

- The singular focus on subsidies, unlike in other emerging economies, has led to stark market inefficiency in India. This scenario must change for farmer betterment.
- The launch of eNAM (for online trade), a revamped crop insurance scheme in 2016, a new agri marketing Act in 2017 and finalising a Model Contract Farming Act in 2018 are key government initiatives that will thrust the agri-sector's journey ahead.
- Key tools needed to kick-start India's agri journey to 2025 – increased public investment to create an enabling scenario, a policy environment that induces private investment in farming, keen participation of private sector in the entire value chain from farm inputs supply to farm products export. Successful implementation of the stated recommendations will likely achieve doubling of farm income by 2022!

AN OVERVIEW:

Indian farmers have collectively produced 5x the quantity of foodgrain over the last six decades; horticultural output too has increased by 3x in the last 26 years. We note foodgrain and horticulture output has achieved a record 283MT and 314MT respectively for FY19.

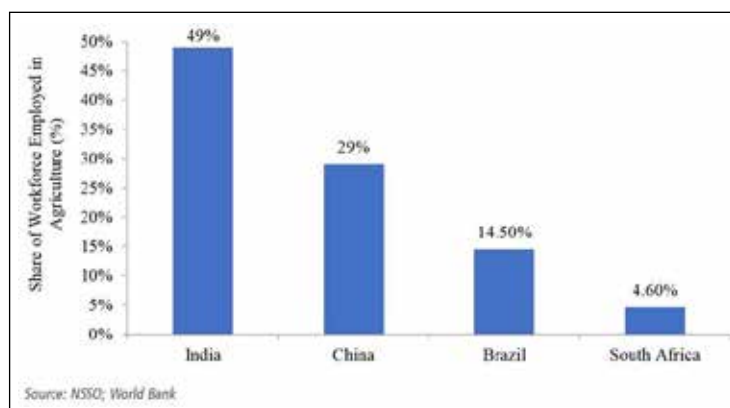
ANALYSIS & DISCUSSIONS:

Sustainable growth of any sector depends on the ability of the sector to generate income that can be reinvested. In terms of gross capital formation (GCF), investment in agriculture as a percentage of GDP in agriculture and allied services decreased from 18% in FY12 to 14% in FY18. However, the government's share in total GCF increased from 14% in FY12 to 19% in FY17 (National Accounts Statistics, 2018). The government has been injecting funds through numerous schemes introduced in its Five Year Plans. However, a large section of public spending has been mostly in the form of subsidies and only partly in agricultural related R&D.

India's Subsidy Culture: The singular focus on subsidies has resulted in tremendous wasteful expenditure and has not led to reaping any benefit to the sector. Input subsidies i.e. government-

sponsored subsidies to farmers for fertilisers, irrigation, electricity and food – are the most expensive aspect of India's agricultural policies. India has witnessed a high subsidy budget over time. This has resulted in our agriculture sector being more dependent on input subsidies when compared with other large emerging economies as seen in exhibit 5 below:

Exhibit 5: Share of Workforce Employed in Agriculture (%)



Source: World Bank; National Sample Survey Office

Developing economies such as Brazil and China have made a conscious move away from subsidies realising them to be one-sided transactions that do not provide long-term benefits of real development. In India, of the total planned revenue expenditure, 35% is spent on subsidies whilst a mere 9% is earmarked for capital investment (Union Budget, 2018). This improper and low utilisation of allocated funds has been resulting in superior market inefficiency.

For any investment to have a positive impact on production, productivity and real income, it must contribute to capital formation at the farm level. In this respect, the investments made by farmers themselves are indispensable. Public investment in agriculture should create the enabling environment that helps farmers re-invest in their land. Most developed countries spend a significant share of the agriculture investment on essential public goods, such as rural infrastructure, including roads and electricity.

Role of Private Investment

Government policies that allow:

- farmers access to seeds,
- the private sector to set up businesses that deliver supplies to farmers, and
- markets and trade environments to function for farmers,

are critical inputs to equip farmers to be able to produce more and re-invest in agriculture. Agricultural investment entails a large component of public good and this nature of investment has an 'inducement' effect on private investment – both at the farm household level and the corporate sector.

For any improvement in farm income, India's private corporate investment in agriculture should at least double from the current level of investment (Chand, 2018) [1]. Private sector investments in India along value chains are opening up new market opportunities for farmers. However, the declining share of private investment in agriculture is discouraging. Increased participation of the private sector is required across value chains – these include a wide range of small and large scale activities that encompass supplying farm inputs, processing, storing, distributing, wholesaling, retailing and exporting farm products.

To promote private sector participation, the government has allowed 100 per cent foreign direct investment (FDI) in several segments of the agriculture sector.[2] These include fertilisers, agricultural machinery, horticulture, development of seeds, animal husbandry, pisciculture and the cultivation of fruits and vegetables. Drawing these private sector investments is expected to greatly benefit Indian farmers, as a majority of them engage in small scale businesses and struggle to attain profitability. These investments can be used to propagate agricultural R&D, develop technologies for energy saving, and protect the environment, which could help increase yield. However, there is a need to strengthen government policies to encourage private investment in agriculture. Stringent regulations, high risk in agriculture, administrative procedures and delays have often discouraged private investment.

The significance of capital formation in agriculture for growth is evident from the fact that investment in machinery and equipment enables the farm workers to work on larger tracts of land and make use of other forms of capital, such as livestock. The investment in machinery and equipment augments labour and renders it more productive. Further, the concept of investment to augment productive capacity of agriculture entails not merely investment in physical assets, but investment in human capital, science and technology, social capital build-up and in infrastructure. Private investment in agro-industries complement farm-level investment but such capital cannot substitute for the investments that need to be made by the farmers themselves.

Promoting Farm Level Investment

First and foremost, the prerequisite for promoting farm level investment is stability in income. However, the challenges and risks involved in agricultural income are manifold. With small and marginal farmers constituting a majority (~80% [3]) in the agriculture sector in India, realising economies of scale at an individual level is a challenge. Farm mechanisation – an essential input to reduce cost and increase yield is increasingly becoming uneconomical with continued reduction in average farm size. Accessing key farm inputs and supplying to the market as a collective could potentially lower the input costs for farmers and lead to greater realised revenues. By innovative sharing of the cost of machinery, the cost required to be invested by farm holders can be made affordable.

Custom hiring models and tying up with local original equipment makers is one of the ways to reach out to the small farms. Some examples of initiatives taken by private investors in custom hiring are given below:

Exhibit 6: Private Investor Initiatives in Custom Hiring

Company/ Parameters	Geography of Operations	Operational Model
Mahindra & Mahindra	Pan India	Franchisee based model
TAFE (Tractor & Farm Equipment)	Tamil Nadu	Experimenting with various options
Zamindara Farm Solutions Pvt Ltd.	Punjab & Haryana	Library and radio taxi
Olam India	Madhya Pradesh	Tie ups with agri- service providers
ISAP	Karnataka & Rajasthan	Rental tie ups with FPOs
John Deere	Madhya Pradesh	Tie ups with FPOs
EM3 Agri services	Pan India	Pay-for-use models
Tata Trust	Madhya Pradesh	Tie ups with EM3, FPOs
Yanmar Coromandel	Tamil Nadu & Andhra Pradesh	Rental models through outlets

Source: Company Data, Media

Farmers' Readiness to Risk

An important criterion to ensure stability in income is a farmer's readiness to risk. Monitoring of the sowing progress, crop condition is the necessary premise for farm based decision making in a situation of shortage or surplus. As precision farming or smart agriculture is gaining prominence in India, global majors are adopting innovative solutions and customised models to help small and marginal farmers whose investment capacity is limited. It uses information technology or other technological innovations such as GPS, GNSS global navigation satellite systems, even drones to accurately predict what ingredients crops and soil need for optimum productivity.

Several models using satellite data have been devised by researchers to monitor crop growing progress. A high time frequency meteorological satellite can gather information about the terrestrial process daily, making it possible to monitor the crop continuously and dynamically (Fang & Meng ji Hua, 2008) [4]. Development of remote sensing technology and the use of remote sensing data make it possible to apply crop growing models in large scale areas. The Government of India has recently announced a new drone policy that permits use of unmanned aerial vehicles (UAV) with a few rules and regulations. These regulations have been put in place as of December 2018. This is good news for the agriculture sector because drone technology is a potent solution for crop monitoring and crop insurance. However, the application of these models would require location specific agro parameters and observed field data.

Liberalising Agriculture

The fact remains that agriculture is still in the clutches of highly restrictive laws which have inhibited it from developing into an efficient market place for agricultural produce. This is an area where the Central government can continue to play the lead role. There exists a maze of laws especially the Essential Commodities Act, the Land Ceiling Act, the APMC Act and the Foreign Trade Act, 1995, which enable arbitrary imposition of restrictions on exports, minimum export prices, and unfair imports.

The sugar production sector is a case in point. It is probably the most complex and under-reformed sector of the agricultural economy. The Central and state governments have poured subsidies and resources into the sector and India has a problem of chronic overproduction. India is likely to produce over 35 million tonnes this financial year, which is 40% more than what is required for domestic consumption. There is already a stock of 10 million tonnes of sugar in place. Moreover, government policies misapplied export and import controls in order to “manage” domestic prices of commodities such as sugar, which means that Indian farmers have never been able to effectively enter global supply chains.

The propensity to subsidise farmers translates to subsidy arrears reaching massive proportions particularly in the years of overproduction thereby calling for a “rescue package”. There have been various recommendations including from a committee led by C Rangarajan. But implementation has been lackadaisical.

It is clear that unless agriculture is unshackled and liberalised in general and policies such as the Foreign Trade Act, APMC and ECA in particular, are abolished or reworked completely, both man and nature will continue to conspire against Indian farmers.

Addressing Problems of Scale

The provisional numbers from a latest survey of the 10th agriculture census 2015-16 highlight the challenge of scale. Small and marginal farmers with less than two hectares of land account for 86.2% of all farmers in India, but own just 47.3% of the crop area. In comparison, semi-medium and medium land holding farmers owning between 2-10 hectares of land account for 13.2% of all farmers, but own 43.6% of crop area. Indian farms have become more fragmented between 2010-11 and 2015-16, and land holdings continue to be inequitably distributed. During this period, the proportion of small and marginal farmers grew from 84.9% to 86.2%, whilst the total number of operational holdings grew from 138 million to 146 million. More importantly, the total area under farming, however, fell from 159.6 million hectares in 2010-11 to 157.14 million hectares in 2015-16.

The existence of a large number of small and marginal farmers, close to 126 million, makes it difficult to enable the reach of new technology and farm support schemes.

The Right Set of Initiatives Has Been Announced

- Launch of the electronic national agriculture market or eNAM to facilitate online trade to give more choice of buyers to farmers.
- This was followed by a revamped crop insurance scheme launched in the kharif season of 2016 which promised reduced premiums and higher coverage of risks.
- In April 2017, the centre rolled out a new agricultural marketing Act and urged states to adopt it for making wholesale markets more competitive and transparent.
- In May 2018, the government finalised a Model Contract Farming Act to integrate farmers with bulk purchasers and agro-industries. Thus, promoting cooperative farming, for instance, will allow small and marginal farmers to take the advantage of their family labour. Corporate farming, meanwhile, could allow economies of scale to kick in at lower thresholds.

However, the implementation of the stated measures along with cooperation of the states will signal the difference between success and failure.

Farmer Producer Organisations (FPO)

Organising farmers into formal management practices is an important step to improve market linkages. The initiative of the Government to aggregate farmers into FPOs (cooperatives/SHGs/FIGs/producer company) can help integration into the supply chain and take up roles traditionally done by market intermediaries. The farmer aggregators can help farmers take collective decisions on cultivation, make best use of market intelligence, create opportunities for producers to get involved in value adding decision and activities, such as, input supply, credit, pre-conditioning, processing, marketing and distribution.

The instrument of Farmer Producer Company (FPC), registered under the Companies Act is emerging as effective. FPCs offer a wide range of benefits compared to other formats of aggregation of farmers.

Exhibit 7: Statewise Progress Of FPO Promotion as on 30 September 2018

State	No. of Farmers		No. of FPOs	
	Mobilised	Targeted Farmer	Registered	Under Registration
Andhra Pradesh	6792	7000	7	0
Arunachal Pradesh	1750	2750	2	2
Assam	5647	7500	12	3
Bihar	26186	34000	27	8
Chhattisgarh	29135	29000	26	2
Delhi	3535	3500	4	0
Goa	1810	1750	2	0
Gujarat	19166	20000	20	1
Haryana	12225	12750	23	3
Himachal Pradesh	4887	4850	5	0
Jammu & Kashmir	6814	8061	2	5
Jharkhand	10009	12000	8	2
Karnataka	121218	122500	119	1
Madhya Pradesh	126934	145000	141	3
Maharashtra	88348	99500	91	9
Manipur	5671	6950	4	4
Meghalaya	2990	3750	3	1
Mizoram	1700	2700	1	2
Nagaland	1750	1750	2	0
Odisha	39463	38900	41	0
Punjab	6288	6000	7	0
Rajasthan	49617	50500	40	2
Sikkim	16279	15750	30	0
Tamil Nadu	10945	11000	11	0
Telangana	24548	23998	20	0
Tripura	2874	2750	4	0
Uttarakhand	6004	6000	7	0
Uttar Pradesh	35746	49000	35	15
West Bengal	80317	88500	75	12
Total	748648	817709	769	75

Source: Small Farmers' Agr-Business Consortium

FPCs have performed well in states like Maharashtra, Madhya Pradesh and Kerala and farmers have been able to realise higher returns for their produce. Most of the FPOs remain focused on addressing issues of crop planning, technology infusion, input supply and primary marketing. Given that FPOs have been successful aggregators for meeting farmer's needs, it is important that the roles of FPOs extends further up the value chain, entering into post-harvest management, transport, storage and value-added processing and engage in contract production of primary agricultural produce.

Creating Mechanisms for Responding to Excess Production

Government policy initiatives are an important determinant of farm incomes but they typically get triggered in the event of crop failure and do not adequately address the issue of overproduction and consequent loss in realisations for farmers. Thus, the policy response function for agri must recognise that absence of rain or poor rainfall is not the only driver of stress. Even "normal" or good rains can cause stress as higher output often translates into lower realisations.

Current policies do not adequately address the eventuality of lower realisations arising due to excess output. Typically governments use a combination of MSP increase and higher procurement along with rural infra spend to alleviate farm distress. Even the budget leans heavily on the Market Assurance Scheme, which is a decentralised procurement of MSP-notified crops other than wheat and paddy by states where it shall be the responsibility of the states to handle and dispose of the procured commodity. The Centre will compensate the states for losses, if any, in the process to a maximum of 40 percent of MSP of the procured commodity. However, there is enough documented evidence on the shortcomings of this approach i.e. constraints of FCI, the wastage involved, limitations of state governments and the subsidy burden.

Since it is equally likely that farmer realisations will be hit in times of overproduction, key variables including soil nutrients, environmental factors, progress of monsoons and sowing patterns etc. can be monitored by an expert panel (crop and regionwise) and respective agencies can step in with alternative/ diversified crops, and the required infrastructure if there is a likelihood of excess production. A case in point is the Karnataka government which stepped in last year in the Cauvery command area to make farmers opt for ragi (finger millet) or other millet cultivation over their preference for paddy or sugarcane, as drought loomed. Technology can also be leveraged to do this much more effectively now.

Making Crop Insurance Effective

One of the effective mechanisms to mitigate agricultural risks emanating from weather is the adoption of a robust insurance system. Crop insurance was introduced in India in 1972. However, it always grappled with the problems of lack of transparency, non-payment/delayed payment to farmers etc. Till March 2016, there were three crop insurance schemes operating in India – National Agricultural Insurance Scheme (NAIS), Modified National Agricultural Insurance Scheme (MNAIS), and Weather Based Crop Insurance Scheme (WBCIS). The crop insurance schemes were not very successful – penetration of agricultural insurance was low and stagnant in terms of area insured and farmers covered. In 2016, the GoI launched a new crop insurance scheme, Pradhan Mantri Fasal Bima Yojana (PMFBY). Some of the improved features of the scheme were removal of capping on premium rates leading to higher amount of sum insured, fixing premium rates at 2% in kharif season and 1.5% in rabi season for farmers leading to substantial increase in premium subsidy by the government.

With the introduction of the new schemes, the overall area insured has increased marginally by 6.5%, from 54 million hectares in 2015-16 to 57 million hectares in 2016-17. However, the number of farmers insured has increased significantly by 20% from 48 million in 2015-16 to 57 million farmers in 2016-17. During the same period, the sum insured increased by 74% and premiums paid increased by 298% [5]

However, there has been disappointment among the farmers, insurance agencies etc. on the actual benefits incurred from the scheme. Delay in submission of yield data, payment of premium subsidy to insurance companies and therefore delay in payment to the farmers is causing lot of discomfort. Some of the reasons for this delay are the following:

- (1) **Crop Correction for Claim Settlement:** Farmers declare production of a crop which has low premium but a high claim amount. However, there are instances where in reality, they produce crops that have low input costs. The difference in what they declare and what they actually produce necessitates verification on the ground and calculation of claims. This causes serious delays.
- (2) **Area Correction for Claim Settlement:** Farmers are sowing less and expecting more. In many of the cases where there are delays in claim settlement, the sowing certificate stating the area sown for the period does not match with the sown area declared.
- (3) **Multiple Ownership of Land:** The scheme allows the claim to be settled with one owner per land. But on the ground, the expectation is if there is more than one owner for a land, all the owners will get the payment.

Thus, there are delays in claims payment as insurance companies are not releasing payments without clear documentation which is being overlooked at the time of registration & premium collection.

Widespread use of remote sensing in agriculture, insurance programme with minimum human intervention in order to assess crop damages and expeditious settlement of claims is necessary for smooth functioning of the crop insurance scheme. An increase in awareness among farmers through government agencies, insurance companies and banks is required. Farmers should be informed through an aggressive media campaign about compulsory deduction of premium, amount of sum insured, name of insurance company and the procedure for settlement of claims. Indian Railways Catering and Tourism Corporation (IRCTC) has already shown the way for railway tickets booked online by informing the passengers about the insurance policy through an SMS and email [6].

Premium subsidy programs for crop insurance that started in the USA, China and Kenya have been very successful [7]. The government of China in 2007 led an expansion of insured farm area from 15 million hectares in 2007 to 115 million hectares in 2015. The Kenyan experience is significant due to its efficiency in settlement of claims within 2-4 days. Kilimo Salama (Safe Agriculture) is a weather index based insurance product developed by Syngenta Foundation for Sustainable Agriculture (SFSA) in 2009. They developed an application that uses Safaricom mobile technology, M-pesa, to transfer money for payment of claims. Whenever there is a deviation from normal rainfall resulting in germination failure, the claim amount automatically gets transferred into the accounts of insured farmers [8].

HOW TO CREATE OPTIMUM FARMER INCOMES

Efficient Inputs Usage: Agriculture in India is largely dependent on groundwater irrigation-responsible for 70% of the total production (Fishman et.al, 2015) [9]. However, over extraction of groundwater is depleting aquifers across the country and water table declines are pervasive. The rate of depletion in India is estimated to be highest in the world (Aeschbach-Hertig and Gleeson, 2012). In India the problem is not merely of scarcity but inefficient use of water resources. According to a 2010 report of the UNESCO-IHE Institute of Water Education, the water footprint (the ratio of total volume of water used to the quantity of production) of rice production in India is 2020 M³ a year compared with 970 M³ a year in China and a global average of 1325 M³ a year. This means we use more drop per crop than most other countries, an inverse of our avowed national objective of “more crop per drop” [10].

Several countries have successfully adopted advanced technologies for water conservation and trading. Israel is recognized as the world leader in water technology – with its advanced method of desalination, water recycling, transport, irrigation monitoring and water security. Every year, Israel reclaims 630mm cubic meters of waste water for agricultural purposes, which accounts for 80% of total waste water and is the highest rate of waste water reuse in the world [11]. Australia introduced the concept of water trading in the late 80s, and in 2004, the intergovernmental agreement on a National Water Initiative, facilitated the expansion of water markets across connected valleys and eventually state borders in the Murray-Darling Basin (Fargher. W, National Water Commission)[12]. The basic tenet of Australian Water Trading Market was “Cap and Trade Approach”. “Cap” represents the total

pool of water available for consumption; consistent with sustainable levels of extraction. “Trade” implies change of ownership over time. The price is determined in the market by the value placed on water by many buyers and sellers.

Based on the assessment of water requirement and water availability, accounting for diversification of cropping patterns, a revival or construction of water storage structures would be critical. These storage structures would not only help in assured water availability as rainfall patterns change erratically, they would also reduce the risk of crop loss and loss of livelihood.

Water storage through tanks and overhead structures should be treated as economic assets and the pricing of water for agricultural purposes should account for that.

There are three key objectives to be achieved which together will lead to increased farmer incomes:

- Soil Moisture Security – Minimizing the water gap between demand and availability
- More Crop per Drop – Efficient on-farm water use
- Improved Market Linkages – Ensuring access to, creating and sustaining markets.

Diversifying Sources of Income: One possible measure of increasing farm household income is to generate income from diversified sources. The government’s employment generating schemes, MGNREGA is one such step in this direction. In recent years, migration and remittances have also become a main source of rural household income. Bihar and Jharkhand are examples, where a large section of non-farm income has become an important source of investment in agriculture for the development of family farming and particularly for making the shift from subsistence agriculture to market oriented production.

Diversification of income also implies empowering people to provide employment opportunities. Efforts need to be taken to enhance the proportion of non-farm income in small and marginal farmers’ earnings. Rural construction and industrialisation are important supplementary sources of income.

Adopting State Specific Policies: Agricultural households derive income from varied sources. Large farm households i.e. those owning more than 10 hectares of land depend primarily on cultivation. Small households, with lower sizes of land, derive their income mainly from wages and salaries. The composition of farm and non-farm income varies widely across states. More than 70% of income is derived from the farm business in the states of Madhya Pradesh, Assam, Haryana, Punjab and Uttar Pradesh, whilst lower than 50% of income is derived from the farm business in West Bengal, Kerala and Tamilnadu.

Understandably, the growth path of the states in each source of farm income varies. Chhattisgarh registered highest growth in income from cultivation followed by Haryana, Madhya Pradesh, Andhra Pradesh, Odisha, and Punjab.

High growth in income from cultivation in Chhattisgarh can be partially explained by the high budget allocation on agriculture and allied activities in comparison to other states. However, increase in budget outlay in other states, like Bihar had lower impact. While these measures are cyclical in nature, a more competitive price can be ensured to farmers through agricultural marketing reforms.

The other important sources of farm income growth which directly improve output and reduce cost are an increase in cropping intensity, area under fruits and vegetables and yield of foodgrains. Cropping intensity has improved in most states. Yield of foodgrains and the area under fruit and vegetable cultivation have increased considerably, mainly in MP and Karnataka.

Diversification of household income to other agri-allied activities like livestock and non-farm activities is found to be a significant contributor to farm income growth. In most states, real income from livestock has more than doubled in 10 years. Non-farm sector has the potential to create more productive employment as it contributes nearly 69% of the NDP by engaging merely 39% of the workforce.

Growth of agricultural activity in MP has been remarkable in all the factors of income growth. Growth path of other fast growing states differ – while income from non-farm activities in Andhra Pradesh and Odisha had significant growth, Rajasthan witnessed high growth in income from livestock.

The two relatively more important factors that can impart a positive nudge to growth in income of farmers are - better price realisation and diversification of income. The key premise here is that co-opting of states will be critical to the success of the goal of farm income doubling. The role of an enabling environment by states has been more decisive in attaining tangible goals. A case in point is the stellar growth of agriculture in Madhya Pradesh, where the leadership fixed both supply as well as demand side problems. The states will have to continue to play a meaningful role in next-gen agri reforms (legalising of land leasing, contract farming, repeal of APMC Act, eNAM etc.) and for expansion/modernisation of farm marketing networks.

Market Expansion: Domestic demand has slowed, therefore, it is essential to expand the market to other countries. Openness to trade and integration into global markets is the central element of successful growth strategies. Higher and sustained economic growth is associated with export growth. A three-pronged strategy for promoting export of agri & allied commodities are the following:

- Raising the quality of export items.
- Export diversification.
- Export competitiveness.

Fresh food markets provide significant opportunities for developing countries to develop agricultural export. Also, fresh food products have high income elasticity of demand and face fewer traditional protectionist barriers. However, these products are more likely to carry food safety risks and encounter Sanitary and Phytosanitary Measures (SPS) as barriers to market access (Muhammad et al.) [13]. Indian exporters encountered various SPS-related problems in several export destinations. Export of many food items from India have long been facing severe problems owing to the presence of aflatoxin beyond the maximum levels permitted by the EU.

Indian exports of mango and mango pulp have been affected by SPS related problems in various export destinations including the USA, Japan, the EU, Australia and New Zealand. India's exports of rice face SPS related problems in countries, such as the EU, the USA, Japan, the Middle East and Russia (Das, 2008) [14]. This directs us to focus attention on producing food products of international standards. The major setback lies in the low level of awareness amongst the producers and consumers on SPS measures. Organising workshops, consultancy services on SPS measures, effective co-ordination among various relevant national and sub-national agencies, and transparency on the procedures are some of the measures taken by different countries in meeting international food standards [15].

Export diversification strategy is an effective tool which if effectively implemented can enable the exporters to revive and strengthen their exports. Hot-spot analysis of geographical identification of global markets can be a significant step towards market realisation. Secondly, in the past, branding of basmati rice had given significant boost to promoting export. However, all exports are not sustainable. The export of rice, for instance, is simply the export of precious ground water. As international commodity prices crash, the clamour for India to open its borders for high-value, low-volume imports will rise. Therefore, it is required that more of high-value agri-commodities are branded and promoted for export. Creating consumer awareness of agri-commodities in the identified global markets can help generate demand.

Export competitiveness implies ability to quickly respond to market forces. Instead of global demand and supply factors, farmers in India are guided by minimum support and procurement prices fixed arbitrarily by the government. Keeping domestic prices of farm goods artificially high disincentivises export. Minimum support and procurement prices also over-incentivise cultivation of cereals vis-à-vis

commercial and horticultural crops. This affects India’s ability to capture export markets. India’s farm produce suffers from poor customs, port infrastructure and high logistics cost that cut into exporters’ margins. Exports of many agricultural commodities, sugar for instance, are regulated by arbitrary quota fixation in India. Such executive actions make India an unreliable supplier. That in turn leads to low net realisations from export. Promotion and expansion of export requires an increase in the level of awareness both in terms of improving farming and the market.

An ideal approach to promote farm level investment is to create a one-stop integrated solution that can address the needs of farmers and create channels to connect with them.

Two-Pronged Approach

Exhibit 8 (a): Integrated Solutions Platform - a Platform for Aggregating Needs and Identifying Solutions

Farm Stage	Farm Need	Farm Services
Sow	Efficiency in usage of inputs - seeds, fertilisers	Advisory
Grow	Efficiency in usage of water – irrigation, de-weeding	+
Harvest		Mechanisation
Post-harvest	Processing, transport, storage	Cross-selling opportunities looking at farmers data, needs & queries

Exhibit 8 (b): Stores/Outlets/Mobile Applications to Connect with Farmers

Connectors	Services
Mahindra Samriddhi/ EPC	Advisory, Seeds & input, Irrigation
Trringo	Custom hiring -mechanisation solution
Mahindra Finance	All financing needs
Krishilok	Market linkage, processing & branding

Globally there are several success stories of productive agricultural investment models. For instance, promoting investment in agriculture has been the key reason for the significant economic growth of sub-Saharan African countries. Data suggests that investment on agriculture was 11 times as effective in reducing poverty in sub-Saharan Africa compared with investment in other sectors. In other developing countries, it is said to be about four times as effective. In the last 15 years, 22 countries have been able to cut hunger by half. Also, the framework for agriculture that African countries have put together has enabled them to put their own investments into agriculture [16].

World Bank funded National Fadama Development Project is an example of transforming Nigerian farmers from subsistence farming to agropreneurs. The funded project helped create value chains of cassava, rice, sorghum and horticulture in six states; Kogi, Niger, Kano, Lagos, Anambra and Enugu. The six states were then used to serve as hubs of Staple Crops Processing Zones (SCPZs), while surrounding states were used to serve as catchment areas to feed the processing zones [17].

CONCLUSIONS:

Agriculture in India requires larger participation from private sector to assist in promotion of farm level investment. Public investment should create an enabling environment and a policy environment that induces private investment. Participation of private sector is required across the value chain. These value chains include a wide range of small and large scale activities that involve supplying farm inputs, processing, storing, distributing, wholesaling, retailing and exporting farm products.

Farm level investment should not be merely on physical assets, but also on human capital, science and technology, social capital build-up etc. Such investment will enable the farmers to generate non-farm sources of income that can be used to re-invest on land.

References

- [1] Live Mint, Jan 17, 2018, "India looks for more private capital in farms to boost incomes".
- [2] India Brand Equity Foundation, Jul-2018, <https://www.ibef.org/economy/foreign-direct-investment.aspx>
- [3] Ministry of Agriculture, 2012. Agriculture Census 2010-11. Department of Agriculture and Co-operation, Ministry of Agriculture, Government of India. (URL: <http://agcensus.nic.in/document/agcensus2010/agcen2010rep.htm>).
- [4] Wu Bing-fang & Meng-ji hua (2008), "Study on the crop condition monitoring methods with remote sensing"; <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.184.2686&rep=rep1&type=pdf>.
- [5] Agriculture Statistics at a Glance.
- [6] Gulati, A et al. (2018), "Crop Insurance in India: Key Issues and Way Forward", Indian Council for Research on International Economic Relations, Working Paper No. 352.
- [7] United States Department of Agriculture, Risk Management Agency, 2016; China Statistical Yearbook.
- [8] Syngenta Foundation for Sustainable Agriculture.
- [9] <http://www.indiaenvironmentportal.org.in/files/file/agricultural%20water%20use%20India.pdf>.
- [10] <http://www.unesco.org/new/en/santiago/natural-sciences/hydrological-systems-and-global-change/unesco-ihe-institute-for-water-education/>
- [11] <http://israelnewtech.gov.il>
- [12] <http://www.oecd.org/tad/sustainable-agriculture/49192129.pdf>.
- [13] <http://ageconsearch.umn.edu/bitstream/26500/1/32010133.pdf>.
- [14] Kasturi Das (2008), "Addressing SPS Challenges in India", Centre for WTO Studies".
- [15] http://wtocentre.iift.ac.in/Papers/SPS_Paper_CWS_August%202009_Revised.pdf.
- [16] Food and Agriculture Organization of the United Nation (2016), "Ending Poverty and Hunger by Investing in Agriculture and Rural areas.
- [17] World Bank, (2015), "Fadama Project turns Nigerian Farmers into agropreneurs".
<http://www.worldbank.org/en/news/feature/2015/04/02/fadama-takes-nigerian-farmers-to-higher-level>.