

Agricultural Value Chains in India: *Prospects and Challenges*

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1. Abstract

Growth and development of agricultural value chains for local and external markets can be considered as a powerful tool for poverty reduction and to fight against the challenge of food-security in developing countries like India. This particularly makes a strong case in India where farmers are able to produce agricultural products, such as fresh fruits and vegetables that have higher potential for value addition as compared to conventional crops, and if access is made available to processing, marketing and distribution, which could enhance the value of the final products. This paper assesses the current status of fruits and vegetables production and export from India along with its potential to external markets particularly to other South Asian countries. Besides, the paper also examines the overview of agriculture value chains (mainly of fruits and vegetables) in India. A comparative case analysis helps to better understand various processes adopted and initiatives of agri-business models in India. Finally, the paper identifies major challenges related to the agriculture value chains and puts forward some of the key recommendations for the growth and development of agriculture value chains in India.

2. Introduction

Agriculture in South Asian countries and specifically in India have potential for market-based economic development that can create benefits through national or regional agricultural value chains. Supporting agriculture-based activities can foster economic prosperity in these countries where poverty is endemic. Further, it can address key socio-economic issues that affect day-to-day lives of farmers and traders.

According to World Bank (2015), 75 percent of the world's poor live in rural areas – 883mn people at the US\$1 per day poverty- level and depend on agriculture as their major source of income. Rural poverty also remains high and tenacious in South Asia. Agricultural growth can be an effective tool in reducing rural poverty similar to the growth in other sectors of the economy; thus development, economic growth and strengthening agricultural value chains in South Asian countries like India could be among the most effective ways to address the socio-economic problems of farmers.

The conceptual framework of agricultural value chains includes a sequence of value adding activities, from production to consumption, through processing and marketing. Each segment of a chain has one or more backward and forward linkages. A value chain in agriculture identifies the set of actors and activities that bring a basic agricultural product from production in the field to final consumption, where at each stage value is added to the product.

The terms value chain and supply chain are often inter-changed (Food and Agricultural Organisation 2005). According to Dunn (2014) an agriculture value chain can be a vertical linking or a network between various independent business organisations and can involve

processing, packaging, storage, transport and distribution. In South Asian countries, such as India, agricultural value chains are often fragmented; lack investment; and fail to include vulnerable groups and are missing critical linkages of farms and markets.

The globalisation of agriculture value chains constitutes a major challenge to serve local and national markets. A study by the United Nations Conference on Trade and Development (UNCTAD 2006) found that major companies, except few exceptions, are reluctant to cooperate with the local farmers because of structural shortcomings, such as lack of quality products and poor reliability. The availability and quality of domestic suppliers is a key determinant to participation in companies/private firm based value chains.

A study conducted by International Finance Corporation (IFC) in 2012 considers the system of agriculture value chains as a pyramid. Farmers, particularly small marginal farmers, are at the lowest-level of this pyramid and constitute the base. Firms and middlemen are in the middle while consumers are at the top of the pyramid. Thus, in order to channelise the resources, it is necessary that the price, which consumers pay, trickle down to the base of the pyramid so that it can become sustainable. But, at the same time the base of the pyramid (farmers) need improved market access to make coordination with the consumers. Furthermore, consumer also needs quality products at affordable prices. This requires a sustainable agriculture value chain based on modern technology and diversified agricultural products.

In this paper, an attempt has been made to bring together various issues affecting agriculture value chains in India. This paper examines the status, prospects and challenges in the development of agriculture value chains in India in general and fruits and vegetables in particular. Although the paper is primarily based on data and information available from secondary sources and published literature, it has also taken insights of field work conducted in Uttar Pradesh and Bihar by the authors under the “Sustainable Development Investment Portfolio in South Asia” project at CUTS, which is supported by Australian Government, Department of Foreign Affairs and Trade (DFAT).¹

Given this background, the paper is organised in to six sections. This first section introduces the theme of the paper. The second section provides an overview of agricultural value chains in India focussing on three case studies. The third section examines the status and trends of fruits and vegetables in India from a point of view of potential component of agricultural value chains. The fourth section focusses on some of the existing challenges in agriculture value chains. The final section presents key recommendations.

¹ Details about the project can be accessed at: <http://www.cuts-citee.org/SDIP/>.

3. Agriculture Value Chains in India

The agriculture system in India has undergone rapid transformations over the past few decades particularly after the economic reforms of 1990s. The emergence of integrated agriculture and food supply and value chains is one of the most visible market phenomena in India. Increasing concentration on processing, marketing and export is being observed in all the segments of the chain. The traditional way of food production is being replaced by practices more similar to manufacturing processes, with greater co-ordination across farmers, processors, retailers, exporters and other stakeholders in the agriculture value chain (Kumar *et al.* 2011).

Agricultural Gross Domestic Product (GDP) increased at an annual rate of 3 percent between 1980 and 2012-13, making India the third largest agricultural producer by value after China and USA. However, this sector is yet to realise its full potential. The sector currently fulfils only 60 percent of yield for most crops, particularly fruits and vegetables. Yet for many crops India does not have global scale processing facilities. In India only 4 percent of the fruits are processed compared to China (23 percent), Indonesia (50 percent) and Brazil (70 percent) (Shivakumar 2016). Apart from these, another issue is loss of agricultural products. Post-harvest losses in India are too high (25-30 percent of total production) (Joshi *et al.* 2007).

Thus, fruits and vegetables are suitable areas for consideration to revive Indian agriculture. Fruits and vegetables can provide 2-4 times higher incomes to farmers and consume 40-80 percent less water per hectare in comparison to cereals. China's success in apple can be a meaningful lesson for India where China's export of processed apple increased from US\$50 million to more than US\$1.4bn in eight-nine years (Shivakumar 2016).

Apart from it, with steep rise in income of middle class, change in preferences and lifestyle, transformation in work profiles and demography has created a huge demand for high-value commodities and products, such as fruits, vegetables, livestock products etc. Other than these, changes in tastes, preferences and food-habit of Indian towards frozen and pre-cooked or ready-to-eat items have also increased particularly youth and working class and with the rising numbers of shopping malls and eating joints. This has also necessitated changes in quality and safety of products, production and processing process and distribution methods. Farmers have to grow and try to diversify their production systems accordingly and in some of the areas they are trying to do this. This also opens a huge opportunity in the expansion of domestic market for non-conventional, crops, such as fruits and vegetables.

In India, agriculture system along with value chain framework has not been conceived as a main strategy to bring more efficiency, productivity and earnings. There has not been enough emphasis on the growth and development of efficient agricultural value chains in India. Through the development of modern agriculture value chains at national and regional-levels, farmers in India can gain from increased knowledge, data, and information and

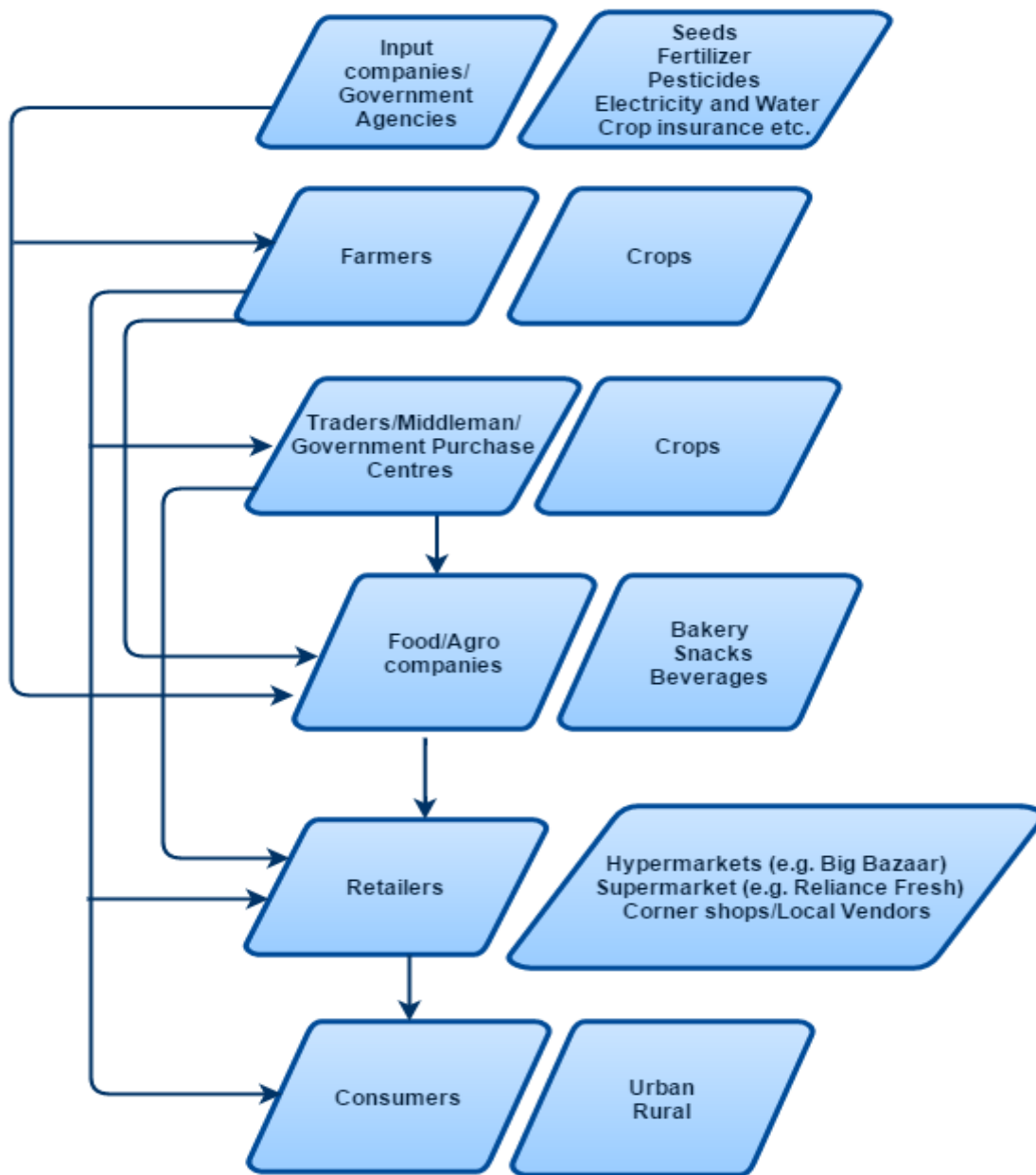
communication technologies. At the same time, modern and particularly urban consumers in India will get better quality and safe food products according to their choices and preferences. Costs, risks and losses to retailers and exporters will also go down with the better value-addition. Figure 1 shows the basic model of fruit and vegetable agriculture value chain in India.

Agriculture value chains in fruits and vegetables provide an alternative for the diversification of agriculture in view of high income, employment, foreign exchange earnings and a new method to combat challenges of food security. These products have high income elasticity of demand. Whenever and where-ever income of the population goes up, demand for these products also goes up mainly in the middle-income groups of developing countries. The rise in income and stress on quality has influenced the demand side while new technologies and trade agreements have the potential to influence the supply side.

But it is also noteworthy that in India, due to lack of technologies related to quality seeds, fertilisers, irrigation and good agricultural practices farmers find it very difficult to enhance their productivity. There is urgent need to develop innovative technologies related to agricultural inputs, such as quality seeds mainly climate-resilient varieties, fertilisers and improved irrigation equipment.²

² During a field work conducted in Kushinagar district of Uttar Pradesh in November-December 2015, it was found that 20 percent agricultural land is flood affected in the area, so farmers need short duration varieties/stress tolerant varieties and solar pumps, which they do not get on time and at affordable prices. Apart from it, farmers also face problem of processing units and marketing channels, for example, the sugar factories of the district do not have distillation facilities thus they cannot produce *ethanol*. Thus, they run on losses and ultimately the burden is transferred on farmers in the form of late payment. This hinders further possibility of value chain in cash crops such as sugar in the district. The situation is not very different in Mau district of Uttar Pradesh also. Water table has gone down in recent years, so farmers are completely dependent on diesel pumps. Solar pump sets are too costly and even though government is providing subsidy on these pumps, farmers are not getting these: a) because of lack of awareness, b) institutional corruption in the government agencies and departments, c) it is almost impossible for a small farmer to pay a lump sum heavy amount which costs him around 60,000 rupees for a 2 HP solar pump even though there is subsidy of 1,40,000 rupees. Farmers in this district stressed that cultivation of non-conventional crops such as *Menthol (Pudina)* can be highly useful for the region if processing units and storage facilities are established and marketing channels are made available.

Figure 1: A Model of Agriculture Value Chain of Fruits and Vegetables in India



There have been examples in India where successful agro-business models incorporated small and marginal farmers in their network and linked them with markets. The following cases briefly analyses such examples, which have been working very well in India for the development of agriculture value chains and linking the farmers to the domestic and external markets.

Case of PepsiCo

PepsiCo's agricultural operation in India is an example. At present, PepsiCo is earning 26 percent of its turnover from processed agricultural products (such as rice, potato, peanut butter, tomato, chilly, garlic and ginger pastes etc. The company has signed contracts with

Punjab Agro Industries Corporation and Punjab Agricultural University for contract farming and research purposes. The company provides inputs and technology to the farmers. Returns to the farmers have also gone up as now farmers supply agricultural products to the company at an agreed price and for a fixed quantity. Direct involvement of company's agents with farmers ensures good quality for company as well as cover risks to farmers from crop infestation and bad weather etc. (Punjabi 2015).

Case of Mahagrapes

Mahagrapes is a cooperative and partnership firm of various cooperative societies spread all over Maharashtra state in India. It was established in Pune in January 1991 to export fresh grapes (mainly seedless grapes) from India. It was established by the support from National Cooperative Development Corporation (NCDC), Government of Maharashtra and other related government agencies involved in agricultural product export. Mahagrapes has established itself as a reputed brand in European, Sri Lankan and Middle Eastern markets.

Currently, it comprises 16 grape growers' cooperative societies having strength of more than 2500 grape growers with 6000 ha of land under grapes from Sangli, Solapur, Latur, Pune and Nasik. Mahagrapes also provides support to small farmers by bulk-buying/in house production of inputs. Apart from it, farmers receive price based on the quality of their output. To maintain standard, quality and safety it also provides materials, technical help and infrastructure support, such as cold storage to the farmers (Mahagrapes 2015). Mithofer and Waibel (2011) argued that farmers do earn significantly higher profits compared with those outside the Mahagrapes scheme. The success of Mahagrapes demonstrates that multi-specialised intermediaries can play in linking small farmers to overseas export markets.

Case of PRAN group

The PRAN (Programme for Rural Advancement Nationally) group started in 1981 in Bangladesh. It has now become Bangladesh's largest grower and processor of fruits, beverages and vegetables. Other than Bangladesh it supplies processed products of fruits and vegetables to more than 75 countries, including India. The PRAN group has also set up a processing plant in Tripura state of India.

The Tripura government has allotted land to the PRAN group in Bodhjungnagar to set up the unit, where already 500 people, mostly local residents and women, have been employed. It is expected to reach 1,000 workers by 2017 after the expansion of the unit. The group is also setting a processing unit at Kalyani in West Bengal's Nadia district. It also plans to set up units in Odisha and Siliguri in West Bengal to receive other agricultural products from North Eastern parts of India (PRAN 2016; Business Standard 2015).

Table 1: Comparison of PepsiCo, Mahagrapes and PRAN on Select Parameters					
Agri-business model	Reaching small farmers	Adoption of new technology by farmers	Investment in modern technologies	Delivering strong marketing	Sharing benefits
Pepsico	Limited	Strong	Strong	Strong	Limited
Mahagrapes	Strong	Limited	Strong	Strong	Limited
PRAN	Strong	Limited	Strong	Strong	Limited

Note: Comparison based on model developed by Gandhi (2015)

Table 1 demonstrates that agribusiness models of PepsiCo, PRAN and Mahagrapes have both positive and negative traits. While the outreach of PepsiCo to small and marginal has been limited the reach of PRAN and Mahagrapes is comparatively strong and wider. With its strong dissemination activities PepsiCo has been able to provide new and modern technologies to the farmer's linked with its programme while this is limited in case of Mahagrapes and PRAN. But these organisations have failed in sharing the benefits and profits equally with their farmers, this need to be corrected as the long-term objective of these agri-business models should be connecting the farmers to the market and provide the equal share of benefits to them.

Despite these drawbacks these models demonstrates that agri-business models can work in South Asian countries, such as in India and Bangladesh and have potential to connect small and marginal farmers to the market and export community. Need of the hour is to develop national and regional-level policy framework to support the private companies and business houses to design innovative ideas to develop the agriculture value chains in India and link the farmers to the market and wider export community.

4. Status of Fruits and Vegetables Production and Trade

The above mentioned cases demonstrate that non-conventional crops, such as fruits and vegetables, have the potential to be exportable products (raw as well as processed) to external markets. So, it is necessary to review the production and trade trends of fruits and vegetables. The following section provides a brief overview of fruits and vegetables production and trade of India.

Table 2: Fruits and Vegetables Production in India (In '000 MT)		
Year	Fruits	Vegetables
2004-05	50867	101246
2005-06	55356	111399
2006-07	59563	114993
2007-08	65587	128449
2008-09	68466	129077
2009-10	71516	133738
2010-11	74878	146554
2011-12	76424	156325
2012-13	81285	162187
2013-14	88977	162897
<i>Source: Indian Horticulture Database-2014</i>		
<i>Note: Data includes all fruits and vegetables</i>		

Table 2 shows the overall production of fresh fruits and vegetables in India from the year 2004-05 to 2013-14. The trend reveals that the production of both fruits and vegetables has increased substantially over the past 10 years. The growth rate of vegetable production has stagnated since the last two-three years. There have been slight fluctuations in the growth rate of vegetable production while the growth rate of fruits production remained almost constant and steady over the past 10 years. This steady growth of fruits production should be taken as an advantage and has potential to be converted in the development of fruits value chain sector in India. There is need to frame such a policy for steady vegetables production, which can support the vegetable value chain sector in the long-term.

Table 3: Export of Fresh Fruits and Vegetables from India to World		
Year	Quantity (in MT)	Value (in Million INR)
2011-12	1309924.82	17229.98
2012-13	1666872.60	19666.26
2013-14	1482498.58	31696.12
<i>Source: Indian Horticulture Database-2014</i>		

Table 3 shows that India's export of fresh fruits and vegetables to the rest of world has increased in terms of value however there have been slight fluctuations in terms of quantity. By comparing the data from Table 1 to Table 2 it can be seen that although the production of fruits and vegetables has gone up between 2011 to 2014 but the exports of fruits and vegetables has shown slight variations. It indicates that the growth of production has not been transformed into exports. Thus, the country clearly requires trade promotion policy linked with production policy. Hence, the cross-border agriculture value chain cannot evolve until these two policies are strongly coherent within the country.

Table 4 indicates that India exports fresh fruits to few countries of South Asia while it exports vegetables to almost all South Asian countries. But even the exports of both vegetables and fruits to these South Asian countries are in few products and in most of the products it is very low. This possess a challenge for evolution of cross-border agriculture value chains despite the fact that most of the South Asian countries have similar agro-climatic conditions, food habits, taste and preferences and lifestyle.

Table 5 indicates that India is one of the largest producers of some of the fruits and vegetables including bananas, guava and papaya for which India holds the top rank in the world. This clearly demonstrates that India has the capability to evolve and develop value chain in these products. The Table also shows that the other South Asian countries are importing these specific products from other parts of the world even though India has potential to fulfil their demand for these particular fruits and vegetables.

However, lesser import quantity of fruits and vegetables of other South Asian countries from India may be the result of different existing trade barriers in the region. This also hinders the possibility of evolution of cross-border agriculture value chain across the region. The negative figures shows that that there is a possibility of informal trading for these particular products, so that the partner countries are unable to record correct numbers to their databases.

Table 4: Exports of Fresh Fruits and Vegetables from India to Other South Asian Countries (2013-14)

Fruits (Quantity in MT)								
	Apples (08081000)	Fresh Bananas (08030000)	Fresh Oranges (08051000)	Fresh Grapes (08061000)	Guavas (08045010)	Mangoes (08045020)	Papaya (08072000)	Pineapples (08043000)
Bangladesh	30702	..	25849	31109	..	2900	..	..
Nepal	4914	5933	2306	..	..	1106	1113	1395
Sri Lanka	444	..	..	..	..	..	..	..
Maldives	..	310	..	..	12	..	..	267
Vegetables (Quantity in MT)								
	Cabbage (07051100)	Cauliflower (07041000)	Onions (07031010)	Peas (07081000)	Tomatoes (07020000)	Fresh Potatoes (07019000)	Sweet Potatoes (07142000)	
Pakistan	281	..	73329	7458	344508	5247	..	
Nepal	55	2	38908	166	6606	148343	149	
Sri Lanka	1	..	223697	..	..	24652	..	
Maldives	2	21	..	..	644	3032	45	
Bangladesh	0	..	404885	..	20786	..	..
Afghanistan	..	2	..	..	..	..	..
<p><i>Source: Indian Horticulture Database-2014</i></p> <p><i>Note: Data extracted on HS code 8 digit</i></p> <p><i>“..” indicates data not available</i></p>								

Table 5: India's Status in Fresh Fruits and Vegetables Production in the World (2013-14)

Fruits (Quantity in MT)							
	Apple (08081000)	Fresh Bananas (08030000)	Fresh Oranges (08051000)	Fresh Grapes (08061000)	Guava (08045010) and Mangoes (08045020)	Papaya (08072000)	Pineapples (08043000)
India's Rank	5	1	4	9	1	1	6
India's Total Production	2497678	29724548	3886198	2585338	22099225	5639300	1736739
India's Total Export	36098	34830	28236	160256	42249	9921	3566
India's Export to South Asia	36060	6243	28155	31109	4018	1113	1662
South Asia's Imports From World	2,03,009	..	1,13,612	39,075	14,194	3,580	4,511
Trade Potential (India to South Asia)	1,66,949	..	85,457	7,966	10,176	2,467	2,849
Vegetables (Quantity in MT)							
	Cabbage (07051100)	Cauliflower (07041000) and Broccoli	Onions (07031010)	Peas (07081000)	Tomatoes (07020000)	Fresh Potatoes (07019000)	Sweet Potatoes (07142000)
India's Rank	2	2	2	2	2	2	10
India's Total Production	9039219	8573276	19401677	4,006,200	18735912	41555384	1132400
India's Total Export	384	51	1482498	8,482	426535	220926	501
India's Export to South Asia	339	25	740819	7624	372544	181274	194
South Asia's Imports From World	163.114	636.868	687533.5	23235.63	315074	530893.8	399.793
Trade Potential (India to South Asia)	-175.886	611.868	-53285.5	15611.63	-57470	349619.8	205.793
<i>Source: Author's calculation based on the data from Indian Horticulture Database-2014, APEDA (2015) & UN COMTRADE (2015)</i>							
<i>Note: Data extracted on HS code 8 digit</i>							
<i>".." indicates data not available</i>							

A brief analysis of production trends and trade status of fruits and vegetables shows that there are potential to gain from this. But a structural challenge in the Indian agricultural system not only hinders the potentiality of export from India but also poses barriers to the development of agriculture value chain in these products.

5. Existing Structural Challenges

Development of agriculture value chain in India at national-level and in South Asia at regional-level can offer solution to the food-security problem from capacity building and knowledge-sharing point of view. But this will require not only the free flow of agricultural products but also exchange of scientists and researchers and latest technology within region. Major barriers to these include complex visa regime, non-tariff barriers to market access, lack of cooperation in joint scientific projects/work and lack of proper infrastructure (transport as well as communications).

Although, there have been several new positive initiatives that brings hope for wider cooperation, such as signing of Bangladesh-Bhutan-India-Nepal (BBIN) Motor Vehicle Agreement, National Seed Association of India (NSAI) and Bangladesh Seed Association (BSA) agreements on cooperation of seeds.³

Access to finance

Agricultural value chain system in India is completely unorganised and the local firms lack required capacities to export agricultural products to external markets. Most of the Indian agricultural value chain firm's focusses on local market and they need more resources and capacity to compete in the external markets (Raju 2014). They need to be given relaxations in tax, institutional credit and other monetary incentives. For example, many incentives are given to IT companies and new start-ups, such facilities can be extended to agricultural products exporting firms also. Specialised arrangements have also not been made to meet the credit requirements of farmers and new entrepreneurs.⁴ Credit for pre and post-harvest inputs, guarantee and risk for final output have not been made part of overall agriculture and export policies in India.

³ NSAI and BSA signed a Memorandum of Understanding (MoU) in April 2015 in New Delhi with the help of CUTS to cooperate in trade and knowledge-sharing in seeds. More information about this MoU can be accessed at: http://www.cuts-citee.org/RISTE/pdf/MoU_between_Seeds_Associations_of_India_and_Bangladesh.pdf.

⁴ It was found during a field work in Gaya, Bihar in September-October 2015 that farmers are interested in cultivating cash crops such as *Mushroom* in that area as a new processing unit by a local entrepreneur has been set up and there are export possibilities. Rajesh Singh is a local entrepreneur who has setup a processing unit to process *Mushroom* and then export it in other markets with the help of local farmers. While traditionally this area was known only for the cultivation of rice and pulse, now farmers are showing sign of diversification and willing for a change to cultivate more and more cash crops. But they require financial support from the government and other related agencies as it is costly to continue operation of unit for a long time without initial support or subsidy.

Non-tariff barriers

In India, some agricultural value chains are oriented towards exports as the products find global markets, such as fruits, vegetables, coffee, tea, spices, cashew etc. While the export based value chains might be similar to that of commodities for domestic markets, there are some parts of the value chain that are very different. The exportable products require improvement in quality and standard, mutual recognition of certificates and standards by other countries etc. (Srinivasan 2012).

Although, in case of agriculture based exportable products testing and health safety regulations and procedures are now mandatory but infrastructure (testing and certification laboratories at crucial custom ports equipped with trained and enough number of staff members) for these have not been created in India. Apart from these, exportable agricultural products are not being dealt with clear export promotion policy, which has hindered prospects of these products in overseas markets.

Market access

The improvement of the agriculture value chain in India continues to be a challenge. The existence of middlemen and agents, absence of data and information about other links in the chain and inability to invest in improving the performance in almost every part of the chain led to inefficiencies. Agricultural value chains are difficult to stabilise in India with a large number of small and marginal farmers. The production, collection, storage and delivery parts of value chains have to be made efficient in order for the small farmers to realise higher returns.

Capacity building

Another major challenge is improvement in the production and supply competencies of the small and marginal farmers. To export agricultural products in external markets, it is necessary that quality and safety of product is maintained. Most of the small and marginal farmers do not realise how to produce, store and preserve agricultural products in a modern and more sophisticated era and how to constantly check the quality. Even many cold storage and godown owners do not know the exact details to preserve and store agricultural products (Raju 2014).⁵ In this context, the role of government becomes critical as they have sufficient resources to establish infrastructure and train the farmers and entrepreneurs about quality and safety procedures of exportable agricultural products.

⁵ This was also found during field work conducted in Bihar in October 2015 that cold storage are providing same temperature to all the vegetables and fruits while they require different treatment. It was also found that although a significant investment has been done to make/establish cold storage but most of them are running on loss because their operator do not have skills to operate them on optimum-level and use them more efficiently. Bhanu Pratap Mehta, Branch Manager, IGS International Pvt. Ltd. (a firm that is involve in export import of various agro-products) stated that “government should make small cold stores with the capacity of 4000-5000 carton and give on lease for five-six years because many people do not know how to use or operate it, but because of government subsidy and financial support they have invested in it”.

6. Conclusion and Recommendations

For many crops, India ranks lowest in terms of yield and for many crops it is largest producer but fails to process, preserve and export them. This is due to structural constraints discussed in the previous section. But it can be rectified if appropriate steps are taken by government, various semi-government agencies and private sector involved in agricultural production, marketing and export related activities. The following are specific recommendations to enable and develop a viable agriculture value chain system in India:

- I. In a large developing countries like India where infrastructure is not developed, tax and other related duties are often too high and total costs are unbearable for small and marginal farmers and new entrepreneurs, it is necessary that tax regime should be made innovator and entrepreneurs-friendly (Rota 2010). Recently, government announced several initiatives for '*startup IT companies*', such facilities and packages should also be given to agriculture sector.
- II. Given the fact that infrastructure is less developed in India and the public investments in it are very limited, than it is appropriate to encourage investments by the private sector in agriculture. For example, testing laboratories, certification and inspection mechanism can be developed by either private companies or with their assistance. A coordinated mechanism for connecting infrastructure is also necessary. Initiatives like BBIN-Motor vehicle agreement should be encouraged and more agreements for connecting infrastructure facilities should be signed between the South Asian countries.
- III. Currently, India does not have famous brand for crops/food products in external markets. This can be done by identifying few products and specific export destinations (for example fruits to the South Asian countries) and by launching an aggressive marketing campaign similar to Indian tourism campaign *Atithi Devo Bhava*. Specific attention should also be given to such agricultural export promotion zones (AEPZs) where fruits and vegetables products are included in the list decided under the National Foreign Trade Policy 2015-2020.
- IV. Domestically, agro-processing sector should be considered an important component of agriculture and export policies thus there is a need for a new initiative, such as *Grow, Process and Export from India* similar to '*Make in India*' campaign.
- V. Farmers and entrepreneurs have little or no knowledge about latest technologies and how to work effectively and efficiently. The role of information technology and communication in agricultural should be developed and advertised (Negi and Anand 2015). Although there are initiatives, such as launch of '*Kisaan Channel*'

and ‘farmers helpline’ but need is to make them popular among farmers and entrepreneurs.⁶

- VI. Currently, multiple ministries and government departments oversee various facets of agriculture, export and allied sector and this creates confusion and insufficient accountability (McKinsey 2013). There is a need to create a single authority for this sector, similar to ‘TRAI’ in telecom sector. This will also be effective in eliminating the role of middleman and un-authorized agents.
- VII. Attention should be focussed not just on increasing productivity and improving extension services, but also on increasing advocacy efforts through other channels. It was observed during field work that NGOs, self-help groups (SHGs), women’s association in rural areas, micro, small and medium enterprises (MSME) and farmer producer organisations (FPOs)⁷ are very active in this role and increasingly becoming effective to deal with the local level agricultural issues. Government should scale up its support to these institutions through focussed schemes. This can be done with the assistance from existing organisations, such as National Bank for Agriculture and Rural Development (NABARD) or Small Industries Development Bank of India (SIDBI). Apart from government banks, private and foreign banks should also be encouraged to open their branches in rural areas and provide financial support to farmers and new entrepreneurs.
- VIII. As most of the South Asian countries share similar agro-climatic conditions and their standards for certifying the agriculture products (for example, phytosanitary issues), such as germination and moisture requirements etc. are similar, they should start accepting certificates and validation proofs of other countries also for trade purposes. This will reduce additional costs and time and will motivate the new entrepreneurs to involve in cross-border trade.
- IX. Scientists and researchers should give training to farmers and entrepreneurs to time to time not only at district headquarters but also in villages and at their farms, so that they can learn about latest developments in the agriculture field. National institutions, such as ICAR, IARI etc. should start programme to identify farmers with potential excellence and encourage them to train other farmers in their areas.

⁶ During field work in Mau and Kushinagar districts of Uttar Pradesh, farmers expressed the need to make them aware about new government schemes, initiatives and technologies. Although most of them have cell phones, radio and television sets, yet they are not aware about the development in their area. Training and awareness generation camps for farmers to focus on cash crops or to establish local units should be encouraged by the government.

⁷ During a stakeholder consultation meeting held in Patna in December 2015, representatives of several FPOs expressed that although they want to get government support (monetary, training and capacity building) for initial years yet there must be framework for linking a FPO to another FPO, thus making a network of FPOs in district or state- level, so that they can exchange information, learn from each other and sell their products within that network also.

Robust national and regional agriculture value chains have the potential to create economic-social impact on the country as well as on the region as a whole. However, the political-economic condition under which they function today makes it difficult to achieve desired economic outcomes. Developing a favourable policy environment coupled with encouraging market conditions can lift their status. This can become a significant step not only in the development of agriculture or welfare of farmers but also reducing the problem of region-wide unemployment through motivating youth in entrepreneurship in agriculture and allied sector.

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