Value Added (GVA). The GVA by agriculture and allied activities was estimated at INR 18.53 trillion in FY18. India is the leading producer of milk, pulses, and spices and the second largest producer of rice, wheat, cotton, sugarcane, farmed fish, sheep and goat meat, fruits, vegetables and tea.¹³ The GVA at constant prices for the agriculture and allied sector grew at a CAGR of 3.56% between 2012 and 2018.

Figure 3: Gross value added by agriculture and allied sectors (US\$ billion) at constant 2011-12 prices



Major crops and agricultural production

Indian agriculture is dominated by the cultivation of rice in the kharif season and wheat in the rabi season. Some major crop statistics are tabulated here:

Table 1: Major crop production in India (million tonnes)

Crop	2011-12	2017-18*	2018-19**
Rice	105.30	112.91	115.60
Wheat	94.88	99.70	99.12
Total cereals	242.20	259.59	257.35
Total pulses	17.09	25.23	24.02
Total food grains	259.29	284.83	281.37
Total oilseeds	297.99	298.82	315.02
Sugarcane	361.04	376.91	380.83
Cotton (million bales of 170 kg each)	35.2	34.89	300.87
Jute and mesta (million bales of 180 kg each)	11.40	10.14	10.07

(*As per fourth advance estimates, **as of 28 February 2019)

¹³ India: Issues and Priorities for Agriculture: The World Bank

Challenges in agriculture sector

Despite increasing reforms in the agriculture sector over the years, creating an overall transition, certain challenges continue to exist in this sector, hampering overall growth.

Low productivity: India has constantly faced the challenge of low productivity in agriculture. Indian crop productivity is lower than other top producing countries such as China, Brazil and the United States. Within India, because of varying levels of mechanisation and irrigation, there is wide variation in crop productivity. Factors such as rainfall dependency, imbalanced use of soil nutrients, inadequate access to irrigation, loss of fertility of soil, uneven access to technology, and lack of access to finance have been hindering optimum productivity.

Low level of farm mechanisation: There is limited adoption of technology among farmers due to information asymmetry and lack of sufficient resources, including finances. There is high variation in levels of mechanisation and modernisation across states. Thus, it is necessary to intensify agricultural practices in India through sufficient modernisation and technology intervention, and for it to make an impact, it has to be accessible to farmers of all categories.

Low irrigation uptake: A majority of the farmers in India still practice rain-fed agriculture. Rainfed agriculture accounts for 52% of the total cropped area in India.¹⁴ This creates high levels of unpredictability due to changing weather patterns often leading to heavy losses.

Lack of access to finance: Access to finance is a major tool in agricultural value chain impacting resource efficiency and quality. Despite measures to support financial inclusion among farmers, discrepancies in crop loans, loan waivers and limited awareness creates major hindrances in access to finance.

Reduction in arable land: The per capita arable land in India, which stood at about 0.34 hectares in the 1950s, has declined to nearly 0.12 hectares in 2016. This further intensifies the need to increase per unit yield to tackle the growing challenge of food and nutrition insecurity.¹⁵

Lack of market linkages: To generate proper remuneration, it is essential to form critical backward and forward linkages. Indian agriculture lacks the presence of strong linkages with farmers, creating both knowledge and monetary gaps.

¹⁴ Doubling Farmers' Income- Volume VII

¹⁵ FICCI: Next Generation Indian Agriculture - Role of Crop Protection Solutions



In view of the above challenges, the Indian Government has taken up multiple reforms. Some key flagship programmes are as follows:

Doubling Farmers' Income

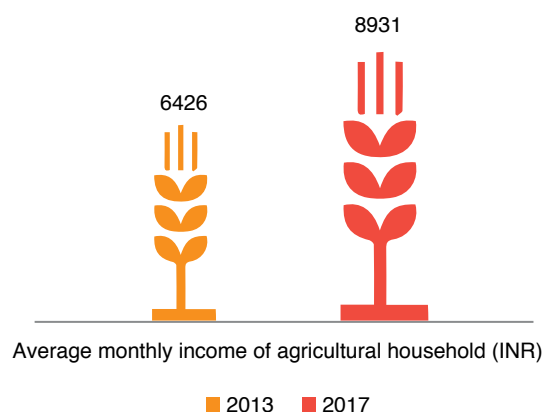
Doubling Farmers' income is the flagship programme of the Indian Government, which targets the doubling of farmers' income by 2022, to create an optimum remunerative agricultural value chain ecosystem for farmers. A recent survey conducted by NABARD, the NABARD All India Rural Financial Inclusion Survey (NAFIS) shows that average agriculture household income was INR 8,931 per month in 2016-17, which is a mere 39% increase from 2013.

These figures demonstrate a need to strengthen the impetus on farmers' income through various reformative initiatives.

It is estimated that doubling farmers' income between 2015-16 and 2022-23 would require an annual growth rate of 10.41% in farmers' income. The identified areas to accelerate growth are as follows:¹⁶

- Improvement in productivity
- Resource use efficiency or saving in cost of production
- Increasing cropping intensity
- Diversification towards high value crops
- Shifting cultivators from farm to non-farm occupations
- Improvement in terms of trade for farmers or real prices received by farmers

Figure 4: Average monthly income of agricultural households (INR)



Kisan Credit Card (KCC): The KCC scheme was started in 1998 as an initiative to provide easy and adequate credit to farmers through formal sources. Credit under the scheme could be utilised for input purchase by farmers to support production needs. The scheme was further extended for the investment credit requirement of farmers, viz., allied and non-farm activities in 2004. The scheme was further revisited in 2012 to simplify it and facilitate the issue of electronic KCC. The cumulative number of KCCs as on 31 March 2018 stood at 176.7m¹⁷ and the operative KCCs stood at 69.2m.¹⁸



¹⁶ Doubling Farmers' Income: NITI Aayog

¹⁷ Pocket Book of Agricultural Statistics, 2018, Directorate of Economics & Statistics

¹⁸ Press Information Bureau, GOI

Pradhan Mantri Krishi Sinchai Yojana (PMKSY): The major objective of PMKSY is to achieve convergence of investments in irrigation at the field level, expand cultivable area under assured irrigation, improve on-farm water use efficiency to reduce wastage of water, enhance the adoption of precision-irrigation and other water saving technologies (more crop per drop), enhance recharge of aquifers and introduce sustainable water conservation practices by exploring the feasibility of reusing treated municipal waste water for peri-urban agriculture and attract greater private investment in precision irrigation systems.¹⁹ The total area covered under micro-irrigation in 2018-19 was 1.16m ha.²⁰

Soil Health Card Scheme: The scheme is designed to support judicious use of fertilisers and other soil nutrients through creation of a soil health database. The scheme envisages collection and testing of 25.3 million samples for generation of 14 crore Soil Health Cards for farmers once in three years. The total samples tested for cycle 1 was 25 million and for cycle two was 26 million²¹.

Paramparagat Krishi Vikas Yojana: Paramparagat Krishi Vikas Yojana aims to support and facilitate organic farming practices in the country to drive sustainable agriculture. The total number of approved farmers under the scheme stands at nearly 3.5 lakh.²²

Pradhan Mantri Fasal Bima Yojana (PMFBY): The PMFBY was introduced on 14 January 2016 to reduce agricultural distress and improve farmer welfare without hefty hikes in the Minimum Support Prices (MSP) of agricultural products prices due to monsoon fluctuation-induced risks. The PMFBY Scheme operates on the basis of “Area Approach,” i.e., defined areas for each notified crop for widespread calamities. During the kharif season of 2017, 3.5 crore farmers were insured under the scheme and claims were paid to 1.4 crore farmers.

Pradhan Mantri Jan Dhan Yojana: Pradhan Mantri Jan Dhan Yojana was initiated to provide formal financial services to the otherwise financially excluded population. The scheme ensures access to financial services, such as the availability of a basic savings bank account, access to need-based credit, remittance facility, insurance and pension.²³

Other supporting Government of India initiatives:²⁴

Besides the initiatives targeted at agriculture development specifically, certain other Government of India programmes are also enabling growth in the agriculture sector by bringing in the required skill and technology in the sector. Some of these initiatives are Make in India, Digital India, Startup India and Skill India.



¹⁹ Soil Health Card Scheme

²⁰ Pradhan Mantri Krishi Sinchai Yojana

²¹ Pradhan Mantri Fasal Bima Yojana

²² Paramparagat Krishi Vikas Yojana

²³ Pradhan Mantri Jan Dhan Yojana

²⁴ Make in India

Policy landscape of Indian agriculture sector: Current scenario, key gaps and strategic interventions

There is a growing impetus to create a policy environment that supports all agricultural value chain stakeholders and to push for sustainable agriculture growth. While several policies and schemes are in place in the agriculture sector, it remains necessary to identify key gaps that are hindering large-scale implementation with maximum impact. The following section attempts to identify these key gaps in the policies and possible recommendations to address them.

Agriculture inputs

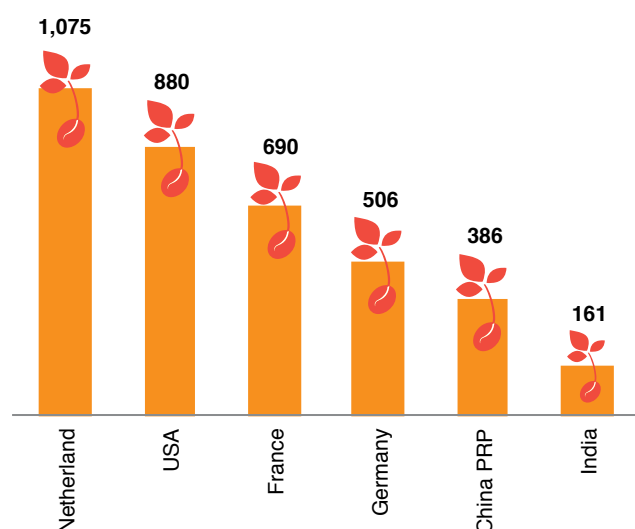
Brief overview

Indian agriculture has consistently struggled with low productivity. Thus, agricultural inputs are a key sector of focus to tackle the challenge of low yield and support the Doubling Farmers' Income initiative.

Indian seed industry

India has a share of 4% in the global seed market. The Indian seed market reached a value of US\$3.6 billion in 2017, exhibiting a CAGR of about 17% during 2010-2017. The seed market is expected to surpass US\$8 billion by 2023.²⁵ Indian seed market is dominated by maize, cotton, paddy, wheat, sorghum, sunflower and millets.

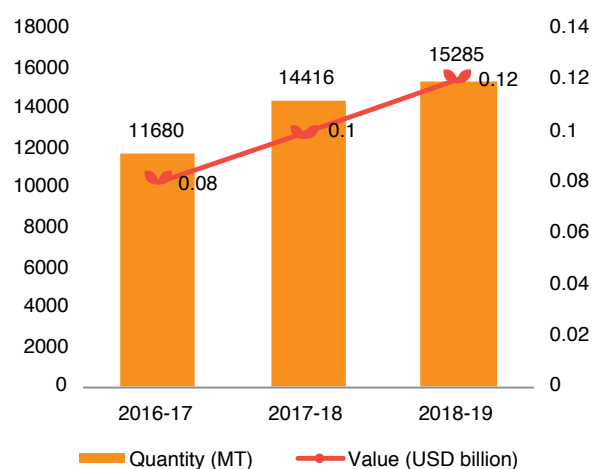
Figure 5: Top countries in F&V seed export (2017, Value in US\$ million)



Source: APEDA



Figure 6: Export of F&V seeds from India



²⁵ Seed Industry in India 2018-2023, Businesswire

India, being a major agriculture-based economy, is also a key player in agricultural seed trade. In 2017, India was the 14th highest exporter of fruit and vegetable seeds (in terms of value). Export quantity and value have also witnessed an upward trend over the past years.²⁶

The sector shows huge potential for growth supported by seed policies in favour of seed producers and exporters. The seed industry is exempted from GST rate on seeds used for sowing purposes only. The Government has also allowed 100% FDI in the development and production of seeds and planting materials.

Policy landscape

National Seeds Policy, 2002²⁷

The National Seed Policy, 2002, provides intellectual property to seed varieties. The key thrust areas of the policy are as follows:

- Varietal development and plant varieties protection
- Seed production
- Quality assurance
- Seed distribution and marketing
- Infrastructure facilities
- Transgenic plant varieties
- Import of seeds and planting material
- Export of seeds
- Promotion of domestic seed
- Strengthening of monitoring system

The key initiatives under the policy were:

- Establishment of Plant Varieties & Farmers' Rights Protection (PVP) to undertake registration of extant and new plant varieties.
- Establishment of National Gene Fund to implement the benefit sharing arrangement, and payment of compensation to village communities for their contribution to the development and preservation of plant genetic resources.
- Plant Genetic Resources for Food and Agriculture Crops to be permitted to be accessed by research organisations and seed companies.
- Establishment of National Seeds Board (NSB) to replace the existing Central Seed Committee and Central Seed Certification Board as the apex body for the seed sector.

Seed Village Programme²⁸

An effective and farmer-friendly model through the Seed Village Programme (SVP) to upgrade the quality of farm saved seeds has been in operation. Under this programme, foundation/ certified seed is provided at 50% subsidy on cereals and 60% subsidy on pulses, oilseeds, green manure seeds and fodder crops limited to 1 acre per farmer. The farmers are also trained on seed production and seed technology at the stages of sowing, flower initiation and harvest. The quality seeds produced by these farmers are used for the following three years and the excess quantity is sold/ shared/ bartered to other farmers locally and in nearby villages.

Sub-Mission for Seed and Planting Material (SMSP)²⁹

The objectives of the scheme include³⁰:

- Increasing production of certified/ quality seed
- Increasing SRR more particularly to achieve higher SRR
- Upgrading the quality of farm saved seeds with specific objective to cover 10% villages and produce 100 lakh quintals of seed each year through farmers participatory seed production
- Strengthening the seed multiplication chain through assistance to public and private sector
- Promoting new technologies and methodologies in seed production, processing, testing etc.
- Strengthening and modernizing infrastructure for seed production, storage, certification and quality control particularly to ensure compliance with the provisions of the Seeds Bill 2004/ISTA standards, OECD certification
- Facilitating movement of seed from India in international trade and increase its share to 10% by 2020 as envisaged in the new policy on seed development
- Ensuring availability of seed in contingent situations
- Facilitating dissemination of seed related information through information, education and communication
- To provide an effective system for protection of plant varieties, the rights of farmers as well as plant breeders and to encourage the development of new varieties of plants

26 APEDA Agriexchange: International Trade Statistics

27 Seednet India portal

28 Seednet India portal

29 Department of Agriculture Cooperation and Farmer Welfare

30 Seednet India portal

Key gaps and strategic interventions

Gaps

Need to promote seed exports: India is an exporter of seed potatoes, seeds of wheat, barley, maize, paddy, sorghum, millet, soybean, groundnut, alfalfa, forage, fruits and spores; and a net importer of sugar beet seed, clover 'trifolium spp' seed, seeds of herbaceous, vegetable seeds (2016).³¹ Thus, there is scope to boost seed exports through standardised and quality domestic production.

Gaps in IP protection and regulation: Many seed companies face the threat of loss of sale because of the availability of duplicate seeds. Many of the proprietary hybrids created by seed companies are copied and sold by in the market because of insufficient IP protection. Besides this, many States such as Maharashtra have mandated three-year trials for the registration of hybrids in the State, which attracts exorbitant costs, further restricting companies from developing and marketing new products.

Need to strengthen seed delivery system: The Indian seed delivery system is comprised of formal and informal systems. Even with investments in the formal sector, as about 60-65% of the seed in use is unlabelled, it shows the deficiency in the seed delivery system. This shows the scope for improvement in the delivery system of seeds. In addition, tribal and hilly

communities also use seed varieties of high quality and benefits. Most of these varieties are not in the seed chain, and could be brought into the informal chain with some amount of genetic purity, by adopting special maintenance breeding methods.³² These farmers' varieties are important for future breeding programs, as they possess useful traits developed through natural evolution. Their integration would enable effective seed delivery to farmers at affordable costs.

Need to increase focus on new variety development: With changes in the environment and resource availability, it is necessary to develop new varieties. Although demand for good quality seed for vegetable production is increasing, the number of vegetable hybrids developed and released by the public and private sectors is limited.³³

High cost of vegetable crop seeds: The vegetable seed production and distribution channels flow from the ICAR-SAUs system to the private sector, which charges royalty for it. The private sector has a strong presence in the hybrid vegetable seed sector leading to higher costs. Cost also increases because of the need of more labour and other inputs. Moreover, farmers have to purchase the hybrid seeds (F1 generation) every time, as the genetic constitution of seeds harvested in the previous season (F1) alters.

Stringent import regulations: Seed import regulations in India are stringent, involving multiple steps for importers. The import



³¹ National Seed Association of India: Seed Times"

³² Doubling Farmers' Income – Volume VII

³³ IASRI: Problems in seed industry

of plant materials into India is regulated as per the purpose of import. Import clearance involves various steps from receipt of reference from customs until recommendation for its release or otherwise, including sampling and detailed testing, which includes bacteriological, mycological, entomological, nematological tests, etc., besides the post entry quarantine (PEQ) testing at the importers' premises under the PEQ facility.³⁴ The process often takes longer and involves complex documentation that needs to be relaxed or reiterated to be simpler.

Strategic interventions

Setting up seed production hubs: Currently, there are no dedicated seed production hubs in India. Setting up dedicated seed production hubs can lead to focused efforts in sector development. Inclusion of the private sector is necessary for the successful operation of these hubs, as it can bring in the necessary expertise to the sector. Government incentives for investment in these hubs can help attract private players.

Export orientation: As mentioned, India has huge scope for promotion of seed exports and requires efforts in this area. The seed production hubs can be oriented towards exports by establishing an export promotion wing. The functions of this wing may include global seed trade assessment, thorough understanding and tracking of seed import requirements

across geographies, and consequently, alignment of the seed production as per import requirements.

Strengthening of Seed Village Programme: Strengthening the Seed Village Programme will improve seed delivery. Seed subsidies for high yielding variety and hybrid seeds may be given to farmers at specified intervals, so that the maximum number of farmers gain access to newly developed seeds.³⁵

Seed cost rationalisation: In the present system for vegetable hybrids, the varieties and hybrids developed by ICAR-SAUs are given to private sector seed companies at nominal rates of royalty. By providing breeder seeds on cost basis to public sector seed organisations, they may be able to produce vegetable seeds on a large scale and provide to farmers at reasonable prices. ICAR-SAUs should also provide variety-wise package of practices for vegetable seed production and technology, along with breeder seeds.

Improving seed traceability: To control the distribution of spurious seeds, improving seed traceability is an important measure that needs to be in place. Using a barcode or Quick Response (QR) Code could be one method. Using these unique codes could help in strengthening seed traceability and enable farmers to track the origin of the seed before purchasing. Besides deterring spurious seeds, it could also help in tracing their origin in case of quality issues.



³⁴ Import and Export procedure: Directorate of Plant Protection, Quarantine and Storage

³⁵ Doubling Farmers' Income – Volume VII

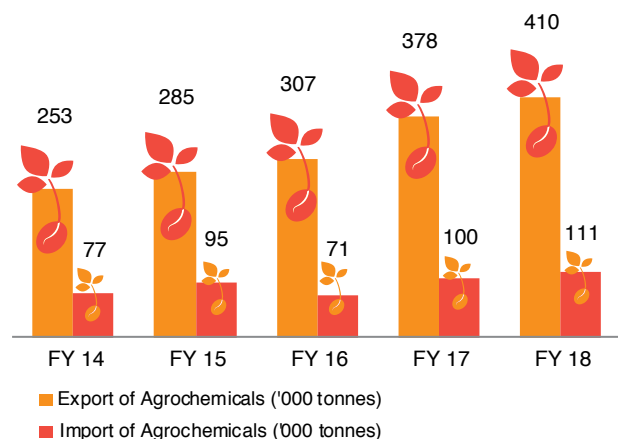
Indian agrochemical industry

The agrochemical industry is also integral to the Indian agriculture. The agrochemical industry is comprised of insecticides, fungicides, herbicides, bio-pesticides and other chemicals, such as fumigants and plant growth regulators. At 53% insecticides account for major share of the market in terms of value followed by herbicides (24%) and fungicides (19%).³⁶ The production capacity of agrochemicals (pesticides and insecticides) in India has increased over the past years to

around 0.29m MT in 2016-17.³⁷ The Indian agrochemical market is pegged to reach US\$6.3 billion by 2019-20.

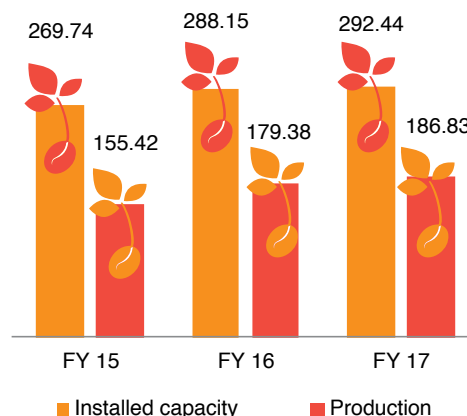
Further, at the global level, India remains one of the lowest users of agrochemicals even though it is a major food producer, as shown in the figures show. While India ranks second in global food production, its share in agrochemical usage is comparatively very low, ranking 13 globally.

Figure 7: Indian crop protection market



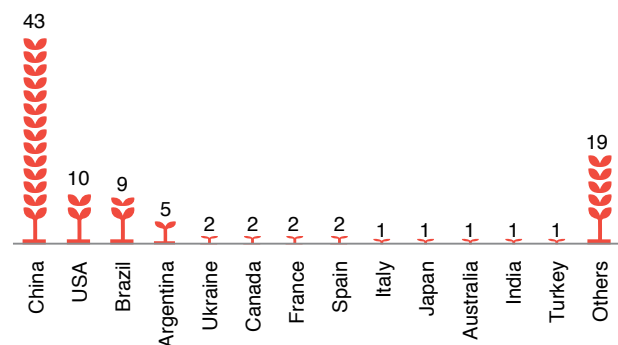
Source: CARE ratings

Figure 8: Capacity and production of agrochemicals in India (pesticides and insecticides) ('000 MT)



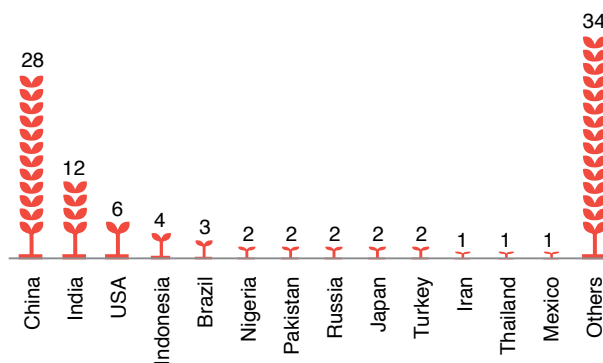
Source: CARE ratings

Figure 9: Share in agrochemical use for 2016 (%)



Source: FAO

Figure 10: Share in agriculture production for 2017 (%)



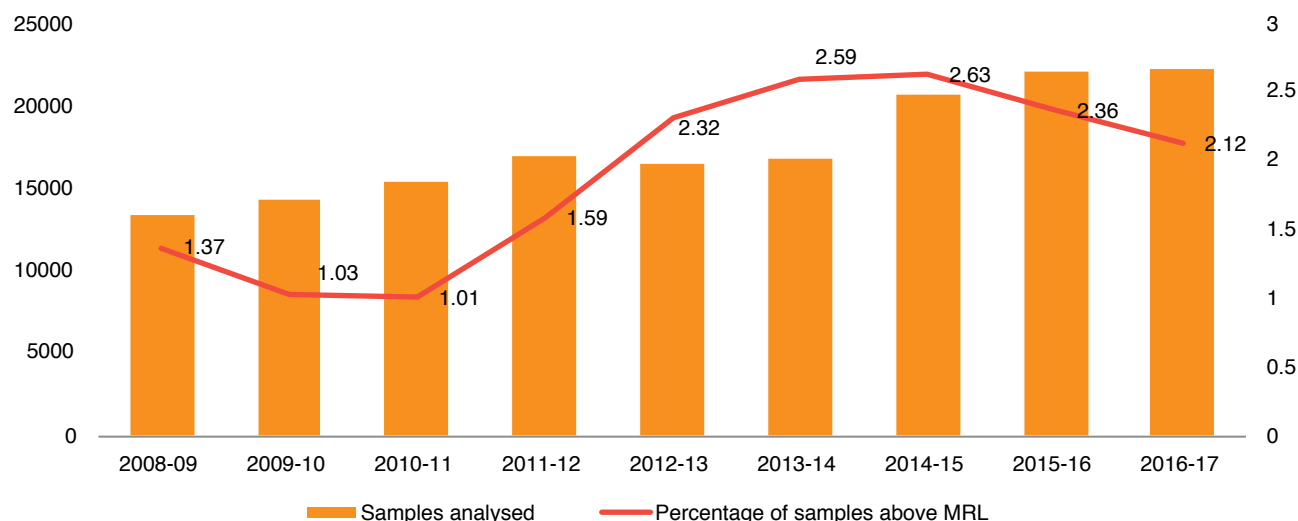
Source: World Bank

³⁶ Doubling Farmers' Income: Role of Crop Protection Chemicals & Solutions: FICCI

³⁷ Annual Report: Department of Chemicals and Petrochemicals

It is also important to note that 98% of agricultural commodities comply with the Minimum Residual Limits (MRL) specified, presenting a positive picture for the export market of Indian commodities.

Figure 11: Pesticide residues in Indian agriculture commodities



Source: All India Coordinated Programme on pesticide residues, ICAR

Policy landscape

Insecticides Act, 1968 and Insecticide Rules, 1971³⁸

The Act addresses the following areas:

- Functions of board, registration committee and laboratory
- Registration of insecticides
- Grant of licenses
- Packing and labelling
- Insecticide analysts and insecticide inspectors
- Provision regarding protection and safety during manufacturing

Key gaps and strategic interventions

Gaps

Low rate of registration of new molecules: The rate of registration of new molecules in India is very low. During FY 2006 to FY 2017, only 0.5% of the registered molecules were new under section 9(3) and 99.5% were registered under section 9(4).³⁹ Further, Indian companies spend around 1-2% of revenues in R&D, while for global multi-nationals, this investment stands at around 8-10%.

Underutilised testing infrastructure: There is one Central Insecticide Laboratory (CIL), and two Regional Pesticide Testing Laboratories (RPTLs) in the country with an annual testing capacity of 4,700 samples. There are 68 State Pesticide Testing Laboratories (SPTLs) with an annual test capacity of 73,547 samples. A comparison of the annual test capacity of all the State laboratories with the total number of registered pesticide dealers, gives a contrasting outcome between existing infrastructure and required infrastructure. As of 2016-17, there were 2,17,407 registered pesticide dealers, whereas the annual test capacity was just 73,547 samples, demonstrating the inadequate testing capacity. However, the existing SPTLs are under-utilised, with only around 70-80% of the total capacity utilised.⁴⁰

Spurious products: There is an increasing menace of spurious or non-genuine products, which lead to crop loss and damage soil fertility, financial losses for farmers, the Government and agrochemical companies. Illegal imports of technical grade chemicals with no Central Insecticides Board (CIB) and Registration Committee (RC) registration has led to the formulation of non-genuine and illegal pesticides locally. In some cases, counterfeiters are selling insecticides as “bio products.”

³⁸ Directorate Of Plant Protection, Quarantine & Storage

³⁹ Doubling Farmers' Income – Volume VII (Under IA 1968, under sec 9(4) registration are granted for already registered insecticides also known as Me-Too

⁴⁰ Doubling Farmers' Income – Volume VII

Strategic interventions

Promotion of new molecule registration: As mentioned above, there is limited new molecule registration in the agrochemical sector. The rationalisation of pesticide regulation is necessary to reduce the time taken to register new molecules and create a more efficient system. Currently, most new molecules with patents are imported. Impetus on the domestic production of new molecules by incentivising such efforts is also necessary.

Strengthening of quality and testing infrastructure: Strengthening of quality and testing infrastructure is also required, such as Central Insecticide Laboratory (CIL), Regional Pesticide and State Pesticide Testing Laboratories (SPTLs), establishment of new Central Integrated Pest Management Centres (CIPMCs) and strengthening of existing CIPMCs for vigorous monitoring and surveillance of agriculture fields and encouraging farmers to adopt IPM.

Regulation of organic pesticides: Currently, the organic pesticides and bio-stimulants category is not covered under the Pesticides Act, and thus, a comprehensive policy for their regulation is necessary.

Harnessing generic molecule manufacturing: By 2020, it is expected that agrochemicals worth US\$4.1 billion will be off-patent. Indian companies, with their established processes in generic molecule manufacturing, can harness this opportunity. India also has the opportunity to take up contract manufacturing with process technologies for more than 60 generic molecules.⁴¹

Promotion of agrochemical export: Currently India accounts for 8% of global agrochemical exports, ranking fifth in the world after China, Germany, USA and France. It is necessary to boost domestic production for both domestic use and exports. This can be done through supporting Government policies that focus on ease of regulatory and industry approvals.

Indian fertiliser sector

Given the heavy dependency of our economy and employment on agriculture, the fertiliser sector continues to be a major focus area for policymakers. Fertilisers played a significant role in the Green Revolution and overall agricultural growth in the country. With the increasing demand for production, usage and growth in the fertiliser sector have also seen an upward trend. However, India still lags behind in average fertiliser usage when compared to developed economies. There are also significant variations in inter-country usage.

Policy landscape

New Urea Policy (NUP)

As per NUP 2015, the energy norms for the 25 gas-based urea units fixed during earlier policies have been mopped up. They are now eligible for the concession rate on the basis of revised energy norms fixed for each group from 1 June 2015 to 31 March 2018. This would be the simple average of pre-set energy norms of NPS-III and average actual energy consumption during 2011-12, 2012-13 and 2013-14 or the pre-set set energy norms of NPS-III, whichever is lower.⁴²

Neem coating of urea

To prevent urea diversion from agriculture, the Department of Fertilizers has mandated that 100% of production by all domestic manufacturers should be neem-coated urea.⁴³

Nutrient Based subsidy (NBS)

The policy provides a fixed nutrient based subsidy for Nitrogen (N), Phosphate (P), Potash (K) and Sulphur (S). The scheme governs 22 grades of decontrolled fertilisers and 15 grades of complex fertilisers. Additional subsidy is also provided on micronutrient and secondary nutrient fortification.⁴⁴

Direct benefit transfer: The Government has introduced the Direct Benefit Transfer (DBT) system for fertiliser subsidy payments. Under the fertiliser DBT system, 100% subsidy on various fertiliser grades shall be released to fertiliser companies, based on the actual sales by retailers to beneficiaries. The sale of all subsidised fertilisers to farmers/buyers will be through point of sale (PoS) devices installed at each retailer shop and the beneficiaries will be identified through Aadhaar Card, KCC, Voter Identity Card, etc.⁴⁵

Key gaps and strategic interventions

Gaps

Imbalanced fertiliser usage: With the launch of the Nutrient Based Subsidy (NBS) in 2010, P and K fertilizers became costlier compared to urea. As a result, the fertiliser consumption ratio (N:P2O5:K2O) widened from 4:3.2:1 (2009-10) to 7.2:2.9:1 (2015-16). This imbalance is leading to poor soil quality and decrease in fertiliser use efficiency.

Poor and incomplete fertiliser prescription: Currently, most of the fertiliser usage is not based on the soil testing report and overlooks the location and crop-specific nutrient status. This may impact the yield levels of the crop. The Soil Health Card

⁴¹ Report on Indian Agrochemical Industry: FICCI

⁴² Fertilizer policy: Department of Fertilizers, GoI

⁴³ Press Information Bureau, GoI

⁴⁴ Fertilizer policy: Department of Fertilizers, GoI

⁴⁵ Department of Fertilizers, GoI

Scheme is one of the positive initiatives by the Government in this direction, although implementation challenges still persist. Linking of Soil Health Cards to other measures like agri finance and subsidies need to be taken up on priority.

Slow pace of innovation: Launch of new fertiliser products is slow because of stringent registration requirements. It takes many years to launch a new fertiliser product in India, leading to delays in launch of new technology products.

Micronutrient deficiencies

Micronutrients have not received adequate focus, and micronutrient deficiencies are widespread in Indian soil. The nature and extent of deficiencies may vary with soil type, crop type and other agro-ecological situations. Intensive cropping of high-yielding varieties of rice and wheat has been noted to lead to deficiency of zinc (Zn) initially, and subsequently of iron (Fe) in rice and manganese (Mn) in wheat. Crops grown in the deficit soil have also started to affect human and livestock health.

Urea usage distortions: Since only agricultural urea is subsidised, subsidised urea has begun to be diverted to industry and across the border. These leakages imply that only 35% or about INR 17,500 crore of the total urea subsidy of INR 50,300 crore reaches the intended beneficiaries, small and marginal farmers. Underpricing of urea compared to other fertilisers, encourages overuse.⁴⁶

Fertiliser use efficiency

Despite increase in fertiliser use in the last few decades, foodgrain production has not grown proportionately. Today, we are producing less food per kg of Fertiliser than we were earlier. The decline in fertiliser use efficiency is attributed to dwindling organic carbon in Indian soils, micronutrient deficiencies and imbalanced fertiliser use. The country lags behind in the introduction of high-efficiency fertiliser technologies capable of reducing wastage, like nanotechnology, nitrification inhibitors and urease inhibitors which are popular in other parts of the world.

Strategic interventions

Ease of registration process

Registration of new fertiliser grades is a lengthy and cumbersome process. This slows down the innovation process and delays the launch of efficient products in the Indian market. Hence, registration processes for the introduction of new fertilisers need to be made time and cost-efficient so that the farming community has timely access to new products.

Rationalising subsidies

Fertiliser subsidy and regulation are not on par. Under the current NBS, manufacturers of DAP, MoP and other complex NPK fertilisers are paid a uniform subsidy per nutrient unit basis, but in the case of urea, such subsidies have not been introduced because of implementation concerns. This is resulting in a disproportionate use of urea and adversely impacting the soil health. Bringing urea under the NBS programme would restore the nutritional balance.

There is a need to revisit the subsidy policy for fortified fertilisers as well, and corrections should be made promptly to popularise this product category.

Measures to promote micronutrients

Fertiliser fortification with micronutrients could be an appropriate solution to tackle micronutrient deficiencies in India as it can save both time and application cost. However, the current subsidy policy on fortified fertilisers is not considered to be attractive by the industry. Policy support in terms of subsidy rationalisation for fertilisers could provide the desired impetus to this preferred product group.

Rationalising tax and custom duties on micronutrient products and adequate investments in soil and plant testing infrastructure are some other measures which can promote micronutrient use.

Incentivise use of indigenous raw materials

Currently, the country relies heavily on imports for raw materials used in the production of phosphatic fertilisers. Rock phosphate is a major ingredient for making SSP and DAP fertilisers and India imports almost 85% of its requirements, even though the country, according to the Geological Survey of India, has an estimated 250 million tonnes reserves with 150 million tonnes of this expected to be in the fertiliser grade.⁴⁷

With a global phosphorus crisis considered to be imminent, urgent measures will need to be taken for efficient utilisation of indigenous low-grade rock phosphate reserves. Although some efforts have been made in the past to promote these products, including inclusion of phospho composts under the Fertiliser Control Order (FCO), the products failed to gain popularity because of a less favourable cost-to-benefit ratio compared to subsidised phosphatic fertilisers. Further research to improve the efficacy of these products using indigenous rock phosphates should be undertaken on priority.

⁴⁶ Reforming the fertilizer sector: Union Budget

⁴⁷ Indian Minerals Yearbook, Indian Bureau of Mines



Introduction of high-efficiency fertilisers: Wastage is a big area of concern as more than half of the fertilisers in some cases are wasted due to leaching, runoff, fixing or volatilisation. Technologies promising high fertiliser use efficacy need to be adopted and commercialised. Fertiliser segments like nitrification and urease inhibitors are gaining popularity across the world. These products are capable of increasing the efficiency of nitrogenous fertilisers and reducing wastages. Newer products like polyhalites and silicon-based products should be explored further and promoted for betterment of soil health. The process for the introduction and registration of new products needs to be simplified for their fast-track introduction.

Alternative nutrition sources: There is a need to secure the availability of fertilisers by promoting alternative sources of nutrition like potash derived from molasses in sugar distilleries. The product was brought under the Fertiliser Control Order (FCO), but only limited volumes are being produced and marketed. There is a potential for multi-fold growth from current levels. Close coordination with the sugar industry can help increase production volumes. This can help immensely in reducing import dependencies and stabilising the price of muriate of potash (MOP), a popular potash-based fertiliser. Support in research efforts, faster evaluation and registration of indigenous plant nutrition sources can encourage the identification of more such plant extract-based nutrition sources.

Organic and bio fertilisers: Use of organic manure in India is far from satisfactory. Dwindling organic carbon in Indian soils is also leading to reduction in the use efficiency of fertilisers. Policy measures need to be strengthened to promote city compost, pressmud compost and other organic fertilisers.

Different states have different laws for bio fertilisers which further leads to process inefficiencies faced by the marketing companies. A unified policy will encourage good companies to come forward and aggressively take up this product category.

Relaxation of licensing requirements for bio products like vesicular-arbuscular mycorrhiza (VAM) biofertiliser will encourage better participation from the pesticide channel which is currently not coming forward to adopt these products because of hassles related to fertiliser licence requirements.

Revival of customised fertilisers

Customised fertilisers were introduced in India in 2008, but their sales have not picked up over the last 10 years. Out of the 36 grades notified under the FCO, 26 grades are for basal and 10 grades are used as top dress. Of these, 23 grades are with Zn and 19 with B; the content varies from 0.1 to 1.0%. In 2015-16, the total sale of customised fertilisers was 59,891 tonnes, which decreased to 39,590 in 2016-17 (FAI, 2018). New players can enter into this market as going forward, with rising awareness and area under horticultural crops, sales of customised fertilisers are going to rise.

Fresh attempts to revive the customised fertiliser segment by linking it to the Soil Health Card Scheme is a step in the right direction. However, more needs to be done in terms of ease of processes to encourage the participation of fertiliser companies.

Agriculture storage infrastructure

Brief overview

The post-production stages of agricultural value chain need to be effectively supported by supporting infrastructure. India faces an impending challenge of large post-harvest losses. As per estimates by the Associated Chambers of Commerce of India, post-harvest losses (PHL) stand at INR 926 billion (US\$14.33 billion). It is estimated that 3.9-6% of cereals, 4.3-6.1% of pulses, 2.8- 10.1% of oilseeds, 5.8-18.1% of fruits, and 6.9-13% of vegetables suffer from losses during harvest and post harvest stages. One of the major factors for these losses is the inefficient post-harvest and storage infrastructure, further intensifying the need to undertake large-scale improvements.

In India, three main agencies in the public sector build large-scale storage and warehousing capacity, viz., Food Corporation of India (FCI), Central warehousing Corporation (CWC) and State Warehousing Corporation (SWCs). The main functions of the CWC and SWC are to acquire and build warehouses at suitable places and to operate them for storage of agricultural produce, fertilisers, and certain other items, including industrial goods. The total warehousing capacity available in the country is as follows:

Table 2: Warehousing capacity in India

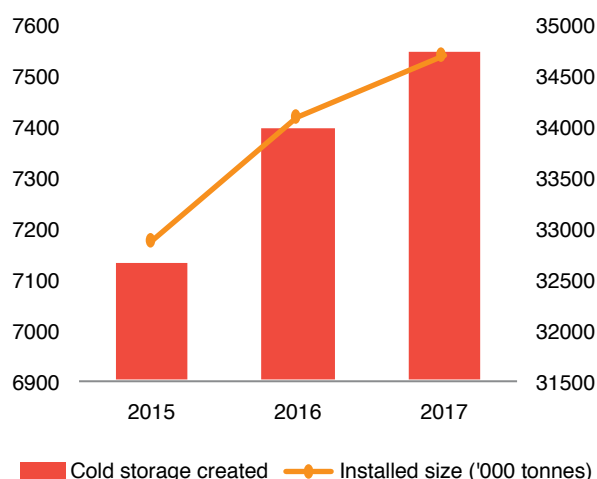
S. no.	Name of the organisation	Storage capacity in million tonnes
1.	Food Corporation of India (FCI)	35.92
2.	Central Warehousing Corporation (CWC)	11.72
3.	State Warehousing Corporations (SWCs) and State Agencies	45.28
4.	Cooperative Sector	15.07
5.	Private Sector (ISAM – rural godown scheme)	57.75
6.	Total	165.74

Source: WDRA Annual Report 2015-16 and DMI March 2017

An additional 19m tonnes is estimated created independently by the private sector. It is estimated that of the total available storage capacity of 165.74m tonnes, about 42m tonnes could be in excess. This also points to reports of low capacity utilisation of warehousing capacity in the country.⁴⁸

Sufficient infrastructure is necessary to reduce the PHL and prevent distress selling. The Indian agriculture sector incurs 18-25% losses in the entire supply-chain.⁴⁹ Further, for horticulture crops and perishable commodities, well established cold chain infrastructure is a key requirement. An estimated 34m tonnes of storage capacity in cold storages (as of March 2017) has been created, but with allied development of only about 11,000 refrigerated transport units.

Figure 12: Cold chain infrastructure development



48 Doubling Farmers' Income – Volume IV

49 Doubling Farmers' Income Volume III

50 Department of Agriculture, Cooperation and Farmers Welfare

As per the draft India Cooling Action Plan (ICAP), the growth projected in various segments of cold chain is as follows:

- Current pack house stock is around 450 units (in 2017) and it is expected to grow to 100,000 units by 2037-38;
- Reefer vehicle stock is around 12,000 units (in 2017) and is expected to grow to 300,000 units by 2037-38;
- Current cold storage capacity is 35m tonnes (in 2017) and it is expected to grow to 45m tonnes by 2037-38; and
- Ripening chamber stock is around 1,000 units (in 2017) and it is expected to grow to 12,000 units by 2037-38.

Policy landscape

Integrated Scheme for Agriculture Marketing⁵⁰

The major scheme objectives include:

- To promote creation of agricultural marketing infrastructure by providing backend subsidy support to State, cooperative and private sector investments.
- To promote creation of scientific storage capacity and promote pledge financing to increase farmers' income.
- To promote Integrated Value Chains (up to primary processing only) to provide vertical integration of farmers with primary processors
- To promote training, research, education, extension and consultancy in the agri-marketing sector
- To establish a nation-wide information network system for speedy collection and dissemination of market information and data on arrivals and prices for its efficient and timely utilisation by farmers and other stake holders.

- Under the scheme, 38,755 storage infrastructure projects with a capacity of 65.01m MT were sanctioned and subsidy to the tune of INR 2763.68 crores was released against the total sanctioned subsidy of INR 3403.59 crores.

Key gaps and strategic interventions

Gaps

Lack of modern infrastructure: There remains a lack of modern warehouses and cold chain structures in the country, leading to mismanagement of stored commodities. Modernising the food-handling infrastructure will aid compliance with the country's food safety regulations and help ensure global competitiveness. In addition, it promotes efficiency, integrity and safety of individual operations at the enterprise level.⁵¹ Silos are a major storage infrastructure replacing flat storage globally. Steel Silo storage with bulk handling facility is highly mechanised and modernised method of storing food grains in bulk. As per Action plan, the FCI had targeted selection of silo operators for 18 LMT capacity in 2016-17. Against this, selection of silo operators for construction of 2.5 LMT for six locations has been completed and agreement signed with the selected silo operators. The agency wise status of construction of silos shows a gap in actual achievement against set targets.



Table 3: Silo progress in India

Year	Selection of silo operator (LMT)		Silo completion (LMT)	
	Target	Achievement	Target	Achievement
2016-17	36.25 (Phase 1)	36.75	5	4.5
2017-18	29 (Phase 2)	5	15	1.75
2018-19	34.75 (Phase 3)		30	
2019-20			50	
Total	100	41.75	100	6.25

Source: FCI

Major cold storage facilities are also using obsolete technologies for refrigeration. Most refrigeration equipment in use is outdated, inefficient and single-commodity based. According to the Indian Society of Heating, Refrigerating and Air-conditioning Engineers (ISHRAE), of the 7,000 cold storage units in the country, almost 5,000 are based on outdated technologies, which are energy-inefficient.

Policy gaps: The pattern of assistance under ISAM is lower than other schemes operated under NHB/ NHM/ MoFPI. It needs to be revisited and assessed as per the actual requirement of infrastructure.

Lack of cluster-focused approach: Currently, the scheme design does not consider cluster or crop-based support. The scheme is generic in nature and does not focus on cluster development for specific crop requirements.

Lack of integrated cold chain logistics: The cold chain industry is dominated by the construction of cold storage units. There is lack of development in other links in cold chain logistics, e.g., the railway system has no refrigerated containers for domestic traffic and road movement is serviced by only about 10-11,000 reefer trucks, as estimated by the NCDC. The estimated contribution of transport in the total cold chain capacity is 12%, which is extremely low, considering its need.⁵²

Non-uniform capacity utilisation: The utilisation of agricultural warehouses is highly variable across the country. FCI storage statistics for March 2019 suggest 79% utilisation at the national level, 98% utilisation in Punjab, while for Sikkim it was 45%,⁵³ which shows high variations in capacity utilisation. In the North Eastern States, because of the challenging geography and difficult transportation, post-harvest linkages are often impacted, including storage of agricultural commodities.

Land availability: Many warehouse entrants face challenges with land approvals and allotment due to unclear land classifications in terms of warehouse zones. Increasing land prices are also a major challenge for warehousing companies along with stringent agricultural land acquisition rules.⁵⁴

Lack of integration with complete supply chain: Limited forward integration in the value chain impacts the utilisation of warehouses along with lack of quality infrastructure set-up in line with value chain requirements.

51 Doubling Farmers' Income – Volume III

52 Agri-business Opportunities in Cold-chain: NCDC

53 Food Corporation of India

54 Building warehousing Competitiveness: PwC Report



Lack of IT penetration: The Indian agricultural warehousing space is still lagging behind in technological integration. Limited real-time visibility with manual inventory management, warehousing management, documentation, billing and reporting affects the sustainability of the sector.

Strategic interventions

Creation of collection hubs: There is a lack of aggregation due to the majority of small and marginal farmers in the sector. This may be tackled by the creation of collection hubs at the village level to encourage farmers to use the facilities. Further, in cold-chain, the first mile capacity to facilitate market connectivity of short life horticultural produce is a challenge. Therefore, building aggregation units (i.e. modern pack-houses and pooling points) at the village level with transport links would help strengthen the chain.⁵⁵

Cluster-focused approach: It is necessary to introduce a cluster-focused approach for the development of cold storage to enable crop specific support in particular regions. The scheme for cold storage could include a separate action plan to focus on the development of these clusters with the State as the responsible authority.

Private sector incentivisation: It is necessary to develop modern infrastructure with facilities such as scientific warehousing, GPS tracking, real time monitoring. Public private partnership (PPP) can be a useful instrument in developing this. Rebate on indirect taxes for private warehousing facilities

that are involved in agri-warehousing and financing could be given. Besides this, altering the tendering process for private players from lowest price to technical qualification preference is important, as it would improve the quality of infrastructure.

Provision of loans under Negotiable Warehouse Receipt at same norms of crop loan: Provision of loans at same interest rate and subvention provision as short-term crop loan will encourage farmers to store in the warehouses and get necessary credit facilities at optimum rates.

Promotion of scientific storage and modern equipment: Incentivisation on the purchase of scientific equipment for storage of agricultural commodities may be done to promote upgrade in the sector. Further rationalisation of import duty and GST for importing innovative storage equipment might support modernisation and innovation in the sector.

Reforms in Warehousing Receipt Financing: To promote lending through Warehouse Receipt Finance, financing to NBFCs involved in WRF may be boosted by categorisation of loans offered to NBFCs by banks as Priority Sector Lending norms. There are certain operational inefficiencies in WRF, such as borrowing from multiple banks for one stack of underlying commodity or mismatch between weight and value of underlying commodities. Thus, it is necessary to define clear scrutinisation and assignment norms for WRF loan pools through increased technical awareness among the lenders, clear policy dialogues on WRF, timely review of the progress and necessary course correction in the sector

⁵⁵ Doubling Farmers' Income – Volume XIV

Farm mechanisation and irrigation

Brief overview

India accounts for around one-third of the global tractor production. However, the level of farm mechanisation in India is still lagging behind developed economies. With the Government's increasing focus on farmer remuneration, it has become imperative to increase the use of farm machinery and farm equipment, especially with regard to irrigation practices. Custom for-hire centres have been developed by many states on PPP basis to rent out agricultural equipment, ease the use of mechanisation and open opportunities for used equipment exporters.⁵⁶ The level of mechanisation in India stands at about 40-45%.⁵⁷

There is a high level of regional variation in the level of mechanisation in India. States like Punjab, Haryana and Uttar Pradesh showcase high mechanisation in agriculture, while states in the south, west and north east lag behind. The high level of mechanisation may be attributed to favourable government policies, large landholdings and high awareness. The Indian farm mechanisation market is expected to reach INR 400 billion by 2019-20.

India is also a major exporter in the market, exporting 79,000 tractors annually.

Figure 13: Indian farm mechanisation market (INR billion)

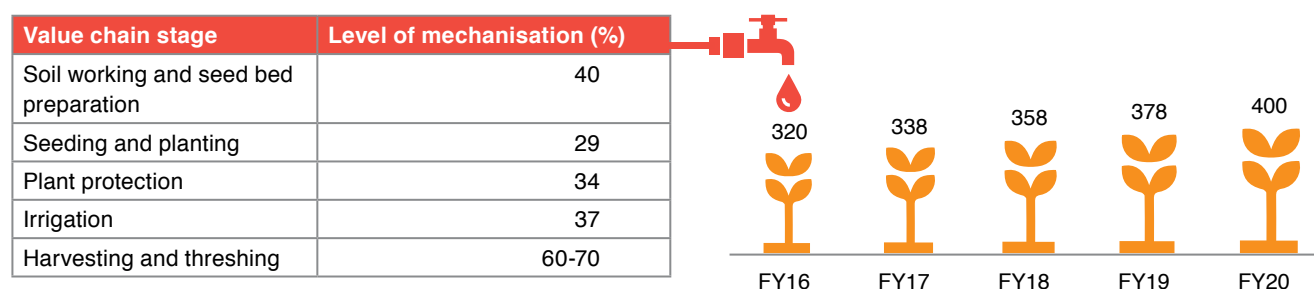
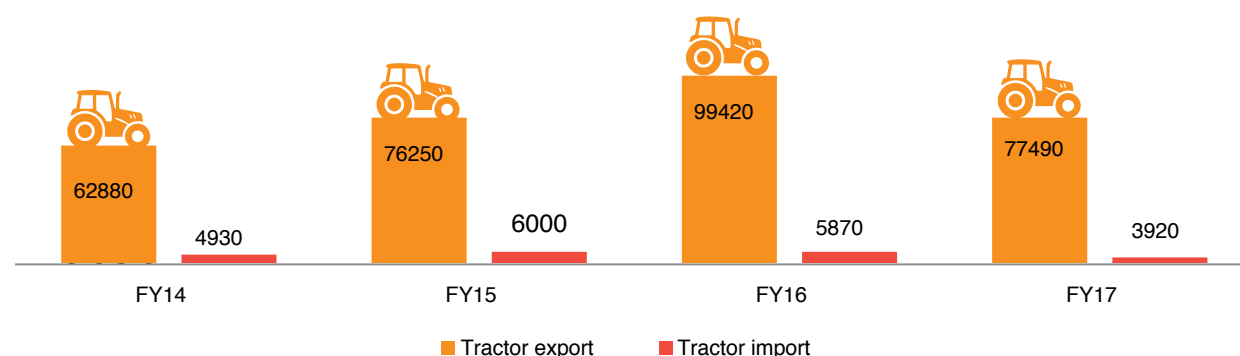


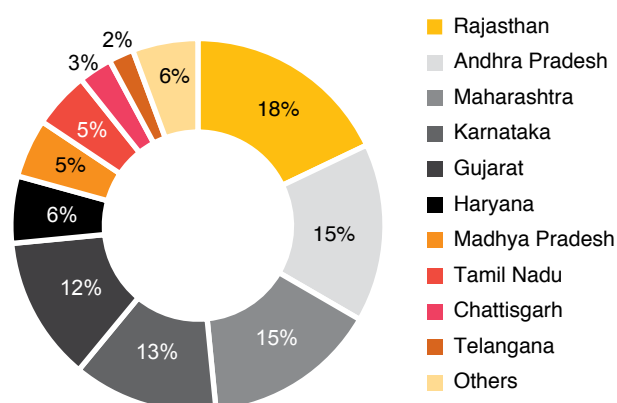
Figure 14: Tractor import and export from India (no. of units)



Source: Farm mechanisation sectoral paper by NABARD

In terms of irrigation, India is still to catch-up with its growing requirement. Currently, the gap between the irrigation potential created (IPC) and the irrigation potential used (IPU) is a staggering high of 23m ha, which craves attention for intervention. As of date, only about 10 million hectares of the total 63 million hectares of irrigated area is covered under micro-irrigation. An annual coverage of a minimum of 2.5 million hectares is necessary to quickly achieve water use efficiency and narrow the gap between IPC and IPU.⁵⁸ Micro-irrigation, although a primary instrument in tackling the growing water crisis, is yet to catch-up on a large scale. Among States, the coverage of micro-irrigation is highly variable. More than 70% of the total area under micro-irrigation in India is spread across only five States, as depicted in the following figure:

Percentage of total area under micro-irrigation in India (March 2018)



Source: Pocket Book of Agricultural Statistics 2018, Directorate of Economics & Statistics

⁵⁶ The U.S. Department of Commerce's International Trade Administration: India Agriculture Sector

⁵⁷ Farm Mechanization: Indian Council of Food and Agriculture

⁵⁸ Doubling Farmers' Income – Volume XIV

The total area under micro-irrigation in India is 1.02 crore Hectares.

Policy landscape

Sub-Mission on Agriculture Mechanisation⁵⁹

The mission objectives are as follows:

- Increasing the reach of farm mechanisation to small and marginal farmers and to regions where the availability of farm power is low;
- Promoting “Custom Hiring Centres” to offset the adverse economies of scale arising due to small landholding and high cost of individual ownership;
- Creating hubs for hi-tech and high value farm equipment;
- Creating awareness among stakeholders through demonstration and capacity building activities;
- Ensuring performance testing and certification at designated testing centres located all over the country.

Pradhan Mantri Krishi Sinchai Yojana⁶⁰

The objectives of the scheme are:

- To achieve convergence of investment in irrigation at the field level
- Enhance the physical access of water on the farm and expand the cultivable area under assured irrigation
- Integration of water source, distribution and its efficient use, to make best use of water through appropriate technologies and practices.
- Promotion of micro-irrigation in the form of drip, sprinklers, pivot, rain-guns in the farm
- Improve on-farm water use efficiency to reduce wastage and increase availability both in duration and extent
- Attract greater private investments in irrigation

Key gaps and strategic interventions

Gaps

Farm mechanisation

Small land holdings affecting economies of scale: In India, the average land holding size remains comparatively smaller than other countries, at less than 2 ha. To ensure return on investment and make investment profitable in farm mechanisation, the area under operation should be large, which is difficult as the GCA in India has limitations.

Unavailability of sufficient investment credit: Although investment credit is a component of KCC, its uptake is still limited because of unawareness about the component. Further, the procedure to avail agriculture term loans is more cumbersome than production credit. Sufficient manpower with technical appraisal skills is a crucial issue for banks, which creates hindrance in the smooth disbursement of term loans for various activities helping farm mechanisation. In addition, opposed to crop loan, where interest subvention is provided for timely payment to farmers, term loans present higher interest rates.

Lack of farm equipment uptake: Tractors dominate the Indian farm mechanisation market and there remains a lack of other farm equipment uptake. While tractor penetration has grown from one per 150 hectares to one per 30 hectares on agricultural land, other sectors have not shown a major upsurge. For example, the growth in volume of the Indian power tiller market has been inconsistent, despite their high utility.⁶¹

Subsidy based on allocation rather than requirement:

Farm mechanisation is an investment-heavy agenda for farmers. Current schemes are in progress in the country to share the investment load of farmers through subsidies. The available subsidies for farm mechanisation are based on the budget allocation made by the Government. The approach needs to be altered to make it requirement based.⁶² Based on demand estimations at the district or state level, allocations may be made to make it more feasible for farmers.

Inefficient equipment testing process: SMAM has a provision of conducting performance testing for various farm equipment. However, there are insufficient institutions that can provide certified services, which is a challenge for the manufacturers.⁶³

Irrigation

Variation in implementation process of PMKSY: Currently due to variations in process of PMKSY, there is a non-uniform implementation across states creating difficulties in the assessment of gaps at national level and corresponding course correction.

Low micro-irrigation penetration: The penetration of micro-irrigation in Indian States varies. The average penetration at the all-India level is 5.5%, which is much less than countries such as Israel (90), US (55) and China (10). With half of the agricultural land dependent on rain, there is huge potential for irrigation.⁶⁴

Poor irrigation efficiency: Gross irrigated area in the country is about 96 million hectare from nearly 650 BCM (billion cubic metre) of water, which gives a delta of 0.68 metre (m) per hectare of gross irrigated area. Taking 70% of the average rainfall of 1,170mm (1.17m) as effective for crop consumptive use, the gross water use is about 1.48m per hectare of the gross irrigated area.

⁵⁹ Department of Agriculture Cooperation and Farmers Welfare

⁶⁰ Pradhan Mantri Krishi Sinchai Yojana

⁶¹ Farm Mechanization: Indian Council of Food and Agriculture

⁶² Farm Mechanization Sectoral Paper: NABARD

⁶³ Transforming Agriculture through mechanization: FICCI Knowledge Papertra

⁶⁴ Accelerating growth of Indian agriculture: Micro irrigation an efficient solution: FICCI

This is very high, as compared to water use in irrigation systems in developed countries, such as the USA, where water allocation is about 90 cm/ ha. This overuse reflects low irrigation efficiency of about 35% to 45% in most surface irrigation systems, and about 65% in case of ground water use.⁶⁵

Growing water crisis: Ground water depletion is a growing threat in India. The Central Ground Water Board (CGWB) estimates that 1,034 of the 6,584 assessed Community Development Blocks are over-exploited. Besides, 253 are critical, 681 are semi-critical and 96 blocks are completely saline. Besides, a growing population and rapid urbanisation has created high competition for water resources. Adding to this, climate change is a global threat that will affect freshwater systems.

Low uptake of micro-irrigation: Micro-irrigation is still in the developing stages in the country and its widespread uptake is slow. Various reasons for low uptake of micro-irrigation can be:

- Lack of awareness amongst farmers regarding micro-irrigation and its benefits
- Lack of access to finance for farmers for micro-irrigation equipment purchase
- The Land Ceiling Laws, fragmented and small land holdings, ceiling on the subsidy amount, are also some factors that discourage wide adoption of drip micro-irrigation

Strategic interventions

Farm mechanisation

Skill development: A budget needs to be provided under SMAM to establish value addition centres for training, demonstration and under custom hiring schemes.

Access to finance: Access to finance for farm equipment must be improved by simplifying the documentation process and providing interest subvention for timely payments.

Scale neutral machinery: In light of the predominance of small and marginal holdings in India, R&D should aim at developing and designing scale-neutral machinery. Further, machinery that can suit different terrains should be prioritised.

Subsidy release through DBT: Most of the subsidy released is back-ended producer subsidy and is often delayed. The process needs to be converted to DBT to ensure timely and rightful subsidy release.

Increasing efficiency of Custom Hiring Centres (CHCs): CHCs tackle many challenges in farm mechanisation. However, they face certain challenges themselves, such as availability of farm machinery and implements during peak period and underutilisation during lean period, lack of awareness and support services. To improve the efficiency of CHCs, certain measures could be adopted, such as in addition to providing access to machines on rental providing access to package of practices, quality inputs, extension services and input application equipment. They could be linked to banks for transparent screening process, regular monitoring and impact assessment.⁶⁶

Irrigation

Comprehensive national irrigation mission: It is imperative to undertake micro-irrigation technology under mission mode for widespread adoption by farmers. The creation of a SPV such as in Tamil Nadu, Andhra Pradesh, and Gujarat to implement the scheme timely, could facilitate this implementation. For instance, Gujarat Green Revolution Company limited is an implementing agency for the implementation of Micro-Irrigation Scheme on behalf of the Government of India and the Government of Gujarat in Gujarat State through reputed authorised Micro-Irrigation System suppliers, who supply and install the Micro-Irrigation System and provide agro services pertaining to the Micro-Irrigation System. It aims to bring a second Green Revolution in the State by saving water, electricity and enhancing agriculture productivity resulting in farmers' prosperity at large. Further, digitisation should be integrated using geo-tagging, Internet of Things (IOT) to develop a transparent implementation process.

Infrastructure status for micro-irrigation: Under the Water and Sanitation category, the RBI has notified, "Infrastructure" status to water supply pipe lines and to irrigation (dams, channels and embankments). To achieve the true potential and benefits of micro (drip) irrigation leading to transformation in the agriculture sector, micro (drip) irrigation could be brought under the infrastructure category. The status of infrastructure would facilitate banks and other financial institutions in providing financial assistance as a "priority sector" to equipment manufacturers and farmers at concessional rates and for longer durations. The infrastructure status can also result in fiscal and tax benefits to manufacturers helping attract more investment in the sector.

Promotion of rainwater harvesting and alternate source of energy: There is a need to promote rainwater harvesting in the country for utilisation of dry land. Promotion of solar operated micro-irrigation applicators to save crops during low rainfall under the rain-fed farming system could be done through subsidy provision. Use of renewable energy such as solar power needs to be integrated to enhance the impact of PMKSY and achieve sustainable development of agriculture. Solar power can be effectively used for pumping water from water harvesting structures (farm ponds), and facilitate efficient irrigation systems, such as drip and sprinklers in the fields.

Use of scientific tools: Use of high-science tools for planning, implementation and monitoring, such as remote sensing images and data, water budgeting modelling tools, scenario development simulations along with GIS and soft skill planning participatory tools need to be used. Greater focus is necessary on micro-irrigation at the State level. Four States, Gujarat, Andhra Pradesh, Maharashtra and Rajasthan, which have seen strong growth in area under micro-irrigation and have higher than average penetration of micro-irrigation. All these States have focused on micro-irrigation and better use of IT. Thus, it is necessary to adopt this practice countrywide for effective implementation. In irrigation too, it is necessary to provide easier finance to farmers because of the high costs of equipment.

Mandatory micro-irrigation for water intensive crops: For crops such as sugarcane and rice, which use 60% irrigation water, micro-irrigation should be made mandatory. For this, a separate State-level body may be established.

65 Doubling Farmers' Income – Volume VII

66 Farm Mechanization Sectoral Paper: NABARD

Agricultural finance

Agricultural credit is essential for the development of agriculture in India. Credit is not only the critical input but also the effective means of development. Cooperatives, Regional Rural Banks (RRBs), commercial banks, Self Help Groups (SHGs) and informal credit sources together constitute the Indian rural credit delivery system. The Government of India initiated several policy measures to improve the accessibility of farmers to institutional sources of credit. The policies have been designed to provide timely and adequate credit support to all farmers with a particular focus on small and marginal farmers and weaker sections.

Policy landscape

Kisan Credit Card⁶⁷

KCC scheme was started in 1998 as an initiative to provide easy and adequate credit to farmers through formal sources. Credit under the scheme could be utilised for input purchase by farmers to support production needs. In 2004, the scheme was further extended to the investment credit requirements of farmers, namely allied and non-farm activities in 2004. The scheme was further revisited in 2012 to simplify it and facilitate the issue of electronic KCC. The total number of cards issued until March 2017 stood at 9.2 crores.

Pradhan Mantri Fasal Bima Yojana (PMFBY)⁶⁸

PMFBY was introduced on 14 January 2016 to reduce agricultural distress and improve farmer welfare without hefty hikes in the Minimum Support Prices (MSP) of agricultural products prices due to monsoon fluctuation-induced risks. The PMFBY scheme operates on the basis of an 'area approach', i.e. defined areas for each notified crop for widespread calamities. During the kharif season of 2017, 3.5 crore farmers were insured under the scheme and claims were paid to 1.4 crore farmers. In the kharif season of 2017, a total of INR 34,77,6055 crores was insured and claims of INR 17,209.94 crores were paid.⁶⁹

Weather Based Crop Insurance Scheme (WBCIS)⁷⁰

WBCIS uses weather parameters as "proxy" for crop yields in compensating the cultivators for deemed crop losses. Payout structures are developed to the extent of losses deemed to have been suffered using the weather triggers. The weather perils covered under the scheme include:

- Rainfall – deficit rainfall, excess rainfall, unseasonal rainfall, rainy days, dry-spell, dry days
- Temperature – High temperature (heat), low temperature
- Relative humidity
- Wind speed
- A combination of the above

- Hailstorm, cloud-burst may also be covered as Add-on/ Index-Plus products for farmers who have already taken normal coverage under WBCIS

Key gaps and strategic interventions

Gaps

Credit

Lack of proper credit usage: KCC limit is set across a defined set of criteria for crops at the district level. Owing to the lack of information on the implications of proper usage and insufficient monitoring due to lack of manpower, the credit is often diverted to non-agricultural purposes, impacting timely repayment.

Lack of customised products for allied sectors: Currently, KCC is the primary instrument of lending in agriculture. However, there is growing focus on allied agricultural activities not addressed by the scheme but can help in income enhancement. The Government has also envisaged covering the dairy and fisheries sector under KCC, reflecting a possible change in the pattern of lending.

Status of Financial Literacy Centres (FLC): FLCs are an ideal model to curb ground level financial illiteracy, since all the banks are running them. However, factors such as the lack of infrastructure and lack of efficient manpower is hindering the successful attainment of financial literacy through FLCs.

Coverage of leasing farmers: In regions where verbal lease is the norm, farmers often find it difficult to uptake KCC against the leased land, as banks consider verbal lease as high risk, which may lead to double financing. Legal bans or restrictions on land leasing have led to concealed tenancy in almost all parts of the country. Informal tenants are most insecure, as they either possess short duration oral leases or rotate from one plot to another each year. This de-motivates them to invest in agricultural land improvement. Informal tenants do not have access to institutional credit, insurance and other support services, which affects the productivity of land they cultivate.

Lack of last-mile efficient delivery of credit: There is a lack of ground level full scale implementation of KCC due to inefficiencies such as the lack of land records, lack of awareness, lack of coverage of women farmers.

Insurance

Lack of participation of private sector players and limited innovation: There is lack of private sector participation due to unfavourable tendering process with lack of profit generation and competitiveness. Besides, present "cluster" size in key States is too large. This effectively prevents small to mid-size insurance companies from participating in the tender process

67 Jain Irrigation Systems Pvt Ltd: Approach paper on Why Drip Irrigation should be considered as Infrastructure Industry

68 Accelerating growth of Indian agriculture: Micro irrigation an efficient solution: FICCI

69 RBI: Revised KCC scheme

70 Operational guidelines for PMFBY, PMFBY

Limited coverage: As per the Pocket Book of Agricultural Statistics, 2017, only 28.63% of the Gross Sown Area is insured under all schemes, with Meghalaya and Sikkim having the least coverage at 0.01% and 0.10%, respectively. This shows a huge gap in the coverage under the scheme

Lack of insurable interest in case of non-loanee farmers: Farmers who want insurance must establish insurable interest. However, often, farmers are not real owners of land; therefore, the land records are unavailable. This hinders access to insurance owing to incidents of fraud on account of duplicate enrolment. Therefore, insurance companies are hesitant to provide insurance.

Lack of customised products: Although PMFBY ensures coverage of notified crops, the allied sectors remain uncatered. Specific sectors of importance and value at the State level need to be identified and appropriately insured, such as fisheries, sericulture, etc.

Inefficiencies in crop cutting experiments and coverage: Being only yield-protection insurance, the scheme is not holistic and fails to consider revenue protection. Without revenue protection, farmers do not benefit from the insurance scheme, irrespective of the harvest at the end of the season. There is a lack of trained professionals to handle the CCEs, and the current technology is not reliable. This has led to delays in assessment and settlement of claims, further eroding trust in the scheme.

Implementation issues in PMFBY: There have been incidences of high rates of actuarial premium cited by reinsurance companies in the past seasons due to delays in finalisation. These operational delays along with delays in reporting and subsidy release from the Government hinder the smooth implementation of the scheme.

Strategic interventions

Agricultural credit

Coverage of land leasing farmers: The NITI Aayog has come up with a model lease agreement to overcome various restrictions across States hindering agricultural productivity and lending. The model Act seeks to permit and facilitate leasing of agricultural land to improve access to land by the landless and marginal farmers. It also provides for recognition of farmers cultivating on leased land to enable them to access loans through institutional credit. Implementation of this Act and recognition of leasing farmers would help increase the coverage and efficiency of KCC.

Incentive for timely payment of loan: Although loan waivers helps resolve issues of farmers plagued with natural calamities and crop failures, those who tend to pay on time do not receive any benefits. This in turn discourages timely repayment and increases wilful defaults. Banks at the village and district level could recognise and incentivise farmers paying timely to help encourage the habit of timely repayment. These farmers could also help in spreading information among their communities regarding the benefits of timely repayment.

Strengthening of FLCs: FLCs serve as an important tool in promoting financial inclusion by providing information and literacy on various financial services and products. Their objective is to provide free financial education and credit counselling. FLCs have a major role in improving financial literacy among farmers due to their ground level presence. A diagnostic study would help in ascertaining the issues and causes for lagging operations of FLCs and in identifying their effects. Once the diagnosis is complete, institutional strengthening is necessary to improve information dissemination.



Development of customised agricultural finance literacy programme:

It is necessary to develop comprehensive agricultural finance literacy programmes targeting farmers and other stakeholders in this sector. The programme can be divided into two phases: coordination and content setting and implementation phase. While the initial phase would involve extensive groundwork with content development for financial literacy, a centralised programme with a localised approach would be useful. It would be important to ascertain the local scenario of districts and villages to provide the best possible financial literacy.

Women disaggregated data reporting and soft-target setting for percentage lending to women farmers:

Coverage of women is a major challenge in agricultural credit. Current data reporting at financial institution level does not distinguish between male and female farmers, and thus, no separate focus is on women's low contribution amongst beneficiaries. Developing a basic format is necessary to separate women and men beneficiaries as a woman's challenges are often liquefied at the overall policy level. Thus, a basic data reporting change could help in shifting focus on women's access to credit.

Crop disaggregated data reporting: Crop-wise lending data can enable better assessment of requirements and gaps on a finer scale. SLBC-level data reporting can ensure crop wise data assimilation and analysis.

Crop insurance

Private sector facilitation: It is necessary to promote private sector participation through change in the tendering process, which can be increased in the timeframe of involvement and assessment of technical capacity of the private players rather than lowest cost. The cluster size of implementation may also be reduced to enable more participation from small players.

Use of technology: Replacing manual CCEs with technological and automated methods is necessary, such as space technology and GIS. Use of weather-based products should also be promoted for further efficiency.

Use of drones: Crop imaging through drones to assess crop damage could increase efficiency of estimation. The Ministry of Civil Aviation has recently developed global standard drone regulations that would permit, with appropriate safeguards, the commercial application of various drone technologies. The regulation was developed after extensive consultations among various stakeholders, and has been effective from 01 December, 2018.

Optimisation of PMFBY: To improve the scheme transparency and efficiency, monthly release of data on tender dates, sum insured, premium rates and subsidies, yield and damage data, and claim data could be adopted at both the Central and State level. This would enable timely reviews and necessary course corrections if required.⁷¹

Mandatory implementation across States: Currently, the States can voluntarily implement or withdraw the scheme. Thus, it is necessary that all states implement PMFBY. The States may then further customise the scheme as per the local conditions and requirements while retaining the basic features of the scheme. This would ensure large-scale implementation across India with focus on local conditions.

⁷¹ ICRIER, February 2018: *Crop Insurance in India: Key issues and Way Forward*



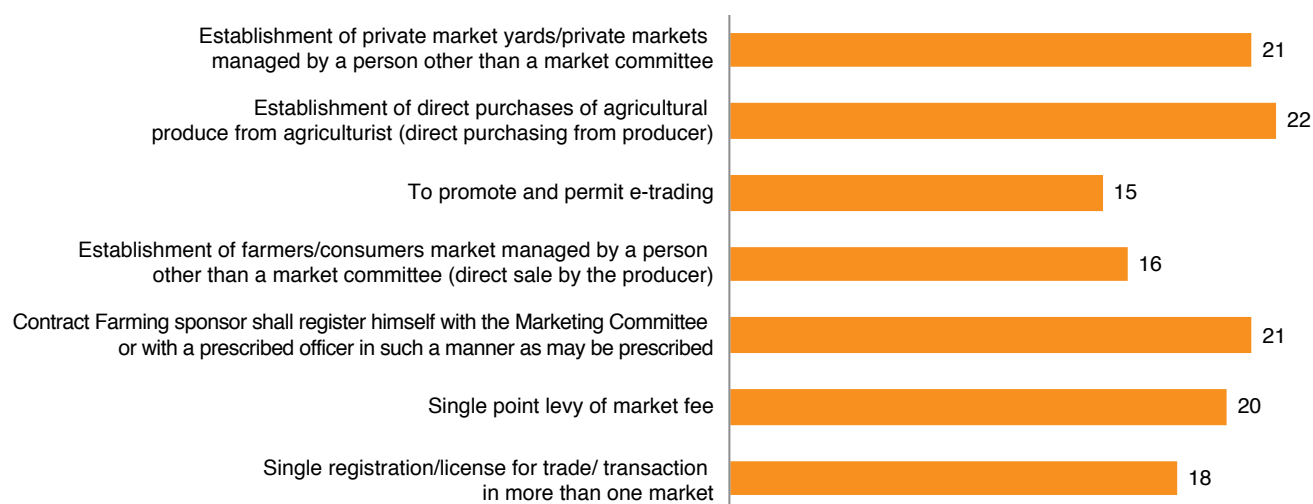
Agriculture marketing

Brief overview

Indian agriculture marketing system is characterised by the presence of multiple intermediaries often leading to challenges such as non-optimum price realisation, information and transaction leakages. Over the past years, the Indian agricultural marketing system has evolved, considering the changes in the agriculture sector. However, it is necessary to implement these

initiatives on a large scale to for the benefit of farmers. The status of marketing reforms in India is illustrated below, with the progress of seven key marketing reforms across States. The implementation of reforms is non-uniform and needs to be incorporated by all State agriculture marketing departments/ boards.

Figure 16: Status of marketing reforms with reference to seven key areas vis-à-vis the Model APMC Act as on 27 March 2017 (number of states)



Policy landscape⁷²

The Model APMC Act, 2003

The Model APMC Act of 2003 has provisions for

- Direct sale of farm produce
- Special markets
- New markets for agricultural produce by farmers, consumers, or private persons in any area
- Registration of market functionaries instead of licensing, which facilitates them to operate in the entire State
- Single levy of market fee in the entire notified area
- Establishment of producers' or consumers' markets to facilitate direct sale and purchase of agricultural produce
- Investment of revenue earned by APMC for market infrastructure.

Model State/ UT Agricultural Produce and Livestock Marketing (Promotion & Facilitation) Act, 2017

This Act aims to provide alternative and wider options for farmers to sell produce and obtain better prices. It contains

clauses such as freedom to sell produce to any person or agency at any place of choice, which may fetch better returns, promoting e-trading, creating conducive conditions, such as inter-State trading license, grading, standardisation, and quality certification for promoting a nation-wide, single agricultural market.

The State/ UT Agricultural Produce & Livestock Contract Farming and Services (Promotion & Facilitation) Act, 2018

The Model Contract Farming Act covers the entire value and supply chain from pre-production to post harvest marketing, including services contract for the agricultural produce and livestock.

National Agricultural Market (NAM)

The Government introduced a Central Sector Scheme for promotion of a National Agricultural Market (NAM) to transform the agricultural marketing environment. A unified market can be best realised through a pan-India electronic platform, which can facilitate the participation of buyers and sellers from all over. The e-NAM network was inaugurated on 14 April, 2016 and until date, 585 markets, 16 States and 2 Union Territories have been integrated with e-NAM.

⁷² Directorate of Marketing and Inspection, MOA&FW

Key gaps and strategic interventions

Gaps

Shortage of market yards: Agriculture Produce Marketing Committees (APMC) operate principle market yards and sub-market yards, which are major market places with infrastructure and facilities across the country for agriculture commodities. The average area served by one market yard in India is more than 400 sq. km. Therefore, the availability of transport facility and incurred cost and time is a bottleneck in market access for farmers.

Limited implementation of unified licensing: Unified licensing has been proposed so that a licensee buyer can operate as trader in any principal market yard, sub-market yard, private market yard and e-trading platform in the State/ UT. However, 25 States/ UTs are yet to adopt unified licensing and only 11 States have issued around 27,000 unified licenses until May 2019.

Lack of market information with farmers: Farmers often have lack access to market information, such as current market price of commodities in nearby markets, price fluctuation, and market trends, which are decision-making factors for farmers. There is a gap in structured channel for market information dissemination to the farmers.

Lack of infrastructure in periodic rural market: There are more than 22,000 periodic rural markets in the country. There is lack of basic infrastructure such as open platform, cover shed, storage facilities, drying and cleaning facilities, drinking water, electricity, etc., in most of these markets.

Lack of efficiency in operation of eNAM: 585 markets yards of 18 States/ UTs are registered in eNAM but lack of optimal utilisation of the platform has been observed in most cases. There is lack of effective awareness among farmers and buyers about the eNAM platform and its value proposition for market functionaries. There is also a gap in the technical efficiency of the existing APMC staffs in operating eNAM.

Lack of inter-mandi trade: Inter-mandi and inter-State trade can promote better price discovery and better price realisation and reduce multiple intermediaries. However, it has not been adopted by most APMCs and not been popular among buyers.

Strategic interventions

Setting up primary agriculture markets at close proximity: Setting up agriculture commodity markets in accessible locations can help increase farmer participation in formal marketing systems. Primary agriculture markets operating in approximately every five km radius would increase the ease of selling and make it more economically viable for farmers.

Infrastructure development for periodic rural market: There is need of market infrastructure and basic facilities development at the periodic rural markets. Structured approach in planning, designing and implementation is required and convergence with other department can be done as per guidelines of the GrAM scheme.

Providing quality assaying services: There is need of high quality and trusted assaying report for the lots to undergo inter-mandi and inter-State e-trade, as physical verification may not be possible at times. Hence, efficient assaying process and trusted assaying report is required. Private agencies can be hired for the service if required.

Handholding and technical support for eNAM: eNAM operation requires competency in assaying and other operational procedures such as online registration, payment, data management. Handholding support to the eNAM mandis for the first three to four years and module-based structured training regularly can bring efficiency among the staff. It is necessary to deploy efficient staff for specific job roles of eNAM for longer periods.

Market intelligence to serve farmers: Linking farmers with current market information and trends through ICT based channels can help them minimise informational asymmetries and increase their negotiation power in the market channel. This could help farmers in decision making to select the time and place of selling their commodities.

Access to logistics service: eNAM enables buyers to participate in inter-mandi and inter-State trade of commodities. However, after the trade, buyers from distant location have to make all logistical arrangements to move the commodity. Organised logistics services by registered vendors of eNAM mandi can ease the transaction process and encourage more inter-mandi and inter-State trade.

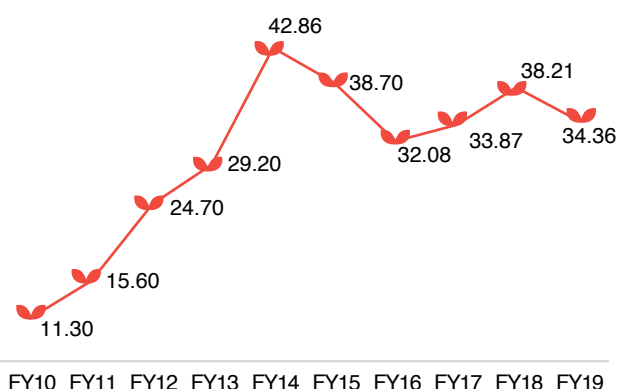
Adoption of Model APML Act, 2017: It is necessary to adopt the new Act with required regulation, as it enables new provisions for the agriculture market. The act can facilitate efficient marketing systems by incorporation of various reforms such as private sector participation, direct marketing, setting up of certification and assaying facilities.

Encouraging new market development: In several areas, market accessibility is a challenge for farmers, especially small and marginal farmers. It is necessary to provide more marketing facilities by increasing the efficiency of existing markets, creating new markets, providing agriculture marketing extension services. Conducive environment and required support is required to promote private markets, direct marketing place and contract farming.

Agricultural export

India has begun developing export competitiveness in certain specialised products, and has emerged as the ninth largest exporter of agricultural products in the world (2017). Agricultural exports from India reached US\$38.21 billion in 2017-18, showcasing a CAGR of 16.45% from 2009-10 (Figure 17).

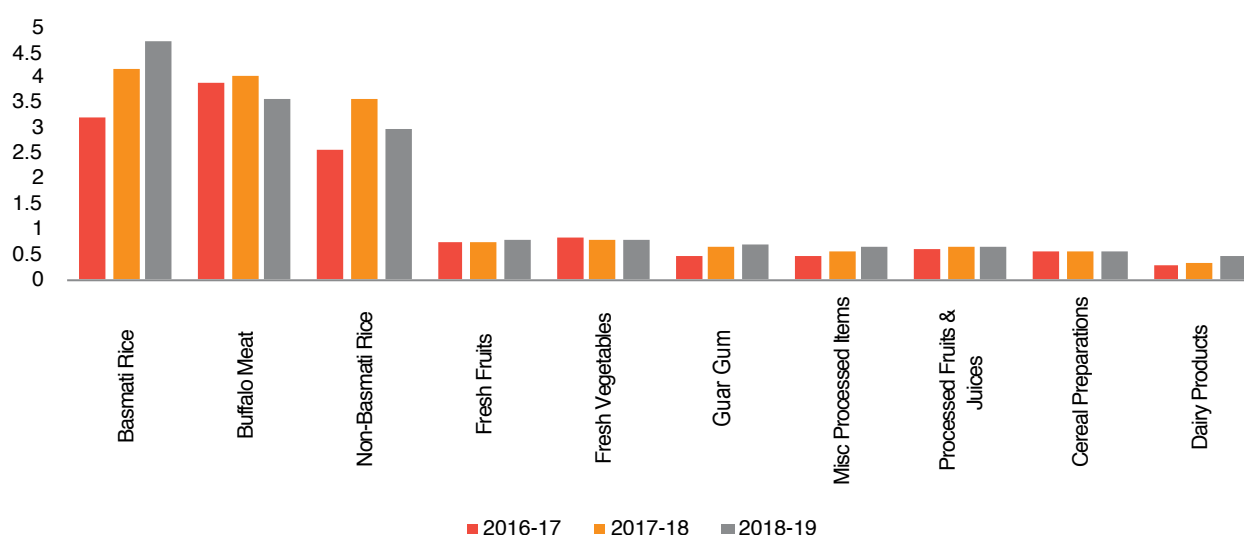
Figure 17: Agricultural exports from India in US\$ billion (for FY19, figures up to Feb 2019)



India is also well positioned geographically for trade, with close connectivity to major nations in Europe, the Middle East, Africa, South East Asia and the Australian subcontinent. The commodity-wise demand for Indian agricultural commodities has also increased. The following figure shows the value of agricultural exports for the principal commodities from India:



Figure 18: Export of principal agricultural commodities from India (value in USD billion) (Source: APEDA)



As the figure shows, marine products, buffalo meat and rice are the largest agriculture commodities exported in terms of value.

Policy landscape

Agriculture and Processed Food Export Promotion Scheme of APEDA

APEDA has launched Agriculture and Processed Food Export Promotion Scheme with the components on export infrastructure development, quality development and market development with the following objectives:

- To develop industries relating to the scheduled products for export by providing financial assistance or otherwise for undertaking surveys and feasibility studies, participation in equity capital through joint ventures and other reliefs and subsidy schemes;
- To improve the packaging of scheduled products;
- To improve the marketing of scheduled products outside India

Agriculture Export Policy, 2018⁷³

Recently, the agriculture export policy has also been approved with a vision to double agricultural exports from the present over US\$30 billion to over US\$60 billion by 2022 and reach US\$100 billion in the next few years, with a stable trade policy regime. The policy has both a strategic as well as an operational component for holistic export growth. Other policy objectives are:

- To diversify our export basket, destinations and boost high value and value added agricultural exports including focus on perishables.
- To promote novel, indigenous, organic, ethnic, traditional and non-traditional agri-products exports.
- To provide an institutional mechanism for pursuing market access, tackling barriers and deal with sanitary and phyto-sanitary issues.
- To strive to double India's share in world agri-exports by integrating with global value chain at the earliest.
- Enable farmers to obtain the benefit of export opportunities in the overseas market.

Key gaps and strategic interventions

Gaps

Lack of backward linkages: There is a lack of backward integration in the agricultural value chain, especially in perishable commodities, affecting the quality and longevity of produce. Since the importing regulations in other countries are highly stringent with respect to production and transportation, it impacts the exportability of producers. Further, some importing norms necessitate farmer registration for procurement, which is still underway in most States.

Lack of post-harvest technologies: There is insufficient level of processing and post-harvest technologies, affecting the quality and shelf life of the agricultural produce.

Lack of sufficient infrastructure: Transportation and logistics from land-locked States is a challenge and with underdeveloped cold chain infrastructure, the chances of losses during transportation are very high. Transportation costs constitute a large share of the total wholesale or retail price. The cost of airfreight for tropical fruits and vegetables frequently accounts for 30-60% of the selling price in the international market.⁷⁴

Policy constraint: The present assistance in the form of Transporting Scheme by the APEDA is generally constrained by poor support, which is adversely affecting Indian Agricultural Processed Food Products Exporters in competing with developed countries. There is also delay in Transport Assistance Scheme (TAS) affecting the working capital cycle of the exporters. A major difficulty faced by Export Oriented Units before (EOUs) of agricultural processed food products in the international market is the high level of subsidies given by developed countries for their agri-exports. Hence, it is imperative that APEDA develops concrete market strategies in its schemes for market development to make Indian agricultural processed food products more competitive and enhance efficiency.

Extensive documentation and procedural constraints: There is no single window system for export of agri-commodities; therefore, extensive and multiple documentation is necessary. With limited awareness about the procedures and factors such as traceability, farmers are discouraged from participating in the export of commodities.⁷⁵

High landed cost: India has higher final landing prices than other competing suppliers, e.g., in case of mango export to the USA. Thailand (US\$5798/ ton), Brazil (US\$1277/ ton), Peru (US\$1255/ ton) and Mexico (US\$840/ ton) are able to reach US ports at much cheaper prices than India (alphonso mango reaches at US\$6462/ ton).⁷⁶ The high cost is due to challenges in aggregation from small land holdings, poor yield and poor infrastructure.

Strategic interventions

Advanced infrastructure set up: Support is necessary to set up more investment based advanced and high technology infrastructure facilities with international standards. Further assistance is necessary to EOUs to utilise their full capacity and improve total quality attributes required for processing products on par with international standards.

Streamlining of schemes: It is also necessary to streamline the Transport Scheme of APEDA and a comprehensive transportation cost cover, right from pre-shipment stage to post-shipment and market destination to meet price competition. In addition, it is necessary to give 100% financial assistance to EOUs under the Market Development Scheme of APEDA

⁷³ Ministry of Commerce and Industry

⁷⁴ Indian Electronic Theses and Dissertations

⁷⁵ Indian Agri Exports: Study on difficulties faced by the exporters in the supply chain of agriculture products: APEDA

⁷⁶ Doubling Farmers' Income: Volume IV

to meet front-end promotional expenditures to accelerate the export growth of agricultural processed food products with the markets of developed countries in view. Further, a specific quota may be designated for the export of horticulture commodities, which will address the fluctuation in freight rates.

Farmer linkage: It is necessary to strengthen linkages with farmers to encourage their participation in exports. For this, State Governments need to proactively assist exports from their States, which includes ensuring farmer registration for traceability, identification of commodity specific clusters, and consequently, the need gap analysis of infrastructure. Post-harvest infrastructure in the States also requires strengthening and should be benchmarked with international standards, at least for crucial high value crops.

Ministry of Agriculture, Cooperation and Farmers' Welfare and APEDA have already identified ten clusters for export-based production. More clusters can be tapped for focused efforts. However, these clusters or producing zones will require prioritised technology support to supply varieties and qualities as per aforementioned demand assessment.⁷⁷

Global visibility: It is also necessary to strengthen global market intelligence, with global partnerships to ensure the visibility of Indian commodities globally. Considering, the low MRL in Indian agricultural commodities, they could be promoted globally, presenting a favourable picture for export.

Food processing

Brief overview

The food processing sector is one of six superstar sectors under the Make in India initiative⁷⁸ because of its high potential and expected growth. There is a growing need to develop linkages in agricultural value chains in India to make it more remunerative for farmers. Food processing forms an integral part of the forward linkages assisting in reduction of food wastage and increasing the value of produce through value addition. India, with a large consumer base of 1.3 billion and as a major agricultural producer, could be a major food-processing hub. The Indian processed food market is expected to reach US\$543 billion by 2020. The industry engages approximately 1.77m people in around 39,319 registered units with fixed capital of US\$29.2 billion and aggregate output of around US\$144.6 billion.⁷⁹

Policy landscape⁸⁰

Prime Minister Krishi SAMPADA Yojana

PM Kisan SAMPADA Yojana is a comprehensive package, which will result in the creation of modern infrastructure with efficient supply chain management from farm gate to retail outlet.

The emphasis is on the creation of infrastructure facilities, which include:

- Mega food parks (ongoing)
- Integrated cold chain and value addition infrastructure (ongoing)
- Creation/ Expansion of food processing and preservation capacities (new)
- Infrastructure for agro-processing clusters (new)
- Creation of backward and forward linkages (new)
- Food safety and quality assurance infrastructure (ongoing)
- Human resources and institutions (ongoing)

Key gaps and strategic interventions

Gaps

Gaps in policy design: Currently, the existing schemes are directed for large-scale projects, creating a need to develop incentives for small-scale projects. Large-scale schemes have been unable to generate the anticipated results. The ministry restricted the capital subsidy only to units being set up in the mega food park under Creation/Expansion of Food Processing and Preservation Capacities. Further, the scheme design is oriented at establishment and lacks focus on incentivising users to come to the Mega Food Park. In addition, the timeline of 30 months for operationalisation of food parks too tight and ignores the associated contingencies.

Non-uniform commodity focus: Although the primary focus of the food processing schemes is on perishables, more technical infrastructure for perishables is required, and other commodities also need to be equally addressed because of their role in food security and exports.

Lack of sufficient infrastructure facilities: With evolving lifestyles and food habits, there is an increasing need to develop the food-processing sector. However, there is a shortfall of infrastructure in the country. This includes long and fragmented supply chains, inadequate cold chain infrastructure, transportation gaps, technological integration and lack of modern logistical facilities. This further hinders the growth of the food-processing sector.⁸¹

Lack of skill development in the sector: Food processing requires skill, with various technical steps across segments. However, agricultural value chain is still dominated by the unorganised sector. It is estimated that the incremental human resource requirement for persons trained through short-term/ modular training initiatives in the food processing sector until 2022 will be 74,22,000,⁸² demonstrating a need to strengthen the skill development in the sector

77 Doubling Farmers' Income – Volume IV

78 Make in India: Superstar sectors

79 Invest India: Food Processing Sector

80 Ministry of Food Processing Industries

81 Bottlenecks in Indian food processing industry: FICCI

82 Human resource and skill requirements in the food processing sector, 2022: National Skill Development Corporation



Lack of research and development: There is insufficient development of new technologies in the sector with most technology imported. In the existing infrastructure too, technologies are becoming obsolete and require upgrading.

Strategic interventions

Facilitation of small-scale projects: As mentioned above, the thrust of schemes has primarily been on large quantum projects. Further, as the small, distributed projects near the production zones work better for the perishables, focus should be on promoting such projects, which may target FPOs and FPCs to ensure feasibility and viability.

FDI process optimisation: Although India has allowed 100% FDI in food processing, the process is quite tedious and complex and needs to be simplified

Promotion of food processing at all scales: Food processing is comprised of primary, secondary and tertiary processing. There needs to be incentivisation for investments in secondary and tertiary processing.

Flexible land norms and proper monitoring: The scheme could be flexible in terms of land requirement, especially in small and hilly areas where a majority of the landholdings are small and fragmented. A project management system collects and collates information systematically, with project evaluation and monitoring.

Supply chain optimisation: It is necessary to overcome fragmented supply chains through promotion of initiatives such as contract and corporate farming, establishment of FPOs to directly link with food processors to ensure quality and consistency in raw material supply and optimum remuneration to farmers.

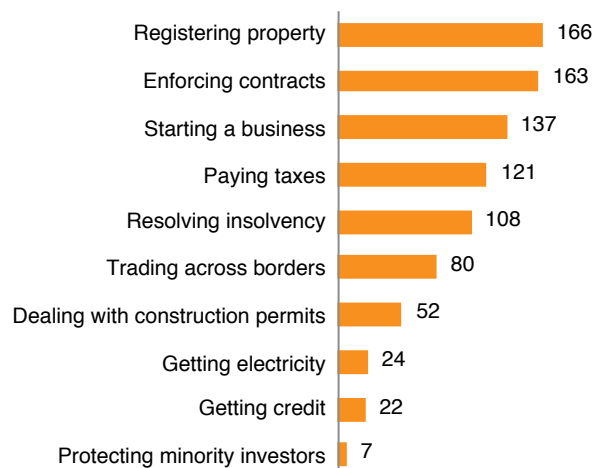
National Level Food Processing Policy: Developing a national level food processing policy is necessary to address key areas of reform in the sector such as private sector participation, promotion of export, infrastructure and institutional strengthening. While some States such as Andhra Pradesh, Jharkhand, Odisha and Tamil Nadu have come up with State Food processing policies, a national level policy is needed, with various reforms charted out for the food processing sector. Separate assistance for skill development in food processing sector is also required.

Agribusiness investment and innovation

India ranks 77 out of 190 countries in the Ease of Doing Business rankings done by World Bank with a score of 67.23 on a scale of 100. India has shown huge reform in the area jumping from a rank of 134 as per EODB 2014. This can be attributed to various investor friendly processes including relaxed FDI reforms. The rankings on EODB topics for India are as follows:

Figure 19: Rankings on Doing Business topics - India

Country	EODB Rankings
New Zealand	1
Singapore	2
Denmark	3
Hong Kong SAR, China	4
Korea (Rep.)	5
Georgia	6
Norway	7
United States of America	8
Macedonia, FYR	9
United Arab Emirates	10
India	77

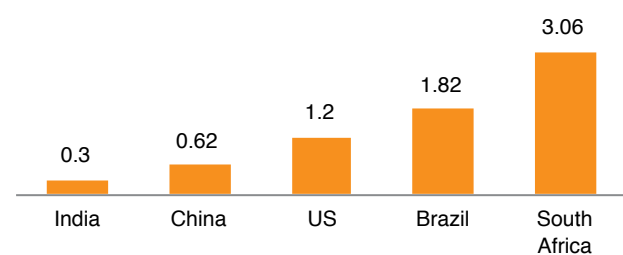


Although India shows huge progress in overall investment, agribusiness investments face certain challenges due to high dependency on critical factors.

Agribusiness startups: India continues to be among the top six countries globally, with the highest number of deals in agricultural technology (the US, Canada, the UK, Israel and France comprise the other five countries). In 2016, within global investments, Indian agritech start-up firms contributed around 9%, valued at US\$313m. From 2013 to 2017, 366 agri-based start-ups have come up.

R&D: R&D in agriculture has a direct implication on technology enhancement and yield enhancement to boost farmer income. To tackle the challenges of food insecurity, malnutrition, hunger, poor productivity and insufficient exports, it is necessary to further strengthen R&D. It is estimate that India spends 0.30% of its agriculture GDP on agricultural research, which highlights huge prospects to further intensify efforts in the R&D sector (Agriculture Science and Technology Indicators).

Figure 20: Agriculture research spend as a percentage of agricultural GDP



The various challenges that hinder progress in the sector are lack of private sector participation (currently, public sector institutions are the primary units of agricultural R&D), lack of sufficient technical human resource, lack of research infrastructure, mobilisation, and allocation of finances

Policy landscape

Startup India⁸³

Startup India is a flagship initiative of the Government of India, which aims to build a strong ecosystem for nurturing innovation and start-ups in the country, to drive sustainable economic growth and generate large-scale employment opportunities. Through this initiative, the Government aims to empower start-ups to grow through innovation and design. The Startup India initiative is based on the following three pillars:

- Simplification and handholding
- Funding support and incentives
- Industry-academia partnership and incubation

Atal Innovation Mission (AIM)

The AIM, including Self-Employment and Talent Utilisation (SETU) is the Government of India's endeavour to promote a culture of innovation and entrepreneurship. Its objective is to serve as a platform for the promotion of world-class innovation

hubs, grand challenges, start-up businesses and other self-employment activities, particularly in technology driven areas. It has two core components:

- Entrepreneurship promotion through SETU
- Innovation promotion: to provide a platform where innovative ideas are generated

AIM provides a grant-in-aid of INR 10 crore to each Atal Incubation Centre for a maximum of five years to cover the capital and operational expenditure cost in running the centre.

NewGen Innovation and Entrepreneurship Development Centre (NewGen IEDC) under National Science & Technology Entrepreneurship Development Board (NSTEDB)

The Government's NewGen IEDC Startup Program is implemented in educational institutions. A maximum of 20 new projects are supported in a year and the Government provides one-time, non-recurring financial assistance, up to a maximum of INR 25 lakh to the institution for the establishment cost, furnishing of cubicles for start-ups, purchase of PCs with printers, library books, journals, laptop, multimedia projector, 3D printers etc.

Dairy Entrepreneurship Development Scheme promoted by National Bank for Agriculture and Rural Development (NABARD)⁸⁴

The scheme aims to promote modern dairies. It provides 25% of the project cost as back-end subsidy restricted to a maximum of 10 animals, subject to a ceiling of INR 15,000 per animal for establishing a dairy unit (INR 6 lakh maximum). In addition, 25% of the project cost as back-end subsidy restricted to maximum 20 calves, subject to a ceiling of INR 6,000 per animal for establishing a dairy unit (INR 5.30 lakh maximum)

Venture Capital Finance Assistance (VCA) Scheme promoted by Small Farmers' Agri-Business Consortium⁸⁵

Capital assistance will depend on the project cost, location and the promoter's status. It will be in the form of interest-free venture capital assistance up to INR 50 lakh or 26% of the promoter's equity, whichever is lower.

ASPIRE (MSME)

The Indian Government has launched Aspire to set up a network of technology and, incubation centres, and to promote start-ups for innovation and entrepreneurship in rural and agriculture-based industry.



⁸³ Startup India

⁸⁴ NABARD

⁸⁵ SFAC

⁸⁶ R&D Industry Report: FICCI

Key gaps and strategic interventions

Gaps

Low return of investment: The rate of return on technology investment has not proven very profitable in case of agri-tech startups in comparison to other IT-based startups. High-priced technology solutions are unaffordable for a large user group, i.e., small and marginal farmers increasing the overall cost.

Lack of skilled employees: Owing to the lack of marketing and attractiveness of the field, agribusiness enterprises are finding it hard to obtain and retain skilled talent. Even R&D activities in India are not as productive as other large economies. India has been unable to increase the number of PhD's in science and engineering significantly and lags behind most major economies in converting its R&D investments into high quality research. More than 25% of investment is directed at basic research, against 5% in China and 17% in the US.⁸⁷

87 National Science Board, *Science and Engineering Indicators* 2018

Regulatory and policy issues: Although multiple policies are in place, there remains a lack of transparency and ease of application. There are stringent set of criteria for registration as a startup, with only a third qualifying as one. According to the status report of the programme, the DIPP has stated that out of 1,425 applications received only 522 have been recognised as startups (2017). There is a gap in the taxing policy with Minimum Alternate Tax (MAT) not included in the tax break (startups take longer to breakeven and such a break would help with cash flow).

Lack of private sector participation in R&D: Most of the R&D in the sector is being undertaken in public sector institutions. There is a fragmented R&D structure, with many Government structures, organisations and programmes in India. India's target of spending 2% of GDP on R&D will not be possible without the private sector investing in technological development.

Lack of commercialisation of technology: This is a challenge because of the lack of PPP in R&D. It is important to



commercialise and market technologies to increase their use and promote R&D in the sector. India is still heavily dependent on developed technologies, and therefore, requires marketing and commercialisation of local technologies.

Strategic interventions

Startup infrastructure: Focus is necessary to create stronger start-up support infrastructure to assist with critical business requirements, such as obtaining finance, feasibility study, business structuring, marketing, commercialising technology, and developing a business model. The regulations need to be relaxed for agribusiness startups, especially those dealing directly with farmers and strengthening the community.

Cluster development with R&D focus: Cluster development programs can be set up to develop R&D centres for particular clusters. A common facility or centre can support R&D as well as capacity building for members of the cluster. Clusters can also be virtually connected to other clusters and avail themselves of information on intellectual property rights.

Private sector facilitation in R&D: A systematic approach to collaboration is necessary between the Centre and State Governments in implementing policies favourable for developing R&D centres by giving access to land. Private sector participation can be promoted through grants or fiscal incentives, such as R&D tax incentives and incentivisation of VCs and angel investors when they invest in an R&D enterprise. It is also necessary to increase funding in the R&D sector. Currently, India performs substantially low on both government funding of university research (51st out of 56 countries) and government spending on R&D (38th out of 56 countries) showing significant scope for improvement.⁸⁸

The benefit of deductions for research is limited to 150% from 01 April, 2017 and 100% from 01 April, 2020. To compensate for the reduction, in weighted deduction, India can look to develop infrastructure in the form of R&D parks, which would function as a hub for research and innovation. These parks can be modelled on the Shenzhen SEZ in China. Such parks can offer fiscal incentives to both domestic and foreign investment in R&D.⁸⁹

⁸⁸ R&D Industry Report: FICCI

⁸⁹ R&D Industry Report: FICCI



Conclusion

As one of the most important cornerstones of the Indian economy, development of the agriculture sector is a key focus area. There is a gradual shift in Indian agriculture towards technology, information and knowledge management systems for farming systems, integrated value chains and favourable policymaking. Many policies and schemes have been set up to tackle the challenges faced by various stakeholders in Indian agriculture. However, certain areas need further intervention and attention from policymakers across various sub-sectors.

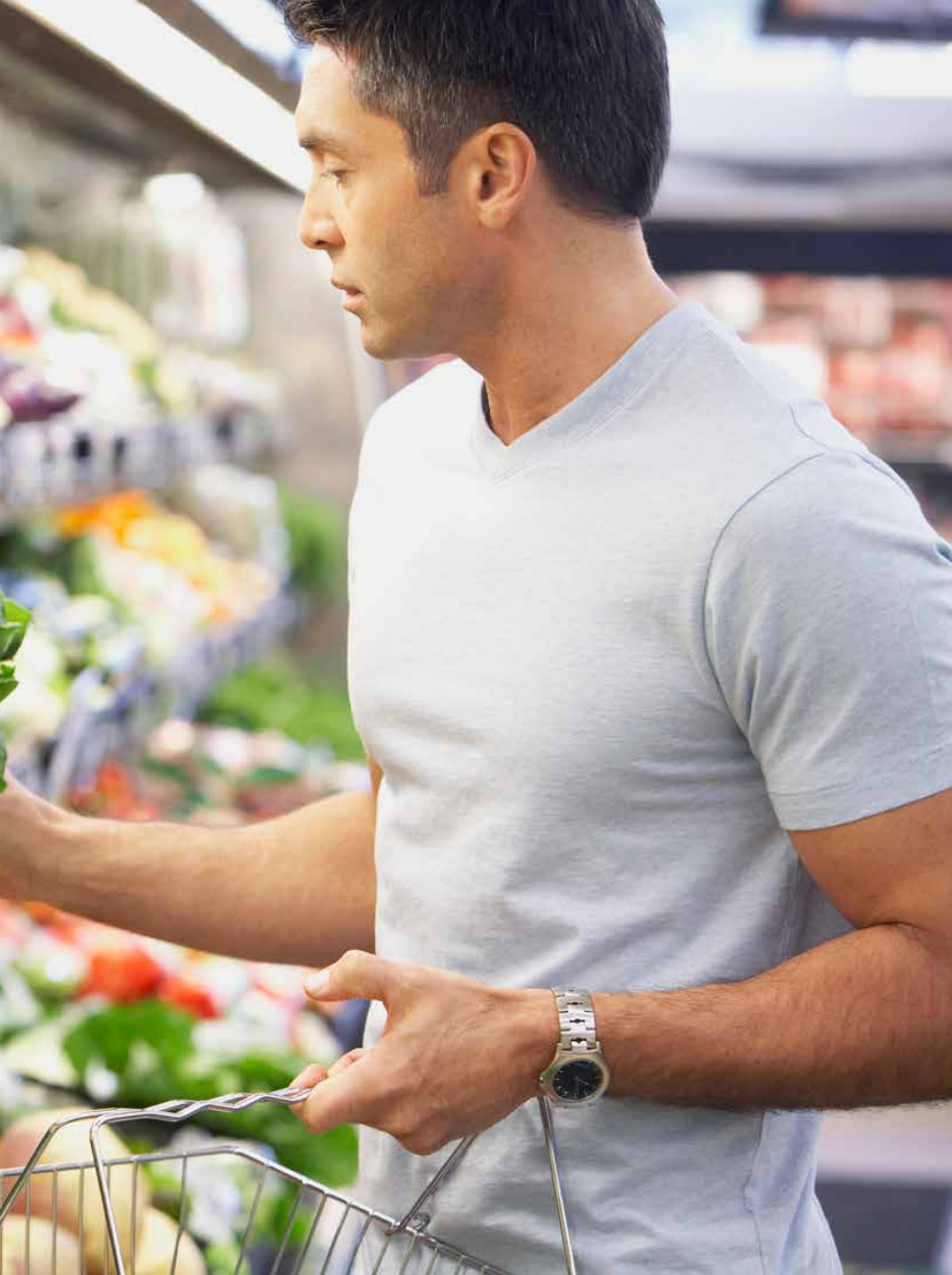
There is a need to increase agri-exports by strengthening the registration and regulation process. Greater focus on R&D and innovation is necessary. Agriculture infrastructure also needs to be modernised and improved, considering the requirements. The Indian agriculture sector is yet to reach its mechanisation potential. Hence, it is necessary to promote the inclusion of technology on a larger scale while reducing the dependency on rainfall through the widespread adoption of irrigation, especially micro-irrigation.

Access to agriculture finance and insurance also remains a challenge for many farmers who lack awareness and infrastructure. The last-mile delivery of these services needs to be strengthened along with the development of more customised products suited to farmer needs.

Agriculture marketing and linkages play a crucial role in farmer remuneration and profitability. Gaps in the value chain linkage hinder price realisation by farmers. Another area of improvement is farmers' access to market information and technical support. Processing needs to be promoted to strengthen linkages. A key aspect of overall growth in the sector is going to be innovation and PPP. Policies and incentives that are oriented towards the promotion of private sector participation and innovation need to be in place.

Thus, it is necessary to build a conducive policy environment, which would support the holistic and sustainable growth of the agriculture sector.





About ASSOCHAM

The knowledge architect of corporate India

Evolution of Value Creator

ASSOCHAM initiated its endeavor of value creation for Indian industry in 1920. Having in its fold more than 400 Chambers and Trade Associations, and serving more than 4,50,000 members from all over India. It has witnessed upswings as well as upheavals of Indian Economy, and contributed significantly by playing a catalytic role in shaping up the Trade, Commerce and Industrial environment of the country.

Today, ASSOCHAM has emerged as the fountainhead of Knowledge for Indian industry, which is all set to redefine the dynamics of growth and development in the technology driven cyber age of 'Knowledge Based Economy'.

ASSOCHAM is seen as a forceful, proactive, forward looking institution equipping itself to meet the aspirations of corporate India in the new world of business. ASSOCHAM is working towards creating a conducive environment of India business to compete globally.

ASSOCHAM derives its strength from its Promoter Chambers and other Industry/Regional Chambers/Associations spread all over the country.

Vision

Empower Indian enterprise by inculcating knowledge that will be the catalyst of growth in the barrier less technology driven global market and help them upscale, align and emerge as formidable player in respective business segments.

Mission

As a representative organ of Corporate India, ASSOCHAM articulates the genuine, legitimate needs and interests of its members. Its mission is to impact the policy and legislative environment so as to foster balanced economic, industrial and social development. We believe education, IT, BT, Health, Corporate Social responsibility and environment to be the critical success factors.

Members – Our Strength

ASSOCHAM represents the interests of more than 4,50,000 direct and indirect members across the country. Through its heterogeneous membership, ASSOCHAM combines the entrepreneurial spirit and business acumen of owners with management skills and expertise of professionals to set itself apart as a Chamber with a difference.

Currently, ASSOCHAM has more than 100 National Councils covering the entire gamut of economic activities in India. It has been especially acknowledged as a significant voice of Indian industry in the field of Corporate Social Responsibility, Environment & Safety, HR & Labour Affairs, Corporate Governance, Information Technology, Biotechnology, Telecom, Banking & Finance, Company Law, Corporate Finance, Economic and International Affairs, Mergers & Acquisitions, Tourism, Civil Aviation, Infrastructure, Energy & Power, Education, Legal Reforms, Real Estate and Rural Development, Competency Building & Skill Development to mention a few.

Insight into 'New Business Models'

ASSOCHAM has been a significant contributory factor in the emergence of new-age Indian Corporates, characterized by a new mindset and global ambition for dominating the international business. The Chamber has addressed itself to the key areas like India as Investment Destination, Achieving International Competitiveness, Promoting International Trade, Corporate Strategies for Enhancing Stakeholders Value, Government Policies in sustaining India's Development, Infrastructure Development for enhancing India's Competitiveness, Building Indian MNCs, Role of Financial Sector the Catalyst for India's Transformation.

ASSOCHAM derives its strengths from the following Promoter Chambers: Bombay Chamber of Commerce & Industry, Mumbai; Cochin Chambers of Commerce & Industry, Cochin; Indian Merchant's Chamber, Mumbai; The Madras Chamber of Commerce and Industry, Chennai; PHD Chamber of Commerce and Industry, New Delhi.

Together, we can make a significant difference to the burden that our nation carries and bring in a bright, new tomorrow for our nation.

ASSOCHAM Corporate Office:

5, Sardar Patel Marg, Chanakyapuri,
New Delhi-110 021

Tel: 011-46550555 (Hunting Line)

Fax: 011-23017008, 23017009

Email: assochem@nic.in

Website: www.assochem.org

Contact us:

Chetan Vij

Assistant Director

The Associated Chambers of Commerce and Industry of India
Chetan.vij@assochem.com

Deepankar Khare

The Associated Chambers of Commerce and Industry of India
Deepankar.khare@assochem.com

About PwC

At PwC, our purpose is to build trust in society and solve important problems. We're a network of firms in 158 countries with over 250,000 people who are committed to delivering quality in assurance, advisory and tax services. Find out more and tell us what matters to you by visiting us at www.pwc.com.

In India, PwC has offices in these cities: Ahmedabad, Bengaluru, Bhopal, Chennai, Delhi NCR, Hyderabad, Kolkata, Mumbai, Pune and Raipur. For more information about PwC India's service offerings, visit www.pwc.in

PwC refers to the PwC network and/or one or more of its member firms, each of which is a separate legal entity. Please see www.pwc.com/structure for further details.

© 2019 PwC. All rights reserved.

Contact us:

Ashok Varma

Partner, Government Reforms and Infrastructure Development (GRID)
PwC India
ashok.varma@pwc.com

Ajay Kakra

Executive Director, Agriculture and Natural Resources (GRID)
PwC India
ajay.kakra@pwc.com

Ravinder Grover

Associate Director, Agriculture and Natural Resources (GRID)
PwC India
ravinder.grover@pwc.com

Acknowledgements:

Authors

Ravinder Grover

Associate Director, Agriculture and Natural Resources (GRID)
PwC India
ravinder.grover@pwc.com

Bhumika Pandita

Senior Consultant, Agriculture and Natural Resources (GRID)
PwC India
bhumika.pandita@pwc.com

Editorial support

Dion D'Souza
Vishnupriya Sengupta

Design

Pallavi Dhingra



Data Classification: DC0

This document does not constitute professional advice. The information in this document has been obtained or derived from sources believed by PricewaterhouseCoopers Private Limited (PwCPL) to be reliable but PwCPL does not represent that this information is accurate or complete. Any opinions or estimates contained in this document represent the judgment of PwCPL at this time and are subject to change without notice. Readers of this publication are advised to seek their own professional advice before taking any course of action or decision, for which they are entirely responsible, based on the contents of this publication. PwCPL neither accepts or assumes any responsibility or liability to any reader of this publication in respect of the information contained within it or for any decisions readers may take or decide not to or fail to take.

© 2019 PricewaterhouseCoopers Private Limited. All rights reserved. In this document, "PwC" refers to PricewaterhouseCoopers Private Limited (a limited liability company in India having Corporate Identity Number or CIN : U74140WB1983PTC036093), which is a member firm of PricewaterhouseCoopers International Limited (PwCIL), each member firm of which is a separate legal entity.

PD/September 2019-M&C513