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Food Value Chain Analysis

A Review of Selected Studies for Pakistan and Guidelines for Further Research

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I. INTRODUCTION

The study of value chains comprises of two key concepts: value and chain. The term value is synonym to “value added” in the Value Chain Analysis (VCA) as it characterizes the incremental value of a resultant product produced from processing of a product. For agricultural products, value addition can also take place through differentiation of a product based on food safety and food functionality. Price of the resultant product shows its incremental value. The term chain refers to a supply chain indicating the process and the actors involved in the life cycle (from conception to disposal) of a product (Hawkes and Ruel, 2011). Hence, Kaplinsky and Morris (2001, pg. 4) defines VCA as study of the “full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use”. Sanogo (2010) in addition to the movement of a product from one stage to another and identification of the actors, firms and their services, also adds analysis of the institutional support to production at various stages to VCA.

Hence, food VCA (FVCA) stands on the pillars of production, processing and marketing of food products. In Pakistan, the agriculture sector accounts for 21percent of the GDP and provides livelihood to 45 percent of the country’s population (Govt. of Pakistan, 2011). Hence, the production stage encompasses not only the physical, human, financial, and other economic resources involved in the production of the agricultural product in various agro-ecological zones, but also involves livelihood strategies of the households engaged in production. This stage also includes the roles of public and private institutions and the services these institutions contribute to the production systems.

Trench et al. (2011) report that changing diets have increased demand for high value agriculture especially meat, dairy, vegetables, and processed foods. The global growth in per capita income continues to drive diversification of consumption and increase demand for both quantity and quality of food in developed and developing countries. However, processing of high value agriculture has amplifying income and employment effects but also has environmental concerns attached to it. Like other developing countries, processing of agricultural products in Pakistan takes place both on- and off-farm. Their environmental implications are unknown but their income and employment generation are highlighted in the existing literature (Haq, 2011; Gomez et al. 2011). On-farm food processing is part of the household livelihood strategies including labor supply to various production and processing activities that can directly and indirectly affect their income and consequently production capacity. For example, women carry out the on-farm fruit processing in Swat valley (Haq, 2011).

Lusine et al. (2007) presented performance measures to assess the success of supply chains. The authors used four criterion including efficiency, flexibility, responsiveness and food quality to assess performance of value chains. Efficiency points to the utilization of resources in the supply chain and its measures include production costs, profit, return on investment and inventory. Flexibility indicates the degree of responsiveness of the supply chain to a changing environment and is measured through customer satisfaction, volume flexibility, delivery flexibility, and lost sales. Responsiveness shows the time spent in the fulfillment of a request and is measured through fill rate, product lateness, customer response time, lead-time, shipping errors, and customer complaints. Food quality, the fourth and final criteria of performance measure, is further divided into product and process quality. Product quality consists of product safety and health, sensory properties, shelf-life, and product reliability and convenience, while process quality consists of the characteristics of production and marketing systems.

However, studies conducted in Pakistan and identified in this survey, with the exception of a few efficiency measures, have not used this set of criteria in evaluating food value chains. Many of the studies reviewed herein used primary data to

investigate marketing channels rather than conducting value chain analysis. For example, Khushk and Sheikh (2004) investigated the marketing chain of mangoes, Ahamad et al. (2008) studied cherry marketing in Gilgit, Zeb and Khan (2008) studied peach marketing in Khyber Pakhtunkhwa, Shah et al. (2010) estimated marketing margins of different actors involved in citrus marketing in Haripur and Aujla et al. (2011) and Shah et al. (2009) did a similar study for grapes produced in Quetta, Pishin and Mastung districts of Balochistan with the addition that the authors estimated post harvest losses at various stages of the chain. Similarly, a number of studies have also investigated marketing channels of vegetables. These studies are similar in nature to those that investigated fruits marketing chains. Lashari et al. (2003) investigated onion marketing in Sindh and Zeb et al. (2007) did a similar study for onions produced in Swat and Khyber Pakhtunkhwa. Sharif et al.'s (2003) study of livestock and dairy markets is similar. Studies of the dairy sector by Fakhar and Walker (2006) and Burki and Khan (2011) go further into investigating efficiency and competitiveness of the value chains.

International studies, on the other hand, used VCA to investigate the types of value chain coordination, understand the tensions between various actors participating in the supply chain, and study the competitive strategies of the supermarkets (Dolan and Humphrey, 2004). VCA is also used to investigate the role of food safety standards and food quality along the value chain and its effect on the competitive strategies of a firm (Narro et al. 2009; Reardon et al. 2001). The international literature is very rich in investigating the effects of food safety standards on exports. However, Saleemi (2008) is the only study located that investigated the impact of certification on farm income in Pakistan. In the international literature, Henson and Humphrey (2010) studied the complexities of private standards in global agri-food chains and their impacts on developing countries. Nadvi (2008) used VCA to study market and corporate governance. The former encompasses the study of institutional framework through which markets operate, including enforcement of contracts while the later comprises accountability of firm to its shareholders, workers and to society. Gereffi and Mayer, 2006, Sagheer et al. (2009) and Cadilhon et al. (2006) underlined the roles of various actors in the value chain on the quality of food products.

Hence, as compared studies about value chains in Pakistan, international studies have used value chain analysis for other purposes. A detail of the Pakistan studies and their analyses is given in the next section. Few generalizations are in order. First, these studies do not cover the inputs market in their analysis. Second, there is no information about whether exported fruits and vegetables go through third-party certification. Third, we are also unaware of the supermarket effect in Pakistan. Fourth, using value chain analysis, the existing literature does not explain the availability of a few Pakistani fruits and vegetables in supermarkets in United Arab Emirates and other countries of the world. Fifth, the criterion of flexibility, responsiveness and food quality are ignored in the marketing chain studies conducted in the country.

This report examines methodologies and recent studies concerning high-value supply chains for fruits and vegetables, dairy, meat and livestock for domestic and international markets. Specifically the report presents a review of the national and international literature on food value chains and summarizes perceived best practices for conducting value-chain studies. The report also examines and presents performance measurement mechanisms used in measuring the efficiency of supply chains in Pakistan and elsewhere.

The report is organized into four sections that follow. Section two presents a review of the studies of VCA conducted for Pakistan. The international literature on value chain studies is reviewed in the third section. The fourth section is a conclusion providing a synthesis of both the reviews and some final implications.

2. STUDIES OF FOOD VALUE CHAINS IN PAKISTAN

A food value chain shows the movement of a food product along the supply chain and identifies the actors and their value-added activities. The data required for such analysis is not readily available. Most of the studies conducted in Pakistan collected and used primary data. These studies present the flow of food products from producer to consumers and focused on marketing channels. Unfortunately the information regarding value addition at each stage is not reported in these studies. However, these studies reported sale and purchase prices received and paid by different actors along the value chain and thus help in estimation of the efficiency of the chain. Lashari et al. (2003) provided various performance measures to estimate the efficiency of fruits and vegetables supply chains. These measures included marketing margin, absolute margin, breakdown of consumer rupee, marketing cost and net margin. Marketing margins are determined as the differences between prices at two levels in a market. These margins are used to study the differences between producer and consumer prices for the same quantity of a commodity:

$$mm = \frac{ps}{sp} \times 100 \quad (2.1)$$

where mm represents marketing margin, ps stands for price spread measured as the difference between the prices paid and received by a marketing agency in a supply chain, sp represents base price of the same agency for the same commodity.

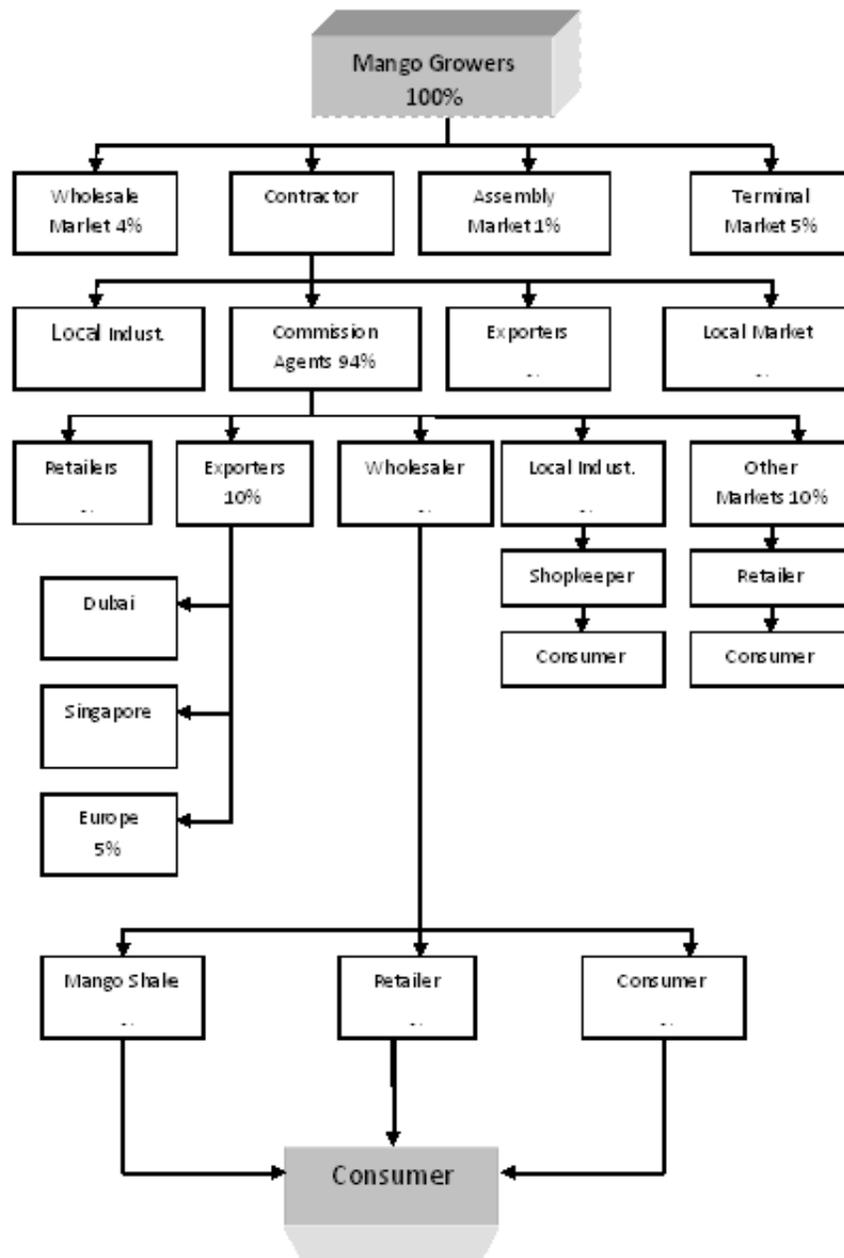
Absolute margin is another performance measure and determined as the difference between sale prices of two or more than two agencies for equivalent quantity of a specific commodity. Breakdown of consumer's rupee is another performance measure and represents the process in which a consumer's one rupee expenditure on a particular commodity is divided among the producer and marketing agencies. It indicates the fraction of a consumer's rupee earned by producer and marketing agencies which helped the movement of the product from farm to fork. Marketing margin indicates the amount received by the different marketing agencies for providing their services. These services include grading, packing, loading/unloading, transportation, commission charges and market taxes. Net margin is left over after paying all the marketing costs. Most of the studies reviewed herein for Pakistan utilize these types of measures.

2.1. Fruits

Marketing channels start with growers and end on consumers (Khushk et al. 2004; Rahim et al. 2007). Growers perform production activities while some of them are also involved in harvesting. Khushk and Sheikh (2004) found that the majority of mango growers sell their produce to contractors. Contractors act as a bridge between growers and commission agents and exporters. Commission agents finance contractors' activities while contractors facilitate farmers by paying in-advance for the crop at fruiting stage. Contractors mostly harvest, assemble and store mangoes while sometimes they grade, pack, transport and sell through commission agents/exporters at the wholesale market. Commission agents play a key role in the supply chain by controlling the quantity and information about prices more than any other actor. They sell their produce to wholesalers, other terminal markets, exporters, and retailers through auction. Retailers sell their product to local consumers. It is important to mention that exporters require a license to export. Besides a license, experience, contacts and capital to entry in the business are some of the pre-requisites of becoming a successful exporter (Khushk and Sheikh, 2004).

Khushk and Sheikh (2004) and Khushak (1997) in their investigation of the supply chain of mangoes reported that growers sell out most of their produce to contractors (90 percent), followed by wholesaler (4 percent) and terminal markets (5 percent) (Figure 2.1). Contractors supply mangoes to wholesale market and local commission agents (94 percent), local market (3 percent), local industry (2 percent), and exporters (1 percent). Commission agent sells mangoes to local wholesalers (70 percent), other markets and exporters (10 percent each), and local industry and retailers (5 percent each). Commission agents setting in wholesale markets charge 6 to 10 percent of the total value for their services. The local industry processes the fruits and then markets it in retail and it finally reaches consumers. From other markets, retailers buy the fruits and then sell out to the consumer. Exporters export the produce to different countries like UAE, Singapore and Europe. Wholesalers get mangoes through auction from commission agents and sell out to retailers, and finally to ultimate consumers.

Figure 2.1: Mango supply chain



Source: Khushk and Sheikh (2004)

Ahamad et al. (2008) conducts a study in district Gilgit in 2007 to identify various agents and channels in marketing of cherries. They collected primary data from 49 cherry growers, 25 cherry wholesalers and 30 cherry retailers. They estimate marketing margins and price spread for all the agents working in marketing of cherries. The study identified four marketing channels: 1) growers-retailers-consumers; 2) growers-contractors-wholesalers-retailers-consumers; 3) growers-wholesalers-retailers-consumers; and 4) growers-consumers. In Gilgit, most of the cherry growers followed the second channel. Marketing margin for wholesaler was 56.7 percent, 14.3 percent for local retailers, and 35.1 percent for retailers in Islamabad. The calculated price spread in the study is given in table 2.1. It is important to mention that a narrow price spread and higher share of producer in the consumer price is better for both producers and consumers (Kumar and Srivastava, 1993). The calculated price spread was low for local retailers and high for Islamabad retailers. Ahamad et al. (2008) reports that although contractors play a main role in cherry marketing by providing a large amount of cherries to wholesalers, yet contractors buy the whole output of cherry orchards at the fruiting stage and behave like producers because they are the first actors in the chain supplying to wholesalers.

Table 2.1: Price spread for actors involved in cherry marketing

Actor	Buying Price (Rs/Kg)	Selling Price (Rs/Kg)	Price Spread (Rs/Kg)
Wholesaler	64	120	56
Local Retailer	64	72	08
Islamabad Retailer	120	185	65

Source: Ahamad et al. (2008)

Zeb and Khan (2008) analyzed the performance of marketing system of peach produced in the two valleys of former North West Frontier Province (NWFP) (now Khyber Pakhtunkhwa) in 2006. The study shows that contractors buy peach from the producers and sell it in the wholesale markets of the country including Lahore, accounting for 42 percent of the total quantity handled, Rawalpindi (26 percent) and Peshawar (32 percent). The marketing margin for contractors was 30.3 percent as compared to 3.6 and 15.0 percent for wholesalers and retailers. In absolute value terms, contractors received a price of Rs. 155 per 10 kgs of peaches, earning an absolute margin of Rs. 47/10 kgs, the highest return as compared to other marketing intermediaries (Table 2.2).

Table 2.2: Average sale price and absolute margin received by actors involved in peach marketing in Swat and Peshawar valleys (Rs/10 Kgs)

Marketing Intermediary	Swat	Peshawar	All (Both Areas)
Average Sale Price			
Producer	100	115	108
Contractor	150	160	155
Wholesaler	165	175	170
Retailer	200	200	200
Absolute Margin			
Producer	100	115	108
Contractor	50	45	47
Wholesaler	7	5	6
Retailer	35	25	30

Source: Zeb and Khan (2008)

Shah et al. (2010) conduct a study during 2008 to estimate marketing margins of different actors involved in citrus marketing in Haripur district of NWFP, Pakistan. The study reported that commission agents in citrus marketing make a bridge between seller (producer or contractor) and buyer and charge a fixed rate of Rs. 15.8 per crate from seller and Rs. 6.3 per crate from buyer. The major cost items for commission agent are labor, rent of office, salary of staff etc., as shown in (Table 2.3). Wholesalers purchase citrus from commission agents in auction and sells in small quantities to the retailers. A crate of oranges purchased by wholesalers from the commission agents cost Rs. 301, while it earns him about Rs. 67, by only spending Rs. 7.2 per crate.

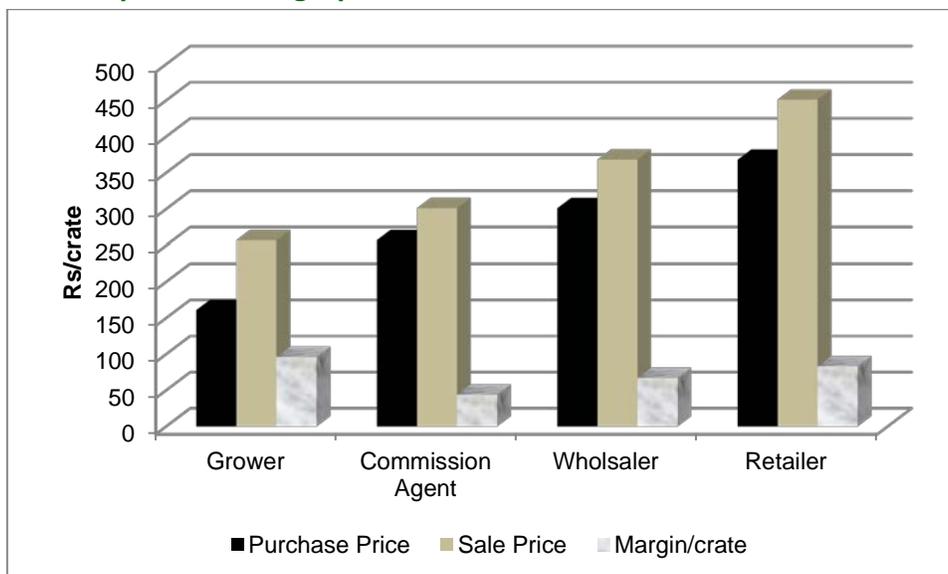
Table 2.3: Commission agent and wholesalers' handling cost (Rs./crate)

Cost Item	Commission Agent (Rs./crate)	Wholesaler (Rs./crate)
Labor	6.0	3.0
Market fee	1.0	
Wages for assistance (auction, cleaning etc)	2.0	3.0
License fee	0.2	0.7
Stationary	0.1	0.1
Boarding/lodging	1.6	0.4
Utilities	0.9	---
Rent	3.2	---
All	15	7.2

Source: Shah et al. (2010)

The profit margin earned by different functionaries involved in citrus marketing is given in figure 2.2. Growers in citrus marketing earn the bulk of the profit margin. They earn Rs. 96 per crate, followed by retailers (Rs. 83), wholesalers (Rs. 67) and commission agents (Rs. 44). Growers receive 35.7 percent of the retail price and the remaining 64.3 percent is earned by different market functionaries. Aujla et al. (2011), Shah et al. (2009) and Shah et al. (2004) did a similar study for grapes produced in Quetta, Pishin and Mastung districts of Balochistan with the addition that the authors estimated post harvest losses at various stages of the chain.

Figure 2.2: Purchase and sale price and margin per crate of citrus



Source: Shah et al. (2010)

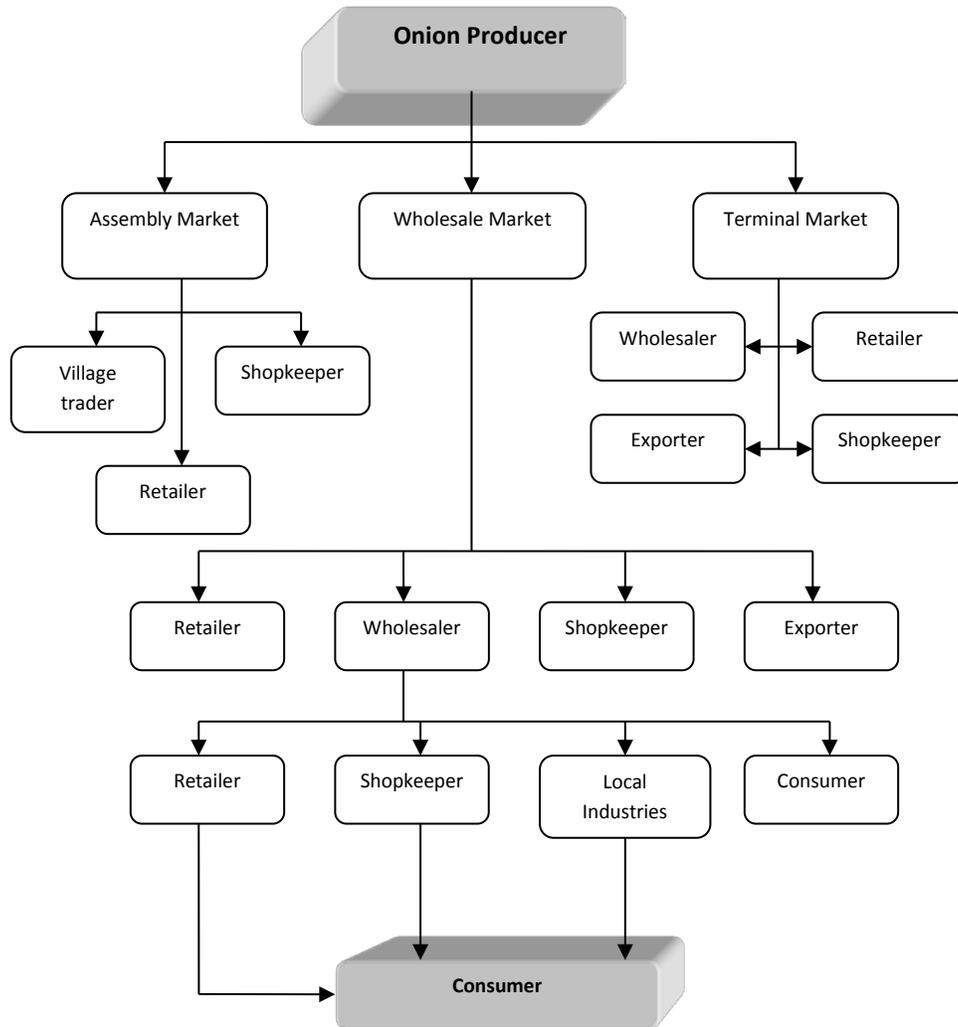
2.2. Vegetables

Studies investigating supply chains of vegetables in Pakistan have used the same performance measures as used in the fruit supply chain analysis. Lashari et al. (2003) investigates the vegetable marketing system in major vegetable growing and consuming areas of Sindh province. The study reported that vegetables supply chains are inefficient because of the long chain of market intermediaries, ineffective price information system, inadequate physical facilities and power concentration of a few traders. The authors interviewed 465 growers of tomatoes, onions and chilies and various marketing intermediaries involved in the marketing of these vegetables.

Lashari et al. (2003) reported that the existing vegetables marketing system consists of assembly markets, wholesale markets and terminal markets. Assembly markets, usually small in size, are situated close to the farm gate, where farmers sell marketable surplus of vegetables. Traders, shopkeepers and retailers buy from these markets. Price is directly negotiated between buyer and seller. Producers prefer to sell larger quantities in wholesale markets located in a district town or a major sub-division. These markets have storage, transportation and communication facilities. Permanent offices and auction floors have been constructed in these markets. Almost every trader (commission agent) has sufficient space in the market to store produce for a few days (free of cost) or for longer periods for a nominal charge. Commission agents also provide lodging and boarding facilities to the contractors and producers, who bring their produce from long distance. Participants in these markets include commission agents, wholesalers, retailers, shopkeepers and weighing men. Terminal markets are generally situated in large urban centers. These markets process the large marketable surplus and route vegetables for export to various international markets. Traders in terminal markets are usually wholesalers who supply agricultural products to firms and industries for processing and to the retailers and shopkeepers. Traders in these markets have access to modern facilities for approaching their agents in other national and international markets.

According to Lashari et al. (2003) onion growers mostly supply produce to wholesale market (60 percent), followed by terminal markets (30 percent) and assembly markets (10 percent). Wholesalers supply 70 percent to other wholesalers, 20 percent to exporters and 5 percent to shopkeeper (Figure 2.3).

Figure 2.3: Onion Marketing Channels in Pakistan



Source: Lashari et al. (2003)

Lashari et al. (2003) calculated market margins of tomatoes (Rs./14 Kg), onions (Rs/100 Kg) and chilies (Rs./40Kgs) for producers and other intermediaries. Rahim et al. (2007) investigated the role of various functionaries in tomato marketing. Lashari et al. (2003) show that producers received the highest margins for all the three vegetables due to the investment made in production (Table 2.4). They also bear the highest production and marketing risks among all actors involved. Tomato producers' share in consumer's rupee (on final retail price) was 70 percent as compared to 18 percent of retailers, 7 percent of wholesalers and 5 percent of commission agents (Table 2.4). Similar trend in margins are also evident for onion producers. In the case of chilies, the share of producers in consumer's rupee was 67 percent, followed by wholesaler (14 percent), retailer (12 percent) and commission agent (7 percent).

Table 2.4: Market margins of vegetable producers and other market intermediaries

Vegetable Season	Producer	Commission agent	Wholesaler	Retailer	Retail Price
Tomato					
Early season	160 (71%)	10 (4%)	15 (7%)	40 (18%)	225
Mid season	115 (72%)	10 (6%)	10 (6%)	25(16%)	160
Late season	142 (68%)	10 (5%)	16 (7%)	42 (20%)	210
Entire season	139 (70%)	10 (5%)	14 (7%)	35(18%)	198
Onion					
Early season	485 (54%)	110 (12%)	125 (14%)	185 (20%)	905
Mid season	210 (55%)	45 (12%)	53 (14%)	75 (19%)	383
Late season	325 (54%)	64 (11%)	82 (14%)	130 (21%)	601
Entire season	340 (55%)	73 (12%)	87 (14%)	122 (19%)	622
Chilly					
1 st Picking	1332 (67%)	148 (7%)	290 (14%)	230 (12%)	2000
2 nd Picking	1260(66%)	140 (7%)	285 (15%)	215 (12%)	1900
3 rd Picking	1233 (69%)	137 (8%)	210 (12%)	200 (11%)	1780
4 th , Picking	1080(68%)	120 (7%)	210 (13%)	190 (12%)	1600
Entire season	1226 (67%)	136 (7%)	249 (14%)	210 (12%)	1820

Source: Lashari et al. (2003)

The net margin, calculated after accounting for production costs in case of producers and marketing cost in case of other intermediaries, was highest for producers for all three vegetables (Table 2.5). Tomato producer's earned a net margin of Rs. 108 per crate at the early season and Rs. 90 per crate during end of the season. Onion producer's earned highest net margin of Rs. 405 per bag at the early season and lowest Rs. 130 per bag during mid season (Table 2.5). In case of chilly producers' net margins decreased with each picking mainly due to increased supply to markets. The net margins of tomato, onion and chilly producers over the entire season averaged Rs. 87/crate, Rs. 260/bag and Rs. 1070/40kg, respectively.

In a similar study, Zeb et al. (2007) conduct an analysis in Swat area during 2005 to explore the marketing channels adopted by onion growers and determine the performance of the existing marketing system. The study showed about 76 percent of the onion growers sell onions to contractors and the remaining growers market their produce in wholesale market located in Mingora. Hence, as compared to Sindh, onion marketing is marked by contractors in Swat. The difference between the marketing practices between the two regions is mainly due to the reason that onions are produced in off-season in Swat while it is produced in regular season in Sindh. Returns on investment made in off-season onions are more as compared to regular season and is the main reason for attraction of contractors to the business. The authors reported that contractors' marketing margins and net margins were highest as compared to producers because in this case most of the risk is faced by contractors who buy onions while these are in the field.

Table 2.5: Net margin of producers and other market intermediaries

Vegetable Season	Producer	Commission Agent	Wholesaler	Retailer
Tomato				
Early Season	108	05	09	31
Mid Season	63	05	04	16
Late Season	90	05	10	33
Entire Season	87	05	08	26
Onion				
Early Season	405	98	117	170
Mid Season	130	33	44	49
Late Season	245	52	74	115
Entire Season	260	61	78	111
Chilly				
1 st Picking	1176	138	284	218
2 nd Picking	1104	130	279	203
3 rd Picking	1077	127	204	188
4 th Picking	924	110	204	178
Entire Season	1070	126	243	189

Source: Lashari et al. (2003)

A less quantitative analytical study was conducted by the Agribusiness Development and Diversification Project (2008). They carried out the Participatory Rapid Horticulture Appraisal of Sindh Banana, Dates, Guava, Mango, and Chillies in April 2008. The study presented product specific value chain maps and identified the major players and constraints faced by them

in the value chain. However, the value chain map did not show the price, quantity and value of product moved from one actor to another. The study also conducted product specific strengths, weaknesses, opportunities, and threats (SWOT) analysis. Growers identified lack of market information, forward and backward linkages with markets and unavailability of cold storage facilities for banana, dates, mango, and guava as the major weaknesses. They also identified increase in the local processing of mango, banana, and guava as an opportunity for significantly increasing the demand for these fruits.

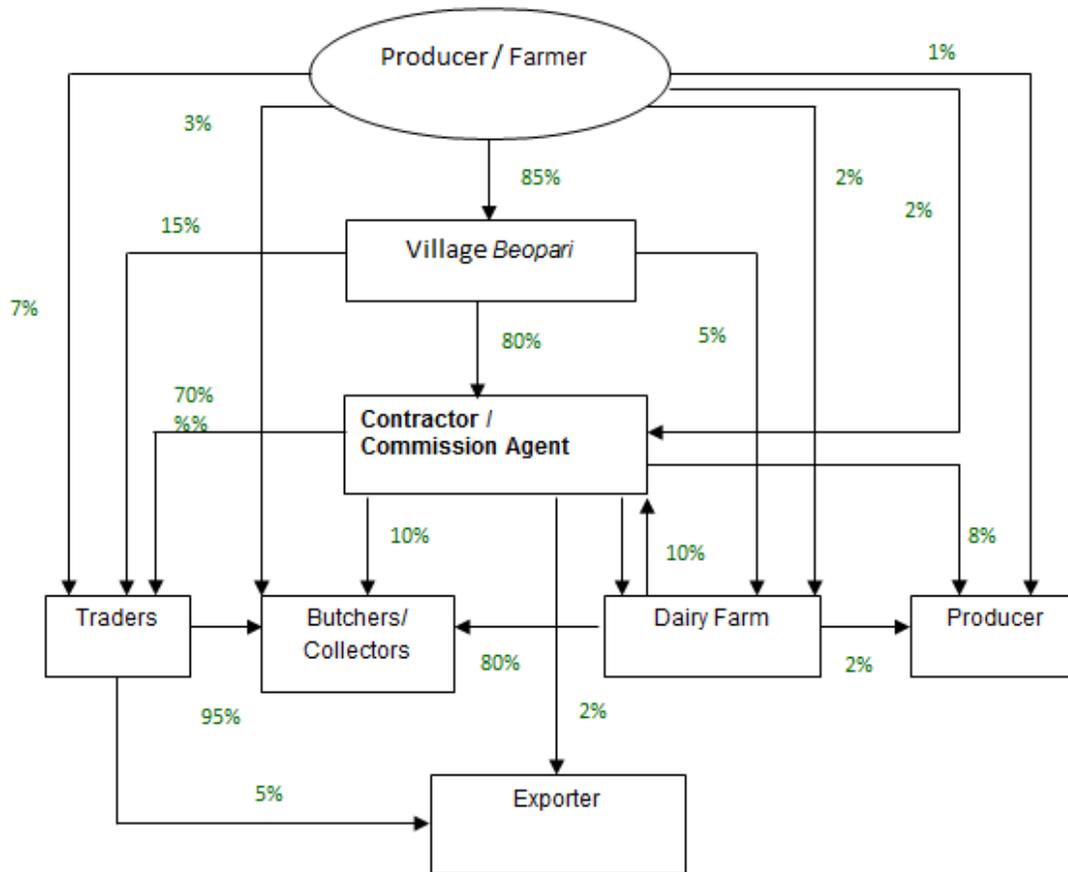
One study that goes beyond assessing marketing channels, revenues and marketing margins is Saleemi (2008a). He investigated the impact of the introduction and certification of Global Good Agricultural Practices (GlobalGAPs) in citrus (kinnow) orchards on prices and farm income in Bhalwal. The certification and Hazard Analysis Critical Control Points (HACCP) are the requirements for accessing international markets; for example, kinnow exports were banned to Russia due to lack of certification). The certification requires round the year record keeping of inputs used, necessary field and factory tests of Maximum Residue Level (MRLs) and potable water tests. It allowed exports to Russia and other European countries. Saleemi (2008a) reports that in the absence of certification, the price of Pakistani kinnows per 10 kilograms in international market was US\$ 6 as compared to the price of Argentinean certified kinnows of US\$ 23 per 10 kilograms. Hence, certification has the potential to increase kinnows producers' income.

2.3. Live Animals

Livestock is an important component of the agriculture sector of the country accounting for 53.2 percent of the agricultural GDP (GOP, 2011). Almost every agrarian family owns small and large ruminants. Women and children manage these animals. Live animals in the country are marketed with and without entering into formal livestock markets (Sharif et al. 2003). Marketing of live animals takes place in thousands of small rural markets. These markets operate on weekly, fortnightly, monthly, and in some areas on daily basis in peri-urban areas near the large urban centers. The majority of live animals are marketed through these markets. Village traders (or *beopari*) are the main marketing intermediary in buying and selling of animals. *Beoparies* sell to contractors or commission agents, followed by distribution to other intermediaries.

Sharif et al. (2003) reported that only one percent of the animals are marketed outside of these markets (Figure 2.4). *Beoparies* buy livestock from farmers and sell 80 percent to contractors or commission agents (Figure 2.4). The animal traders purchases 70 percent of animals from contractors and sell to butchers/collectors. The butchers/collectors mostly buy culled animals because of their lower price.

Figure 2.4: Large ruminants marketing in Pakistan

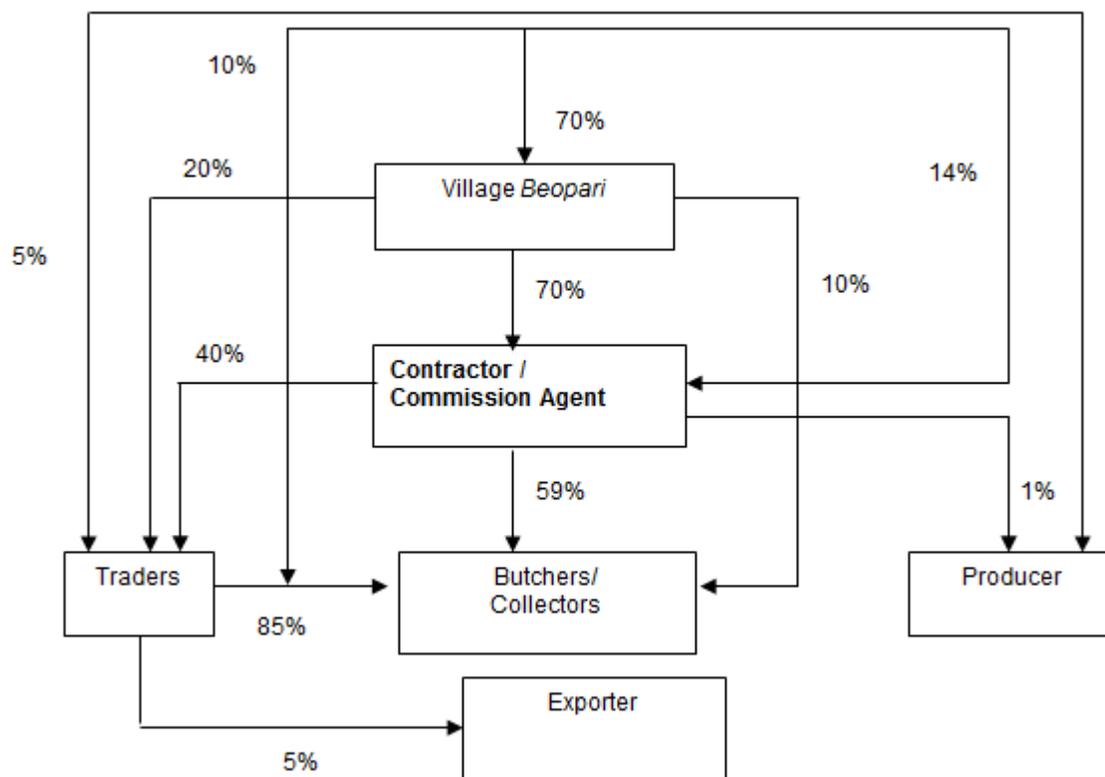


Source: Sharif et al. (2003)

Sharif et al. (2003) observe similarities and differences in large ruminants marketing across the provinces of Pakistan. They report that marketing for large ruminants in Punjab and Sindh are similar. Khyber Pakhtunkhwa gets 60 percent of live animal from Punjab and the rest (40 percent) from its own local areas. Butchers purchases account for 65 percent of the live animals traded in wholesale markets while 35 percent of the animals are purchased by farmers for dairy farming. In Balochistan, 90 percent of large ruminants come from Punjab and Sindh and the remaining are from local areas. These animals are also exported to Iran and Afghanistan. In AJK, 40 percent of the animals come from the different markets of Punjab province while the rest are from local areas. Mostly *beoparies* buy these animals and sell 90 percent of the animals to commission agents from where butchers purchase animals for slaughtering.

Sharif et al. (2003) present marketing channel for small ruminants. *Beoparies* buy animals from farmers and sell (70 percent) within the village and the rest in other markets (Figure 2.5). These *beoparies* sell (70 percent) of the small ruminants to contractors or commission agents who sell these to traders. These contractors and commission agents sell 60 percent to butchers and the rest to animal traders. In the province of Sindh, a major proportion (75 percent) of small ruminants is traded through respective village markets. From there the animal traders buy four-fifth of the animals while the rest are purchased by contractors/commission agents. Major proportion (80 percent) of the small ruminants of contractors/commission agents are purchased by butchers. In the province of NWFP, *beoparies* account for 70 percent of small ruminants of farmers. Of the rest, 15 percent are sold to other farmers, 10 percent to wholesalers, and the remaining 5 percent to butchers. *Beoparies* sell 85 percent of their collection to the butchers. In Northern Areas, butchers account for 75 percent of the small ruminants produced by farmers. Like other provinces of the country, in Balochistan province *beoparies* also account for the major part (80 percent) of small ruminants produced by farmers. The majority of these animals are purchased by butchers through commission agents and only 16 percent are transported and traded through livestock traders from other provinces of the country. In AJK, the provinces of Punjab and NWFP account for 55 percent of the small ruminants traded while the rest are produced locally. *Beoparies/collectors* buy the major share of small ruminants and they sell one-fourth of these animals to butchers while the rest are marketed to contractors/commission agents.

Figure 2.5: Small ruminants marketing in Pakistan



Sharif et al. (2003)

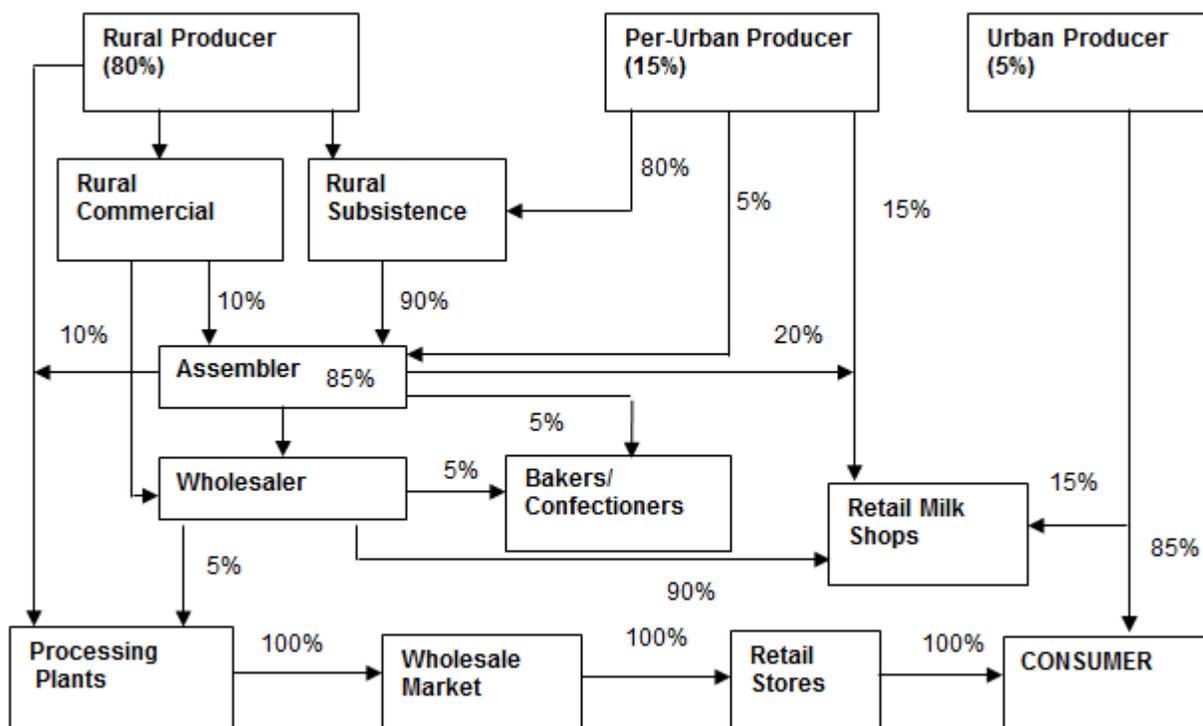
2.4. Milk

Sharif et al. (2003) investigated the milk supply chain in detail. Sharif et al. (2003) report that 80 percent of total milk production takes place in rural areas whereas 15 percent milk is produced in peri-urban areas. In Punjab and Sindh provinces the distribution across channels is more or less the same, with some variations across various intermediaries. In NWFP, Balochistan and AJK, the milk marketing system is on a very limited scale. In NWFP, the milk production is mainly taking place in rural areas. Ninety percent of the milk is produced at subsistence farms and is directly sold to the consumers. On the other hand, the rural commercial farmers sell 45 percent of milk through urban retailers and 40 percent through village retailers. In this way, the milk retail shops are the main intermediaries of supplying milk to the consumer of NWFP. In the Northern areas of NWFP, the milk distribution system is highly rudimentary as small ruminants are mainly raised there. In Balochistan, small ruminants are the main animals raised. The milch animals are mainly kept in the urban and peri-urban areas. Therefore, the milk is mainly (85 percent) produced in the urban areas and remainder is contributed by the farmers in peri-urban localities. About 90 percent of the milk produced in urban areas is marketed to urban consumers through retail milk shops. In this way, the retail milk shops are the main intermediary between producers and urban consumers. In AJK, about four-fifth of the total milk production is produced in rural areas whereas 7 percent of milk production comes from Punjab. The assemblers are the main collectors gathering milk from producers in rural and peri-urban areas in Punjab. These assemblers further market mainly (73 percent) through wholesaler or milk retail shops. Hence, peri-urban producers and milk retail shops/wholesalers are the main supplier of milk to the consumers of AJK.

One study that goes deeper into value added in milk markets is Fakhar and Walker (2006). They presented a vision for Pakistan's dairy sector transformation to become one of the world's most competitive dairy sectors. The study envisions the dairy sector of the country serving as an engine of economic growth. Fakhar and Walker (2006) report that about 33 billion liters of milk is annually produced from 50 million animals managed by 8 million farming households in the country. The milk economy accounts for 27.7 percent of the total agriculture sector. About 71 percent of the milk produced is consumed in rural areas while the remaining is consumed in urban areas. Only 3 percent of the total milk produced in the country is processed (UHT) and consequently marketed formally, but the demand for UHT milk has been growing at 20 percent per annum. The unprocessed milk (i.e. 97 percent) is distributed through a "multi-layered distribution system" in both the urban and rural

areas through various market intermediaries. The processed milk sector contributes 0.43 percent to real GDP of the country. The report, in addition to many other recommendations, suggested identifying and improving adoption of best farm management systems including improvement of dairy infrastructure (cooling tank usage, sheds, etc), discouraging adulteration, identifying cost effective delivery of pasteurized milk to larger proportion of Pakistan’s population, encouraging commercial dairy farming based on modern principles of entrepreneurship, and establishing additional research institutions.

Figure 2.6: Milk marketing in Pakistan



Source: Sharif et al. (2003)

Participation in supply chain networks also affects the efficiency of dairy producers. Burki and Khan (2011) evaluated these effects for dairy producers in Pakistan. They studied the relationship between supply chain and technical inefficiency using survey data of 800 smallholder dairy producers. Burki and Khan (2011) showed that building of a milk supply chain network increased technical efficiency of smallholder dairy producers. They demonstrated that dairy farms located in “milk districts” employ fewer resources relative to those located in “non-milk districts” to produce given output levels. The study showed that farms with larger herds were more efficient than those having smaller herds. However, the inefficiency reducing effect of herd-size becomes stronger when large farms are located in milk supply chain regions. Increase in the number of market players in the supply chain leads to an increase in technical inefficiency of dairy farms. Hence, technical efficiency is lowest where market structure resembles monopsony while highest in oligopsony. The authors conclude that building of supply chains in rural areas can increase productivity and growth of smallholder. They also showed that the buyer-side market structure holds the key for the success of the emerging agro-food supply chain systems. Further, experienced farmers, timely provision of water to dairy stock and better feeding regimes can significantly enhance farm efficiency.

3. VALUE CHAIN ANALYSIS: AN INTERNATIONAL PERSPECTIVE

Just like national studies, international studies have also used performance measures to assess the success of supply chains. However, these measures are more comprehensive in covering various aspects of the value chain. Lusine et al. (2007) used the following four criteria to undertake a performance measurement survey (PMS) of the actors involved in the Dutch-German tomato supply chain:

- i. efficiency;
- ii. flexibility;
- iii. responsiveness; and

iv. food quality.

Efficiency measured how well the resources are utilized in the supply chain and its measure includes production costs, profit, return on investment and inventory. Flexibility indicated the degree of responsiveness of the supply chain to a changing environment measured through customer satisfaction, volume flexibility, delivery flexibility, and lost sales. Responsiveness is measured as the time spent in the fulfillment of the request. It is also measured through fill rate, product lateness, customer response time, lead-time, shipping errors, and customer complaints. Food quality, the fourth part of PMS, is divided into product and process quality. Product quality consists of product safety and health, sensory properties and shelf-life, and product reliability and convenience. Products must be “free” of hazards to be safe. Sensory perception includes the overall sensation of taste, odor, color, appearance and texture. The shelf-life of a product encompasses the time period from harvesting/processing to the point in time at which it becomes unacceptable for consumption. Product reliability shows the compliance of actual product composition with product description. Process quality consists of the characteristics of production and marketing systems. A complete list of performance measures and their definition used under the four criterion is given in Annexure-1. Lusine et al. (2007) indicated that studies have used different supply chain performance measures, making the harmonization of these measures complex. However, costs, profit, customer satisfaction, lead-time and the majority of the product quality indicators are the most consistently used indicators.

Besides, performance measures, Taylor (2006) suggested the following five principles for consideration while conducting value chain studies:

- v. Identify what creates value from the end-user perspective and not from the individual firm’s perspective.
- vi. Find out the steps across the value stream. In addition, highlight waste created in each step.
- vii. Implement the actions that create value and flow of the product without interruption, diversions or waiting.
- viii. Based the output produced on customer demand.
- ix. Continuously remove successive layers of waste in both the product and the processes.

Taylor (2006) also recommends selecting a specific value streams for investigation. Detailed studies needs to be carried out in order to gain an understanding of the dynamics of the supply chain, the wastes that occur, and the opportunities for improvement. Grunert et al. (2005) reported that heterogeneity of served consumer markets, raw material, degree and type of regulations, degree of relational exchanges, and power distribution in the chain are important factors in value chain analysis. Sanogo (2010) added to Taylor’s (2006) list of best practices. In Sanogo’s (2010) view, VCA should consider:

- x. systematically mapping the actors taking part in the production, distribution, marketing, and sales of a product. The map characterizes the actors, profit and cost structures, and flows of goods throughout the chain, employment characteristics, and the destination and volumes of domestic and foreign sales. Such details can be gathered from a combination of primary survey work, focus groups, participatory rural appraisal (PRA), informal interviews, and secondary data aspects of value-chain analysis as applied to agriculture.
- xi. identifying and estimating the share of costs and benefits of each actor in the chain. Such analysis should help answer the following questions:
 - a. Who are the beneficiaries for participating in the chain?
 - b. What are the magnitudes of their investments (i.e. costs) and benefits?
 - c. Whose benefits can be further increased from enhanced private and public support?
 - d. What is the return of each actor to the one rupee investment made in the value chain?
 - e. What are the socio-economic characteristics of the participants in the chain?
- xii. determining the scope for quality enhancement within the chain. Quality enhancement may involve improvements in the production, delivery and processing of the product, its packaging and design. It will help and enable the actors to gain higher value along the chain. The following questions are the focus of such analysis.
 - f. What are the technological, skill and investment requirements for each actor of the chain?
 - g. What is the structure of regulations and entry barriers laws governing the up-gradation?
 - h. Is up-gradation legally allowed?
 - i. Will quality enhancement overcome trade restrictions?
 - j. How does the new technology affect environment, if any?

k. What is the value of additional benefits to the actors carrying the quality enhancements?

xiii. highlighting the role of governance in the chain. Specifically, governance refers to the structure of relationships and coordination mechanisms that exist between actors in the value-chain. Governance is important from a policy perspective by identifying the institutional arrangements that may need to be targeted to improve capabilities in the value-chain, remedy distributional distortions, and increase value-added in the sector.

In yet, another study Gómez et al. (2011), added to the list of Sanogo (2010). Their best practices include the following.

xiv. Food VCA should target the opportunities available in the domestic markets due to three reasons. First, the value of domestic retail sales is higher than food exports. However, retailers should ask for the global food quality and safety standards for domestic products which will increase exports and attract supermarkets. Second, higher incomes and changing diets among urban populations (e.g., increased consumption of meats and processed foods) increase domestic processed food demand. The increase in processed food also increases the scope for FVCA. Third, developed countries have higher tariffs for processed foods than for raw commodities impeding value addition in exports FVCs. Research should focus more on identifying what public policies, private-firm decisions, and FVC innovations can improve the functioning of domestic FVCs, not just on export channels.

xv. Gómez et al. (2011) indicated that it is often difficult to influence production decisions and increase FVC participation among poor farmers (as net sellers) and as intermediaries mainly due to lack of assets and skills as compared to their better-off counterparts. Poor households earn a large portion of their income from off-farm employment and are commonly net food buyers. Hence, greatest poverty implications of FVCs likely to arise indirectly through increased employment for unskilled workers in commercial agriculture and post-harvest processing. Therefore, in addition to profitability as a direct effect of FVC participation, investigate the important indirect effects of FVCs have on rural and urban poverty.

xvi. The value chain analysis should help improve marketing channel efficiency. Gómez et al. (2011) argued that since poor participate in FVCs not only as farmers but also as consumers, therefore, only reducing the difference between retail price and farm gate price at the same time decrease food costs for poor as consumers and increase their earnings as sellers. Marketing efficiency can be accomplished through “cost-efficient market intermediation” which includes product sorting, storage, processing, and distribution.

xvii. Pay attention to the quantity and quality of post-harvest losses. These losses are higher for rural households, mostly poor, who lack capacity for food processing and storage. Post harvest losses are important determinant of market inefficiencies. These also lead to production inefficiencies due to inefficient use of productive resources. Hence, reducing post-harvest losses can help reduce pressure not only on natural resources like land and water but also on other resources including pesticides, fertilizers, machinery and most importantly human resources.

xviii. It is an important component of value chain analysis to consider certification of food products quality. This creates price premium for products e.g. certified organic products. However, certification does not come without cost and infrastructure requirements often excluding resource poor farmers from high value markets e.g. in coffee, fair trade certification costs 2.4 to 10 percent of retail price. Hence, certification can also serve a barrier for small farmers to enter markets. Therefore, any VCA should consider the impacts of certification in its investigation.

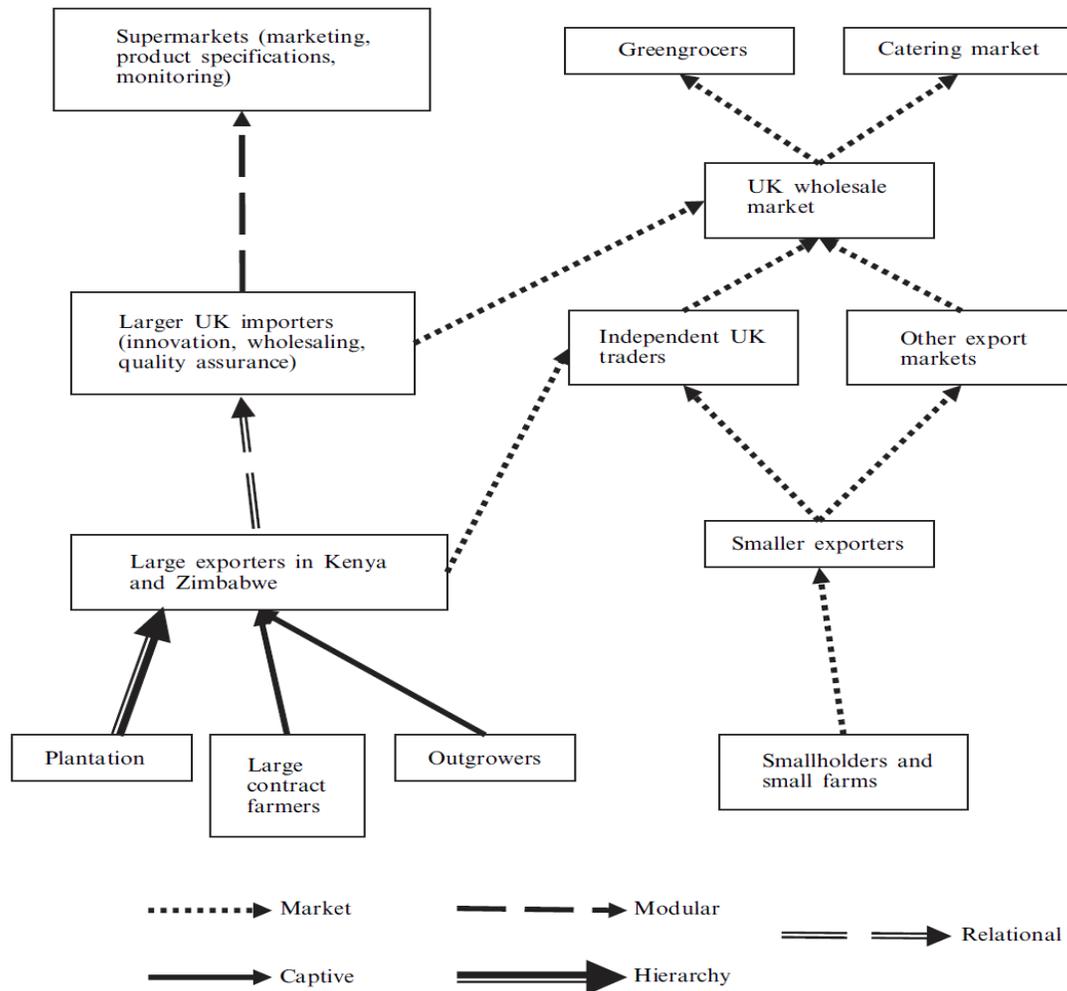
3.1. Fresh Fruits and Vegetables

Given the width and breadth of international studies on value chains, it is beyond the scope of the study to fully review this literature. However, a review of some of the studies using the performance measures and best practices identified in the previous section is presented as follows.

Lusine et al. (2007) reported that development of a PMS is complex due to the reason that actors working in the chain have conflicting goals. Studies have used VCA to investigate tension among actors involved in value chain. Dolan and Humphrey (2004), for example, examined the changing pattern of value chain relationships in the fresh vegetable sector among the Kenyan and Zimbabwean exports to the UK. In Kenya five leading vegetable export firms while in Zimbabwe six leading exporters were interviewed. The study report that large exporters in Kenya and Zimbabwe buy fresh vegetables from large contract farmers, out-growers and plantation owners and supply these to large UK importers and wholesale markets (Figure 2.7). However, the UK supermarkets bypass the wholesale markets and work directly with UK importers, delegating lower profit functions such as quality control, monitoring, and distribution to these importers. A typical super-market sources

its products from approximately six different suppliers of imported fresh vegetables. Dolan and Humphrey (2004) argued that competitive strategies of the supermarkets, particularly around product differentiation and the need to control risk in the face of a more complex regulatory and consumer environment lead to the increasing role of supermarkets in the UK. Supermarkets are also instrumental in extending the range of imported produce (by introducing new vegetables), more sophisticated packaging and increased postharvest processing such as washing, trimming, and chopping. They also innovate product ranges (particularly in exotic and tropical fruit and vegetables), product variety, food preparation and packaging. Supermarkets also extend a year-round supply of products, even though this often meant sourcing produce from different countries around the world. Hence, UK supermarkets also changed the roles of exporters and producers, forcing them to acquire a range of new capabilities to retain their UK business. Wholesalers supply to traders, greengrocers and other users.

Figure 2.7 Kenyan and Zimbabwe fresh vegetables export to Europe



Source: Dolan and Humphrey (2004)

Lusine et al. (2007) used the Dutch-German tomato supply chain as the case study. They conducted focused interviews of the chain manager of a breeding company, owner-growers of tomato producing firms, wholesalers, manager of a distribution center, and managers of supermarkets. Hence, this study completed the cycle from farm to fork as compared to Pakistani studies that only focused on marketing aspects. There was only one breeding company producing different vegetable seeds. The company has developed certification system based on seed quality standards. The authors interviewed seven out of 12 tomato growers. Wholesalers deliver half of the output to supermarkets in Germany. Wholesalers used the International Food Standard (IFS) certification. The retail distribution used HACCP for food quality control.

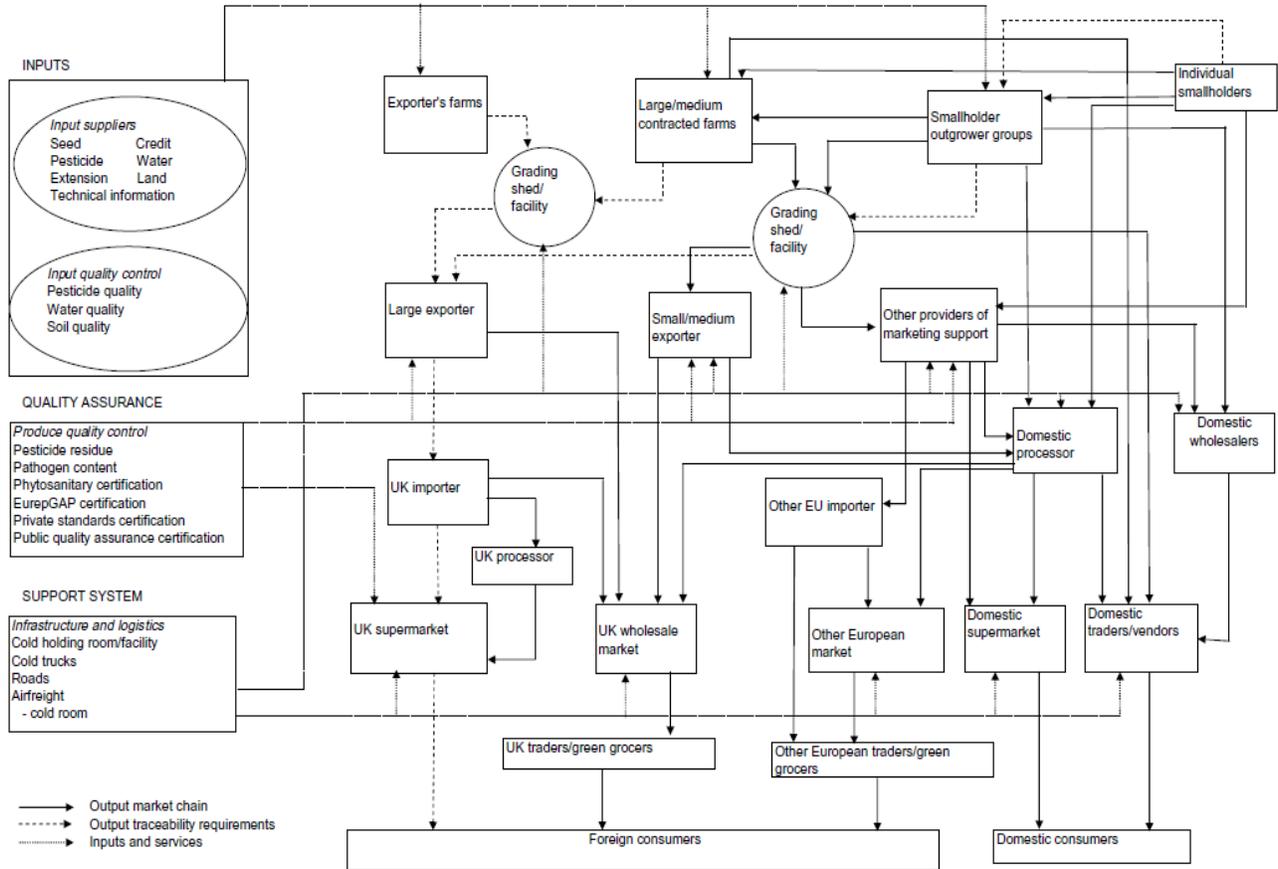
Blandon et al. (2009) explored the role of transaction costs and collective action in shaping small-scale farmer participation in the fresh fruit and vegetable supply chain to supermarkets in Honduras. The authors note that in traditional spot markets, farmers can sell their produce without the need for an ex-ante and/or ex-post relationship with buyers. This con-

trasts with supermarket supply chains where coordinated relations with buyers, through which product quality, safety and logistics are governed, have to be established and maintained. In such a case the importance of transaction costs increase. The study conducted a survey of 325 small-scale producers to collect the required data. Blandon et al. (2009) employed an econometric model to investigate the factors determining participation of small farmers in supermarkets supply chain. Results indicated that human capital variables, such as gender, age and education, are not statistically significant suggesting that these variables were not important determinants in the participation of small-scale farmers in the supply chain to supermarkets. Farm characteristics and asset variables were also statistically insignificant.

Blandon et al. (2009) explained the participation or non-participation of small-scale farmers in the supermarket supply chain using factors related to relative price and transaction costs. The effect of the relative price that farmers receive in the supermarket supply chain versus spot markets is highly significant for small-scale farmer participation. Even receiving the same price from the main market supplied as from alternative markets reduces the probability of participating in the supply chain to supermarkets. Their analysis shows that farmers participating in the supermarket supply chain have a greater degree of trust in their buyers than farmers supplying to the spot market. Participants in the supermarket supply chain also perceive that their buyers have a greater level of trust in them and are also more satisfied with their buyers than farmers supplying to the spot market.

In another study, Narrod et al. (2009) studied the value chain of Kenyan green beans and Indian grapes exports. Smallholders produced both products and were linked to export markets through producer-run cooperatives in the case of green beans and marketing and farmer cooperatives in the case of grapes. Green beans in Kenya are marketed through export supermarkets and export wholesale to the UK and domestic markets (Figure 2.8). These three marketing options are distinguished by the degree of food safety standards and the demand for traceability. In the figure 2.8, the dashed lines represent traceability requirements. In the figure, the circles (grading sheds) depict the final stage of screening for the beans before they are packed for export. The UK supermarket chain requires third party certification from EurepGAP, British Retail Consortium (BRC) and, in most cases, retailers' private food safety protocols. The beans must also be accompanied by a phytosanitary certificate issued by a competent authority. These are the reasons that the value chain use quality inputs in the production of beans. In addition, beans must satisfy traceability requirements; the dashed lines link all the way back to the farms, whether large or small. For smallholders, traceability is mediated through the smallholder growers groups. Smallholders primarily supply to the export wholesale chain and the domestic consumers including hotels, restaurants, etc. Exported beans are screened for safety and quality at the grading shed to meet the exporter's public standards. A few of the small and medium farmers produce bean for canning industry where the only food safety standard applied is the pesticide residue limit. To meet this standard, exporters perform their own testing of the produce. In addition to other requirements, exporters require growers to provide a toilet, pesticide storage unit and a facility for hand washing at the farm and/or grading shed. They also test the water and soil twice a year for pathogens and require farmers to keep records. These records accompany the beans to the exporters' pack houses.

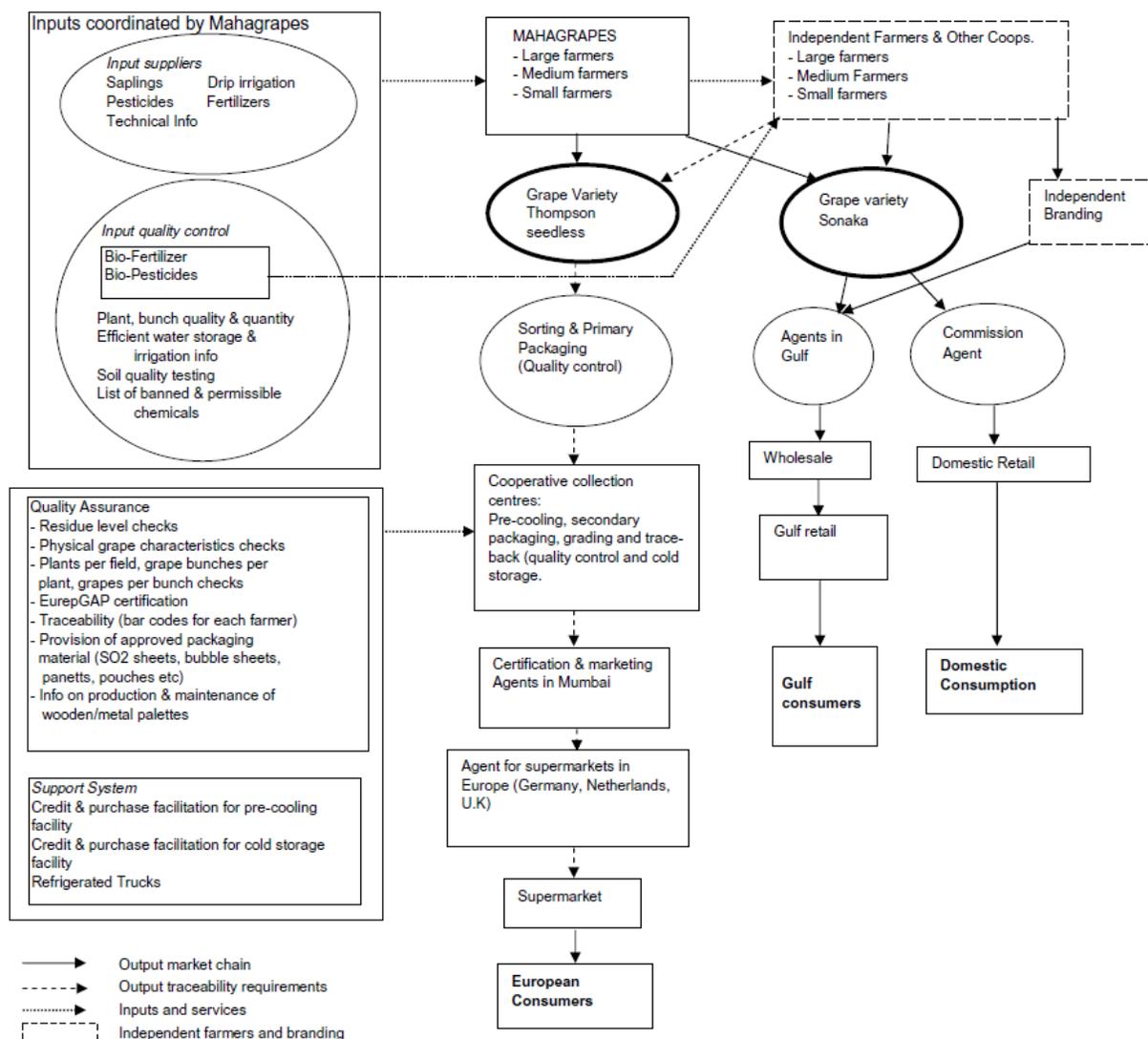
Figure 2.8: Kenyan green beans export to UK



Source: Narrod et al. (2009)

Narrod et al. (2009) reported that India is the second largest horticultural producer in the world but a failed exporter of horticultural produce due to inability of the large number of smallholder to meet export food safety standards. Figure 2.8 also shows the supply value chain for two varieties of grapes: Thompson seedless and Sonaka. Thompson seedless is mainly exported to European markets while Sonaka is exported to the Gulf countries. Exports to the Gulf countries require only simple packaging in farmers' own sheds. Traceability is required in the case of Thomson seedless because of exports to Europe. The circles represent points where the product may be rejected while exporting to different European destinations. In the supply chain shows that in the case of Thompson seedless, food safety standards impose restrictions on production techniques such types of fertilizers and pesticides used as well as on marketing methods e.g. the type of boxes for shipping, maintenance of the cold chain and hygiene in pack houses). Post-harvest facilities must meet EurepGAP sanitation and hygiene requirements.

Figure 2.9: Indian grapes export

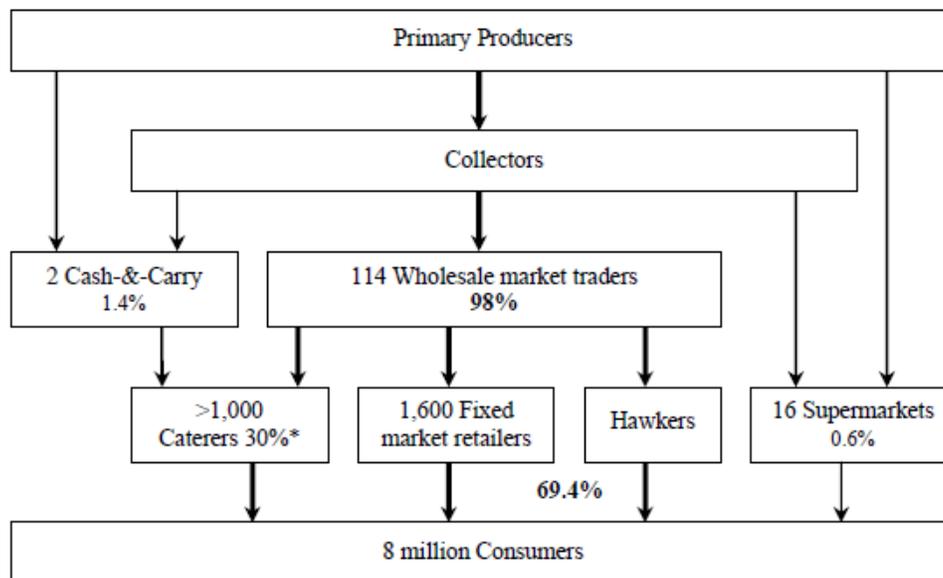


Source: Narrod et al. (2009)

Cadilhon et al. (2006) describe the development of vegetable marketing in Vietnam, where supermarkets are competing with traditional traders for wholesale and retail customers. The authors used data collected through interviews from supply chain actors. The authors used a number of performance indicators to compare the two systems. These indicators include market share, both in terms of volumes and spatial distribution; satisfaction of customers; prices at different stages to assess the role of producers and distributors in building value; labor index (measured as the number of people employed by a supply chain divided by the volume of products sold); and supply chain efficiency assessed by collecting information on price stability, flexibility in response to customer orders, delivery times and quality management.

Cadilhon et al. (2006) reported that large number of producer groups relies on one of their members for collection and marketing to city outlets. Suppliers to supermarkets also supply to traditional wholesalers. Traditional wholesale markets distribute 98 percent of all the tomatoes in town, compared with 1.4% for Metro and only 0.6% to the supermarkets (figure 2.10). The authors commented that although supermarkets in Vietnam are enjoying very strong growth yet their market shares for fresh produce are very small partly due to the very early stage of their development. Consumers reported that although prices are higher in the supermarkets as compared to traditional markets but prices are more stable in supermarkets. The authors also found higher farm gate prices for supermarket supplies. The study found supermarkets more efficient than traditional ones but they still account for very small part (2 percent) of vegetable distribution.

Figure 2.10: Tomatoes supply chain in Vietnam



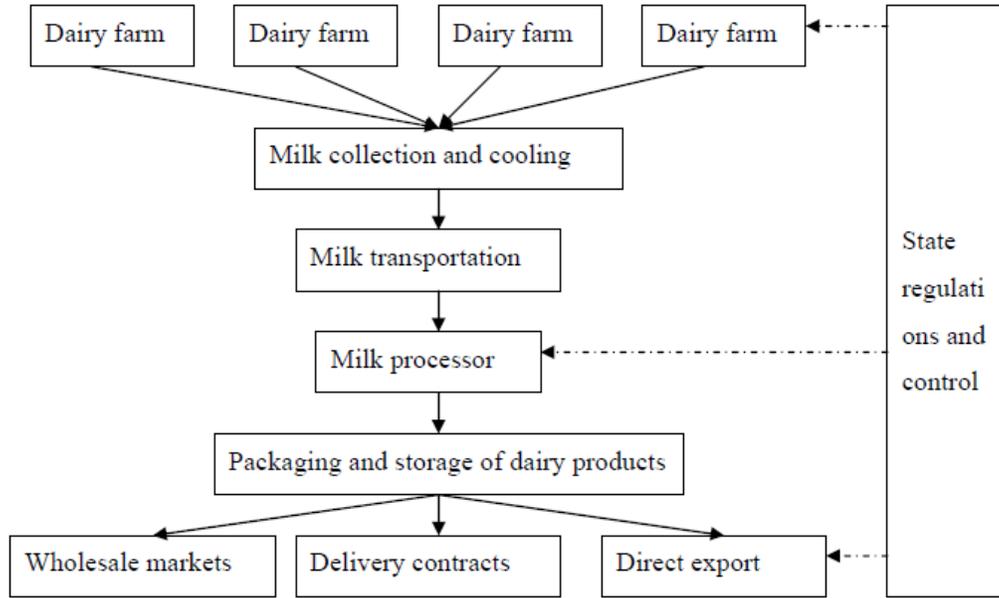
Source: Cadilhon et al. (2006)

Weidemann Associates (2011) conducted an assessment of the USAID funded Agribusiness and Agriculture Value Chain Development (AAVCD) projects since 1998. The assessment documented better practices from 240 AAVCD projects. The 223 projects assisted 1,797 value chains. The lowest number of value chains funded was one and the highest number was 52. The 28 projects that funded one value chain were predominantly dairy (16) and coffee (7) projects. Weidemann Associates (2011) reported that AAVCD projects assisted input suppliers to increase their sales; farmers to adopt new technologies; farmer groups to market increased volumes; traders to enter new markets; processors to improve product quality; support institutions to provide better services; partner firms to increase financing or investment; local NGOs to better manage grants; and governments to improve technology dissemination, market information, regulations or policies.

3.2. Dairy and Beef

Bachev (n.d.) identified formal models for dairy chain management in Bulgaria. The first model (figure 2.11) presents integration of raw milk supply with an industrial processor. This form of supply chain is common in Bulgaria. In this model, long-term and interlinked contracts between farmers and processors govern dependency between them. For example, processor provide working capital to producer against the supply of milk by dairy farmers. Processor also setup own quality and safety control system for milk collection and transportation for processing. The final dairy products are delivered to wholesale, specialized shops, large retailers, and global markets under contracts specifying timing, quantity, products differentiation, packaging requirements etc.

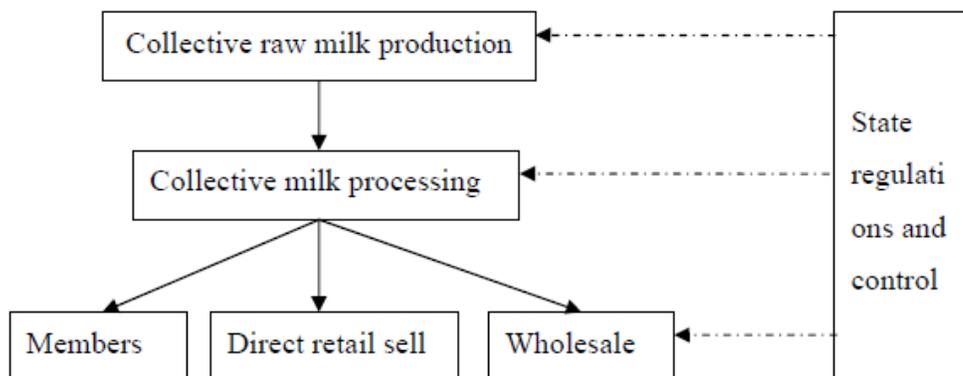
Figure 2.11: Typical value chain in Bulgaria: Model-1



Source: Bachev (n.d.)

Bachev (n.d.) presented his second model as the integration of producers and processors as a cooperative (figure 2.12). He reported only 6 cooperatives supply milk to processors and the final output is distributed to members of cooperatives, local communities, or sell out to market agents (middleman, shop, restaurant, hotel etc.). This framework is represented as Model-2. The biggest challenge of this industry is the competition from the private industry and the institutional requirements for quality, safety etc. However, Mor and Sharma (2012) showed that building such a supply chain could increase the efficiency of dairy farmers, as the milk producers who are part of a cooperative supply chain experienced a higher technical efficiency as compared to those who do not follow the modern supply chain practices. Supply chain participants were found better crisis managers. They recommended the expansion in the supply chain network of the cooperative milk societies for enhancing the efficiency and profitability of the dairy sector along with the provision of more crossbred livestock and an easy availability of finance.

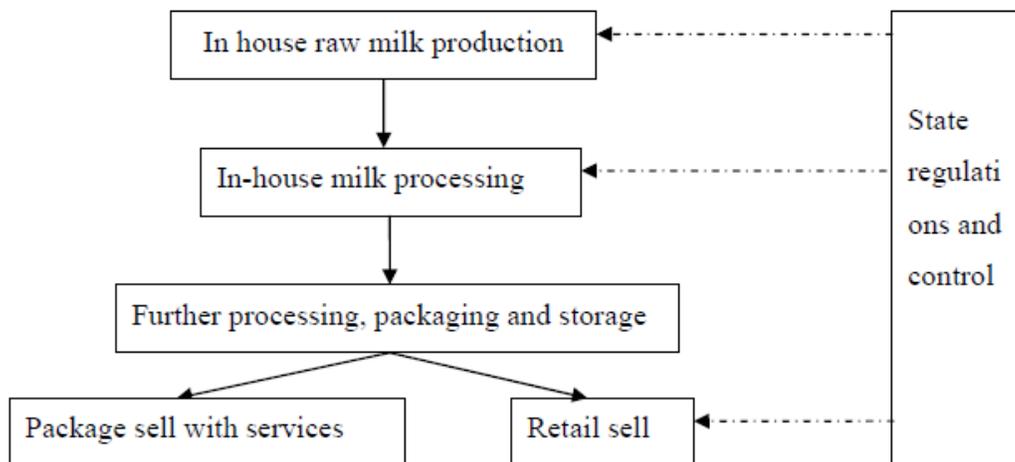
Figure 2.12: Collective dairy production and processing chain in Bulgaria-Model-2



Source: Bachev (n.d.)

Bachev (n.d.) presented his third model as a backward integration of raw milk production by a processor, coupled with complete foreword integration into retail trade (figure 2.13). Hence, the processor has complete control of the supply of raw milk's quantity, quality, price and origin. A single agent keeps the profit generated in the value chain. This model is restricted by inefficiency due to simultaneous management of farming and processing.

Figure 2.13: Integration of production and processing by a single agent: Model-3



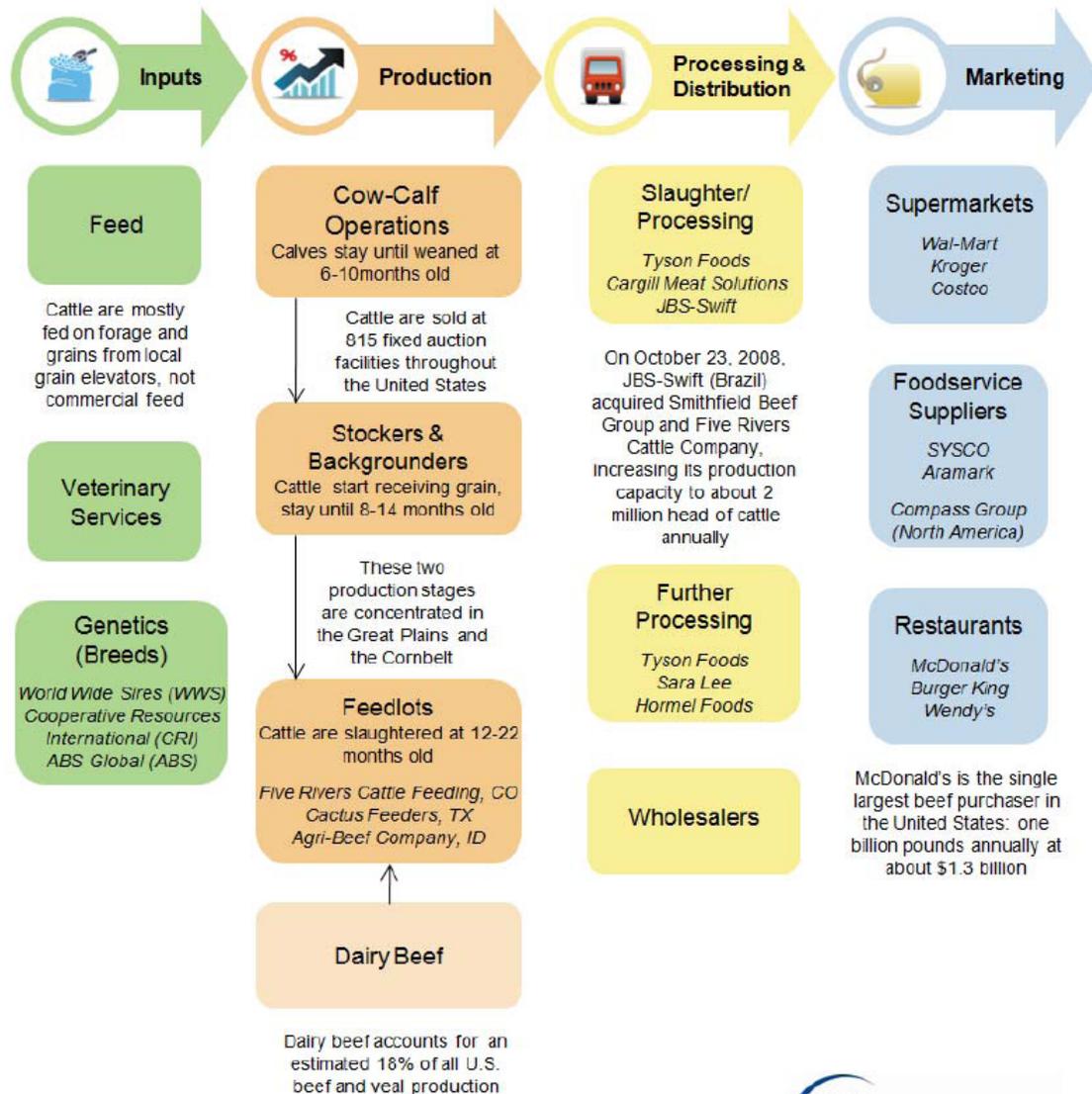
Source: Bachev (n.d.)

Fałkowski (2012) studied the determinants and consequences of participation in dairy market among Polish dairy farmers. He used data set on supply chain characteristics and individuals with different market relationships. He identified and investigated factors that cause households not to participate in the market and its consequent effect on farm revenues. The study showed that commercial dairy farmers were better off than those who ceased milk sales. The difference in their revenue is largely attributed to supply chain modernization, as commercial farms were having modern supply chains as compared to others supplying through the traditional marketing channel. Mor and Sharma (2012) showed that building the supply chain could increase the efficiency of dairy farmers, as the milk producers who are part of a cooperative supply chain experienced a higher technical efficiency as compared to those who do not follow the modern supply chain practices. Supply chain participants were found better crisis managers. They recommended the expansion in the supply chain network of the cooperative milk societies for enhancing the efficiency and profitability of the dairy sector along with the provision of more crossbred livestock and an easy availability of finance.

Lowe and Gereffi (2009) presented the value chain of the U.S. beef industry in figure 2.14. The inputs column refers to the main products and services used to raise beef cattle. These services include feed, veterinary services, and seedstock (breeding). Production is carried in three stages of beef cattle farming. These are cow-calf operations (who keep calves until weaned), stockers and backgrounding (who add weight to cattle with pasture, range, and forage), and feedlot operators (who confine cattle and feed them a high-energy diet of grains to bring them to slaughter weight). Given these production stages, cattle are moved from one farm to another. About one-half of the farms in the US produce beef cattle, and nearly all of these operations are cow-calf or stockers/backgrounding. Dairy beef, from the culled cows also becomes part of the beef industry. About 18 percent of total beef and veal production originates from dairy cattle. Packers slaughter cattle of 1,100-1,300 pounds. They also produce beef products and sausage. Distribution of these products is made wholesalers and food service suppliers such as SYSCO. Wholesalers account for 16 percent of the beef market.

Lowe and Gereffi (2009) showed that marketing of beef and its products are also carried through supermarkets, restaurants, and food service suppliers. Food service suppliers mainly include companies providing dining and vending services. Fresh beef consumption in US accounts for 87 percent beef consumption. The remaining 13 percent is processed through curing, smoking or seasoning.

Figure 2.14: US beef supply chain



Source: Lowe and Gereffi (2009).

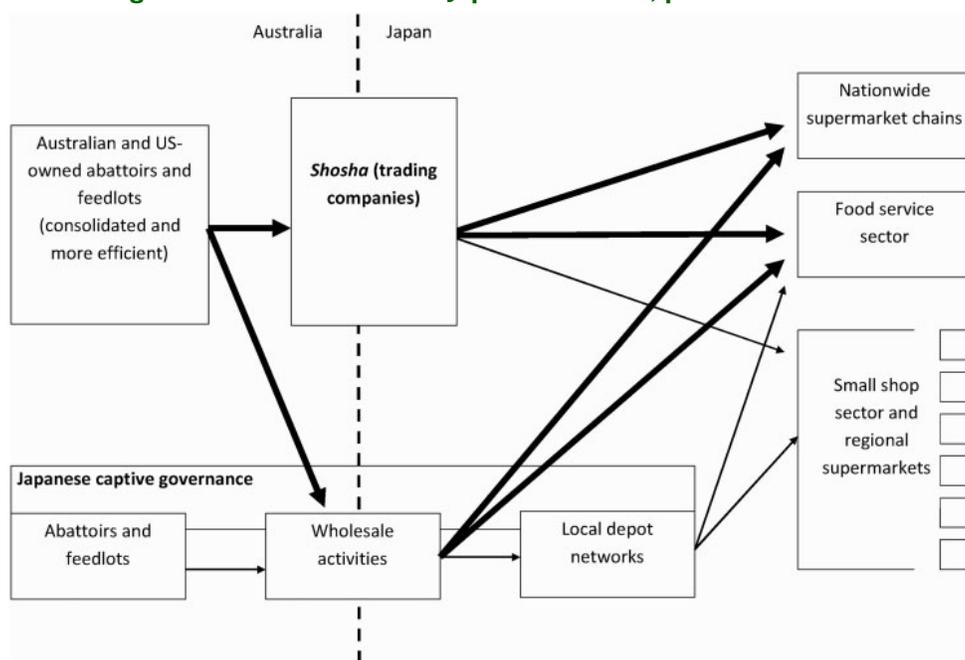
Oro and Pritchard (2010) applied an evolutionary economic geography perspective to the problem of explaining value chain reforms in the Australia–Japan beef trade. Figure 2.15 illustrates the dominance of captive governance beef supply, the darker arrowed lines indicates Australian and US- owned beef firms link with shosha and also showing the wholesaling activities of Japanese beef firms. It also shows the nationwide supermarket chains that are the key agents for the distribution of Australian beef into Japan. It also shows that trading companies and wholesalers supplied to these distributors and cutting the captive governance chains.

In the late 1980s, Japanese investors constructed captive governance arrangements to organize the production of high-value beef for the Japanese market. Two decades later, this trade has come to be structured around a quite different set of principles. This is the result of a path-dependent, co-evolution of firm strategies and the institutional environment. It has involved four phenomena. First, rising and then declining per capita beef consumption in Japan. Second, the impacts of Japanese retail consolidation on competitive advantage within the beef trade cause reduction in importance of the small shop sector and increase the importance of joint companies because of their distribution networks. Third, process upgrading by Australian and US-owned rivals to Japanese beef firms in Australia better enabled them to meet the requirements of the Japanese market. Fourth, the exogenous shock of banning the US product in 2003 open greater potential for Australian exports in frozen ‘parts’, which changed the composition of the trade, and provided expanded opportunities for non-

Japanese owned firms in Australia. These insights have relevance for a broader appreciation of the changing incorporation of Japanese food demand within global agri-food systems.

The evolution of the Australia–Japan beef trade over the past 20 years reflects the changed geographies of institutional environments, which, in turn, alter governance arrangements in recursive fashion. Specifically, servicing the Japanese beef market from Australia now involves a wider range of products, traded through a wider range of governance structures. In telling the story of progressive displacement of captive value chains in the Australia–Japan beef trade, we provide insights into both the changing incorporation of Japan into the world food system, and chart new conceptual approaches for the assessment of such processes.

Figure 2.15: Value chain arrangements in the Australia–Japan beef trade, post-2003



Source: Oro and Pritchard (2010)

In summary, international FVC studies are very comprehensive and cover different aspects of the value chains. These aspects include efficiency in production and distribution (Cadilhon et al. 2006; Mor and Sharma, 2012), trade (Narrod et al. 2009; Oro and Pritchard, 2010), private and public standards and regulations (Reardon et al. 2001; Narrod et al. 2009; Sagheer et al. 2009; Nadvi 2011), corporate governance (Gereffi and Mayer, 2006), tension and strategic relationships among partners and between actors involved in the chain (Bachev, n.d.; Dolanô and Humphrey, 2004) and the role of supermarkets in value chains (Henson and Reardon, 2005; Blandon et al. 2009; Fałkowski, 2012). While doing so, these studies have covered the entire supply chain (Lusine et al. 2007; Lowe and Gereffi, 2009). Lusine et al. (2007), Gómez et al. (2011), Sanogo (2010) and Bachev (n.d.) have also provided the performance measure systems and frameworks to investigate value chain. Hence, while these studies show the diverse applications of VCA, its use and application is very limited in the studies for Pakistan.

3.3. Standards in Value Chain Analysis

Investigating the role of food safety, quality and standards have become an integral part of value chain analysis. Studies in Pakistan have largely ignored this aspect of VCA. Standards is an indication of food quality and are the accepted benchmarks that give information to consumers about the product specification, its effect on health and the procedure through which it has been produced. Reardon *et al.* (2001) define standards as credence goods whereby customers accept the information provided on the label of a product, which provides a basis for the decision of consumption of that particular product without the information provided through the supply chain. Trench et al. (2011) reported that three factors play a key role in driving the demands for safe foods: i) incentives for safer food; ii) private and public standards; and, iii) awareness of consumers about food safety. However, increased cost is the major constraints for implementing standards and monitoring along the value chain especially for small-scale producers.

Nadvi (2008) described the governance of various institutional involved in value chains. He defined governance as the institutional structure by which rules are set and implemented. In the value chains, it could be of various types i.e. market, corporate and industrial governance. Market governance is the institutional framework through which markets are operate and regulated, contracts are enforced, and distributive products brought about. Corporate governance is the accountability of firm to its shareholders, workers and to society where it is located and industrial governance is the organizational ties between different actors that are engaged in the global supply chain (Gereffi and Mayer, 2006). Coe and Hess (2007) gave other names to the institutional and political governance as national and international arena where rules that shape market governance are framed as inter firm governance, which is similar to industrial governance and intra firm governance is the association of capital and labor within the same firm. Nadvi (2008) investigated the relationship between global standards and global value chains (GVCs) through the lens of governance. He also studied that how standards affect institutional and political governance and pointed to social, labor and environmental aspects of process standards. He observed that in process standards developing countries remain on the back foot, and passive standard takers. Developing countries are constantly challenged to address new concerns on compliance. Henson and Humphrey (2010) also studied the complexities of private standards in global agri-food chains as they impact developing countries. They offered three messages. First the development in food safety would give development to private standards particularly in Europe. This makes it difficult to distinguish the different effects of private standards on developing countries by high changes in the rules of agri-food value chains. Second, private standards varied broadly in the form they take and the institution involved in their development. Third private standards and their institutional forms had developed considerably over time. Hence it is important not to focus entirely on current standards rather to observe private standards that are the part of broader trends in value chain coordination. There is a close relationship between the private entities that establish and adopt standards and reform of regulation for food safety, this suggests that private standards and regulations are not different entities.

Sagheer et al. (2009) and Cadilhon et al. (2006) underlined the roles of various actors in the value chain on the quality of food products. Both the studies show that the actions taken at the farm level have a bearing on the quality of the farm product and consequently its marketing in international markets determined by the standards required for marketing. Sagheer et al. (2009) pointed out that a demanding retailer/exporter having global standards will exert pressure on producers to adopt standards similar to international food safety standards. Henson and Reardon (2005) pointed out that the spread of global retail chains and super markets have lead agricultural food systems to become increasingly quality centric and safety driven. However, quality and food safety issues are influenced by producers' knowledge and understanding of inputs (like fertilizers, high-yielding variety of seeds, etc.), good agricultural practices (GAP), good handling practices (GHP) and client's needs of production standards. In the processing sector, HACCP, GMP and GHP are implemented to ensure quality and safety in the processing system. These raise product quality, simplify contractual relationships, facilitate regulatory compliance and improve responsiveness to the customers. These also help processors to penetrate into export markets. Technology, research and development, product innovations, adherence to global production/processing and systems and standards influence processing. In developing economies, exporters connect the small producer to the world market. Exporters, in collaboration with farmers and governments, ensure following of the global norms of production with control on pesticide spraying, pruning, harvesting, post harvest management, etc. However, such regulations are not enforced for the domestic markets.

These studies show that standards provide a regulatory framework to the food industry. Standards directly affect human health. However, the majority of producers in developing countries are yet to follow standards in food production (Unnevehr and Roberts, 2002). Generally, there is a lack of initiative to embrace global standards and this attitude has had some adverse impact on the performance of developing countries firms in global markets. Developing countries also lack the infrastructure to implement some of these standards (Mandal and Deshmukh, 1994). For example, lack of efficient cold storage facilities in several pockets of Indian food industry is cited as one of the cause of poor supply chain management (FICCI F&B, 2006). Absence of cold storage cause violation of many standards related to packaging and temperature control.

4. CONCLUSION

The purpose of this review was to present the various types of studies undertaken in Pakistan and elsewhere for investigating the value chain of food products. Using a framework proposed by Sanogo (2010), these studies can be viewed as classified into the following four broad categories:

1. Studies using VCA focused on the characteristics of a food commodity e.g. price, quality, quantity, etc. The characteristics of the VCA are determined by the end markets (e.g. buyers). Most of the Pakistani studies fall in this category.
2. VCA focused on the environment enabling the flow of product. Such studies investigate factors that either facilitate or hinder the functioning of a market. These factors may include laws, regulations, policies, norms, infrastructure etc.
3. The roles and relationships between various actors involved in the value chain have also been investigated using VCA. Formal and informal linkages and information flows between the chain actors at different levels of the value chain are important element of such analysis.
4. VCA also consider the study of functioning and performance of supporting markets e.g. financial services, input markets including fertilizer, irrigation, equipment and machinery etc. Research and development and productivity growth are also part of such VCA analysis.

Pakistani studies are mainly focused on the investigation of the product flow from farm, through various marketing agencies, to the consumers. These studies have primarily looked at the changes in price and quantity of food product along the value chain using a few basic performance measures. A few studies have provided details of the functions carried out by marketing agencies but mostly these details are not specific to the product under investigation. However, this literature largely ignored regulations whether related to market or quality, input suppliers, processing, exports and imports and the linkages between actors along the value chain. Hence, we don't know whether exported fruits and vegetables go through third-party certification of the practices carried out in production. We are also unaware of the supermarket effect in Pakistan. Specifically, what are the limiting factors for supermarket growth in the country. The existing literature also does not explain the availability of a few Pakistani fruits and vegetables in supermarkets in United Arab Emirates and other countries of the world. Finally, VCA of the processed foods have been strangely ignored in the analysis.

The review also considered value chain focused studies carried out internationally. This reviewed literature is mainly focused on developing countries so that it could be compared to the studies for Pakistan in terms of coverage of production and distribution, imports and exports, standards, regulations governance and strategic relationships and actions of partners. The analysis carried out in these studies have covered the entire supply chain from input to output markets.

Understanding value chains is important for making food products and the food industry more competitive and improves their ability to compete in the global economy. Research on value chains also helps in understanding how local competitive firms are positioned in the global value chains to perform more lucrative activities since production activities take place in different parts of the world. As a result, food value chains generate sustainable jobs and income for rural population and entrepreneurs. It also guides the policy aims to influence decisions of entrepreneurs towards better performance. Further, VCA helps policy makers to study different factors that determine competitiveness of a firm e.g. quality, price, flexibility, design etc., helping the entrepreneurs to identify their strengths and weakness (Schmitz, 2005). Such analysis becomes very important for a relatively young food industry that Pakistan has.

VCA also investigates the relationships and powers sharing between actors and firms, which helps strategically placing the local firms in the chain. From policy viewpoint, VCA helps in identification of the shortcomings holding up the progress of value chain. The analysis also helps to prioritize policies and identify bottlenecks and strategies to resolve these. Understanding such relationships becomes more relevant and important in Pakistan where majority of the producers are small and have no or little leverage in the value chain as compared to the lead or large firm, dictating the terms of exchange in the value chain.

Schmitz (2005) indicated that international competitiveness requires an effective domestic value chain. The quality of domestic linkages and domestic support systems, such as on-time delivery of quality inputs, as well as support institutions, play a critical role in creating international competitiveness. From policy perspective, VCA helps in studying the role of support institutions such as agricultural research and extension and identifying the points of influence and ways to intervene. In the context of the rich international literature on food VCA, there are many opportunities to advance these studies with a focus on Pakistan.

ANNEXURE I: DEFINITIONS OF PERFORMANCE MEASURE INDICATORS

Categories and indicators	Definitions	Measure
i) Efficiency:		
Production costs/distribution costs	Combined costs of distribution	The sum of the total costs of inputs used to produce output/services (fixed and variable costs)
Transaction costs	The costs other than the money price that are incurred in trading goods or services (e.g. searching cost, negotiation costs, and enforcement costs)	The sum of searching costs (the costs of locating information about opportunities for exchange), negotiation costs (costs of negotiating the terms of the exchange), enforcement costs (costs of enforcing the contract)
Profit	The positive gain from an investment or business operation after subtracting all expenses	Total revenue less expenses
Return on investments	A measure of a firm's profitability and measures how effectively the firm uses its capital to generate profit	Ratio of net profit to total assets
Inventory	A firm's merchandise, raw materials, and finished and unfinished products which have not yet been sold	The sum of the costs of warehousing of products, capital and storage costs associated with stock management and insurance
ii) Flexibility		
Customer satisfaction	The degree to which the customers are satisfied with the products or services	The percentage of satisfied customers to unsatisfied customers
Volume flexibility	The ability to change the output levels of the products produced	Calculated by demand variance and maximum and minimum profitable output volume during any period of the time
Delivery flexibility	The ability to change planned delivery dates	The ratio of the difference between the latest time period during which the delivery can be made and the earliest time period during which the delivery can be made and the difference between the latest time period during which the delivery can be made and the current time period
Backorders	An order that is currently not in stock, but is being reordered (the customer is willing to wait until re-supply arrives) and will be available at a later time	The proportion of the number of backorders to the total number of orders
Lost sales	An order that is lost due to stock out, because the customer is not willing to permit a backorder	The proportion of the number of lost sales to the total number of sales
iii) Responsiveness		
Fill rate	Percentage of units ordered that are shipped on a given order	Actual fill rate is compared with the target fill rate
Product lateness	The amount of time between the promised product delivery date and the actual product delivery date	Delivery date minus due date
Customer response time	The amount of time between an order being made and its corresponding delivery	The difference between the time an order is made and its corresponding delivery
Lead time	Total amount of time required to produce a particular item or service	Total amount of time required to complete one unit of product or service
Customer complaints	Registered complaints from customers about product or service	Total number of complaints registered
Shipping errors	Wrong product shipments	The percentage of wrong shipments
iv) Food quality		
Sensory properties and shelf life; Appearance	First sight of the tomato, combination of different attributes (color, size and form, firmness, lack of blemishes and damage)	Amount of damage, color scale, size and form scale
Taste	Determined by the sweetness, meatiness and aroma of a vegetable/fruit	Brix value, which is measurement of a soluble dry substance in a liquid (providing an approximate measure of sugar content)

Categories and indicators	Definitions	Measure
Shelf life	The length of time a packaged food will last without deteriorating	The difference in time between harvesting or processing and packaging of the product and the point in time at which it becomes unacceptable for consumption
Product safety and health Salubrity, Product safety	The quality of the products being healthy and nutritious Product does not exceed an acceptable level of risk associated with pathogenic organisms or chemical and physical hazards such as microbiological, chemical contaminant in products, micro-organisms	Nutritional value and lycopene content Lab checks and monitoring processes according to certification schemes
Product reliability and convenience Product reliability Convenience	Refers to the compliance of the actual product composition with the product description The information provided on the packaging is useful, complete and easy understandable	Number of registered complaints Number of registered complaints
Process quality Production system characteristics Traceability Storage and transport conditions	Traceability is the ability to trace the history, application or location of an product using recorded identifications Standard conditions required for transportation and storage of the products that are optimal for good quality	Information availability, use of bar-codes, standardization of quality systems Measure of relative humidity and temperature, complying with standard regulations
Working conditions	Standard conditions that ensure a hygienic, safe working environment, with correct handling and good conditions	Compliance with standard regulations
Environmental aspects Energy use	The amount of energy used during the production process	The ratio of cubic meters of gas used per square meter of glasshouse
Water use	The amount of water used during the production process	The ratio of liters of water used per square meter of land under the vegetables
Pesticide use	A permitted amount of pesticides used in the production process	The amount and the frequency of pesticide use complying with standard regulations
Recycling/reuse	Collected used product from crop, packaging, etc., that is disassembled, separated and processed into recycled products, components and/or materials or reused, distributed or sold as used, without additional processing	Percentage of materials recycled/reused
Marketing Promotion	Activities intended to increase market share for product (e.g. branding, pricing and labeling)	Increase in number of customers and sales
Customer service	he provision of labor and other resources, for the purpose of increasing the value that buyers receive from their purchases and from the processes leading up to the purchase	Ratio of provision of recourses used to increase customer service to increased sales
Display in stores	Demonstration of the product in the store	Increase in number of customers and sales

Source: Lusine et al. (2007)

REFERENCES

- Agribusiness Development and Diversification Project. (2008). Participatory rapid horticulture appraisal of Sindh Banana, Dates, Guava, Mango, and Chilies. Agribusiness Support Fund, Asian Development Fund, and Government of Pakistan.
- Ahmad, S., Saddozai, K. N., Khan, M., & Afridi, G. S. (2008.). Cherry marketing system in Gilgit district Northern Areas of Pakistan. *Sarhad Journal of Agriculture*, 24 (4), 771-777.
- Aujla, K. M., Shah, N. A., Ishaq, M., & Fraoq, A. (2011). Post-harvest losses and marketing of grapes in Pakistan. *Sarhad Journal of Agriculture*, 27 (3), 485-490.
- Bachev, Hrabrin. (n.d.) *Dairy value chain management in Bulgaria*. Institute of Agricultural Economics, 125 Tzarigradsko Shose Blvd., Blok 1, 1113, Sofia, Bulgaria.
- Blandon, Jose, Spencer Henson and John Cranfield. (2009). Small-scale farmer participation in new agri-food supply chains: case of the supermarket supply chain for fruit and vegetables in Honduras. *Journal of International Development*, 21:971–984.
- Burki, Abid and Khan, Mushtaq. (2011). Formal participation in a milk supply chain and technical inefficiency of smallholder dairy farms in Pakistan. *The Pakistan Development Review*, 50(1). 63-81.
- Cadilhon, J. P. Moustier, N. Poole, P. Tam and A. Fearn. (2006). Traditional vs. modern food systems? Insights from vegetable supply chains to Ho Chi Minh City (Vietnam). *Development Policy Review*, 24 (1): 31-49.
- Coe, N. M. and Hess, M. (2007) Global production networks: Challenges and debates. Paper prepared for the GPERG workshop, University of Manchester, 25-6 January 2007. Available online at:http://www.sed.manchester.ac.uk/geography/research/gpe/downloads/Manchester_Jan07_positionpaper_final.pdf. [Accessed 12 October 2007].
- Dolanô, Catherine and J. Humphrey. (2004). Changing governance patterns in the trade in fresh vegetables between Africa and the United Kingdom. *Environment and Planning*, 36: 491–509.
- Fakhar, Huma and Walker, Geoff. (2006). *The white revolution- dhoodh darya*. Pakistan Dairy Development Company, State Cement Corporation Building, Township Kot Lakhpat, Lahore – Pakistan.
- Falkowski, Jan. (2012). Dairy supply chain modernization in Poland: What about those not keeping pace? *European Review of Agricultural Economics*, 39 (3): 397–415.
- FICCI F&B. (2006). *FICCI Food and beverage survey*. Federation of Indian Chambers of Commerce and Industries, New Delhi.
- Gereffi, G. and Mayer, F. (2006) Globalisation and the demand for governance. In G. Gereffi (ed.) *The New Offshoring of Jobs and Global Development*. ILO Social Policy Lectures, Geneva: International Institute of Labour Studies.
- Gómez, I, C. Barrett, L. Buck, H. De Groote, S. Ferris, H. Gao, E. McCullough, D. Miller, H. Outhred, A. Pell, T. Reardon, M. Retnanestri, R. Ruben, P. Struebi, J. Swinnen, M. Touesnard, K. Weinberger, J. Keatinge, M. Milstein, and R. Yang. (2011). Research principles for developing country food value chains. *Science*, 332:1154-55.
- Government of Pakistan. (2011). *Economic survey of Pakistan*. Government of Pakistan, Ministry of Finance, Islamabad.
- Grunert, Klaus, L. Jeppesen, K. Jespersen, Anne-Mette Sonne, K. Hansen, T. Trondsen, J. Young. (2005). Market orientation of value chains: A conceptual framework based on four case studies from the food industry. *European Journal of Marketing*, 39 (5): 428 – 455.
- Haq, Zahoor. (2011). *Technical Assistance and Support to Fruit & Vegetable Growers in Swat Valley for the Improvement of Production and Marketing in the Horticultural Value Chain*. Khyber Pakhtunkhwa Agricultural University Peshawar, Pakistan.
- Hawkes, Corinna and Ruel, Marie. (2011). Value Chains for Nutrition. Prepared for the IFPRI 2020 international conference “Leveraging Agriculture for Improving Nutrition and Health,” February 10–12, 2011, New Delhi, India.
- Henson, S., & Humphrey, J. (2010). Understanding the complexities of Private standards in global agri-food chains as they impact developing countries. *Journal of Development Studies*, 1628-1646.

- Kaplinsky, Raphael and Morris, Mike. (2001). A handbook for value chain research. Prepared for the IDRC. Downloaded from [http://www.acdivoca.org/acdivoca/amapbds.nsf/f8aed16f1717ff208525738f00036e21/31e9a4331f7f316785256e5900701dba/\\$FILE/A%20Handbook%20for%20Value%20Chain%20Research,%20Kaplinsky%20and%20Morris.pdf](http://www.acdivoca.org/acdivoca/amapbds.nsf/f8aed16f1717ff208525738f00036e21/31e9a4331f7f316785256e5900701dba/$FILE/A%20Handbook%20for%20Value%20Chain%20Research,%20Kaplinsky%20and%20Morris.pdf)
- Khushk, A. M. (1997). *The mango production and marketing system in Sindh PAKistan: Constraints and Oppurtunities*. Wye College, University of London.
- Khushk, A. M., & Sheikh, A. D. (2004). *Structure, conduct and performance of the marketing system, margins and seasonal price variation of selected fruits and vegetables in Pakistan*. Technology Transfer Institute, Pakistan Agricultural Research Council. Tandojam, Sindh: Social Sciences Division.
- Khushk, A. M., Lashari, M. I., & Aslam, M. (2003). Constarints and oppurtunities in mango production and marketing in Sindh. Technology Transfer Institute, Pakistan Agricultural Research Council. Sindh: Social Sciences Division.
- Lashari, M. I., Khushk, A. M., & Ansari, M. A. (2003). A preliminary analysis of the marketing of vegetables in Sindh. *Indus Journal of Plant Sciences*, 2 (4), 367-375.
- Lowe, M. and G. Gereffi. (2009). *A Value Chain Analysis of the U.S. Beef and Dairy Industries*. Center on Globalization, Governance & Competitiveness, Social Science Research Institute, Duke University, Durham, NC 27705.
- Lusine H. Aramyan, Alfons G.J.M. Oude Lansink, Jack G.A.J. van der Vorst, Olaf van Kooten. (2007). Performance measurement in agri-food supply chains: a case study. *Supply Chain Management: An International Journal*, 12 (4); 304 – 315.
- Mor, Surender and Sharma, Supran. (2012). Technical efficiency and supply chain practices in dairying: The case of India. *Agricultural Economics–Czech*, 58(2): 85–91.
- Mandal, A. and Deshmukh, S.G. (1994). Vendor selection using interpretative structural modeling. *International Journal of Operations & Productions Management*, 14(6): 52-9.
- Nadvi, K. (2008). Global standards, global governance and the organization of global value chains. *Journal of Economic Geography* , 323-343.
- Narrod, C., D. Roy, J. Okello, B. Avendaño, K. Rich and A. Thorat. (2009). Public–private partnerships and collective action in high value fruit and vegetable supply chains. *Food Policy*, 34:8–15.
- Oro, K., & Pritchard, B. (2011). The evolution of global value chains: displacement of captive upstream investment in the Australia–Japan beef trade. *Journal of Economic Geography* , 709-729.
- Rahim, T., Khan, M., Himayatullah, & Shafi., M. M. (2007). Marketing of selected surplus fruits and vegetables of Dir district. *Sarhad Journal of Agriculture*, 23 (2): 501-507.
- Reardon, T., Codron, J.-M., Busch, L., Bingen, J., Harris, C. (2001) Global change in agrifood grades and standards: agribusiness strategic responses in developing countries. *International Food and Agribusiness Management Review*, 2(3): 421–435.
- Saleemi, Abdul Razzaq. (2008). Interim impact assessment of kinnow processors and exporters: A rapid assessment of citrus Globalgap® Certification Project, Bhalwal. Agribusiness Support Fund, Lahore.
- Sagheer, Silpa, S.S. Yadav, S.G. Deshmukh. (2009). Developing a conceptual framework for assessing competitiveness of India's agrifood chain. *International Journal of Emerging Markets*, 4(2):137–159.
- Sanogo, Issa. (2010). market analysis tool-how to conduct a food commodity value chain analysis? World Food Program and VAM Food Security Analysis.
- Shah, N. A., Afzal, M., & Ahmad, M. (2009). Marketing margin analysis and seasonal price variation for grapes in Quetta, Balochistan (A case study of Quetta Market). *Pakistan Journal of Agriculture, Agricultural Engineering and Veterinary Sciences* , 25 (1), 39-44.
- Shah, N. A., Akmal, N., Taj, S., & Rind, A. B. (2004). Production and marketing of grapes (*Vitis Vinifera*): Scope for improvement in the high elevation farming system of Balochistan, Pakistan. *Sindh Balochistan Journal of Plant Sciences*, 6 (2), 25-35.

- Shah, N., Khan, M., Khan, N., Idrees, M., & Haq., I. (2010). Profit margins in citrus fruit business in Haripur district of NWFP, Pakistan. *Sarhad Journal of Agriculture* , 26 (1), 135-140.
- Sharif, M., Malik, W., Hashmi, N., & Farooq, U. (2003). *Action plan for livestock marketing systems in Pakistan*. Social Sciences Institute, National Agriculture Research Center. . Food and Agriculture Organization of the United Nations.
- Schmitz, Hubert. (2005).Value chain analysis for policy-makers and practitioners. Institute of Development Studies, University of Sussex, England.
- Taylor, David. (2006). Strategic considerations in the development of lean agri-food supply chains: a case study of the UK pork sector. *Supply Chain Management: An International Journal*, 11 (3): 271 – 280.
- Trench Chenevix, Narrod, Clare, Roy, Devesh and Tiongco, Marites. (2011). Responding to health risks along the value chain. 2020 Conference: Leveraging Agriculture for Improving Nutrition and Health, February 10-12, 2011; New Delhi, India. International Food Policy Research Institute, Washington DC, USA.
- Unnevehr, L.J. and Roberts, T. (2002). Food safety incentives in a changing world food system. *Journal of Food Control*, 13(2): 73-6.
- Weidemann Associates. (2011). *Agribusiness and agriculture value chain assessment: Final report*. Weidemann Associates, Inc. USA.
- Zeb, J., and Khan, Z. (2008). Peach marketing in NWFP. *Sarhad Journal of Agriculture*, 24(2): 161-168.
- Zeb, J., Khan, Z., Nabi, G., and Nawaz, K. (2007). Marketing margins for onion in Swat. *Sarhad Journal of Agriculture* , 23 (3):793-801.

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