



Linking Farms to Markets: Reducing Transaction Costs and Enhancing Bargaining Power

8.1 INTRODUCTION

For commercialization, along with increased linkages to factor markets, the link to agricultural output markets is also essential. Access to output or commodity markets determines price realization, incentivizing small farms to diversify production in line with the changing demands of the market. Rising demand for diversified foods has led to a growing emphasis on grades and standards to ensure quality, health, safety and differentiation of products based on tastes and preferences. In response, rapid technological changes to improve the quantity, quality and efficiency of production and marketing are becoming increasingly relevant (Eaton, Meijerink, & Bijman, 2008; Narayanan, 2014; Poulton, Dorward, & Kydd, 2010; Roy & Thorat, 2008; Swinnen & Maertens, 2007). A majority of agricultural marketing in India takes place through traditional spot markets. These predominantly unorganized markets with limited infrastructure cannot meet the quality requirements and specifications of changing demand and this has increased the importance of organized retail for agricultural products (McCullough, Pingali, & Stamoulis, 2008). Parallel to traditional markets, because of changing demand, the organized value chains for food is also growing. In 2017, India's retail sector was valued at 641 billion USD. The share of food and grocery retail in this share was about 60% (or about 380 billion USD), and the percentage of organized retail in this

share was roughly 2% (about 7.6 billion USD).¹ The retail food segment in India is therefore significant and unorganized, and the share of organized retail is in comparison small.

Although the current share of organized retail is small, projections expect its share to double by the year 2020. The scope of organized retail in food and groceries is vast. Along with organized retail outlets such as Hypermarket, DMart, More, Big Bazaar, Godrej Nature's Market, Walmart, among others, the growth of e-retail in food is also increasing. Companies such as Amazon Pantry, Big Basket, Grofers and Flipkart (after its purchase by Walmart) are expected to show a high level of growth. Developments in organized retail in food are dependent on effective linkages between farm and retail. This farm-retail linkage is essential for income growth at the farm level, the creation of non-farm employment both in rural and urban areas and also improving efficiency and reducing wastage. Therefore, it will have an impact on economic growth, agricultural development and nutrition and access to food. The ability of small farms to effectively link to value chains that take into consideration new requirements of quality, quantity and efficiency is a significant challenge for the agricultural sector. This chapter is divided into three parts. First, we look at the characteristics and features of traditional marketing chains in India in the context of transaction costs to determine the challenges of market participation to small farms. Second, we assess existing forms and newer market linkages that have emerged in agriculture to identify their potential and problems. Last, we determine the need for institutional interventions to improve small farm-market linkages to bring about an inclusive, nutrition-sensitive value chain.

8.2 AGRICULTURAL MARKETS, SMALL PRODUCERS AND TRANSACTION COSTS

The three agricultural marketing channels in India are state-trading, cooperative marketing and private trade (GOI, 2007). Governmental organizations, such as the Food Corporation of India (FCI), Cotton Corporation of India, Jute Corporation of India and National Agricultural Cooperative Marketing Federation (NAFED), along with specialized commodity boards,

¹Global Agricultural Information Report (GAIN) (2017): https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Retail%20Foods_New%20Delhi_India_6-28-2018.pdf (Accessed on 24/10/2018).

which were crop-specific to rubber, tea, coffee, tobacco and spices carry out state-trading, where the state is involved in the procurement. Cooperative marketing exists for commodities with high-asset fixity such as milk and fruits like grapes and bananas. Here, members belonging to cooperatives sell their produce by way of specialized supply/value chains. A significant part of agricultural marketing happens through private trade. The Agriculture Produce Marketing Committee (APMC) often referred to as the *mandi* is the primary market infrastructure found in all states (except Jammu and Kashmir, Bihar, Kerala and Manipur). Their primary function is to regulate market practices such as weighing, methods of sale, methods of grading and methods of payment. To date, there are 7246 functioning *mandis* in India.

Although the APMC aims to provide a platform for marketing activities and reducing exploitation by traders and mercantile capital, much of the transactions that take place is unregulated. Figure 8.1 shows the structure of agricultural markets for non-perishable commodities such as cotton, oilseeds, pulses and grain. The various participants in the market are national agri-businesses, big retailers, agro-processors, traders and their commissioning agents and unlicensed petty commodity producers with different forms of contracts and exchange relations with the primary producer. The fragmented

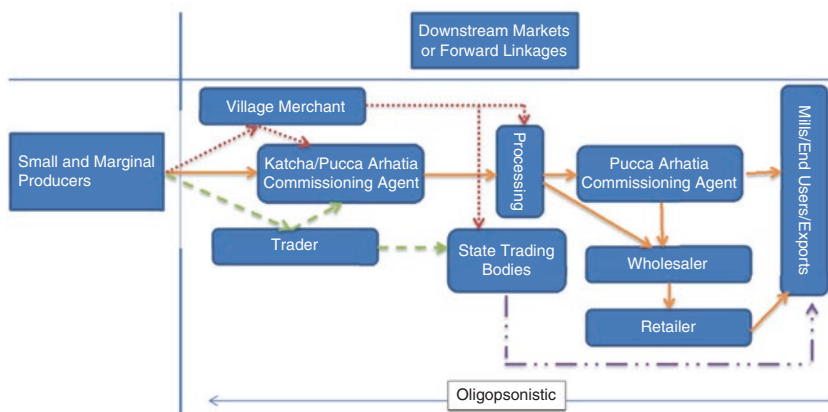


Fig. 8.1 Structure of agricultural markets. Note: The different colored lines denote different channels through which goods are sold and distributed in the market

nature of agricultural markets leads to high transaction costs in its access. The various costs of carrying out marketing activities from price discovery and transportation to searching for buyers and selling are considered market transaction costs.

8.2.1 *Transaction Costs in Agricultural Marketing*

Higher transaction costs for small and marginal producers are due to low economies of scale, low bargaining power, poor connectivity to markets and information asymmetry resulting from poor price and quality knowledge. The exchange relations in agricultural markets, therefore, are not uniform or equal, nor are they set only in price terms (Bharadwaj, 1985). Transaction costs are household-specific, farm-specific, location-specific and crop-specific (Pingali, Khwaja, & Madelon, 2005). Social categorization such as caste and gender can play an inclusive and exclusionary role concerning access to land, credit and markets (Kumar, 2013; RFST, 2005; Sen, 2000). These household-specific transaction costs can in different situations lead to differences in prices charged/paid for services received or goods sold in market transactions (Thorat, 2009).

Farm and location-specific factors also determine the cost of market access and participation. These costs can be attributed to reduced economies of scale (Poulton et al., 2010). Smallholders with limited marketable surplus may not sell directly in the markets owing to geographical constraints, distance to market and poor connectivity. In such situations, they sell their produce to traders or village merchants at the farm gate. The primary function of these intermediaries is consolidating produce at the village level before selling to traders, retailers or processors at the APMC. According to Chand (2012), an average of four to six transactions take place before the produce reaches the final consumer. In the wake of social, scale and geographic disadvantages, intermediaries play an essential role in providing for missing services, although the price realized at the farm level is the lowest competitive price.

Marketing costs to farms are also crop-specific and vary with commodities and high-value products. Higher value perishable crops have more stringent quality requirement making market connectivity, information and infrastructure such as storage important. Initial costs of creating value chains may also be high mainly due to asset specificity. Table 8.1 highlights the various characteristics that influence marketing conditions of agricultural goods. In the wake of higher costs, smallholders may find it hard to

Table 8.1 Characteristics influencing the marketing of commodities and high-value products

| <i>Characteristics</i> | <i>Commodities</i> | <i>High-value products</i> |
|-------------------------------|---|--|
| Market information | Not highly differentiated | Highly differentiated—varieties, nutrient characteristics and value—making information important |
| Price stability | Prices are relatively stable and are often supported by minimum support price (MSP) | Prices can be volatile with huge seasonal variations |
| Asset specificity | Lower capital investments and better transferability of capital | Higher capital investment in value chains, storage and so on with limited transferability |
| Perishability | Can be stored for long periods and may not perish quickly | Products are highly perishable, making the timing of supply important |
| Quality, grades and standards | Low differentiation leads to minimum grades and standards variation | Highly differentiated with large quality, grades and standard differences |

diversify from commodities to high-value products. Addressing these market-level costs is central to enable diversification through price incentives to farmers growing them.

Agricultural markets in India are complex institutional arrangements with many forms of exchange relations and transaction costs. The prominent features of these markets are that (a) participants have low economies of scale; (b) the supply chains are highly fragmented with a large number of intermediaries leading to marketing malpractices (e.g., poor weighing practices, no grades and standards), poor price realization and poor signaling; and (c) the nature of agricultural produce (commodity or product) determine the challenges in marketing. Existing markets, therefore, may not be conducive for the marketing of higher value, grades and standard oriented products. Also, private trade through the APMCs with these limitations have made it difficult for direct linkages between farms and retailers to emerge, limiting the potential to diversify production at the farm level to meet the growing demand for higher value products. Until 2003, before the Inter-Ministerial Task Force on Agricultural Marketing Reforms (2002), APMCs had the exclusive right to function as a market (GOI, 2002). The task force suggested reforms that allowed private agencies and cooperatives to trade in markets, contract farming initiatives to purchase goods directly

from farmers and processors and bulk buyers to procure products directly from the farmers bypassing the APMC (ibid). The next section evaluates the changes in value chain arrangements that emerged in the twenty-first century following these changes and its impact on agricultural value chains.

8.3 EXPERIENCE OF LINKING FARMS TO MARKET

The inefficiencies of agricultural markets in India pose challenges for the organized retail sector to participate effectively. The need for vertically coordinated markets where the intermediaries are bypassed and transaction costs are reduced is necessary for the signaling price and quality information, contract formation to mitigate supply risks and to establish of grades and standards (Birthal, Joshi, & Gulati, 2005; Pingali et al., 2005). The existing marketing system cannot accommodate these specific requirements essential for retail chains to emerge (McCullough, Pingali, & Stamoulis, 2008). Changes in marketing laws and newer platforms of transactions such as eMarkets, warehousing and commodity futures have developed slowly to rectify this mismatch. The Model APMC Act of 2003 amended the existing marketing law in India to allow direct purchase from primary producers and growers, previously not recognized. This led to the emergence of “contract farming” initiatives in India through which retailers or wholesalers could purchase products of specific grades, standards and other requirements that could not be delivered by the existing markets. Newer marketing initiatives and platforms have also been set in place to align traditional marketing with changing markets. The initiatives using electronic platforms have been the eNAM online trading platforms and online commodity exchanges providing platforms for agricultural commodity derivatives. In this section, we look at the role of vertical coordination and online transactions to assess the potential and challenges for small farm linkages to markets.

8.3.1 *Vertical Coordination in Value Chains—Challenges and Limitations*

Vertical coordination (VC) are modes of exchange in which producers and buyers bypass existing marketing channels to assure the supply of quality agricultural goods, in demanded quality at a stipulated time. VC organizes and orders together activities and information flow to reduce transaction costs and control for quality and standards specifications (Buvik & John, 2000). They are enforced by formal or informal contracts and arise when

existing markets and supply chains are rigid to adapt to changes in demand for agricultural goods. Under vertical coordination the terms of sale based on prices, quantity and quality are fixed by contracts *ex ante* between the producer and buyer to reduce uncertainty. Contract farming (CF) is one form of vertical coordination mechanisms that have been implemented in many developing countries to address the changing demand requirements and inefficiencies of existing markets (Barrett et al., 2012; Glover, 1987; Kumar, 2006; Narayanan, 2014; Singh, 2002).

This model is especially prevalent in highly perishable commodities such as fresh fruits and vegetables (FFV), milk and meat (BIRTHAL, Jha, TIONGCO, & NARROD, 2009; CHU-PING, 2010; SWINNEN & MAERTENS, 2007). Under contract farming, farmers directly supply produce to retailers and wholesalers under advanced contracts that stipulate time of delivery, quantity, quality and variety (Benziger, 1996; S. Singh, 2011). Early examples of CF in Spain and Japan in the 1950s indicate a reduction of production cost, leading to its widespread promotion in these countries (Asano-Tamani, 1988). Empirical evidence has shown contract farming to address market failures and improve access to commodity markets and inputs such as seeds, credit, fertilizer and pesticides, technology and extension services (Bellemare, 2012; BIRTHAL et al., 2005; Eaton & Shepherd, 2001; Glover, 1987; Narayanan, 2014; Wang, Wang, & Delgado, 2014). However, whether these institutions have benefited small and marginal farmers have been widely debated. The emergence of supermarkets has led to the widespread use of such contracts to assure the supply of vegetables from producers in China (Hu, Reardon, Rozelle, Timmer, & Wang, 2004), Thailand (Boselie, 2002) and Central America (Berdegue, Balsevich, Flores, & Reardon, 2005) with some success. In India, the contract farming experiences have been varied. The two major challenges in India and many developing countries with small farm-based agricultural systems have been the exclusion of small farmers and the cost of organizing value chains. This has limited the impact contract farming has had in linking small farms to value chains.

8.3.1.1 Size, Crop Type and Geography as Influence of Vertical Coordination

Exclusion of farmers in VC initiatives or the high entry cost of participating in them is a concern for small producers. Size of farms and location are shown to be decisive factors in forming linkages with farms. Some studies have pointed out that because of high transaction and management costs,

small farms are discriminated against as it is less costly to make a small number of contracts with large farmers than a large number of contracts with small farmers (Dolan & Humphrey, 2000; Hazell, Poulton, Wiggins, & Dorward, 2010; Reardon & Berdegué, 2002; Reardon, Timmer, Barrett, & Berdegué, 2003; Swinnen & Maertens, 2007). Others have noted that small producers have successfully formed contracts in particular crops such as papaya (Narayanan, 2014), poultry (Chu-Ping, 2010; Nguyen, Dzator, & Nadolny, 2015; Ramaswami, Birthal, & Joshi, 2009), gherkins (Narayanan, 2014; Swain, 2011), milk (Birthal et al., 2005; Holloway, Nicholson, Delgado, Staal, & Ehui, 2000), fresh fruits and vegetables (Ito, Bao, & Su, 2012; Rao, Brümmer, & Qaim, 2012; Trebbin, 2014; H. Wang, Moustier, & Loc, 2014), among others. In perishable commodities with higher asset fixity, contract farm seems to work better, due to sunk costs, investment in infrastructure and limited hold-up costs.

Geographical location and levels of infrastructure can also influence firms' choice of farms for procuring agricultural goods. Geography influences agro-climatic conditions (that determine the levels of risks, type of crops) and distance to markets. Infrastructure such as irrigation systems and good roads with this can mitigate the disadvantages of climatic risks and poor connectivity of farms. Therefore locations with better connectivity, infrastructure and market connectivity are termed as high potential areas and others as low potential areas (Pingali, Khwaja, & Madelon, 2007). Contracts with farms in high potential areas are therefore preferred and there is evidence from India that shows this. A study by Mangala and Chengappa (2008) in Karnataka reveals that farmers in contract with food retail chains had higher land holding sizes and irrigated land (6 acres and 4.5 acres) compared to traditional market farmers (2 acres and 1.5 acres). Trebbin and Franz (2010) highlight that a Food Chain Partnership (FCP) program² initiated by Bayer Crop Science in India was highly selective about the farmers' eligibility (larger farms), the location of farms (areas where retail and processing infrastructure was good) and the crops they grew (high-value crops). Public goods complementarity of a location may also influence the potential of backward linkages to the farms. Due to higher transaction and administrative costs, higher risks in production, smallholders may not be preferred for vertical coordination in low potential areas. Enabling VC and even market linkages for private trade in low potential areas remains a big challenge.

²FCP is a program launched by Bayer Crop Science in many developing countries for sustainable production of vegetables.

8.3.1.2 *The High Cost of Organizing Value Chains and Incentives to Form Linkages*

Coordination of production and marketing activities in the value chains has costs to it. Some of these costs are organizational costs and not transaction costs and may be higher in certain conditions. Reducing these costs is essential to enable and maintain vertical coordination. In agricultural value chains, buyers use contracts to stipulate ex ante price, quality and time of delivery of products to producers. Forming contracts and managing them are fundamentally new costs that may potentially offset the gains made at the production stages (Pingali et al., 2007). Therefore managing organizational costs at the contracting stages becomes important in VC. Owing to the small size of farms in India, aggregation of farmers is essential to enable contract farming. Here the significant cost to firms are (a) political costs or cost of collaborating with the state to set up initiatives; (b) bureaucratic costs or the cost of identifying farmers, coordinating intentions, formation of groups and establishing systems of governance; (c) management costs or the costs of governing day-to-day functions of the groups, establishing feedback mechanisms and monitoring to reduce free-rider problems; (d) screening costs that entails cost of identifying potential buyers (of produce), sellers (of inputs), institutions (banks, R&D outfits, agricultural universities); and (e) transfer costs of movement of goods to retailers or processors, providing collective goods such as inputs, credit, technology and extension services to producers. Table 8.2 lists the various coordination costs in forming VCs and their effects and influences. Addressing these costs is central to the ability of small farms to make effective linkages to value chains. High costs of coordinating production and contracts with small farms often limit the potential of VC to emerge. Therefore, VC is just one mechanism to rectify the challenges of the markets and the effective functioning of traditional agricultural markets is essential for farm-market linkages.

8.3.2 *Alternative Marketing Platforms—eMarkets, Future Markets and Warehousing*

The Planning Commission (2011) working group on agricultural marketing stated that the significant challenges for markets were the large number of intermediaries, inadequate infrastructure for storage and grading, poor price setting mechanisms and poor competence of market staff. Agricultural markets and their functioning differ from state to state, as market reforms

Table 8.2 Coordination costs and effects at the firm level

| <i>Costs</i> | <i>Characteristics</i> | <i>Effects at firm level</i> |
|-------------------|--|---|
| Political cost | Cost of collaboration with the state for support and subsidies | Agency of coordinating organization, social features of groups. Costs may reduce overtime |
| Bureaucratic cost | Initiating groups, formulating functions and duties | Group leadership, incentive structures, management expertise. Costs may reduce overtime |
| Management cost | Governing day-to-day tasks of the groups, establishing feedback mechanisms, monitoring | Level of benefits provided, type of goods and services, social capital. Recurring cost |
| Screening costs | Cost of identifying potential buyers (of produce), sellers (of inputs), institutions (banks, R&D outfits, agricultural universities) | Agency of coordinating organization, ability to form contracts, level of linkages to state and markets. Costs may reduce overtime |
| Transfer costs | Cost of movement of goods, providing collective goods such as inputs, credit, technology and extension services | Location of farms, crops are grown, level of infrastructure. Recurring cost |

and governance are state subjects or under the jurisdiction of individual states rather than the center. Although suggestions for making agricultural markets a center or a concurrent subject to bring uniformity in the transaction have met with many challenges, the electronic portal for agricultural marketing has been operationalized (Narayanamoorthy & Alli, 2018). eNAM is an online trading platform formed in 2016 that intends to link APMCs to create a unified market. The platform has connected 585 APMCs (9% of markets) in 14 states. The electronic portal aims to help price discovery across markets in India enable a harmonized grading and standards system for a transparent transaction, bypassing intermediaries. Figure 8.2 shows the schematics of the functioning of an e-portal depicting the entry, sampling and grading of agricultural produce before being put on an electronic platform. Here traders from across the country can bid for the produce and when the bids are finalized, they are weighed and stored for collection. The payment is then made electronically to the farmer.

Although in principle a unified market is essential for price discovery, standardizing practices and reducing transaction costs, the uptake and integration to a virtual platform have been slow. The challenges are poor infrastructure and systems in the market. The lack of testing machines and

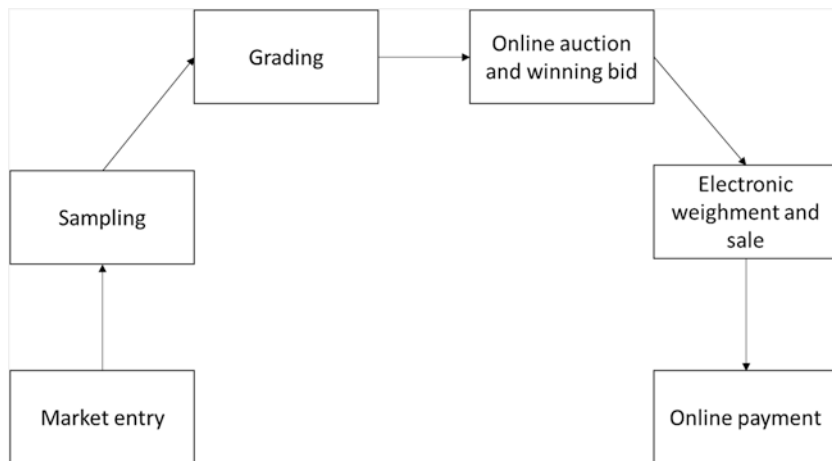


Fig. 8.2 Functioning of the electronic portal (ReMS model) in India

technicians for grades and standards determination, poor internet connectivity, poor storage facilities, low stakeholder participation and malpractices in the form of misreporting physical auction as online auctions (Nirmal, 2017). Online marketing platforms are not without success and the eNAM model is based on Karnataka's Rashtriya eMarkets Services Pvt. Ltd., (ReMS). This joint venture between the Karnataka government and the National Commodity & Derivatives Exchange (NCDEX) eMarkets Limited. Currently, 157 of the 162 APMCs in Karnataka come under this unified platform. The success of this platform can be seen in increased market bids in auctions, reduced collusion among traders and cartels, increased transparency in transactions and reduced delays in payments compared to non-eMarkets (Reddy, 2016). Effective functioning of online marketing platforms can also encourage increased private sector participation, and low potential areas that do not have the advantage for vertical coordination can greatly benefit from such models.

Commodity futures markets and warehousing of agricultural commodities are provisions that exist in the agricultural commodity space that is not widely accessed. The reason for this is mainly due to low economies of scale for smallholders. Although the government comprehensively banned futures trading in 1966, based on the recommendations of various committees, commodity derivatives trading was reintroduced in 2002–03. Through

commodity exchanges, a producer or aggregator can agree to sell agricultural produce at a pre-determined fixed price at a fixed location to a buyer. The position can be a short or long position and the buyer can sell the commodity in the spot market. Profit and loss from the commodity increasing or decreasing in value is borne by the buyer, while the seller remains protected. Currently the major commodity exchanges are the National Spot Exchange Limited (NSEL), Indian Commodity Exchange Limited (ICEX), Multi-Commodity Exchange (MCX), National Commodity & Derivatives Exchange Limited (NCDEX), National Multi-Commodity Exchange of India Ltd. (NMCE), Ace Derivatives & Commodity Exchange Ltd. and Universal Commodity Exchange (UCX) among others. Future markets, which are private platforms, help in reducing price risks and in price discovery.

Warehousing systems are essential instruments for agricultural marketing especially in the wake of high price volatility in agricultural commodities. Even when market prices are low, farmers sell their produce due to cash constraints. In principle, under the warehouse receipt system, farmers can store their produce in warehouses when the prices are low and sell in the markets when prices pick up. When storing their produce, they are issued with a warehouse receipt, which functions as a derivative, which can be traded or put up as collateral with banks for immediate cash needs. The advantages of warehousing are reduced handling costs, higher price realization and the ability to buy and sell without physical transfer. Warehouses can be public such as Food Corporation of India, Central Warehousing Corporation, State Warehousing Corporation and State Civil Supplies, cooperative or private.

Alternative markets are spaces where there is increased private sector participation. A majority of the commodity futures platforms are private sector driven, the successful ReMS model in Karnataka is a public-private partnership and both public and private warehousing systems issue the warehouse receipts. Companies such as ITC ABD one of the largest non-state procurers of wheat in India uses futures platforms to buy and sell wheat and soybean (Rajib, 2015). The private sector players also provide essential services to spot markets. For example, NCDEX works with state procurement agencies such as National Agricultural Cooperative Marketing Federation of India Limited (NAFED) and Small Farmers' Agribusiness Consortium (SFAC) to provide grading and testing services before transactions. The significant challenges for smallholder participation

in these platforms are infrastructure based and related to scale. Access and connectivity to warehouses and collection points is a concern for producers in low potential areas. Public goods such as roads and storage infrastructures are needed for improved participation. Low volumes of produce is again a concern as agricultural output is highly differentiated and in small quantities. This often means the crops produced may not be of the accepted variety or grades and standards. Additional fixed costs for grading, weighing and storage insurance further dissuade smallholder participation in these platforms.

The scope of different forms of marketing is limited to the type of crops, location and the levels of risks associated with production. In high potential areas with irrigation and good access to markets, the scope for producing high-value crops is strong. In these scenarios, the favorability of vertical coordination emerging is strong. In lower potential areas where there are higher production risks and locational advantages are weak, the effective functioning of APMCs remains crucial. In these locations, the scope of eMarkets, commodity futures and warehousing are also high. Also, with non-perishable agricultural commodities, the development of these alternative markets can help remedy some of the potential challenges of the APMCs such as intermediaries, lack of grades and standards and better price discovery and realization. However, for the emergence of newer forms of value chain linkages, there is still a need to remedy the issue of economies of scale, access to capital for both producers and value chain actors and effective governance of value chains and markets. For this, effective institutions and policy to enable farm-market linkages are necessary.

8.4 INSTITUTIONS AND POLICY—VALUE CHAINS AND THE FUTURE OF FOOD SYSTEMS

Linking smallholders to markets is essential for commercialization, to improve household level incomes and provide the incentive for diversification. Well-functioning value chains are also critical to improving the efficiency of bringing food from farm to table by minimizing food loss and waste, thus improving access and availability of food. With changing demand, we see newer channels and platforms of marketing emerging to cater to the changing need. However for small producers to connect to markets through these requires policy support, interventions like aggregation models,

infrastructural development and reform of existing marketing practices that have led to increasing transaction costs in the market. These measures are essential for making value chains sustainable and improving welfare.

8.4.1 Vertical Coordination and Linkages to Alternative Marketing Platforms

In a predominantly smallholder-based agricultural sector, aggregation of farms and effective legislature to enable and enforce contracts are essential for VC. In Chap. 7, we looked at how aggregation models have the potential to address issues of scale with accessing factor markets such as credit, inputs and technology. These models in the form of cooperative and FPOs can also enable better farm-market linkages. Larger farms are preferred to smaller farms as they incur higher costs in contacting and operations. However, in the case of many developing countries, buyers often have no choice but to engage with small and marginal producers due to their predominance in the agricultural sector (Narrod et al., 2007). The role of producer organizations in this regard becomes crucial.

Aggregation models and vertical coordination mechanisms such as contract farming go hand in hand in small farm-based economies as they address the various challenges of the value chain. Although the provisions for contract farming and formation of FPOs were around since 2003, both initiatives have had limited success. Contract farming has been limited to few crops in select locations, and currently, there are few, if any, examples of self-sustaining FPOs. Linkages between these two institutional arrangements are also now few. However, the main factors affecting the uptake of contract farming such as locational disadvantages, costs of selecting farmers, contracting and monitoring and enforcement are potentially remediable through FPOs. Table 8.3 summarizes the various cost characteristics of selection barriers of choosing location and farmers and adherence problems of contract formation and implementation along with costs to both firm and individuals/FPO and the incentives to firms to backward integrate. Aggregation models can reduce search costs (farms and locations) and contracting and monitoring costs (compliance and enforcement) and address some of the disadvantages smallholders have in vertical coordination. In 2018, the government of India introduced the Model Agriculture Produce and Livestock Contract Farming and Services (Promotion & Facilitation) Act, to better facilitate contracts between

Table 8.3 Cost and incentives of firm FPO linkages

| <i>Features</i> | <i>Cost characteristics</i> | <i>Cost to firm</i> | <i>The cost to individuals/FPO</i> | <i>Incentives to firms</i> |
|----------------------------|---|---|---|--|
| Choosing a location | Identifying location specific to need | One time: Search and opportunity cost | Location-specific transaction costs | Bypass markets, stable price and supply, control grades and standards requirements |
| Selecting farmers | Identifying farmers with specific characteristics | One time: Search and opportunity cost | Household-specific transaction costs, opportunity costs | Minimize search costs, screening costs, household-specific transaction costs |
| Contract | Forming contacts specific to a context | Recurring: The cost of specifying contracts—terms, timing, volume and so on | Bureaucratic costs, screening costs, management costs (esp. monitoring) | Reduced bureaucratic and management costs |
| Compliance and enforcement | Monitoring and enforcing of contracts by stakeholders | Recurring: Coordination cost of ensuring compliance | Monitoring costs | Reduced enforcement and monitoring costs |

farmers and buyers. This new law remains outside the jurisdiction of the APMC act and emphasizes the role of FPOs in contract farming. In the traditional contract farming model, contracts were mostly informal and breach of agreements have been common (Dileep, Grover, & Rai, 2002; S. Singh, 2002; Swain, 2011). The new act now promotes enforceable legal agreements, with dispute settling mechanisms to enable contract adherence by producer and buyer.

In alternative eMarket platforms, future markets and warehousing, economies of scale, information and standardized commodities are essential. Aggregating can help in reducing fixed costs of quality determination, transportation to physical locations of transactions and enable better linkages to financial services. There are examples of FPOs trading on the NCDEX and warehousing their products with them. In 2018, NCDEX has opened accounts with over 151 FPOs in 12 states trading in around 16 mostly non-perishable commodities. These platforms also form the

space for private sector linkages with small farms. Aggregation models, therefore, have the potential to develop a tie to both VC and alternative marketing platforms.

8.4.2 *Market Reforms and Infrastructure*

Although vertical coordination and alternative markets are essential platforms and strategies for improving market access in small farm-based economies, enabling efficient access to agricultural spot markets is also necessary. Agricultural markets are fragmented with a large number of intermediaries functioning in them. These intermediaries, however, perform important aggregation roles when agricultural markets are thin and standardization roles in the absence of established grades and standards. Better access to markets would require infrastructure to improve connectivity through roads to enable better transportation of goods, cold chains and goods storage facilities to reduce wastage and proper communication channels through which price and quality information can be transferred. These changes will also allow for better functioning of alternative marketing platforms, especially eMarkets and warehousing. The role of public sector investment is essential to create public goods in this sector. Effective infrastructural development is also vital to elicit a private sector investment response in the value chain. Despite policy mandating the creation of backend infrastructure in organized retail, this has not been the case due to uncertainty about policy regarding FDI in organized retail. Introduction of grades and standards along with infrastructure and methods to determine this at markets is essential to bring about objective grade-based price determination. Policy to enable market reforms, institutions for the enforcement of enacted policy and infrastructure to improve physical access to markets are therefore critical for sustainable value chains.

Ethics in value chains is essential for sustainable development of the agricultural sector. This involves elements of livelihood rights, food and environmental safety, reduction of ecological externalities and human and animal rights. Therefore, ethical supply chains essentially comprise three significant components: profitability, local development and the environment. Profitability takes into consideration how revenue and profits are shared within a value chain, where every stakeholder stands to benefit. Local development considers public and consumer health, welfare and labor standards while environment ascertains the environmental impact of the value chain

from farm to fork. Another aspect associated with sustainable value chains is the issue of food loss. Reduction of food loss in the value chain will ease production pressures when economical, improving access and availability and reducing environmental externalities from the need to produce more. Compared to developed economies where a significant portion of food loss happens at the retail and household levels, in emerging economies, food loss often takes place at the post-harvest stages of storage and transportation. This is usually due to inadequate information regarding best practices or poor or inadequate infrastructure. Food loss often means loss of macronutrients such as fat, calories or proteins, or micronutrient loss such as vitamins and minerals. Reducing wastage and loss are crucial for food security through nutrition-sensitive food systems and sustainability as this would help reduce the strain of population increase and environmental degradation.

8.5 CONCLUSION

Smallholder linkages to commodity markets are essential for agricultural development and commercialization. These linkages help improve household level welfare through income growth when commodity prices are realized in the market. However, the ability of smallholders to access markets that are characterized by changing demand for higher value and quality goods is problematic due to farm and market level challenges. The primary farm level challenge has been rectifying economies of scale problems, while the main market level problem has been high transaction costs resulting from poor infrastructure and institutions to regulate and stipulate exchange (commodities price being determined by non-price factors and lack of enforced grades and standards-based transactions is a good example). Aiding smallholders to address these problems will help improve market linkages and incentivize production corresponding to changing demand.

Vertical coordination, alternative private markets such as commodity futures markets and warehousing and private-public venture markets have emerged to rectify what traditional spot markets have had limited success in addressing. Vertical coordination has improved market access in perishables such as fruits and vegetables, while alternative markets have helped in the marketing of non-perishables such as oilseeds, cereals, pulses, spices and plantation crops. While these linkages play an essential role, effective functioning of spot markets remains crucial. Reducing transaction costs through improved connectivity, development of market infrastructure,

reducing the influence of intermediaries will be central to this. Aggregation models to rectify scale disadvantages will enable better participation of smallholders in different marketing arrangements. The emergence of different marketing platforms are essential as they can address various kinds of institutional, access and marketing problems. Formulating policy to better link smallholders to these platforms will prove critical.

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