

Apple Value Chain: A Case Study from Baluchistan Province

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Abstract

Apple Value Chain encompasses the full range of activities and services required to bring the produce from farm to sale in local, national, or international markets. The value chain includes input suppliers, producers, market actors, processors and buyers. They are supported by a range of technical, business and financial service providers. Apple is a major fruit of Pakistan. Having good storability characteristics, the fruit is available for consumption, fresh as well as stored, almost throughout the year. Baluchistan and northern areas of KPK are the two apple producing areas in Pakistan that have a share of 83 & 16 percent in production respectively. The present study focuses on Baluchistan, being a major apple producing area and information was collected from different actors of the apple value chain which includes farmers, pre-harvest contractors, transporters, commission agents (Arhati), wholesalers (Pharia), traders (Ladania), retailers, processors and exporters with the objective to gain insights into marketing and economic gains across the value chain. The analysis shows that there is a gap between the sales value of farms self marketed by the farm owner and those sold to the PHC. It explains that by moving ahead in the value chain, by self-marketing the produce, there is room to sell the produce at a much premium price through usage of latest marketing techniques and modern packaging. The economic gains across the value chain are distributed like Rs.4.82/kg, Rs.5.05/kg, and Rs.17.57/kg, for commission agents, wholesalers and retailers respectively. Further, the study reveals that farmers capacity building, processing infrastructure support, and market linkages could be the major components of the apple value chain development strategy in Baluchistan. In addition, in-kind assistance to apple farmers including picking ladders, harvesting bags and field plastic crates can also be an extended strategy.

INTRODUCTION

Apples are the most important world fruit crop after oranges, bananas and grapes. China, Italy, USA, Chile and France are the leading apple-producing and exporting countries. Apples are grown under cool or warm temperate conditions where they can receive sufficient winter chilling. Most apples are consumed as a fresh product,

although the primary utilization in some countries is processing into juice and other products. The storage life of apples, after picking, can be extended by cold storage. The long storage life of some apple varieties has resulted, in some areas of the world, to continue uninterrupted supply of apples throughout the year (Waqar *et al.*, 2009).

In Pakistan, Baluchistan is the leading apple growing province; covering 92 percent of the total apple area and contributed 83 percent of the total national apple production (Agriculture Statistics of Pakistan, 2010-11). Apple season starts in July and ends in November with several varieties of the fruit harvested each year. The sector has a huge commercial demand in the market for both fresh and processed forms of apple. Apples are traditionally sold in local markets and through middlemen in Quetta, Peshawar, Islamabad, Lahore, Karachi and other parts of the country. However, there was very little export of apples from Baluchistan and the orchards are not linked to export markets.

The sector faces several constraints including lack of formal training for farmers and related actors of the value chain, scarcity of proper equipment, limited access to markets, and an absence of a formal link between apple growers and actors producing value-added products such as apple pulp and concentrate. Other factors that reduce potential revenues for farmers include a high-waste ratio, lack of utilization of C and D grade fruits, and the absence of export certification or established export channels. Keeping in view the above constraints, the present study is designed with the objectives to document and gain insights into marketing and economic gains across the apple value chain.

MATERIALS AND METHODS

Data Collection

Major fruit and vegetable markets were visited and interviews with related actors of value chain were conducted. A brief description is given below:

Visit to Apple Farms

Twenty-six apple farmers were interviewed to collect information regarding production, harvesting, grading and packing practices, and to estimate the economic gains and sales for the apple value chain.

Visit to Fruit and Vegetable Wholesale Markets

Fruit and vegetable wholesale markets in Quetta, Peshawar, Islamabad, Multan, Lahore, Faisalabad and Karachi were visited to study the actors involved in the value chain and their roles. During these visits 21 commission agents, 21 wholesales, 5 transporters, 3 exporters, 6 cold store operators and 15 retailers were interviewed.

Focus Group Discussions

Interviews and focus group discussions were held with different actors of the apple value chain which includes farmers, pre-harvest contractors, transporters, commission agents (*Arhati*), wholesalers (*Pharia*), traders (*Ladania*), retailers, processors and exporters. Information regarding price structure and cost drivers with respect to each player was obtained to determine the distribution margin along the value chain.

Interview Guide

Questionnaires comprising key questions were prepared used to collect information from different stakeholders of apple value chain.

Data Analysis

The information on price of different grades and packs of produce at different levels of the value chain; Production, harvesting, transportation and labor costs and labor used to perform different activities at each stage of the value chain, was obtained from all across the value chain which includes producers, pre-harvest contractors, harvesting/packing labor, transporters, commission agents, wholesalers, traders, exporters and retailers. The information that was obtained included. Furthermore, there was a large range of information under each category of information mentioned above.

Data Validation

The information collected was verified from multiple sources. Some information was time specific like the price of produce being a variable. Similarly, there was no standardization in the grades and packing size of the produce which makes the situation more complex. Every producer was preparing different grades of produce depending on the quality of fruit and destination market. This aspect was covered by obtaining such information from different primary and secondary sources. During interview sessions, each category of information was discussed at length and information was recorded after reaching consensus. On the basis of the information collected during field visits and from various secondary sources, representative information was estimated which was used for the purpose of analysis.

RESULTS

Apple Value Chain

Apple Value Chain encompasses the full range of activities and services required to bring the produce from farm to sale in local, national, or international markets. Apple value chain (Figure 1) includes nursery developers, input suppliers, growers, pre-harvest contractors, transporters, commission agents, wholesalers, traders, cold store operators, retailers, consumers, exporters and processors. They are supported by a range of technical, business and financial service providers. A brief description of these actors, their roles and position in the value chain is given below:

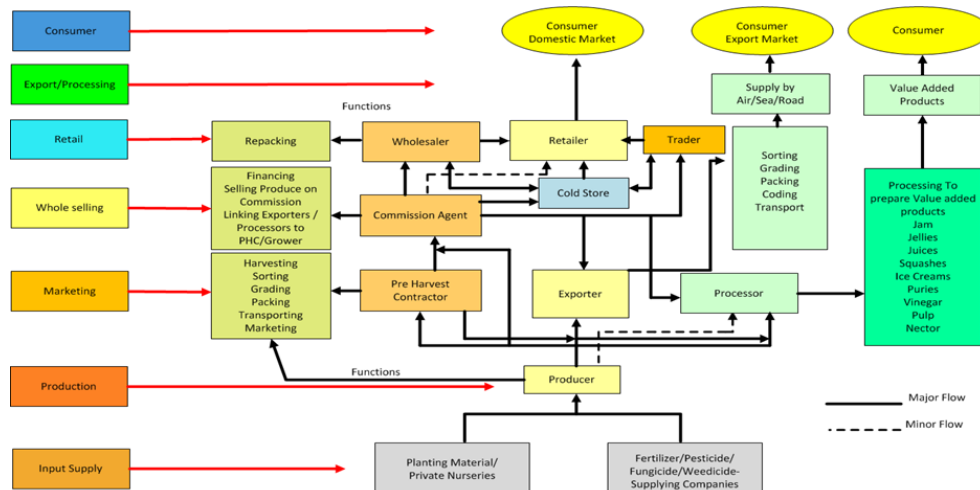


Figure 1: Apple value chain flow.

Sr. #	Actor	Functions
1.	Input suppliers	Input supply of agro-chemicals, fertilizers, pesticides and micro nutrients is an important requirement to undertake production activities. Most of the producers expressed their dissatisfaction over the quality of products and services of majority of agro-chemical input suppliers.
2.	Nursery Developers	There was a mixed response from producers, regarding availability of reliable planting material. It has been observed during the study that no certified planting material, with guarantee of quality and true to type was available to the producers.
3.	Producers	Producers undertake the production activities. In most cases the orchards are sold to the pre-harvest contractors to avoid the risk of loss and hassle involved in it. In case of self marketing, the producers get finance from commission agents for production activities, with the commitment to sell produce through the commission agent providing finance.
4.	Pre-harvest Contractors (PHC) (Bekhar)	The (PHC) purchase the orchards at their maturity stage. Finance for payment to the producer is obtained from the commission agent. Marketing of produce is mostly controlled by the commission agent, providing the finance. The PHC operates in a climate of uncertainty and encounters all sorts of risks.
5.	Harvesting Labor	Harvesting labor works in the form of a group/team. It includes harvesters, sorters/graders, packers and one or two persons for finally closing, marking and strapping the cartoons/crates. Each category of the harvesting labor is paid according to the skill required for its specific job. The quality of produce and its shelf life depends a lot on the way the harvesting labor performs its job but this is the most neglected part of the value chain.
6.	Transporters	Transporters are service providers and they do not own the produce. They transport the produce from the point of production, or from one market to its destination market.
7.	Commission Agents (Arhti)	Commission agents play a vital role in the value chain and perform the important function of linking sellers with the buyers to fill the supply-demand gap. They perform their activities on a commission basis and, normally, do not accept title of goods.
8.	Wholesalers (Pharia/Mas ha Khaur)	Auction in the markets is done in large lots, particularly in large markets, which are beyond the requirement of retailers. Wholesalers buy the lots and sell onward as per requirement of buyer. They mostly buy from the co- mmission agents on credit basis, and make payment after the onward sale of produce.
9.	Traders (Ladania)	The produce is marketed in truckloads and the smaller markets do not have the capacity to absorb the full quantity. To maintain supply to these markets, produce lots are purchased in auction by the traders (Ladania) and is further marketed to surrounding smaller markets.

10.	Cold Store Operator	Cold store operator provides the facility and gets his charges, does not accept any responsibility, in case of damage to the produce.
11.	Retailer	Retailer is the last link of the domestic marketing chain. They make their purchases of required quality and quantity mostly from the wholesalers. The quantity and quality depends on their business volume, selling place and type of customers.
12.	Exporter	Due to non- availability of required facilities a very small portion of the produce is exported. Exporters export the produce, in a traditional manner, to nearby countries of Afghanistan and UAE.
13.	Processor	A very small part of the produce is processed to prepare value added products which include jam, jelly, squash, juice, pury, vinegar, pulp, nectar and clear concentrate. Mostly C and D grade produce is procured by the processors.

Characteristics of Apple Market

Apple is a major fruit of Pakistan. Having good storability characteristics, the fruit is available for consumption, fresh as well as stored, almost throughout the year. Key characteristics of the apple market include:

- Grading, packing and marketing standards are either non-existent or not being implemented.
- Mostly low quality produce is mixed with good quality in a pack, which leads to poor confidence of buyers regarding contents of the pack.
- Produce is marketed in a traditional manner, which leads to high post-harvest losses.
- Branding efforts are almost non-existent or are very little.
- A very small proportion of apple produce is processed into value-added products such as apple pulp, jam, jelly, juice, squashes, drinks, clear concentrate and apple preserves.
- Poor/traditional cold storage facilities which result in deteriorating the quality of stored produce and high storage losses.
- Lack of awareness, on the part of cold store operators, regarding storage requirements of apples.
- Non-availability of any technical advice regarding production technology of apple orchards.
- Limited research and work done on apple production and handling is not properly disseminated to apple growers due to an ineffective extension system.
- Sanitary and Phyto-sanitary issues.
- Baluchistan does not have adequate fresh apple processing, grading and packing facilities, which are necessary for large-scale export of produce.

Economic Gains Across the Value Chain

Table 1 elaborates the profit margins and costs involved in the apple value chain at each actor level. In addition, a breakdown of all costs incurred by each intermediary has also been presented. The total cost of each intermediary was deducted from the gross

margin to reach the net profit margin. The production, harvesting and packing costs of apple producers were estimated at USD 0.09, 0.03 and 0.08 per KG respectively (PKR 8.47, 2.78 and 7.72 per KG respectively) resulting in a total of USD 0.19 per KG (PKR 18.97 per KG). Upon deduction of these costs from the average selling price of USD 0.53 (PKR 52.42), the producer received USD 0.34 (PKR 33.45) per KG as gross profit. When transportation cost, commission and other charges were deducted from the gross profit, the producer received USD 0.22 (PKR 21.37) per KG as net profit. Similarly, the transporter received USD 0.07 (PKR 6.68) and USD 0.03 (PKR 2.97) as gross margin and net profit respectively, the commission agent received USD 0.05 (PKR 4.82) and USD 0.02 (PKR 2.41) as gross and net profit respectively. The wholesaler and retailer received USD 0.05 (PKR 5.05) and USD 0.30 (PKR 29.06) per KG as gross profit and USD 0.04 (PKR 3.80) and USD 0.26 (PKR 25.44) per KG as net profit respectively.

Figure 2 presents how cost drivers impact each actor and contribute to the final price actor after actor. The figure also explains the typical domestic supply chain scenario and how the distribution margin (DM) increases at each actor level and the ultimate price reached at optimum value passing through different channels of the apple value chain. Normally, at producer's level, there are two types of marketing strategies. First is self harvesting and marketing the produce and second is selling the orchard when it is at its maturity stage to the PHC. In the current scenario, self marketing the produce has been developed for the purpose of analysis. In case of self-marketing, the absolute cash margin of producer was calculated on the basis of sale price of one KG of produce in the wholesale market. Whereas in case of selling the orchard to the PHC, the absolute cash margin of the producer was calculated as the sale price of the orchard per KG harvested by the contractor. The distribution margin of commission agents is the commission on sales revenue. Similarly, the distribution margins of wholesalers and retailers were calculated on the basis of their purchase and sale prices.

There is a general perception that intermediaries involved in the marketing of agricultural produce take away a major share of the total profit. In order to acquire a more realistic picture, distribution margins for each market intermediary were estimated. The distribution margin or price spread is the difference between the price paid and received by each specific market intermediary.

As shown above, the retailer received a maximum share of 51 percent in the distribution margin; while the wholesaler, commission agent and transporter received 15, 14 and 20 percent share respectively in distribution margin. The retailer's share in the distribution margin is calculated on the basis of assumption that the total produce purchased by him is sold at a given price. In reality it does not happen so. Retailer is the last owner of produce and has to bear all sorts of losses as the part of produce left unsold fetches a lower price next day.

CONCLUSION

Apple is an important fruit of Pakistan and is given its due priority. KPK (northern areas) and Baluchistan are two main apple producing provinces of Pakistan with Baluchistan enjoying a major share. Due to the large number of apple varieties with different maturity timings, the availability window of fruit is reasonably long, ranging from early July to mid-November. Fruit placed in cold stores further extends the availability period for about three to four months.

Table 1: Price structure and cost drivers at each actor level.

		Apple Farm		
		USD/Kg	PKR/Kg	%
Retailer	Average Selling Price	0.88	86.53	
	Average Buying Price	0.58	57.47	66%
	Gross Profit	0.30	29.06	34%
	Other Costs	0.04	3.63	4%
	Net Profit	0.26	25.44	29%
Wholesaler	Average Selling Price	0.58	57.47	
	Average Buying Price	0.53	52.42	91%
	Gross Profit	0.05	5.05	9%
	Other Costs	0.01	1.25	2%
	Net Profit	0.04	3.80	7%
Commission Agent	Commission Earned	0.05	4.82	
	Gross Profit	0.05	4.82	100%
	Other Costs	0.02	2.41	50%
	Net Profit	0.02	2.41	50%
Transporter	Truck Rent	0.07	6.68	
	Gross Profit	0.07	6.68	100%
	Other Costs	0.04	3.71	56%
	Net Profit	0.03	2.97	45%
Grower	Average Selling Price	0.53	52.42	
	Average Cost			
	Production Cost	0.09	8.47	45%
	Harvesting Cost	0.03	2.78	15%
	Packaging	0.08	7.72	41%
		0.19	18.97	100%
	Gross Profit	0.34	33.45	64%
	Other Costs			
	Transportation	0.07	6.68	55%
	Commission & other charges	0.05	5.40	45%
	0.12	12.08	100%	
Net Profit	0.22	21.37	41%	

Despite the fruit becoming popular among the producers of Baluchistan, indicated by the increase in area and production, the sector faces several constraints which includes traditional agricultural practices, lack of technical know-how, unreliable input supplies and planting material, scarcity of proper equipment, lack of formal training on Good Agricultural Practices, orchard management, limited and traditional cold store facilities and post-harvest handling of produce, resulting in a high-waste ratio. The role of the government appears to be very passive in providing information to the

growers regarding latest production techniques and in the provision of reliable input supplies.

The total produce is marketed to wholesale markets in the country by making grades and packs of everybody's own choice or as per direction of the commission agent. Cash is obtained from commission agents to meet immediate cash needs and undertake production practices. This common practice limits the choice of the producer to market the produce independently.

Due to non-availability of processing facility in the area for C and D grade fruit, producers are not left with any option except for mixing up the inferior quality produce with good quality produce, which leads to an increase in marketing costs and sales of produce at a low price. Due to the perishable nature of fruit, apple needs to be transported in reefer containers, at least to the distant markets to maintain its freshness. In reality, this facility is not available or is not being used appropriately. Furthermore, the fruit is to be stored in cold stores to enhance its shelf life or to avoid distress selling and glut in the market. Due to unavailability of appropriate cold storage facilities which does not meet international standards, it has been observed that placing of produce in the cold store is highly risky.

Exposure of growers and farmers to trainings and workshops for learning purposes is very limited. Trainings and workshops are conducted on a limited scale too. The export of produce is still a neglected area as little quantity of fruit is exported in an informal manner. It needs to be given due attention by linking the producers with export markets to enhance sales revenue.

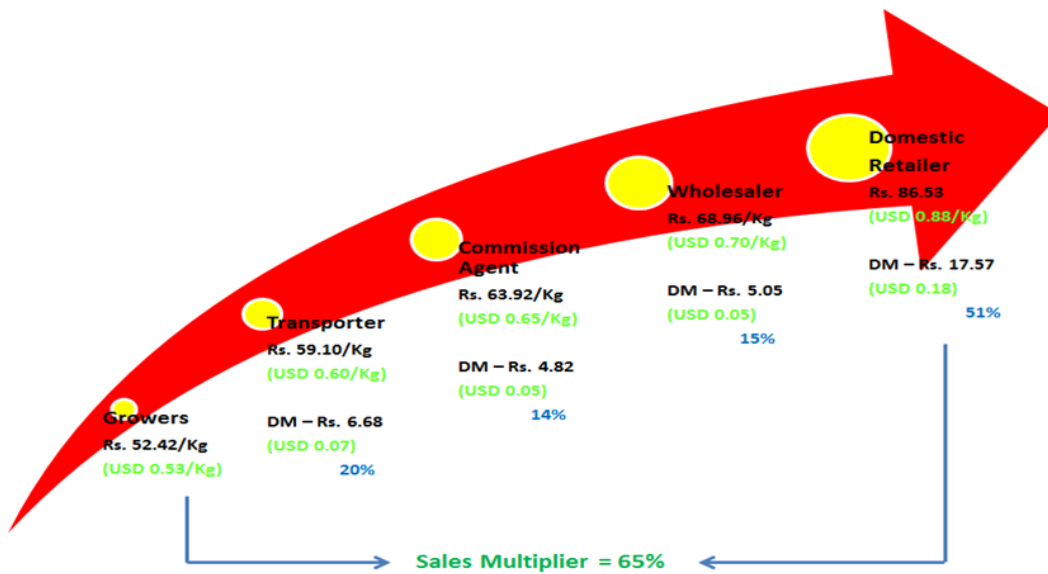


Figure 2: Cost drivers impacting each actor and contributing to the final price actor after actor.

RECOMMENDATIONS

The importance of apple in human nutrition is well-known. Apple plays an important role in balancing the diet by providing energy-rich nutrients. The region of Baluchistan has rich topographic and climatic endowments and variations in soil on which a large range of fruits, such as apples are grown. Baluchistan apple industry needs to move from a production-driven industry to a market-focused one, and the production of apples meeting specific market requirements should be facilitated.

Productivity

Growers should be given training on a regular basis in order to enhance their capacity to manage farms professionally and as per the requirements of GAP to prepare an appropriate marketing strategy independently for successful marketing of all the grades of their produce. In order to have effective results, Technical Field Officers (TFOs) may be appointed for visiting the apple farms on a regular basis with the objective of providing information/guidance regarding latest farm management techniques in order to have better yield and quality.

Small processing facilities may be developed in the apple growing areas. These facilities can process C and D grade produce into canned products and preserve the produce for a longer span of time. This window will immediately reduce significant number of post-harvest losses and increase the profitability of C and D grade produce.

Availability of graders in the pack houses is necessary to meet the buyer's grading requirement of size, weight, number of pieces in a specific weight, uniformity of a lot, and manually this is not possible in an efficient manner and up to the required degree of accuracy. In the light of the above, packing areas may be equipped with graders.

International trips may be arranged for apple growers (Washington Apple, USA) so that they can learn new techniques and technologies and stay abreast with latest agriculture trends for apple sector. Activities such as these can also create opportunities to explore export options in modern markets.

Effective Marketing

Market strategy may be developed to provide necessary information and guidelines to the growers so that they can market their produce in a more profitable manner and as per the requirements of the customer. Corporate marketing is an area which has a huge potential to accommodate the apple sector. Some sustainable linkages should be developed with the corporate sector such as modern retail and large-scale food processing companies. In addition, a structured model can be devised in collaboration with some courier company for delivery of apples directly to the consumers.

Since this rapidly changing world is focusing on the presentation of products, modern packaging has undoubtedly become a vital part of agriculture product business. Farmers must be educated about the importance of modern packaging along with physical samples of packaging material. It is recommended to facilitate farmers with modern and latest packaging material on a cost-sharing basis at least for one season.

Awareness Campaigns

An awareness campaign may be designed to educate apple growers, targeting main apple growing areas. Growers can provide important and useful information regarding pre-harvest activities, cross-care, post-harvest techniques and reliable handling throughout the crop cycle. Local radio and regional television channels are the most effective mediums for such communication.

A data base of apple farmers may be developed and farmers may be directly educated with the help of regular SMS based communication. This approach is effective, instant and low in cost.

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