Chapter 1

Introduction

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1.1 Background and Scope of the Study

Changing consumption preferences towards high value, nutrient and protein rich foods are signaling agricultural diversification in India. Currently, India is the largest producer of milk, pulses, banana, mango, pomegranate, papaya, lemon, okra, ginger and non-food crops like cotton and jute; the second-largest producer of rice, wheat, fruits and vegetables, tea and one of the leading producers of eggs and meat in the world. India produced 281.8 million tonnes of food grains, 307.7 million tonnes of horticulture crops, 176.5 million tonnes of milk, 96 billion eggs and 7.7 million tonnes of meat during TE 2018–19. Table 1.1 illustrates the production and trade statistics for the selected commodities studied in this book.

However, this record level of production has not translated into commensurate increased economic returns to the farmers in India. Unable to find markets for their produce, farmers have often taken to distress sales, burning crops, and dumping produce on the roads. Agricultural policymaking has for a very long time focused on increasing production without giving due attention to the need to develop efficient value chains. While India has diversified significantly from producing grains to a variety of high-value commodities, these commodity value chains have remained relatively underdeveloped. Agricultural value chains are highly fragmented and subject to a high degree of intermediation, resulting in poor price realization for farmers, substantial losses in the quantity and quality of produce, limited scope for value addition, and high price volatility.

The vulnerability of agricultural value chains became more evident during the coronavirus pandemic in 2020. With the sudden announcement of lockdown 1.0 in March, 2020 across the country, supply chains dealing in fresh and perishable produce were hit. Demand plummeted due to the restrictions imposed on the HoReCa (hotel, restaurant and catering) segment, and because of people keeping away from wet

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Table 1.1 Basic Statistics of Selected Commodities (TE 2018–19)

Commodity	Production (MMT)	Export ('000 MT)	Import ('000 MT)	Value of output (INR '000 Crores)
Tomato	19.8 (2)	143	0.1	21.8
Onion	22.8 (2)	1826	4.6	19.4
Potato	49.1 (2)	396	0.4	29.3
Banana	30.6 (1)	116	0.0	33.1
Mango	20.9 (1)	50	0.0	43.4
Grapes	3 (7)	219	5.7	4.8
Pomegranate	2.8 (1)	57	0.0	7.7
Milk	176.5 (1)	23.5 (SMP)	0.6 (SMP)	449.9
Eggs (billion nos.)	96 (3)	412	0.4	78.5
Chicken meat	3.7 (7)	5	0.1	22.0
Tur	4.2 (1)	11	588.5	14.2
Gram	10.2 (1)	115	737	28.8

Source Horticulture Division (2020), DES (2020), DoAHD, DGFT (2020) and MoSPI (2020)

Note Figure in parenthesis is India's rank in global production; export, import data are for fresh only except milk

markets due to fear of infection. In the absence of robust direct marketing channels, farmers could not sell their produce and suffered losses in terms of low price realization and wastage. Despite farmers receiving low prices, retail prices of fresh agricultural produce in many urban pockets did not decline. The high consumer price inflation observed in the months following the lockdown in March, 2020 had been a cause of concern for the policymakers. In its pandemic relief package, the central government announced several packages for the agricultural sector and introduced the Farm Laws 2020, reiterating its vision to liberalise agricultural markets to benefit the farmers. Reforming the Agricultural Produce Marketing Act (APMC) Act to allow direct farming, and contract farming; doing away with the Essential Commodities Act (ECA) to allow free movement and stocking of agricultural commodities; and empowering farmers through the expansion and strengthening of Farmer Producer Organizations (FPOs), were the key components of the announcements. For the first time, the central government pre-empted the states and brought about legal change by way of an Ordinance in June, 2020, followed by enactment through legislation in September, 2020. Despite many challenges presented by Covid-19, the agricultural sector could really benefit from the political will and commitment to bring about long-overdue marketing reforms.

The inefficiencies in agricultural value chains prevent India from reaping the benefits of global trade and becoming a significant player. India's presence in the global markets has been very limited despite it being one of the leading producers of several agricultural commodities. In the domestic markets, farmers are adversely affected as reflected in the low share that farmers receive of the consumer's rupee for a number of

agricultural commodities. This makes it even harder for India's predominantly large number of small and marginal farmers to earn remunerative prices. Given that 86.1% of total agricultural land holdings in India are small and marginal (area less than 2 ha), any agriculture growth that does not deliver benefits to the small and marginal farmers cannot be inclusive. Further, the cereal-centric policies of the government have neglected the challenges faced by farmers growing non-cereal crops. These policies have exacerbated the concerns around environmental degradation including depleting water resources in key rice-growing states as well as soil contamination due to excessive use of chemicals. Very little attention has been given towards the sustainability and scalability of successful value chains across commodities and geographies.

With rising incomes, the demand for high-value agricultural crops such as fruits and vegetables, dairy products, eggs, chicken and fish in India has increased over the years. Therefore, it is important to develop value chains that can handle the pre and post-harvest requirements of such commodities, which are different from that of cereals and pulses. First, the value chains should be domestically as well as globally competitive. Second, the value chains should be inclusive to ensure participation of marginal and small farmers. Third, it should be financially and environmentally sustainable; farmers should be able to earn remunerative returns but not at the cost of environmental health and natural resources. Fourth, the impact of successful value chains can be realized to the benefit of farmers and the agricultural sector, in general, if these chains can be scaled up across commodities and geographies. Last, access to finance through innovative financing methods for all stakeholders in the value chain is critical to ensure that these chains are competitive, inclusive, sustainable and scalable.

In this context, this ICRIER-NABARD research study on agricultural value chains was undertaken to analyze and evaluate the performance of selected agricultural value chains across major producing regions in India using the conceptual framework of competitiveness, inclusiveness, sustainability, scalability (CISS) and access to finance (F). The study includes agricultural commodities such as vegetables (tomato, onion and potato (TOP)), fruits (banana, mango, grapes and pomegranate), dairy, poultry, and pulses. The conceptual framework of CISS-F helps understand how agricultural and food policies work on the ground and what more needs to be done at the policy, institutional and operational levels to strengthen the high-value agricultural chains.

1.2 Methodological Framework

Commodity Selection

Commodities studied in this book include high-value agricultural commodities such as fruits and vegetables, livestock and pulses, which account for more than 50% of the value of output from agriculture and allied sectors (Fig. 1.1). Three

Fig. 1.1 Selection of commodities based on share in GVO of Agriculture and Allied Sectors: TE 2017–18. *Source* National Accounts Statistics 2019, MoSPI

major vegetables—tomatoes, onions and potatoes (TOP)—and four major fruits—bananas, mangoes, grapes and pomegranates—have been selected from the horticulture segment. Milk and poultry have been selected from the livestock segment. In the pulses segment, *gram/chana* and *pigeon pea/tur*, which together account for nearly half of pulses production, have been selected.

Data Collection

The research findings and analysis are based on both primary and secondary sources of data. Secondary data published by the government at the national and state levels; and international databases have been used for most of the analysis.

Field visits were made to major producing regions, *mandis*, processing facilities, farmer producer organizations, etc., of the selected commodities to understand ground realities. The research study did not involve detailed survey, rather, primary information was collected using semi-structured interviews with farmers, traders, market officials and government representatives; and focus group discussions. The list of states and regions visited to study the value chains of the selected commodities has been given in Table 1.2. In all, 24 districts were covered across 10 states indicating the wide spatial coverage of the study.

Table 1.2 Details of field visits

Commodity	State	Region	Purpose
Tomato	Karnataka	Kolar	Kolar APMC-domestic trade
		Bengaluru	Indian Horticulture Institute, Seed companies
	Andhra Pradesh	Chittoor	Processing variety of tomato
	Delhi	Azadpur <i>Mandi</i>	Domestic trade—APMC
Onion	Maharashtra	Nashik	Lasalgaon, Pimpalgaon APMC—domestic trade
		Jain Irrigation, Jalgaon	Contract farming of white onion
	Gujarat	Mahuva	Dehydrated onion value chain
	Delhi	Azadpur <i>Mandi</i>	Domestic trade—APMC
Potato	Uttar Pradesh	Agra	Traditional value chain
	Gujarat	Mehsana	McCain processing, Contract farming
	Bihar	Nalanda	Traditional value chain without APMC
	Delhi	Azadpur <i>Mandi</i>	Domestic trade—APMC
Milk	Gujarat	Banaskantha	Banas Dairy (Co-operative)
	Bihar	Patna	Sudha Dairy (Co-operative)
	Maharashtra	Kolhapur	Gokul Dairy (Co-operative)
		Pune	Private Organized Dairy
	Punjab	Moga	A leading multinational corporation
Banana	Maharashtra	Raver, Jalgaon	Traditional value chain
		Jain Irrigation, Jalgaon	Tissue culture and Banana Processing
Mango	Maharashtra	Ahmednagar	Export facility centre
		Jalna	Export of Kesar variety
		Jain Irrigation, Jalgaon	Tissue culture and Mango Processing
		Mumbai	Irradiation centre, Vashi
Grapes	Maharashtra	Nashik	Domestic trade-APMC, Export model
		Uruli Kanchan, Pune	National research centre grapes, Mahagrapes

(continued)

Table 1.2 (continued)

Commodity	State	Region	Purpose
Pomegranate	Maharashtra	Nasik	Market yard, Domestic trade—APMC
		Solapur	Export model, Domestic trade—APMC
Poultry	Haryana	Hissar	Private poultry farm
	Andhra Pradesh	Madanapalle	Suguna poultry farm
Pulses	Maharashtra	Latur	Pigeon Pea domestic trade
		Mumbai	Vashi <i>mandi</i>
	Madhya Pradesh	Indore	Chana domestic trade
		Dewas	Chana domestic trade
		Ujjain	Chana domestic trade

Source Value chain studies

CISS-F Framework

The conceptual framework of competitiveness, inclusiveness, sustainability and scalability and access to finance (CISS-F), which has been used to evaluate the performance of agricultural value chains, is described in detail in this section.

Competitiveness

Competitiveness of value chains is measured for both domestic and international markets. Domestic competitiveness is measured in terms of the farmer's share in the consumer price. International competitiveness is measured by determining the export competitiveness of agricultural commodities using the nominal protection coefficients (NPCs).

To determine **domestic competitiveness**, the share of all stakeholders in the retail consumer price is estimated. As the distinction between costs and margins of stakeholders is difficult to determine, the two have been clubbed together as mark-ups. Mark-up is defined as the increment in cost because of value addition that includes both real costs as well as margins accruing at various stages of the value chain.

For **international competitiveness**, the export and import competitiveness of a commodity, measured by the nominal protection coefficient (NPC), have been calculated. Nominal protection coefficient (NPCs) is the ratio of domestic prices (P_D) to an international reference price. Using methodology adopted by Saini and Gulati (2017), NPCs under both exportable (NPC_X) and importable hypothesis (NPC_M) have been calculated. For NPC_X and NPC_M , the international export reference price (X_r) and international import reference price (M_r) were used respectively, using the following formula:

$$NPC_X = \frac{P_D}{X_r}$$

$$\text{NPC}_M = \frac{P_D}{M_r}$$

The calculation above required two monthly price series—domestic wholesale price and international reference price for the particular commodity. For domestic wholesale price (P_D), a weighted average of state wise prices in states accounting for at least 60% of the national output were taken. The international reference price was the border price for exports of the commodities or the free on board (FOB) prices. These were adjusted for quality and two reference prices were estimated:

International Export Reference Price (X_r) = International price after quality adjustment
 – Trading and marketing margins
 – Transportation cost from farm to port
 – Port handling charges

International Import Reference Price (M_r) = International price after quality adjustment
 – Trading and marketing margins
 – Transportation cost from farm to port
 + Port handling charges

Trade adjusted NPCs: A time series of trade adjusted NPC values were obtained depending on the value of NPC_X and NPC_M .

- When a commodity is import competing (M), i.e. if $\text{NPC}_M > 1$, then NPC_M is taken
- When a commodity is export competing (X), i.e. if $\text{NPC}_X < 1$, then NPC_X is taken
- When a commodity is in the non-tradable zone (NT), i.e. if $\text{NPC}_X < 1 < \text{NPC}_M$, then NPC values are taken as '1'.

Inclusiveness

Inclusiveness of the value chains is analyzed in terms of the participation of marginal and small farmers in production, and their access to markets, and logistics such as transportation, warehouses, cold storages, etc. A few examples of contract farming are also cited to illustrate how these alternate marketing models affect participation by marginal and small farmers in the value chains.

Sustainability

Sustainability of the value chains has been assessed in terms of financial and environmental sustainability. Financial sustainability has been estimated using the profitability of producing and marketing a commodity. Sensitivity analysis was used to check for the sensitivity of profits of farmers to various scenarios involving price volatility, climate change, etc., for a few commodities. Environmental sustainability has been assessed in terms of water requirement, fertiliser and pesticide consumption and other key environmental factors specific to the farming of the commodities.

Scalability

Scalability of the value chains has been measured in terms of past trends in area expansion or productivity gains, both of which affect the current production levels as well as the future scope of increasing production. Expansion of exports, and opportunities for value addition, which are critical to the economics of scaling up production, have been considered as well. Also, for successful value chains, the potential for replicability across states has been studied.

Access to Finance

Finally, access to finance by various stakeholders in the value chains and the role of innovative financing methods have been studied. Existing gaps in financing, the current reach of organized finance and the potential for innovative financial interventions have been identified. Financial interventions are suggested in order to increase competitiveness, inclusiveness, scalability or sustainability of participants in the value chain.

1.3 Organization of the Book

This book is organized into 9 chapters. This chapter introduces the background, scope and methodological framework of the study. Chapter 2 presents a comprehensive synthesis of all value chains analyzed in this study. The chapter brings out the role of technology, institutions and markets in strengthening agricultural value chains by catalysing each of the components of the CISS-F framework. Chapters 3–8 deal with commodity-specific value chain studies. Chapter 3 explores the value chains of three major vegetables in India—tomatoes, onions and potatoes (TOP); Chap. 4 explores the value chains of two major fruits—bananas and mangoes; Chap. 5 deals with the value chains of grapes and pomegranates; Chap. 6 presents the dairy value chain in India focusing on the milk value chain; Chap. 7 relates to the poultry value chain in India and Chap. 8 analyzes the pulses value chain in India, focusing on gram/*chana* and pigeon pea/*tur*. Each of these six value chain chapters analyze the performance of the respective commodity value chains in terms of their competitiveness, inclusiveness, sustainability, scalability and access to finance. The research findings are used to come up with commodity-specific policy suggestions that could help address existing challenges and strengthen the value chains further. Finally, Chap. 9 presents the way forward and provides some broad policy suggestions relevant for strengthening of agricultural value chains.

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