ICIMOD Working Paper 2017/21

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Strategies for Apricot Value Chain Development in Chitral, Pakistan

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About AKRSP

Since 1982, the Aga Khan Rural Support Programme (AKRSP) works in Gilgit Baltistan and Chitral to promote socio-economic development of rural communities through multi-sectoral activities in partnership with village-based institutions. AKRSP achieves its objectives through capacity building at the grassroots level in the fields of gender, natural resource management, and infrastructure development. AKRSP is a long-term strategic partner of ICIMOD.

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ICIMOD gratefully acknowledges the support of its core donors: the Governments of Afghanistan, Australia, Austria, Bangladesh, Bhutan, China, India, Myanmar, Nepal, Norway, Pakistan, Sweden, and Switzerland.

ICIMOD Working Paper 2017/21

Strategies for Apricot Value Chain Development in Chitral, Pakistan

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August 2017

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Published by
International Centre for Integrated Mountain Development
GPO Box 3226, Kathmandu, Nepal

ISBN 978 92 9115 534 7 (printed) 978 92 9115 535 4 (electronic)

Production Team
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Photos: Ejaz Hussain and Sajjad Hussain

Printed and bound in Nepal by

Sewa Printing Press, Kathmandu, Nepal

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Note
This publication is available in electronic form at www.icimod.org/himaldoc

Citation: Hussain, S., Hussain, E., Partap, U.(2017) *Strategies for apricot value chain development in Chitral, Pakistan.* ICIMOD Working Paper 2017/21. Kathmandu: ICIMOD

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Acknowledgements

The apricot value chain analysis study was conducted as part of the action research component of the Rural Livelihoods and Climate Change Adaptation in the Himalayas (Himalica) Initiative in collaboration with the Aga Khan Rural Support Programme (AKRSP), Chitral, Pakistan. We would like to acknowledge the contributions of many people who have helped bring this study to fruition. The authors are thankful to the enumerators for helping us in data collection and to the SRSP (Sarhad Rural Support Programme) team, Hashoo Foundation, and individual farmers and traders for providing information.

At ICIMOD we would like to thank Dr Golam Rasul, Theme Leader, Livelihoods; Dr Dhrupad Choudhury, Programme Manager, Adaptation to Change Programme; Dr Surendra R. Joshi, Coordinator of Himalica Initiative; Mr Erling Valdemar, Former Coordinator, Himalica Initiative; and Dr Arabinda Mishra, Component Lead, Action Research Component, Himalica for their constant support and encouragement. We are grateful to Mr Gauri Dangol for preparing the map of the study area. Gratitude is also due to Dr Eklabya Sharma, Deputy Director General, and Dr David Molden, Director General, for their inspiration, support and guidance. We sincerely appreciate the efforts of the editorial and publication team.

At AKRSP, we would like to express our sincere thanks to Mr Sardar Ayub, Regional Programme Manager, and Mr Fazl-e-Malik, Manager, Institutional Development Section, for their encouragement, feedback, and valuable suggestions throughout the process.

We extend our thanks and appreciation to Mr Rizwan Roomi, Value Chain Officer, SRSP, and Mr Aftab Ali Baig, Enterprise Development Officer, Hashoo Foundation, for providing information on apricot farming in Chitral District.

The draft of this document was critically reviewed by Mr Ghulam Ali, Innovative Livelihoods Options Specialist at ICIMOD. We owe him special thanks for his suggestions which improved the quality of this publication. Financial support for this research was provided by the European Union under the Himalica Initiative and is thankfully acknowledged.

Last but not least, we would like to express our sincere gratitude to the apricot growers in the union councils of Charun, Mulkhow, Mastuj, Ovir, and Koh and the market agents/traders in Booni, Kosht, Mulkhow, Mastuj, and Parwak for participating in our meetings and focus group discussions and providing valuable information. It would have been impossible to complete this research without their support.

Acronyms and Abbreviations

AKRSP	Aga Khan Rural Support Programme
ARS	Agriculture Research Station
FGD	focus group discussion
CBD	Convention of Biological Diversity
ICIMOD	International Centre for Integrated Mountain Development
KII	key informant interview
KP	Khyber Pakhtunkhwa
LSO	local support organization
NGO	non-governmental organization
PCSIR	Pakistan Council for Scientific and Industrial Research
SRSP	Sarhad Rural Support Programme

Executive Summary

Apricot is the second most important fruit crop, after apple, covering 19% of the total fruit production in Chitral, Pakistan. It is cultivated in 264 of 522 villages (50.6%) in Chitral, mostly under the union councils of Charun, Mastuj, Mulkhow, Ovir, Kosht, and Koh. In these villages every household has apricot trees; the number ranges from a minimum of 10 trees to a maximum of 150 trees per household. Apricot is an important source of cash income to poor mountain households. On average a household produces 160 kg of dried apricot which brings an average income of PKR 17,000 per year.

There is a growing demand for apricot and apricot products within and outside Chitral. However, Chitral's apricot farmers face several challenges to be able to profit from this demand. Apricot-producing areas are remote, transportation facilities are poor, and the transportation cost is high. Moreover, local facilities for storage, processing, packaging, and branding are lacking. Market linkages are weak and participation of producers in marketing is limited. Farmers have no information about market requirements in terms of quality and quantity. In addition, rising temperatures, changing rainfall patterns, and more severe weather events due to ongoing climate change are leading to unpredictable fluctuations in production and demand-supply conditions and call for adjustment of production practices. In view of this scenario, development of a pro-poor and climate-resilient apricot value chain can help improve sustainable livelihoods of poor apricot farmers of Chitral and build their resilience by connecting them with markets.

The present study was, therefore, conducted to carry out an expert analysis of the apricot value chain for its development through identifying and promoting sustainable management practices and strengthening value chain linkages that can bring a significant increase in income for the apricot producers in Chitral, Pakistan.

The findings revealed that the apricot subsector in Chitral is not well developed. The chain has weak links at its various nodes, i.e. production, processing, and marketing. Most of the apricot orchards are poorly managed and have trees of wild varieties. Farmers lack knowledge and awareness of the scientific methods of orchard development and management. They also lack technology for processing and product development, i.e., drying apricots, seed shelling and taking out kernels, and cleaning, packing, and packaging apricot products. Moreover, they also lack the skills for sorting and grading apricot products and are not aware of the international quality standards. As a result, the traders of Chitral are purchasing apricot products from other regions, for example, Gilgit.

The apricot producers also lack the skills for marketing apricot products. The traders do not proactively inform the apricot producers of their needs, and so producers are not able to customize their products according to the market. Moreover, the apricot farmers are not organized and there are no producers associations in the district. Development and strengthening of such associations could help in bringing uniformity to the price of apricot products across the region.

Overall, the findings of the study show that apricot has a great potential for development and improving resilient livelihoods. A variety of value-added products can be developed from apricot fruits and seed kernels. In the agriculture-based economy of Chitral, apricot production can become a rewarding occupation for many people, particularly for underprivileged and low income groups if given a little attention by government, non-governmental, and private sector organizations for upgrading its value chains by facilitating the supply of planting material of improved varieties, introducing fruit processing facilities, and training farmers in orchard management, harvesting and processing of fruit, and development of value-added products. Thus, the apricot subsector can be developed as the apple subsector in Chitral, generating income for the household and ultimately contributing to reducing poverty in the region. Recommendations have been made for the improvement of various value chain functions of the apricot value chain and a value chain up-gradation plan suggested. Key recommendations for the development of the apricot sector include:

- Provide good quality planting material of improved varieties to the farmers by training and strengthening the capacity of nursery growers;
- Build capacities of apricot farmers in grafting techniques and orchard management through training, exposure visits, and supply of key equipment and materials;

- Introduce appropriate technological facilities and build the capacity of producers, especially women and youth, in fruit drying, seed shelling, storage, and processing and development of value-added products;
- Improve farmers access to information on markets, market requirements, and market prices;
- Organize farmers to encourage collective marketing, sharing of experiences and information on various aspects related to apricot value chain development, and for better bargaining power; and
- Introduce appropriate packing material and design market-appropriate packaging and branding, and train apricot producers in packaging of apricots.

Key words: Apricot, value chain analysis, value chain upgrading strategies, Chitral

Introduction

Geographical Location and Livelihoods in Chitral District

Chitral, in Khyber Pakhtunkhwa Province, is the northernmost district in Pakistan bordering Afghanistan. It is bordered by some of the tallest mountains in the world — the Hindu Kush on the northwest, the Karakoram on the northeast, and the Hindu Raj range on the south. The district has an area of 14,850 km^2. The altitude varies from 1,094 m at Arandu in the south to 7,726 m at Tirichmir in the northeast. The topography of the area is varied, with 28.5% of the region covered in glaciers, snow-clad mountains, bare rock, and barren ground, and 62% of the land supporting only pasture with sparse vegetation (NWFP and IUCN Pakistan, 2004). Chitral's main valley is 354 km long and varies in width from 4,800 m at some locations to barely 180 m with even narrower side valleys.

Agriculture and pastoralism are main sources of livelihoods in Chitral. Nearly 90% of the population is engaged in farming. Total cultivated area is around, 22,552 hectares (ha). Approximately half of this land is located in the single-cropping zone comprising Lotkoh, Mastuj, Mulkhow, and Torkhow tehsils. The remainder lies in the double-cropping zone of Chitral and Drosh tehsils. The net area under cultivation is 20,999 ha with 6,187 ha sown more than once, bringing the total cultivated area to 27,186 ha (NWFP and IUCN Pakistan, 2004). Nearly 80% of the farmers possess less than 2 ha of land each; only 1% have more than 2.5 ha (BOS-P&DD and UNICEF-Peshawar, 2014).

Traditionally, the people of Chitral have practiced subsistence agriculture focused on grain production and livestock rearing. Wheat and maize are the most commonly produced crops in the district. Wheat is the most abundantly produced crop covering 56% of the total crops produced in the district. However, both these crops are used for household consumption. Other crops produced in Chitral include beans, potato, rice, and barley. Among these fresh beans and potatoes are produced as cash crops in some valleys, such as Golain, Garum Chashma, and Karimabad valleys.

Fruit Production in Chitral

Khyber Pakhtunkhwa (KP) Province is the second-largest fruit producing province in Pakistan after Baluchistan. Fruits are grown in more than 36,000 hectares (Khyber Pakhtunkhwa Bureau of Statistics, 2012).

Chitral has only 590 hectares under fruit production (1.62% of total area under fruit production in the province), producing 1.2% of total fruit production in the province (Table 1). The district produces a variety of temperate fruit crops including almonds, apples, apricots, cherries, grapes, mulberry, peaches, pears, and walnuts. Chitral is divided geographically into upper Chitral in the north and lower Chitral in the south. Lower Chitral is quite urbanized and a very small part of land is left with people for agriculture and fruit production. In upper Chitral the residents have more land available for agricultural practices and fruit production is abundant.

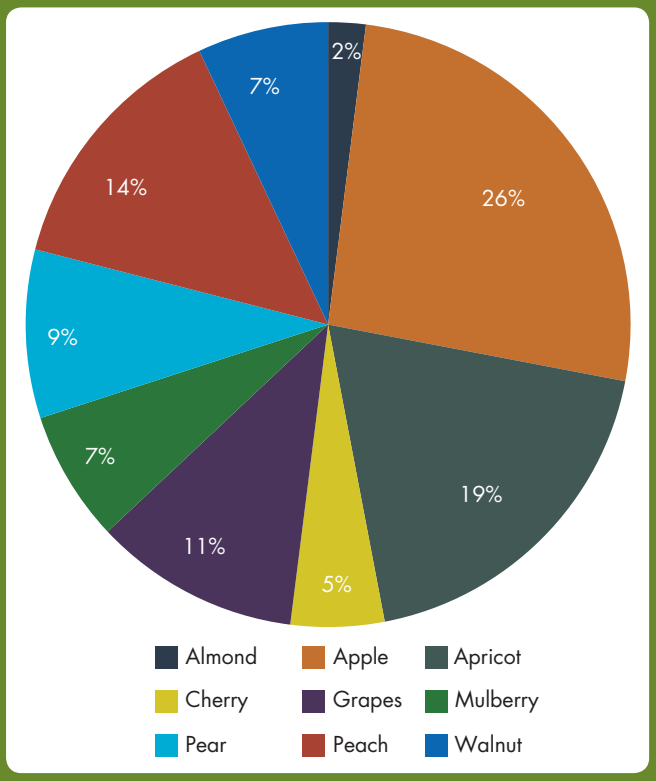
Apricot is the second most important fruit crop after apple, covering 19% of the total fruit production in the district (AKRSP Chitral, 2014) (Figure 1). It has multiple values and uses and potential for value addition at different levels. Thus, the cultivation of apricot as a cash crop is increasing in recent years resulting in increased production. Farmers are bringing increased areas under apricot plantations and adopting scientific ways of grafting improved varieties and orchard management promoted by government and non-governmental organizations.

Table 1: **Land under fruit production in Chitral**

Location	Total reported area '000 ha	Production '000 tones	Yield/ hectare kg	Share of area with KP (%)	Share of production with KP (%)
KP	36.34	333.73	9,184	100	100
Chitral	0.59	3.97	6,740	1.62	1.19

Source: Khyber Pakhtunkhwa Bureau of Statistics, 2012

Figure 1: **Fruit production in Chitral**



An Overview of Apricot Farming in Chitral

Apricot is grown in many parts of Pakistan including the uplands of Baluchistan Province; Parachinar, Hangu, Chitral, Swat, and Hazara Districts in Khyber Pakhtunkhwa Province; Pothwar and Murree Hills in Punjab Province; northern Kashmir; and Gilgit, Chilas, and Baltistan in Gilgit-Baltistan. Apricot was introduced in northern Pakistan from Central Asia (Thompson, 1989). Over time, as humans moved from Central Asia into the Karakoram and Himalayan valleys in northern Pakistan, they brought apricots with them and grew apricot trees from seeds. Apricot became very well adapted and abundant all over the arid inner mountain valleys at elevations from about 1,200 m to 2,900 m (Thompson, 1989). Apricot was used as a multipurpose tree — a staple food providing fresh fruit throughout summer, dried fruit and edible kernels during winter, and firewood in this relatively treeless land to the completely isolated populations living in extremely high, precipitous mountains characterized by very small river valleys (Thompson, 1993).

Ripened apricot fruits ready to harvest

Currently, apricot production is carried out in 264 of the 522 villages (50.6%) in Chitral (AKRSP Chitral, 2014). Most of these villages fall under the union councils of Charun, Mastuj, Mulkhow, Ovir, Kosht, and Koh. In these villages every household has apricot trees. On average, each house has 95 apricot trees; the number varies from a minimum of 10 trees to a maximum of 150 trees per household. There are no state regulations or customary rules available for cultivation and harvesting of apricots in the district. According to the findings of the study, the fruits are grown in 0.059 ha of land per household on average.

Apricot is commercialised for its fresh and dry fruits as well as seed kernels. However, the fresh apricot fruits are highly perishable and shelf life is short. Therefore, farmers sun-dry the fruits in open air and sell as dried apricot. They also sell the seed kernels which are very healthy and yield high-value oil. The district has great potential for apricot production and value addition.

Why a Value Chain Development Approach for Apricot

Value chain analysis and development has been identified as a significant tool for reducing poverty and increasing opportunities for poor communities to participate in the social and economic development and for providing benefits for pro-poor growth (M4P, 2008; SDC, 2008; Hoermann et al., 2010; Choudhary et al., 2014; Joshi et al., 2016; Microlinks, 2017). For poor agricultural producers gaining market access is difficult because they lack knowledge of market requirements or the skills to meet them. Furthermore, poor information flow and other obstacles in value chains prevent them from entering into new markets, or reduce the benefits they obtained from entry. Initiatives that foster value chain development, often with a focus on reducing poverty among smallholder farmers, are designed to overcome some of these obstacles. Thus, a pro-poor and climate-resilient value chain development can help improve sustainable livelihoods of poor apricot farmers of Chitral and build their resilience by connecting them with markets.

The term 'value chain' refers to the value added to products and services as they pass from one link in the chain to the next through combination with other resources, such as tools, human resources, knowledge and skills, other raw materials, or preliminary products (Porter, 1985; ILO, 2006). Kaplinsky and Morris (2003) define value chain as the full range of activities required to bring a product or a service from its conception through the different phases of production to delivery to final consumers and disposal after use. From the institutional perspective, a value chain can be defined as the organisational arrangement linking and coordinating the producers, processors, traders, and distributors who perform different functions; the support markets that provide technical, business, and financial services to the industry; and the business environment in which the industry operates (GIZ, 2007; SDC, 2008; Haggblade et al., 2012; Microlinks, 2017). At its simplest, we can think of a chain as having four main functions: inputs or raw materials, production, processing (transformation), and marketing (wholesale/retailing). At each stage, services such as transport or finance may be needed to keep the process going.

The value chain approach helps in understanding the whole market system and identifying leverage points along the sequence of activities which, properly addressed, can help disadvantaged actors increase their share of the yield, as well as increase the yield overall. The approach is very effective in tracing product flows, showing the stages where value is added, and identifying key actors and their relationships in the chain (Schmitz, 2005).

ICIMOD has adopted a pro-poor, mountain-specific value chain development approach relevant to mountain contexts, challenges, and needs (Hoermann et al., 2010). One of the explicit additions on 'how to make mountain value chains resilient' is the concept built on resilience in the mountains. The specific deployed strategies for promoting resilient value chains include identifying and promoting best practices and effective and efficient technologies for management of water, energy, and soil. The strategies also include enhancing competitiveness, value addition, private sector engagement, and creating conducive enabling environment (Joshi et al., 2016). An apricot value chain development approach in this context fits very well.

Research Hypothesis

The agricultural economy of Chitral is based on cultivation of temperate fruit crops including apples, apricots, walnuts, and mulberry. Apricot is the second most important crop, after apple, and contributes greatly to household

cash income. It has multiple values and uses and potential for value addition at different levels. The value chain analysis of apricot will identify the leverage points and sustainable and equitable strategies for apricot value chain development to improve livelihoods and enhance resilience of overall value chain, agriculture, and mountain livelihoods in the context of socioeconomic and climate change, and the conservation of the ecosystem assets and services in Chitral, Pakistan.

Objectives of the Study

Apricot was identified as a value chain having potential to increase self-employment opportunities for farmers and youth, thus enhancing the income of rural people in various parts of Chitral, Pakistan. The value chain analysis was conducted to identify sustainable value chain upgrading strategies and a plan for the development of the apricot value chain that can bring a significant increase in income for apricot producers. Specific objectives of the study were:

- To conduct a detailed diagnosis of the value chain around the actors, functions, products, market conditions, support services, business constraints, and opportunities;
- To assess end markets and value-adding possibilities for the value chain development with basic financial analysis for recommended products;
- To devise a comprehensive up-gradation plan for the short and long run underpinned by innovation, competitiveness, and environmental sustainability leading to income and employment generation; and
- To suggest recommendations for the overall development of the apricot subsector.

Methodology

Study Sites

Apricot trees are abundant in the union councils of Charun, Mastuj, Mulkhow, Ovir, Kosht, and Koh. Therefore, the value chain analysis of the apricot subsector of Chitral was conducted in these six areas (Figure 2).

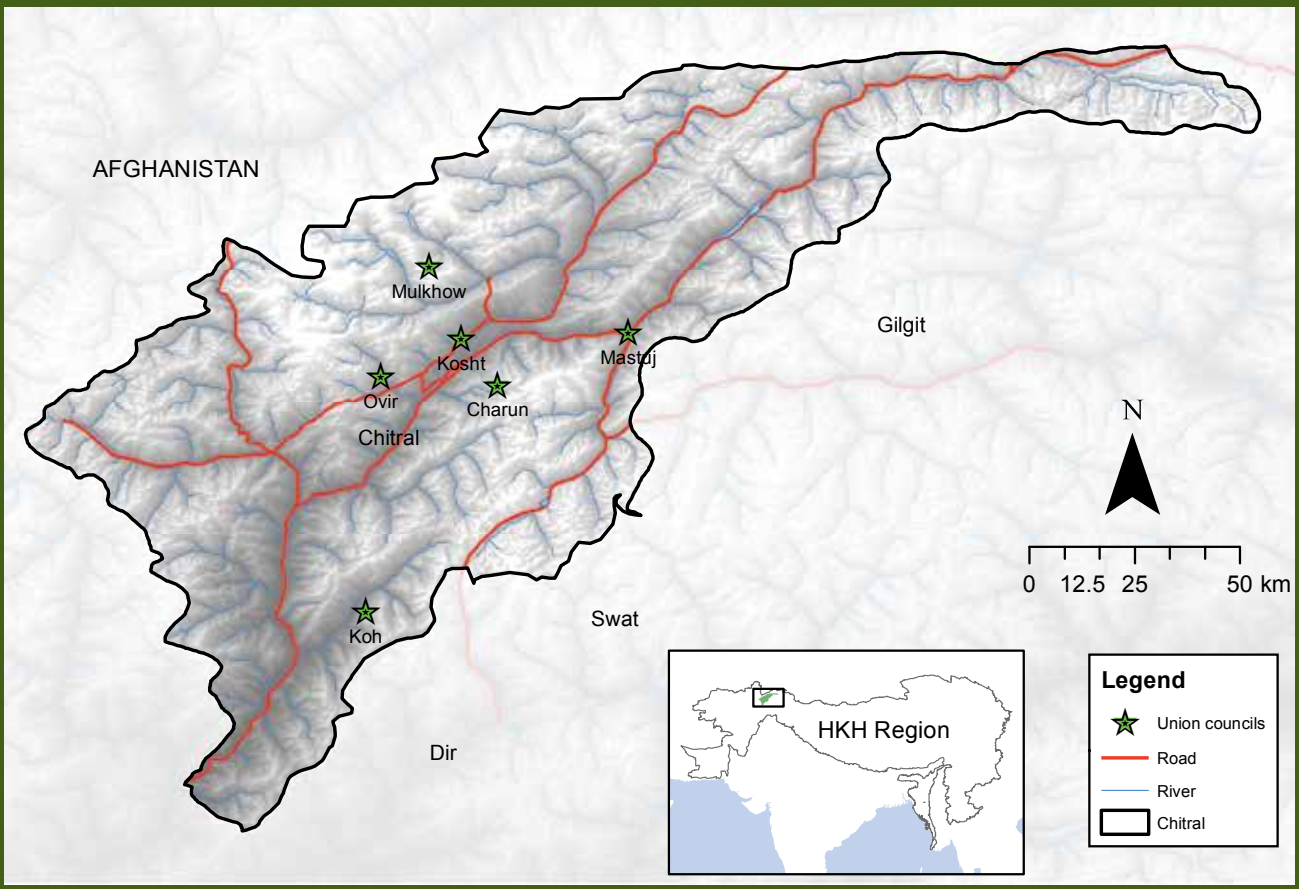
Information Gathering of Apricot Value Chain in Chitral

Information was collected from primary and secondary sources. Secondary information was collected through review of available literature including published and unpublished reports of government and non-governmental organizations and internet research on apricot value chain.

Primary information was collected through household survey, market survey, key informant interviews, and focus group discussions using pretested structured tools/questionnaires. The generic parameters and indicators on which data is collected were:

- Production, cost of production, and picking, drying, and selling of apricot from the growers and growers associations;
- Marketing, trading, and processing from traders, wholesalers, retailers, and processors; and
- Issues and constraints relating to production, picking, drying, selling, marketing, trading, and processing from all stakeholders.

Figure 2: **Map of Chitral showing study sites**



Information on the total number of households, households engaged in apricot farming with more than 50 trees per household, and number of households, traders, and key informants interviewed for this study is given in Table 2. In total, 97 randomly selected households (apricot producers) in five union councils and 38 market actors (traders) were interviewed.

Focus group discussions (FGDs) were held in Chitral with (i) market agents at Chitral town and (ii) apricot producers and agents in five union councils — Charun, Mulkhow, Mastuj, Ovir, and Koh — to complement the information gathered through household survey and key informant interviews. In total, five FGDs were conducted with the apricot producers and one with traders with the support of the local support organizations (LSO) of the respective union councils. These include Biyar LSO, Koh LSO, Qurambara and Shandur Area Development Organization, Hindu Kush Rural Support Organization, and Khow LSO. These discussions were used to draw the value chain maps for the area.

Table 2: **Number of households engaged in apricot farming and number of households, traders, and key informants interviewed**

Union council	Total number of households*	Households having more than 50 apricot trees*	Number of households interviewed	Number of traders interviewed	Number of key informants interviewed
Charun	1,965	350 (13.6%)	10	5	10
Koh	1,882	371 (14.5%)	10	10	10
Kosht	1,643	310 (12.1%)	10	3	10
Mastuj	1,744	425 (16.5%)	20	10	10
Mulkhow	1,734	520 (20.3%)	22	5	10
Ovir	1,728	591 (23.0%)	25	5	10
Total	10,696	2,567 (100%)	97	38	60

Sources: *BOS-P&DD and UNICEF-Peshawar, 2014; *NWFP and IUCN Pakistan, 2004; AKRSP Chitral, 2014

Organizing District-level Multi-stakeholders Workshop

The mapping of apricot value chain was carried out using information gathered through household survey, KIIs, and FGDs. Finally, a district-level workshop involving different stakeholders of apricot value chain was organized to share and validate the findings of the apricot value chain analysis and identified leverage points and the value chain upgrading strategy. More than 100 participants including producers, traders, and other government and non-governmental stakeholders participated in the workshop.

Focus group discussion being held in Kosht

Data Analysis

Quantitative and qualitative data gathered by household surveys and the traders were analysed using simple averages and percentages. No special statistical tests were employed as no comparisons or experiments or other links were involved in the study. However, diagnostic tests were performed to check the normality of the data before conducting the value chain analysis.

Findings of the Study

Apricot Production and Marketing in Chitral: Overall Scenario

Global apricot production in 2014 has been estimated at 4.03 million tonnes (FAOSTAT, 2017). Turkey, Iran, Uzbekistan, Algeria, Italy, Pakistan, France, Morocco, Spain, and Egypt are the top 10 apricot-producing countries in the world. Among these, Uzbekistan is the world's largest producer, producing 547,000 tonnes of the total apricot production in the world followed by Turkey, producing 278,210 tonnes (Table 3).

Table 3: **Top 10 apricot producing countries of the world**

Country	Production (tonnes)
Uzbekistan	547,000
Turkey	278,210
Iran	252,247
Algeria	216,941
Italy	222,690
France	177,000
Pakistan	170,504
Spain	136,446
Egypt	97,522
Morocco	90,274

Source: FAOSTAT, 2017

Turkey and France are leading exporters of apricot while Russia and Kazakhstan are the leading importers. Turkey is the leading exporter of dried apricots, exporting 62% of all world exports in 2011 (Sendall et al., 2013). Global market trends for apricot include an increasing trade in fresh fruit, whilst trade in dried apricot is stagnating. Nonetheless, there is increased interest in dried apricot as an ingredient in health foods such as breakfast muesli and cereal/fruit bars (Sendall et al., 2013).

Pakistan is the seventh-largest apricot producing county in the world with annual production of 170,504 tonnes (FAOSTAT, 2017) from over 2.7 million trees. However, most of the fruit is consumed domestically and only a very small proportion is exported fresh or dried (Sendall et al., 2013). The Pakistan Horticulture Development and Export Board of the Ministry of Commerce has been promoting horticultural products having potential for export selected on the basis of V3 strategy (volume, variety, and value) (DAWN, 2007).

Gilgit-Baltistan and Baluchistan are the main apricot growing regions in Pakistan with the former alone producing 114,286 tonnes in 2007. Information on apricot production in Chitral is lacking; different sources (government and non-governmental organizations) consulted on the internet revealed different information. For example, according to Agriculture Marketing Information System (AMIS, 2014), Chitral produces as little as 528 tonnes of dried apricots per year from trees planted on a small area (66 ha) of land. Therefore, fresh FGDs with key traders in Chitral and other key informants conducted in June 2017 revealed that Chitral currently is producing about 3,800 tonnes of apricot annually. Fruit production is particularly abundant in upper Chitral where residents have more land available for agriculture. Out of 24 union councils in Chitral 12 have agro-climatic conditions suitable for apricot production. Currently, all 10,696 households in 264 villages in the union councils of Charun, Koh, Kosht, Mastuj, Mulkhow, and Ovir, in upper Chitral, have apricot trees; the number per household varies from 10 to 150. Nearly a quarter (24.2%) of these — 2,567 households — have more than 50 trees (AKRSP Chitral, 2014).

Table 4: **Apricot farming in Chitral and its contribution to household income**

Total production of dried apricot (tonnes) (estimated)	3,800
Production of fresh apricot (tonnes)	8,000
Number of households engaged in apricot farming in Chitral	10,696; 2,567 households (24.2%) have more than 50 trees per household
Average annual household cash income of apricot farming households (PKR)	360,000
Average annual household cash income from apricot (PKR)	17,000
Contribution of apricot to household income in Chitral (%)	4.7

Source: Focus group discussion and key informant interview with traders in Chitral (June 2017)

Apricot is an important source of cash income to farmers. It is, in fact, the second most important cash crop in Chitral after apple (Table 4). A study by Jasra

and Rafi (2002) revealed that in northern areas of Pakistan apricot is very important for about 6% of the households, important for 78%, and less important for about 16%. Every year traders collect about 13–20 tonnes of dried apricot and 4–7 tonnes of apricot seed kernels from Chitral. This brings about PKR 15,000–20,000 per household per year, which makes the contribution of apricot to household cash income 4.7%.

Apricot trees (generally of wild varieties) are planted around the house or scattered around the field boundaries and poorly managed resulting in small quantity of production spread over a large area. Key orchard management practices such as pruning, thinning, and training of trees and the use of fertilisers and pesticides are not applied. As a result of this lack of proper management, trees have mostly developed a tendency of alternate bearing. Properly managed commercial orchards of improved varieties are negligible in number. Apricot yield (fresh fruit) varies from 400–750 kg per tree depending on age and size of the tree and the variety. Therefore, the availability of good quality planting material of improved varieties and the orchard management practices and skills are identified as one of the key areas for improvement.

Farmers harvest fruit in June–July; often, unripe fruit are also picked and damage fruits while picking. After harvesting fruits are sun-dried and stored for a while as the local market is small and linkages with the national market is weak. Farmers generally use four marketing channels to sell their produce; about 80% is sold to small traders, mostly Pathans[1]; 5% to local retail shops; 5% directly to consumers; and 10% to traders from Chitral town. Almost all the local wholesalers and retailers store the produce off-farm at their premises. The local traders in Chitral have no idea of where the market for apricot is. For them tourists coming from different parts of Pakistan outside Chitral are their main buyers.

In regard to the market demand for apricot and apricot products within and outside the district of Chitral, available information shows that within Chitral District there is a demand of 100 tonnes of fresh apricots, 5,000 tonnes of dried apricot, 1,500 tonnes of seed kernels, and around 10 tonnes of apricot oil. Much larger demand — 230,000 tonnes of fresh apricot, 30,000 tonnes of dried apricot, 15,000–16,000 tonnes of seed kernels, and 5,000 tonnes of apricot seed oil — exists in down country markets such as Rawalpindi and Lahore (Table 5). Thus, demand is much higher than Chitral can supply, thus most of this demand is met from apricot produced in other parts of the northern areas of Pakistan. Currently Chitral supplies 8,000 tonnes of fresh apricot, 3,800 tonnes of dried apricot, 333 tonnes of seed kernels, and only 0.5 tonne of apricot oil (Table 5).

Currently, no value addition to fruit or seed kernels is done by the farmers. Even they do not pack the fruits properly due to lack of exposure and market information on market requirement. Instead, traders do the packing of the produce. Further, good quality packing material is not available in the area.

Table 5: **Market demand for apricot and apricot products produced in Chitral**

	Fresh apricot	Dried apricot	Apricot seed kernels	Apricot seed kernel oil
Demand within Chitral (tonnes)	100	5,000	1,500	10
Demand in down country market (tonnes)	230,000	30,000	15,000-16,000	5,000
Production within Chitral (tonnes)	8,000	3,800	333	0.5
Quantity imported from other region, e.g., Gilgit (tonnes)	1	200	30	0.5

Source: Focus group discussion and key informant interview with traders in Chitral (June 2017)

Apricot Value Chain Mapping in Chitral

Value chain functions and actors/operators

The apricot value chain originating from Chitral is very rudimentary and as yet not much developed/commercialised. Accurate information on total production/collection, total sales, total number of households engaged in apricot

[1] Pathans are the tribesman of Pashtun who live in north Pakistan and Afghanistan. These are business-minded people and are known for their entrepreneurial skills.

production and their household income from apricot, and end market for apricot produced in Chitral was not available from secondary sources, such as agriculture department and development organizations working in the area as well as on the internet. Thus, fresh FGDs and KIIs with major producers and apricot traders in Chitral town were conducted to collect approximate data (Tables 3, 4, and 5). Nevertheless, apricot value chain originating from Chitral involves a number of operators (mainly producers, as roughly over 11,000 households in 264 villages in the union councils of Charun, Koh, Kosht, Mastuj, Mulkhow, and Ovir are engaged in apricot production and some traders from Chitral and outside), facilitators, and enablers. The main functions involved in the apricot value chain are input supply, production, processing, storage, and marketing. These functions in the value chain are briefly discussed below.

Input supply

The input supply function in the apricot value chain involves the supply of fruit plants, farm tools, and agro-chemicals. We found that almost 80% of the apricot plant supply to small farmers is done through informal farmer-to-farmer contact, while 20% is purchased from government nurseries. A very few apricot trees are purchased by small farmers from government-owned nurseries. On the other hand, commercial farmers purchase 80% of their planting material from government nurseries. Unlike in the apple subsector apricot is considered to be a wild tree. There are very few formal nurseries[2].

The apricot farms in Chitral consist of a mix of traditional and improved varieties. More than 20 varieties are planted in the area, including mirzabigi, kolikhutuki, sardari, begali, khorma, muxhaki, chamborbak, shakhanda, qzazaki, shaki, ishperiki, thurabegi, gulamdan, shamitarian, jamxhulli, and morikan. Among these the preferred ones are mirzabigi (white in colour and big in size). Mirzabigi is also preferred for making kernels. The kernels of this variety are red in colour and are tastier than other varieties. Shakhanda, morikan, and jamxhulli are used for drying and also for making kernels, while muxhaki and gulamdan are known for their good taste and are usually preferred for fresh consumption.

The supply of improved plants is a vital component of the apricot value chain and needs further strengthening. Our study revealed that most of the apricot orchards in Chitral are poorly managed. Thus, development of apricot sub-sector in Chitral needs more attention from the government and other NGOs working in this sector. The apricot nursery growers associations are completely absent in Chitral and need to be developed if this sector has to be upgraded.

In general, the market for improved fruit plants, improved tools, and agro-chemicals is still in its nascent stages and needs technical support from development and government agencies. In some cases distortions are being created as some of the development agencies are providing fully subsidized inputs, thus jeopardizing the private sector market development. Thus, a coordinated approach for the development of the market for improved inputs is needed. This requires sourcing inputs from or through local private-sector operators and their capacity building for provision of quality inputs. A market-based solution can be created if the development agencies build the capacities of existing small fruit nurseries, instead of distributing plants free to farmers, so that they are able to provide quality plants as per market demand.

The input supply function of the apricot value chain in Chitral is taken care of by suppliers of nursery plants/saplings, suppliers of agro-chemicals, and manufacturers of tools. There are few input suppliers in the local market. There are very few nurseries in Chitral, and most of the fruit saplings are produced by the farmers themselves or purchased from neighbouring farmers. The development organizations in Chitral have almost ignored the apricot subsector which really needs support from both the NGOs and government organizations. At present the number of input suppliers in Chitral includes three government-owned nurseries, 12 individual nursery growers, three agro-chemical shops, and 20 tools manufacturers.

Production

Apricot grows best in deep, fertile, and well-drained sandy loam soil. The tree can withstand moderately basic and saline soil but is prone to the presence of more water in root zone (Jan, 2006). Soil in the northern areas of Pakistan

[2] Government-owned nurseries are considered formal nurseries in this study.

Freshly harvested apricots

including Chitral is generally deficient in major nutrients such as nitrogen, phosphorus, potassium (NPK) as well as in organic matter required by the plant.

Apricot production in Chitral is practised through scattered plantations. Trees are planted around the houses or on field boundaries. Properly managed commercial apricot orchards are non-existent in the district. Findings of experimental research show that apricot requires 40 kg of well-decomposed organic matter (compost) per plant at planting time. At the age of 1–2 years needs to be fertilised with 1 kg urea, 0.5 kg DAP (di ammonium phosphate), and 1 kg MOP (muriate of potash) with the addition of 20–25 kg compost. Up to five years, double the above dose is recommended. However, apricot orchards in Chitral are poorly managed. Orchard management practices such as grafting, pruning, and training of trees are not performed. The only management practices include irrigation, limited application of farmyard manure, and application of some chemical fertilizers (that are also inappropriately applied). Most farmers apply Bordeaux mixture to the tree trunks. Pesticides are rarely applied, thus apricots produced in Chital are default organic.

Apricot trees bloom early (February–April) depending on altitude and temperature. Flowers are pinkish white, borne solitary on twigs (one-year-old branch) or short spur. Fruit is small to medium in size, somewhat round in shape, creamy white to orange-yellow in colour, and nearly rough (Jan 2006). The annual fruit harvesting season starts in June and continues through the end of July. The picking methods widely prevalent in Chitral are still faulty. Farmers usually pick the unripe apricots and damage most of the fruits while harvesting. The lack of appropriate orchard management practices results in alternate bearing and high pre-harvest losses. Findings of this study revealed that in 2013 each household in the study area produced around 190 kg of dried apricots and 105 kg of apricot seed kernels.

The production function is taken care of by the farmers themselves. The producers in Chitral are categorized into two distinct types: small farmers and commercial farmers. The small farmers are those having scattered plantations and generally less than 100 trees. The commercial orchards, though a relatively new phenomenon that is becoming an increasing trend, include those farmers who have more than 100 trees. The majority of producers are small farmers; during the survey only four commercial apricot producers were found in upper Chitral.

Storage (on-farm and off-farm)

On-farm and off-farm storage is practiced in the area owing to the relatively small size of the local market and weak linkage with national markets. Storage of fruits is either done by the farmers themselves (on-farm) or by the wholesalers in the local market (off-farm) for a relatively shorter period of time. Fresh apricot is a perishable product having a short shelf life and can only be stored for a maximum of two days. Unfortunately there is no storage facility available to store fresh apricot. An estimated 85% percent losses are reported during the storage of fresh apricot due to unavailability of storage systems. This is one of the reasons the district doesn't have an active market for fresh apricot. However, dried apricot can be stored for more than five months. Therefore, most of the apricot growers are doing business in dried apricot. An estimated 20% of dry apricot is stored by the farmers and the rest is sold owing to the urgent cash needs and lack of proper storage systems. Out of the quantity sold 80% is sold to small traders, mostly Pathans; 5% to local retail shops; 5% directly to consumers; and 10% to traders from Chitral town. Almost all the local wholesalers and retailers store the produce off-farm at their premises.

Improvement in the traditional on-farm storage is proposed in the form of improved ventilation, better staking, control of light, insulation, and more frequent sorting specially for fresh apricot. For off-farm storage the apricot growers are requesting the provision of a cold storage facility with a processing unit at upper Chitral with a capacity to store 50–70 tons of produce attached to a micro-hydro unit. This storage and processing facility can also be used for other fruits, especially apple, pears, and grapes, as well as potatoes, seasonal vegetables, and dairy products.

Processing

Apricot being dried under the sun

In Chitral dehydration of apricot is done using primitive methods, i.e. spreading the fruit, with seeds removed, in open air and under direct sunlight. This leads to contamination with dust, dirt, insects/flies and their larvae, and ants resulting in a poor quality product. Facilities for processing fresh apricots for value-added products — jam, jelly, pulp, juices — are altogether missing in Chitral. Thus, the only processed products of apricot currently are dried apricot, apricot seed kernel, and a very small quantity of apricot oil. Farmers, especially women at the household level, are involved in picking and drying apricot fruits and shelling the seeds to take out kernels. If the women are capacitated with modern dehydration facilities and methods, the products can compete with the dried apricot coming from other regions. Similarly, introducing the technology for processing apricot fruits and training women (also unemployed youth) in making jam, jelly, and juice will make productive economic use of the damaged and poor quality fruit (which currently are going to waste) and lead to self-employment opportunities. Low-cost technology for the same has been developed and is available with the Pakistan Council for Scientific and Industrial Research, Gilgit.

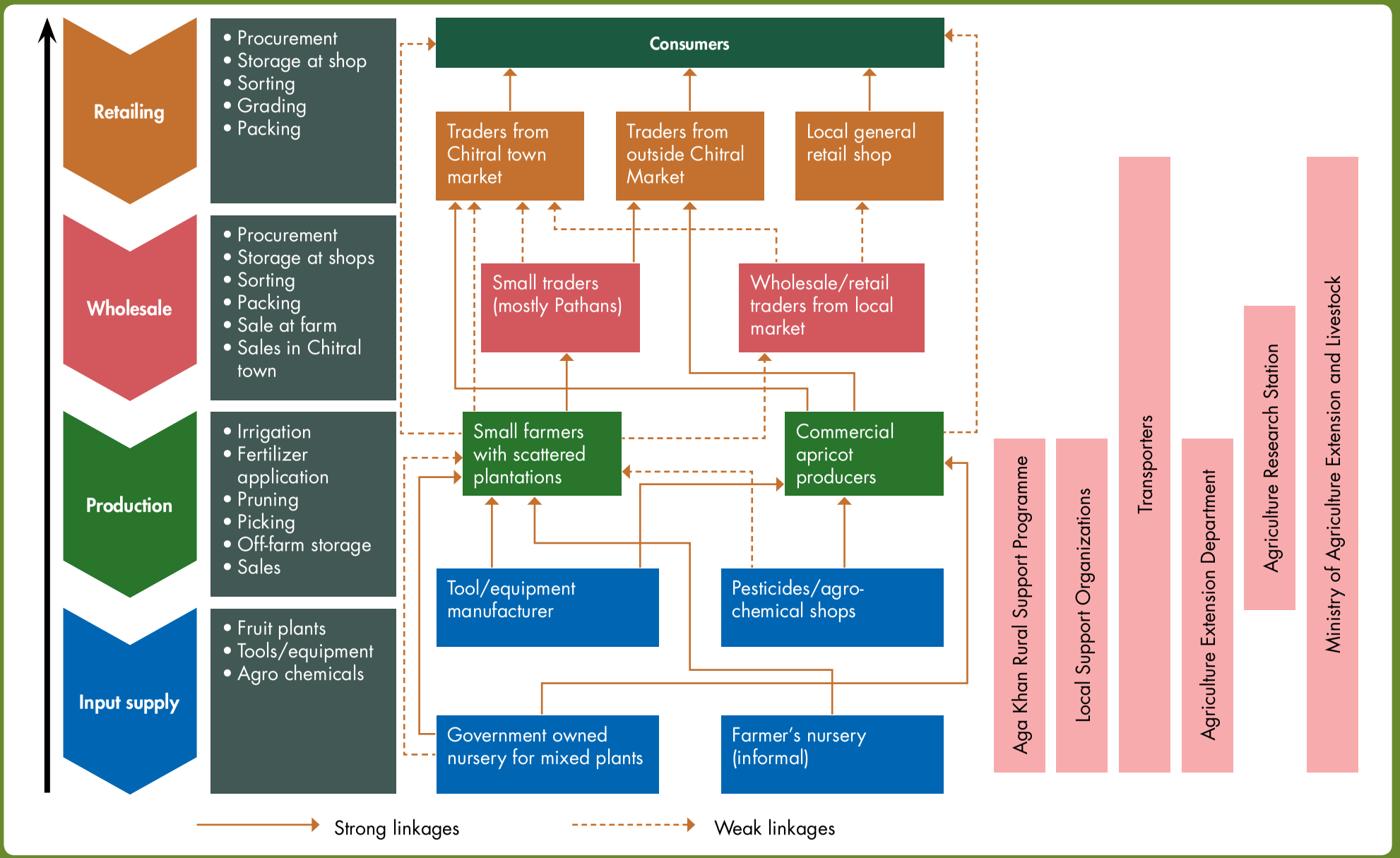
Marketing (wholesale and retail)

Marketing is mostly done by marketing agents. The wholesale and retail trade in local market is mostly done by the same traders. Trade is either through the specialized fruit shops or small general grocery shops in the rural areas. The wholesale and retail market for dried apricot is more developed than fresh apricot market. Every year, the market agents visit the apricot-producing areas during the season for fruit procurement on farm and then transport it to their premises at their own expense. Most wholesalers store dry apricot at their premises and sell it gradually. They buy about 80% of the total produce from the farmers and sell 70% of it to the traders from outside Chitral and 30% to the traders from Chitral. The marketing function is the weakest area and much value is lost due to inefficiencies, notably limited access to other markets, poor packaging, and lack of appropriate transportation systems. In general, all retail fruit and vegetable shops as well as grocery shops are managed individually. At the retail level there is little quality differentiation but some varietal recognition by consumers. Bigger retail outlets are not present at the union council level. The bulk of supply is handled by small retailers, which include both specialized fruit and vegetable shops and general grocers. These retailers sell both local and imported apricot and procure mainly from the wholesale market.

The proportion of self-marketing farmers is negligible. It was reported that the marketing agents including wholesalers and retailers discourage direct marketing by farmers by offering low prices when they arrive in the market with their products. Most farmers, therefore, prefer to sell on-farm to Pathans, who usually go door-to-door to purchase apricot. Although this practice benefits farmers, opportunities for encouraging self-marketing do exist. This needs to be fostered in the form of collective marketing groups instilled with more bargaining power and effective linkages coupled with improvement in the marketing system. The value chain map of apricot from Chitral is given in Figure 3.

Apricot reaches the end consumers through various existing marketing channels: i) small farmers with scattered plantations sell most of their produce to small traders, Pathans, who in turn sell most of it to traders from outside Chitral and a small quantity to traders from Chitral town market, who in turn sell it to the end consumers; ii) small producers sell small amounts to traders from Chitral town market; and iii) to wholesale or retail traders in the local market; iv) while some quantity is sold directly to consumers. The large farmers or commercial producers sell most of the production to traders from outside Chitral and small amounts to local retail shops who sell it to the end consumers. Marketing is done entirely informally. There is no written contract agreement involved between farmers

Figure 3: **Value chain map of apricot in Chitral**



and traders. Farmers depend on traders as a source of market information. The other channel of information is farmer-to-farmer exchange of information between neighbours or relatives. Farmers are mostly unaware of apricot prices received at down country markets like Rawalpindi or Lahore.

Apricot Value Chain Analysis

Backward linkages

Production, price, and its variation for apricot products

Data on the quantity of apricot produced, sold, and consumed (per household as well as total) by the surveyed households, cost price, and selling price per kg in the district during the past five years from 2009 to 2013 is presented in Table 6. The table shows that on an average each household in the study area produced 163.3 kg of dried apricots in 2009. The average quantity of production per household remained around 169 kg during the years 2010 to 2012, while in 2013 the quantity of dried apricot produced per household increased to 190 kg. Overall, data show an increase of 16.5% in the quantity of apricot produced since 2009. Similarly, the average quantity sold per surveyed household ranged from 136 kg in 2009 to 189.7 kg in 2013 (Figure 4). This could be because of a steady increase in market demand and the higher price received for apricots providing Chitral farmers an opportunity to earn more cash income, thus encouraging them to collect, dry, and market more fruit. Cost price has also increased from PKR 9.4 per kg in 2009 to PKR 13.3 per kg in 2013 revealing about a 41% increase. Selling price also rose from PKR 86 per kg in 2009 to PKR 106 per kg in 2013 showing an increase of 23%.

Table 6: **Production, sales, and prices and their variations for apricot in Chitral**

	2009	2010	2011	2012	2013
Average quantity (kg) produced per household	163.3	169.5	169	169.9	190.2
Average quantity (kg) sold per household	136	147.4	140	153.9	189.7
Cost price per unit (kg) (PKR)	9.4	9.6	10.7	12.4	13.3
Selling price per kg (PKR)	86.05	89.4	95.8	99.9	105.9
Average quantity (kg) consumed at household	27.3	22.1	29	16	0.5
Total quantity (kg) collected	15,840	16,441	16,393	16,480.3	18,449.4
Total quantity (kg) sold	13,192	14,297	13,580	14,928.3	18,400.9
Total quantity (kg) consumed at household	2,648.1	2,143.7	2,813	1,552	48.5

Source: Field survey (AKRSP Chitral, 2014)

Figure 4 shows that the average quantity of apricot collected per household has been increasing since 2009. Similarly the average quantity of apricot sold is also showing an increasing trend, while the average quantity of apricot consumed at the household level remains the same since 2009. From this figure it can be inferred that the apricot producers are focusing more on selling apricot rather than consuming it at household level.

Accordingly, the total quantity of dried apricot produced as well as sold by the surveyed households reveals an increasing trend. The total production increased from 15,840 kg in 2009 to 18,449 kg in 2013 (Figure 5), while the quantity sold increased from 13,192 kg in 2009 to 18,400 kg in 2013.

Figure 4: **Average production, marketing, and consumption of apricot per household by surveyed households in Chitral**

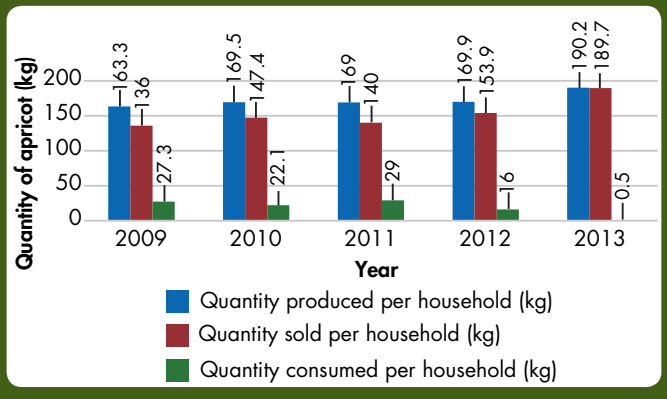
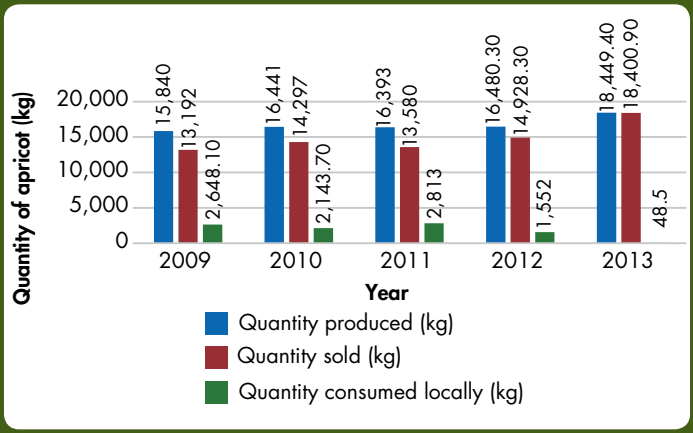
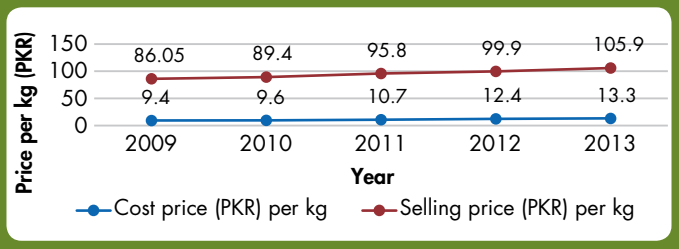


Figure 5: **Total production, marketing, and consumption of apricot by the surveyed households in Chitral**



The total quantity of dried apricot produced/collected by the surveyed households in the district is showing an increasing trend from 2009 to 2013. This is due to an increase in the plantations in the area as a result of promotional efforts by government and non-governmental organizations. Climate change-induced changes in local weather conditions such as increases in temperature and frequency of rains have a major impact on fruit production as revealed by a large majority (68%–88%) of the farmers and KIIs and FGDs. Findings also revealed that the incidences of drought and storms have also increased substantially in recent years, but the farmers have no idea about its impact on fruit production. Similarly the total quantity of apricot sold to the traders is also showing an increasing trend since 2009 to 2012, except in 2011 when quantity sold was slightly low. Similarly, the figure also shows that total apricot consumed at the household level does not show any particular trend, but it is clear that household consumption is decreasing and farmers are focusing more on selling apricot.

Figure 6: **Cost price and selling price of apricot by the surveyed households in Chitral**



The cost price and selling price of apricot from 2009 to 2013 is presented in Figure 6. As explained in Figure 6, cost price has increased from PKR 9.4 per kg in 2009 to PKR 13.3 per kg in 2013 while selling price increased from PKR 86 per kg in 2009 to PKR 106 per kg in 2013. Thus, both cost price and selling price show steady increase over the years; while this increase in cost price is about 41%, selling price is showing an increase of 23%. Thus, the increase in selling price is greater than the increase in cost price of apricot indicating that apricot is becoming a more profitable crop. The average cost price and selling price of apricot also show an increasing trend.

Profitability analysis of apricot at household level

As mentioned in the previous sections, average production of dried apricot per producer household was 190 kg in 2013. Of this, 98% was sold and only a small amount was kept for household consumption. There are five main market towns/trade centres in the district of Chitral including Chitral town bazaar, Drosh bazaar, Garum Chashma bazaar, Booni bazaar, and Mastuj bazaar (BOS-P&DD and UNICEF-Peshawar, 2014), though most of the produce is sold to Pathan traders from outside Chitral. Only a small proportion is sold to traders from within Chitral District.

The producer households sell most of their produce (nearly 80%) to the Pathans who visit them every year during the season. Of the remaining 20% small producers sell small amounts (10%) of their produce to traders from Chitral town bazaar, 5% to wholesale or retail traders in the local market, and 5% directly to consumers. Pathans, the main intermediary buyers, purchase most (about 80%) of the total produce from farmers and sell 70% of it to the traders from outside Chitral (in down country markets in Rawalpindi and Lahore) and 30% to the traders from Chitral town.

The profitability analysis of the apricot value chain has been carried out from the year 2009 to 2013. Usually packaging is provided by the buyer and not farmers, and the buyer also bears the transportation and marketing cost (Table 7).

The net profit in Table 7 has been calculated on average profit per household basis. The net profit since 2009 shows an increasing trend and the percentage increase in profitability since 2009 is 60% (Figure 7). The profitability

Table 7: **Profit and loss statement for apricot production for households in Chitral (PKR)**

Details	2009	2010	2011	2012	2013
Revenue from sale	11,702.8	13,177.8	13,413.0	15,385.3	19,116.0
Cost of goods sold	1,279.8	1,411.9	1,499.4	1,916.3	2,446.4
Gross margin	10,422.9	11,766.4	11,913.6	13,468.9	16,669.6
Admin and marketing cost	0	0	0	0	0
Profit before interest/taxes	10,422.9	11,766.4	11,913.6	13,468.9	16,669.6
Interests	0	0	0	0	0
Taxes	0	0	0	0	0
Net profit	10,422.9	11,766.4	11,913.6	13,468.9	16,669.6

Source: Market survey (AKRSP Chitral, 2014)

can be further enhanced through introducing technology for reduction in losses both in the season and off-season scenarios and improving the quality of dried fruit.

Role of women in apricot value chain

Women make up 51% of the total population of Chitral (Census 1998, GOP). They play a major role in farming, and the intensity of their work depends on the specific activities related to different crops. The findings of the household survey and the FGDs conducted with the communities in the study area reveal that women were actively involved in sowing, weeding, thinning, irrigating, harvesting, and grading (in the case of fruit). In addition to this, women are also involved in the management of fruit plants, removing weeds, picking, grading, drying (apricot and mulberry), and nut cracking (apricot). Women often devote more time to these tasks than men and participate in all operations related to fruit production in addition to their normal domestic chores of cooking, taking care of children, fetching water and fuel, cleaning, and maintaining the houses. However, marketing (at local and national levels) is done only by men. Women have no role in marketing, except during the season when Pathan traders arrive in the villages to collect dry apricot door to door. The involvement and role of women and men in the apricot subsector is presented in Table 8.

Figure 7: **Apricot profitability trend for the surveyed households**

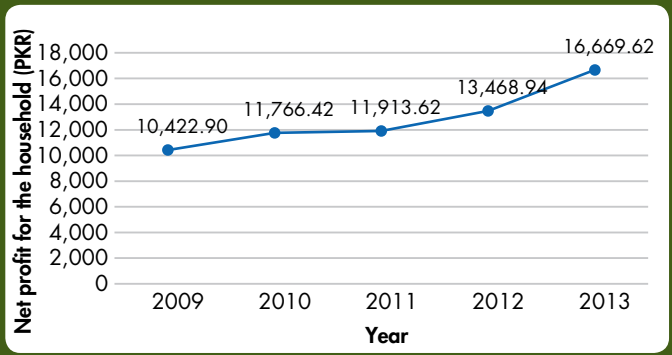


Table 8: **Gender roles in value chain: involvement of men and women in apricot value chain**

Activity	Involvement of women	Involvement of men
Land preparation (leveling)	Low	High
Plantation	Low	High
Input application, transportation	Moderate	High
Irrigation	Low	High
Weeding	High	Low
Pruning	Low	High
Picking	High	Moderate
Grading	High	Moderate
Drying/dehydration	High	Low
Nut cracking	High	Low
Packing	Low	High
Selling	Low	High

Source: Focus group discussions with communities (2013)

Skills and capacities of apricot producers

In Chitral, apricot is mostly considered a wild plant. There are only a few properly managed orchards in Chitral. There is a lack of proper planting material and storage and drying facilities, as well as skills and facilities for fruit processing. Most farmers lack orchard management and fruit processing skills in apricot. The findings of this study revealed that about one quarter of the respondents (26%) have received training related to apricot management. Among those who received the training 72% received it on primary processing of apricot products, 12% on drying of apricot, and 16% on nursery management and cultivation. Findings of the study further revealed that through these trainings the respondents got information on apricot cultivation and grafting and on fruit

processing, including drying of apricots, cleaning of dried apricot, and jam and juice making.

Selling mechanism of apricot by the farmers

In regard to the selling mechanism of apricot by the farmers, our findings suggested that 5% of the farmers were selling the apricots to the consumers directly while 80% were selling to the middleman, 10% to the traders from Chitral town market, and another 5% were selling to wholesale/retail traders in the local market (Figure 8). There were no such associations or federations present in the district through which the farmer could sell their produce. Most of the middlemen are small traders from other districts, i.e., Dir who are mostly Pathans. These Pathans usually carry out door-to-door purchasing of dried apricot from the farmers and provide very good service as a middleman. They usually sell the product from outside Chitral. Farmers sell their apricots to the Pathans at the rate of PKR 140/kg for grade A product and PKR 105/kg for grade B. To local traders they sell at the rate of PKR 130/kg for grade A product and PKR 95/kg for grade B (Figure 9).

Figure 8: **Mechanism for selling apricot by the surveyed households**

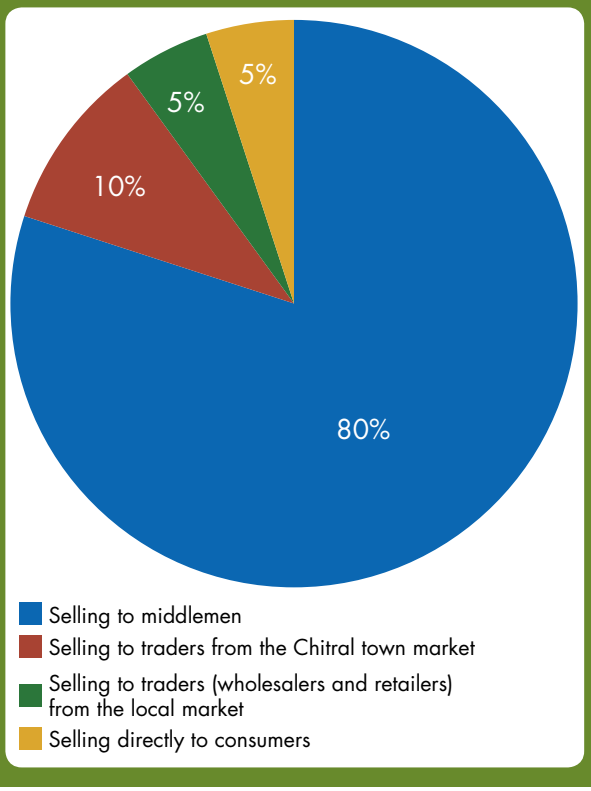
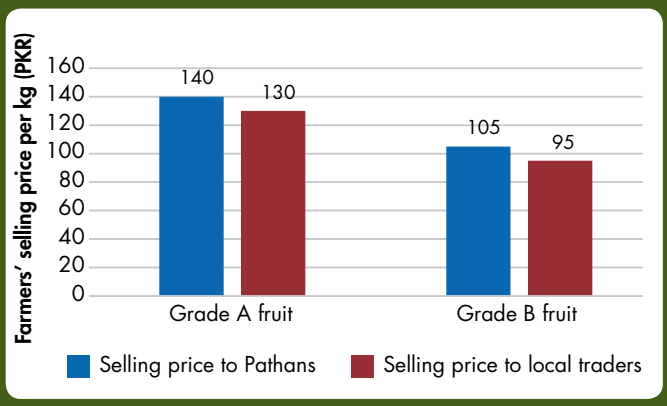


Figure 9: **Farmers' selling price of apricot fruit by grade**



Sources of knowledge and information to farmers

There are significant gaps in knowledge and information particularly at the production level. Producers are not aware of the market requirements in terms of quantity, quality, time, and price.

In regard to the sources of information for farmers on crop management, market, prices, traders, buyers, and the like, the findings suggest that the major source of information about apricot is farmer-to-farmer talks. Nearly three quarters (72%) of the respondents received information through other farmers. Only one-fourth (28%) got information through extension workers, i.e., in group meetings, development workers, NGOs, extension offices, block offices, university. The findings of the study also revealed that even the traders lack information about the markets within and outside Pakistan for dried apricot and apricot seed. They normally sell these products in Chitral market only.

Lack of information and capacity negatively affect the primary actors of the chain the most, who lose out on the opportunity for higher revenues. Actions facilitating information downstream can enable farmers to have more negotiation power within the buyer-driven chain.

Apricot value chain governance in Chitral

The rules and regulations for apricot production in Chitral are very flexible. In fact, there are no state regulations for apricot production and harvesting. The people do not have to take permission from anyone for planting apricot plants and trading apricots. Moreover, there are also no customary rules available for harvesting the apricot.

The apricot producers are not organized and there is no such farmers' organization in Chitral. They are not well aware of the market channels, requirements, and opportunities the sector could offer them. Therefore, in order to empower them, efforts should focus on organizing them into an apricot producers association and facilitating access to inputs, market information, and capacity building through training and other support for the development of the apricot subsector.

Constraints and possible solutions in apricot subsector in district Chitral

Apricot orchard development

The apricot industry of Chitral needs to be developed on a commercial basis. There are very few well-managed apricot orchards in the district. The plants are scattered and wild (unmanaged) and are of low yielding varieties. There is not enough volume and quality for any investor to invest in large-scale processing. The orchards can be developed by providing apricot plants of improved variety to the farmers and training them in scientific techniques of orchard development and management.

Lack of pruning skills

Lack of skills in using scientific pruning methods is also a constraint in producing higher yields and better quality fruit. Pruning when correctly carried out maintains the balance between vegetative and generative growth. Annual pruning is necessary to remove the diseased branches and maintain fruit-bearing spurs. Most of the farmers are not practicing pruning of apricot trees while some of the farmers are pruning the trees in March. Scientifically the pruning of apricot trees should be carried out during December and January when the trees are in full dormancy. Thinning of fruits (if the fruit set is very high) should also be done by hand to improve colour and size of the fruit. It should be done during the early stages, preferably after fruit setting. Unfortunately, thinning of fruits is also not practiced by the apricot producers of Chitral. Excessive pruning can also alter the nutrient balance towards the vegetative growth and reduce the availability of nutrients for fruit growth and development affecting the fruit quality. Thus, it is important to train farmers in pruning and tree management to produce higher yield and better quality fruit.

Fertilizers and other chemicals

Fertilizers and pesticide use is very limited for apricot trees. Generally, apricots are grown at the border of the plots or mixed with other fruits and agriculture crops. Therefore, fertilizers and pesticide applied on other crops will drift to apricot trees. This way apricot trees also receive some quantity of agro-chemicals irrespective of its requirement.

Forward linkages

Marketable apricot products in Chitral

Fresh fruit, dried fruit, and fruit seed kernels are the main apricot products produced in Chitral, though a small quantity of apricot seed oil is also produced (Table 5). Fresh apricot is a highly perishable fruit with a very short shelf life. Production areas are far from market and the transportation facilities are poor leading to a substantial fruit loss. Thus, apricots are mainly sold as dried apricot from Chitral. Only a very small amount is sold as fresh apricot to local consumers. Apricot seed kernels are also sold. These products have huge demand within and outside Chitral. There exists a huge market for fresh as well as dried apricots and apricot products such as seed kernels and apricot seed oil. Earlier, a study on apricot value chain assessment in Gilgit Baltistan by Sendall et. al. (2013) revealed that trade in dried apricot is either stagnating or even declining globally while trade in fresh apricot is increasing as a result of improvement in cold chain and transportation. However, due to constraints such as remoteness of the apricot-producing villages, lack of storage facilities for fresh apricot, long distances to market centres, and poor transportation facility, Chitral farmers currently cannot benefit from the opportunity for selling fresh apricots. Fresh apricots are consumed at home; only small quantities are sold to local traders. There are a large number of producers (over 10,000 households in 264 villages grow apricot) who trade apricots and apricot products. There are more than 20 traders in Chitral town, many of them Pathans who visit the area seasonally (the exact number could not be found), and 12 local general retail shops in the study area which buy and sell apricots. In 2013, the traders in Chitral collected a total quantity of 13,140 kg of dried apricots and over 4,017 kg of apricot seed kernels. Most of the dried apricot produced in KP including Chitral is sold in down country markets such as

Rawalpindi and Lahore (Jasra and Rafi, 2002). Only a small proportion is sold in Chitral town market. Apricot kernel oil is another high value product gaining popularity and has growing demand in the national, regional, and international markets.

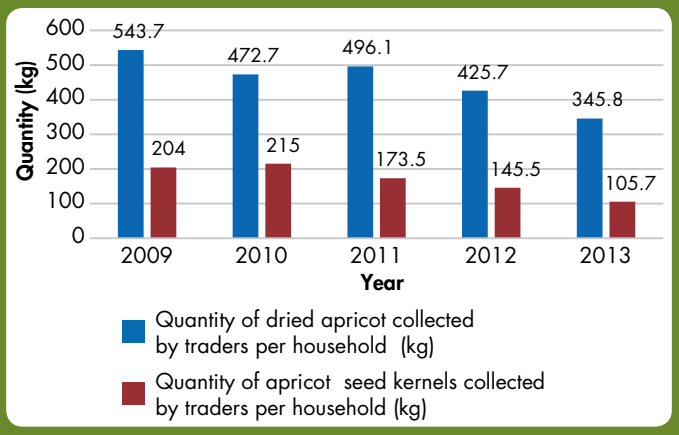
Quality standards and certification

Pakistan has no standards for apricots, though a Codex standard for dried apricot (Codex No. 130-1981) does exist (Sendall et al., 2013). The Department of Plant Protection is responsible for implementing sanitary and phytosanitary measures for plant materials through its quarantine outposts and issues phytosanitary certificates according to the requirements and trade agreements signed with the importing countries. In terms of certification of apricot products third-party voluntary certification, such as GlobalGAP, Hazard Analysis and Critical Control Point (HACCP), and Fair Trade and Organic, is available in Pakistan.

Quantity and prices of apricot products collected by traders

Information on the quantity of apricot and apricot products purchased by the traders from 2009 to 2013 was collected from the local traders in Chitral District (Figure 10). The market for fresh apricot as well as for apricot seed oil is absent in Chitral The reason is that there is no facility developed in Chitral for storing the fresh apricot and the cost of transportation to distant market is also high. Second, the people of Chitral are unaware of the value and process of apricot oil production. So far, there are no institutional efforts in training farmers in post-harvest methods of apricot and other fruits. Though, the retailers in the market are selling apricot oil by purchasing it from Gilgit and other areas.

Figure 10: **Average quantity of dried apricot and apricot seed kernels collected by the traders from individual households in Chitral**

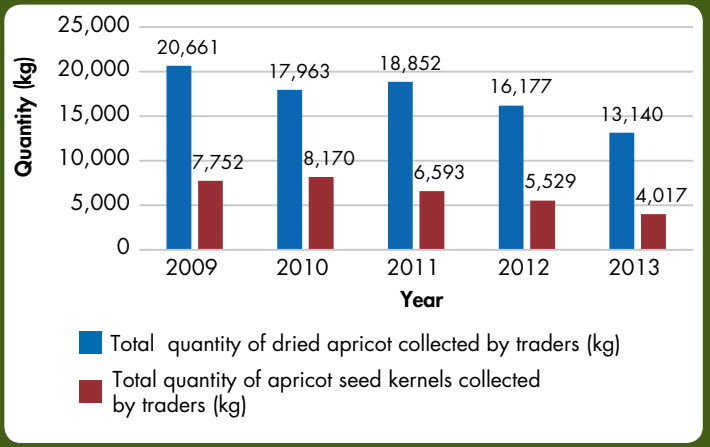


The quantity of dried apricot collected and purchased by local traders per household shows a decreasing trend and the price of dried apricot shows an increasing trend since 2009 except in 2011 when there was a slight increase compared to 2010 (Figure 10). The findings also suggest that the quantity of apricot seed kernels is also decreasing since 2009 and on average the price of apricot seed kernels shows an increasing trend. This is because most of the producers sell apricot directly to traders coming from other districts outside Chitral, mostly Pathans, because they come door to door and purchase the products and offer higher prices than the local traders. Most of these Pathans take the product out of Chitral, as there are no retail shops in Chitral. It was difficult to get data from Pathans as it was difficult to find them.

The peak season to buy fresh apricot is June–July and peak season to buy dry apricot is September–October. The findings of the study further suggested that the local traders do not have information about the main centres of demand of apricot in other areas of Pakistan and abroad and most of them stick to Chitral town market only. According to the traders the major customers of the apricot products are tourists and other people visiting Chitral from other parts of Pakistan.

Figure 11 shows the total quantity of dried apricot and apricot seed kernels collected by the local traders in the district. The findings suggest that the traders collect dried apricot in higher quantity than apricot seed kernels. One of the reasons for this is that apricot

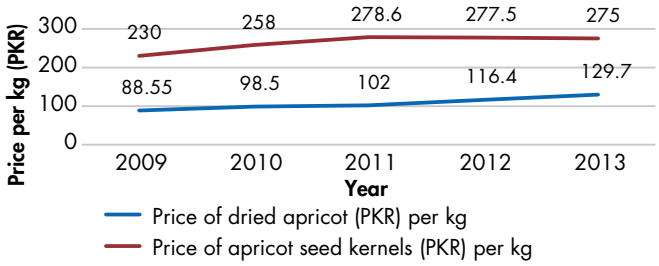
Figure 11: **Total quantity of dried apricot and apricot seed kernels collected by traders in Chitral District**



seed kernels are expensive. Therefore, the traders are charging higher prices in the market which reduces its demand. Overall, the collection/purchase of dried apricot and apricot seed by the traders does not show any clear trend.

Figure 12 shows the selling price of apricot seed kernels and dried fruits at the farmers' level from 2009 to 2013. The figure shows an increasing trend in the price of both dried apricots and apricot seeds.

Figure 12: **Prices of dried apricot and apricot seed kernels paid by traders to farmers in Chitral**



Procurement of products by traders

In regard to the procurement of apricots (Table 9), the majority of traders have no issues related to the quantity, quality, cost involved, and the timely supply at the time of procurement of apricots from the farmers. However, a large proportion (69.4%) of the traders are not satisfied with the packaging of apricots. As a result of lack of training and exposure, farmers do not pack apricots properly. Therefore the traders have to do the packaging themselves and bear the cost of packaging as well.

Table 9: **Traders' satisfaction with procurement of apricots**

	Yes (%)	No (%)
Quantity	73.7	26.3
Quality	57.9	42.1
Packaging	30.6	69.4
Cost	74.3	25.7
Timely supply	91.2	8.0

After collecting dried apricots and apricot seed kernels the traders store them for one week up to four months. According to traders it is easy to store dried apricots in winter but in summer the apricots are attacked by fungus and other insects, incurring losses.

Marketing of apricots by traders

Selling apricots in the market

In regard to the problems faced by the traders in selling apricots and apricot seed kernels (Table 10), findings suggest that most of the traders do not face any problems in meeting market demand. They are usually able to collect the required quantity of apricot from the producers. Similarly the majority of the traders are also satisfied with the cost involved in collecting and selling apricots. However, traders were facing problems in the quality of the dried apricots while selling it. Most of the dried apricot which the traders collect is black in colour and bitter in taste. Though, while procuring the apricot from the producers, most traders (73.7%) showed satisfaction with the quality, but quality becomes a problem while selling the apricots, because consumers have become more conscious of the packaging and colour of apricots. Moreover, timely supply of apricot products becomes a major issue for the traders, because most of the suppliers live in far flung areas of the district which are difficult to access.

Table 10: **Traders' satisfaction with selling the products**

	Yes (%)	No (%)
Quantity	38.5	61.5
Quality	80.0	20.0
Cost	34.8	65.2
Timely supply	57.1	42.9

Ranking of issues related to marketing of apricot products by traders

In regard to issues related to the quality of apricots, timeliness and reliability of supply, packaging, and prices by the sellers (Table 11), the findings suggest that the traders are not aware of any international quality standards; however, they have their own criteria for grading apricot products. In the study more than

Table 11: **Traders' ranking of issues related to the marketing of apricot products**

Issue	Rank 1 = very bad, 2 = bad, 3 = average, 4 = good, 5 = very good	Highest number of responses (%)
Quality	1	35.0
Reliability of supply	3	35.1
Price	5	35.1
Packaging	1	33.3
Delivery time	2	48.7

one-third (35%) of the respondent traders stated that apricot they collect for sale is of lowest grade/very poor quality. The traders are not satisfied as far as the processing and packing of apricot is concerned. Similarly packaging and delivery time of apricot were also major issues for one-third (33.3%) and nearly half (48.7%) of the respondent traders, respectively. However, the price of apricot was ranked highest and reliability of supply of apricot as average.

Ranking of issues in development of apricot subsector by traders

Responding to issues in the development of the apricot subsector (Table 12), over one-third (34.5%) of the traders ranked technological problems highest, because modern technology for processing and packing of apricots is not available in the district which affects the quality and presentation of the products. This is a serious concern for the development of the apricot subsector. Market and finance were also ranked highest by 31.1% and 29.6% of the respondents, respectively. However, problems regarding competition, quality standards, and policy were ranked as lowest concerns for the traders. This could be because of small quantities and similar quality available with all the local traders and existing demand for the products.

Table 12: **Traders' ranking of issues in development of apricot subsector**

Issue	Rank range from 1 (lowest concern) to 7 (highest concern)	Highest number of responses (%)
Technology	7	34.5
Market	7	31.3
Finance	7	29.6
Competition	2	25.0
Quality standards	1	24.1
Policy	1	34.6

Improvement of system efficiency

The apricot traders are closely interacting with the apricot consumers and these sellers are good judges of the taste of consumers and their demand regarding the quantity and quality of apricot products. The inputs and suggestions of apricot traders can be helpful for apricot producers to improve the quality of apricot products according to the market demand. But unfortunately the sellers are not providing any feedback, technical assistance, or training to their suppliers. However, the findings suggest that most of the traders are providing credit loans to their suppliers. A majority of the traders (over three-quarters) are not actively providing information about market requirements to their suppliers. A large majority (75%) are also not informing their suppliers about buyer requirements and quality standards of apricot, which is a clear indication of the inefficiency of traders and sellers in the apricot industry of Chitral. The findings further suggest that most of the traders do not use any medium to communicate with their suppliers, other than face-to-face discussions if they get any chance to meet them. This communication link between traders and suppliers about market requirements needs to be strengthened. Only then will suppliers be able to customize the apricot products according to the market demand and also bring improvements in the processing of apricots. This link can be developed by organizing workshops and buyer-seller meets in different regions by inviting the traders and suppliers so that they can easily communicate with each other and share information about the market requirements and need for new product development to address the market requirement.

Quantitative analysis: Product flow and pricing along the chain

The flow of apricot products in Chitral is mostly through market agents. The major buyers from small farmers are mostly Pathans while commercial farmers usually sell their products to their loyal clients from outside Chitral and to the traders in Chitral town. The Pathans buy apricots by visiting the households and the local traders also do the same. This shows a very dominant role for the market agents alone and an absence of a marketing effort by the famers. The proportion of quantity flow and pricing along the channels is shown in Figure 13. In the figure 'P' represents price, 'A' and 'B' represent grades of apricot/apricot products, and percentages represent quantity sold through each channel.

Number of chain operators and employability

Quantitative analysis of the number of operators involved and employment generated in apricot chain is presented in Figure 14, where 'N' shows the number of chain operators and 'E' shows the number of people employed at each level in each chain. In most parts of the chain the numbers of chain operators and employed people are same, because in this study the number of chain operators has been considered as number of employed people (Figure 14).

Figure 13: **Product flow and pricing along apricot value chain**

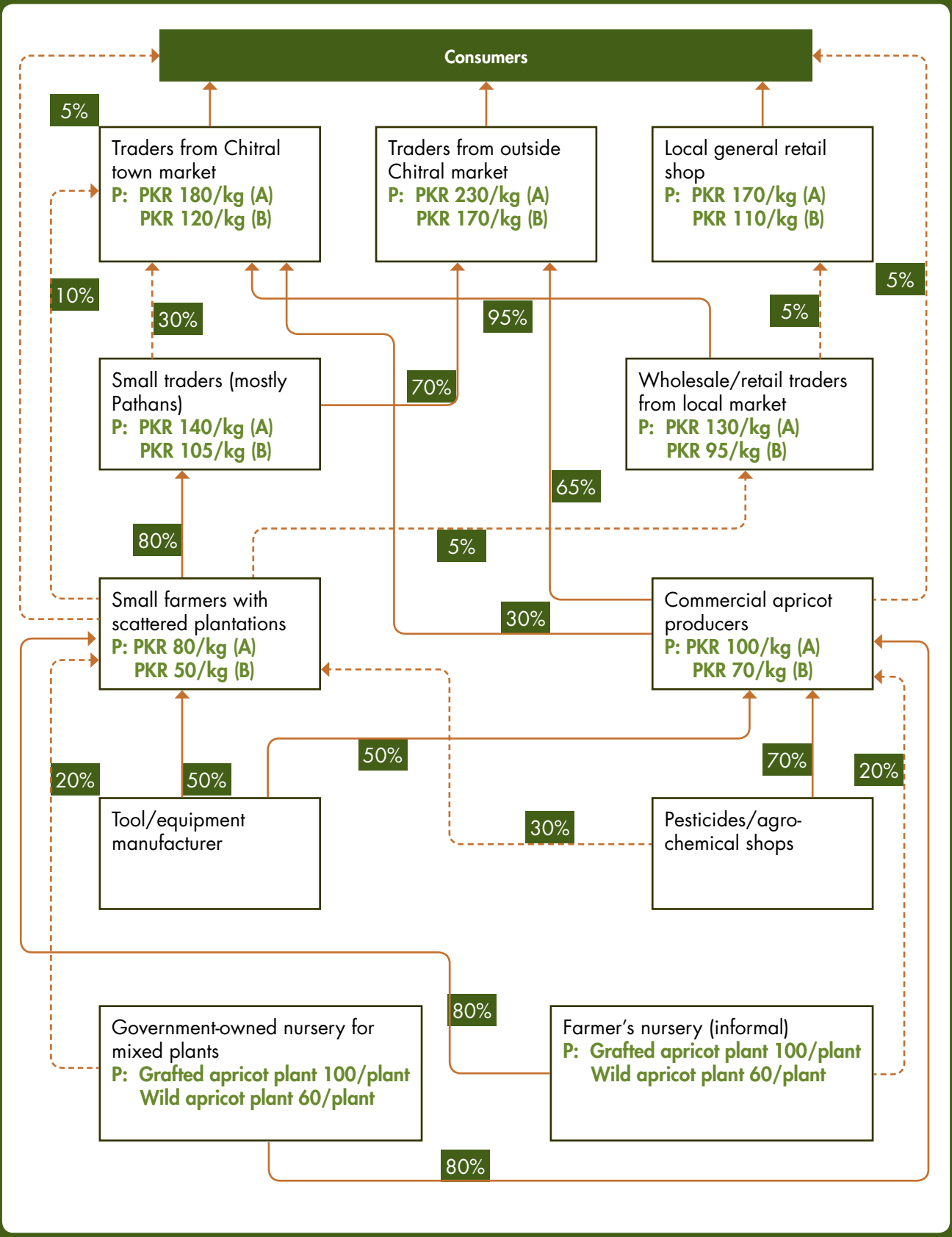
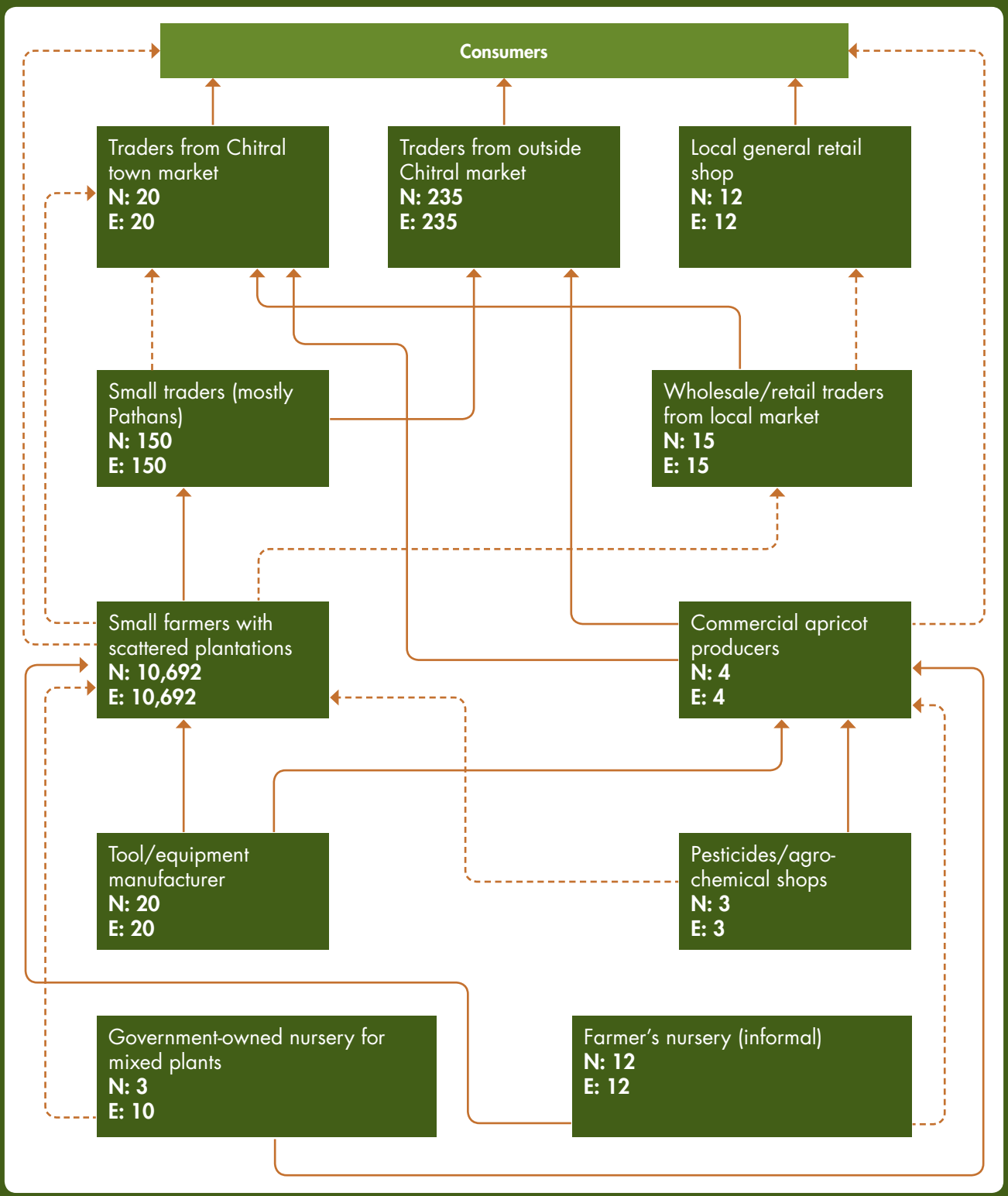


Figure 14: **Number of chain operators and employability in apricot value chain**



SWOT Analysis

SWOT (strengths, weaknesses, opportunities, and threats) analysis is a powerful tool used to identify areas where changes can be made for creating value and upgrading the chain. SWOT helps identify controllable (internal strengths and weaknesses of the subsector) and non-controllable (external opportunities and threats of the subsector) factors that the interventions should address for the development of entire value chain.

The SWOT analysis of the apricot subsector of Chitral District was carried out in focus group discussions conducted in major apricot-producing regions with the consultation and participation of different stakeholders of apricot. It is organized around its value chain functions: inputs, production, storage, and marketing; strengths and opportunities are coupled together and likewise weaknesses and threats (Figure 15).

Major opportunities presented by the current environment are associated with the current trend of growing local demands which is influenced by population growth and rise in income levels. For instance, the current gap in yield/production could enable rapid increase in supply to meet demand; the higher difference between seasonal and off-season prices indicates opportunities for increased profits through development of storage infrastructure, processing, and market linkages and the creation of employment opportunities and entrepreneurship development all along the value chain functions. The district is blessed with a natural comparative advantage with respect to agro-ecological conditions — sufficient land and water resources — to expand apricot production. Moreover, the presence of development NGOs is expected to yield significant progress.

Threats are represented by the poor infrastructure for storage and processing, weak institutions especially with regard to regulation, research and extension services, absence of regulatory measures for quality control of input, non-transparent practices in local market systems, and high cost of transportation and its unreliable supply. These factors generally hold back investment into the value chain, inhibiting its development.

The apricot value chain is one of the oldest value chains in the province. Therefore, farmers have traditional farming skills and are generally motivated. Availability of improved varieties of fruit plants is improving though slowly, and there are functioning linkages between farmers and market agents which create favourable conditions for apricot production and marketing in the province.

However, several weaknesses are hampering the value chain. Important among these are related to non-availability of the improved inputs and tools in the local market, limited access of the value chain actors to finance, absence of cold storage and fruit processing facilities, poor orchard management and storage skills of farmers, poor access to improved tools, and continued use of faulty packaging.

Figure 15: **SWOT analysis of apricot value chain in Chitral, Pakistan**

Strengths and opportunities	Functions	Weaknesses and threats
• Growing local demand for fresh and dried apricot and for apricot products owing to growth in population and general increase in income • Continued improvement in communication infrastructure • Competitive prices of locally produced apricots compared to imported varieties • Possibility for increase in production to fulfil local demand • Existing linkages between farmers and marketing agents	Marketing	• Fruit wastage at market due to inappropriate packing (used cartons) and faulty handling • Weak market linkages and limited participation of producers in marketing function • Absence of grading practices and processing functions in the value chain • High cost of transportation • Lack of available transport • Inappropriate transportation that causes losses
• On-farm storage conditions for most of the year • Price incentives and demand in distant locations in the province, which encourage local storage	Storage	• Excessive losses due to inappropriateness of storage infrastructure • Limited availability of electricity hindering investment in development of cold storages
• Farmers having traditional skills in apricot production • Yield gap (low productivity) • Diversification into improved varieties • Growth in the market sufficient to absorb increased production • Vast potential for increase in production compared to major producing provinces where production has nearly reached maximum levels	Production	• Traditional orchard management practices are faulty (notably pruning, layout and fertility management, and irrigation) • High pre- and post-harvest losses due to lack of skills and infrastructure (i.e., storage facilities) • Poor holding capacity of the farmers resulting in market gluts • Pests and diseases • Social conditions in some areas discourage orchard establishment, especially damages by children and animals
• Competitive situation — manufacturing of traditional tools • Growing demand for improved inputs (e.g., pesticides, chemical fertilizers)	Input supply	• High cost of agro-chemicals • Non-availability of improved tools • Limited availability of quality agro-chemicals and planting material • Absence of regulatory framework for quality testing

Leverage Points for Interventions

Leverage points for interventions were identified based on the analysis of constraints and opportunities carried out as part of the SWOT analysis. At each node a number of constraints and opportunities were identified for making interventions for the development of the apricot value chain. However, major leverage points were at the production/producer and processing levels for the growth of the apricot subsector. Key activities identified in developing the apricot value chain were providing quality planting material of improved varieties by strengthening the capacity of nursery owners; building capacity of producers in orchard management and harvesting, grading, processing, and packing of products; and establishing a cold storage facility. Further, the establishment and strengthening of the apricot growers association and the activities to increase information sharing and coordination between stakeholders were identified as playing a substantial role in improving the governance in the value chain and bringing higher income opportunities to the poor farmers.

Apricot Value Chain Up-gradation Plan for Chitral

Interventions for up-gradation of the apricot value chain were identified based on the leverage points identified through the analysis of constraints and opportunities at various functions of the chain. These interventions were designed to address the constraints (and their root causes) and to build on the opportunities identified. Accordingly, a plan for upgrading the apricot subsector was developed (Table 13). The plan identifies activities, outputs, and the roles and support needed from different institutions and organizations for developing and strengthening of the apricot value chain.

Table 13: **A plan for upgrading the apricot value chain in Chitral and the roles of different actors including private sector**

Opportunities/ Issues	Activities	Outputs	Private sector	Enabler	Who will pay
Inputs supply					
Market-based delivery for pruning, spraying, and other technical services					
• Unavailability of farm tools/ equipment and services to apricot farmers	• Identification and technical assistance to agro-tech service providers • Assist agro-tech to have sufficient service coverage	• Service providers identified and provided with orchard management tools and equipment • Service providers linked with apricot farmers/ associations	• Six service providers have market-based set ups in major towns in Chitral with service extended to the programme areas	• Agriculture Research Extension (ARE) Chitral • AKRSP	• Farmers and farmers associations • Development agencies
Strengthen apricot nurseries					
• Low-quality apricot plants • Lack of apricot nurseries • Lack of certification programme for fruit nursery plants	• Introduce quality apricot plants from Swat and Gilgit • Upgrade existing apricot nurseries and establish new model nurseries • Build capacity of nursery growers • Establish and strengthen nursery growers association • Link development of nursery associations with certification agencies	• Provision of 100 quality plants to each of the 12 union councils (UCs) • Upgrading of three existing nurseries • Establishment of nine new model nurseries • 12 nursery growers trained in nursery management • Two nursery growers associations established and registered with Agriculture Research Extension, Chitral	• One enterprising farmer is in 12 UCs will purchase 1,200 apricot plants from private orchards in Swat and Gilgit • Entrepreneurs/ farmers will establish model nurseries on their own land	• ARE will assist in identifying private suppliers of quality plants • ARE will conduct feasibility for model nurseries	• Farmers associations • Donor agencies
Production					
Increase productivity through trainings, workshops, and exposure visits for farmers					
• Poor orchard management • Unscientific farm management practices due to lack of service providers in region • Absence of apricot grower clusters and associations	• Conduct pre-harvest management training in pruning, fertility management, irrigation, and pest and disease control • Train individual apricot growers in scientific farm management • Form growers association	• 120 growers trained in pre-harvest management • 120 growers trained in scientific farm management • Three growers associations formed (one each in four union councils)	• Star Farm Pakistan will conduct trainings	• SRSP • AKRSP • ARS (Agriculture Research Station) • Farmers associations	• Donor agencies

Opportunities/ Issues	Activities	Outputs	Private sector	Enabler	Who will pay
Post-harvest handling/processing of apricot					
Develop and implement harvest and post-harvest management					
• High post-harvest losses • Lack of apricot processing units in Chitral • No proper equipment and mechanism for drying apricot	• Train growers in post-harvest management • Establish apricot processing units • Register apricot processing unit • Provide training in apricot drying	• 120 growers trained in post-harvest management of apricot • One model apricot processing unit established and registered with Pakistan Council for Scientific and Industrial Research (PCSIR) • 120 women trained in apricot drying	• Star Farm Pakistan will conduct training • Private investors will be identified and encouraged to establish processing unit • NGOs will conduct training	• PCSIR • ARS • AKRSP	• Donor agencies • NGOs • Private investors
Establish cold storage attached to micro-hydro units and training					
• No storage facilities	• Establish two cold storage facilities linked to micro-hydro units at one of the feasible areas • Provide training in store/cold storage management of apricot	• Two cold storage units established • Six members of apricot grower associations trained in cold storage management	• Growers will provide land for cold storage	• AKRSP	• Private investors • Growers associations • NGOs
Marketing and distribution					
• Exploitative marketing practices and non-participation of famers in marketing function • Less profit margin due to selling produce at farm gate • Poor packaging by the producers resulting in wastage during transportation • Absence of diversified marketing strategy for apricot products (kernels, pulp, juice, and seed kernel oil)	• Provide training on apricot marketing • Promote collective marketing • Link development of growers associations to down country market • Introduce quality packaging material • Develop extensive marketing plan for district apricot products	• Six members of apricot grower associations trained in marketing strategies • Apricot growers associations linked with metro group, Lahore • Quality packaging materials provided to grower associations • Marketing plan published and disseminated among growers	• Private marketing firm should be established at district level to carry out all marketing activities • Private growers and sellers in area will be encouraged to adopt the plan	• District government • Growers associations • AKRSP	• Private investors • Growers associations • NGOs

Relevance of Findings to the Development of Apricot Value Chain in Chitral

Upstream Actors (Backward Linkages)

The survey findings suggest that apricot and apple are the major fruits produced in Chitral. Apple makes up 26% of the total fruit production in the district and apricot covers 19%. Compared to apricot, the apple subsector is more developed and is considered one of the important cash crops, having a significant contribution to the district's economy. Most of the government, non-governmental, and private sector organizations have made considerable efforts to develop the apple subsector and streamline the apple value chain. Many new varieties of apples have been introduced in the region, a number of orchards have been developed, and the apple producers have been trained in both pre- and post-harvesting of apple, as well as in customizing apple products according to market demand.

Unfortunately the apricot subsector lags far behind. Technical services related to pre- and post-harvest of apricots and orchard management are not available to farmers. There are very few nurseries supplying saplings of improved varieties of apricot in the district, and they are unable to meet the farmers' needs. Therefore, most of the farmers are purchasing apricot plants or saplings of local varieties from other farmers. This is one of the reasons that the apricots produced in Chitral are of poor quality as compared to the neighbour regions, such as Gilgit. There is also a lack of certification programmes for fruit nursery plants in the region.

The market for improved tools and agro-chemicals for apricot production is also underdeveloped. There are few agro-chemical shops in the area and these shops are only approached by a few commercial apricot producers.

Most of the apricot orchards in the district have a few plants and most of these plants are predominantly local varieties or wild apricots. Most of the apricot trees are found in scattered plantations in the fields. The apricot trees are used for fuel rather than fruit production. The apricot orchards in the region are not planned and managed scientifically. Moreover, the apricot producers lack training and skills in orchard management such as pruning, soil fertility management, pest and disease management and control, and harvesting, processing, and packing of the apricots. The producers also lack the skills and technology for drying apricots, making kernels, cleaning, packing, and packaging apricot products.

Due to poor training and skills related to processing of apricots, farmers are incurring high post-harvest losses. Good-quality packing materials are not available in the region and most of the available packing materials for apricot are faulty and non-standardized. There is no proper system of storing fresh or dried fruit. Therefore, most of the dry apricots are damaged by rain and become black in colour, decreasing their market value.

Downstream Actors (Forward Linkages)

The storage function in the apricot value chain is completely missing. The shelf life of fresh apricot is too short and the traders are unable to market fresh apricot. Moreover, the producers do not pack the apricot products including fresh fruits and dry apricot. In fact, they have no understanding of packaging, leaving the traders to bear the cost of packaging which increases the cost of apricot for the traders. Most of the traders prefer to purchase well-packed and well-packaged apricots from other traders.

The traders are unsatisfied with the quality of the district's apricot products and are shifting away from Chitral in favour of Gilgit. According to the traders Chitral producers are selling apricot products without proper grading and sorting and most of the dried apricots are full of dusts, are black, and bitter in taste. They have little knowledge of post-harvest handling of apricot and they lack modern processing technology. For these reasons, most of the traders

of Chitral are purchasing dry apricots from Gilgit producers and selling them in Chitral town market. According to the traders, Gilgit products are well packed, clean, and good tasting.

The findings of the study also suggest that the local traders do not have information about the main centres of demand of apricot in Pakistan and abroad. Therefore they are unable to sell their products outside Chitral and in other international markets, and they stick to Chitral market only. Further, the traders are not proactive in providing information about market requirements to the producers. This is one of the reasons that the apricot producers are not able to customize their products according to market demand.

Moreover, the traders themselves are not aware of any international quality standards of apricot. However, they have their own local way of grading apricot products and they have given lowest grade to the quality of Chitral apricot. Similarly the traders are also not satisfied with the packaging done and the delivery timing of apricot products by the producers.

The above issues both at backward (upstream) and forward (downstream) linkages, if addressed properly, can lead to the development of the apricot value chain in Chitral, bringing more income to the producers as well as other actors in the chain.

Conclusion and Recommendations

In the agricultural-based economy of Chitral, apricot production can become a rewarding occupation for many people, particularly for underprivileged and low income groups if given a little attention by government, non-governmental, and private sector organizations. Like the apple subsector, the apricot subsector can be developed by upgrading the value chain to generate income for households and ultimately contribute to reducing poverty in the region. Based on the value chain analysis and identification of leverage points at various nodes of value chain (inputs supply, production, processing and storage, and marketing), the following recommendations are provided to strengthen the apricot value chain in Chitral.

For improving input supply

- Most of the apricot trees in the district are low quality and considered to be wild apricot. Improved varieties of apricot need to be introduced and developed and good quality planting material distributed to the farmers.
- At least 20 mother stock nurseries for apricot should be developed in the region and nursery growers trained in proper nursery management for raising and supplying apricot plants of improved varieties to the farmers. Also, a fruit plants certification programme should be introduced to ensure quality of planting material.
- Guidelines and a manual for improved nursery plant production should be developed and disseminated to the apricot growers.
- Because technical services (e.g., grafting, pruning, disease, and pest control) are unavailable to apricot producers in the area, agro-tech service providers should be identified to assist them. At least 10 to 15 service providers would be enough to cover the region if they are properly trained on pruning and spraying orchards.

For enhancing fruit production

- Provide support to the farmers for improved quality planting material, improved tools, and key inputs.
- Build capacity of apricot farmers in orchard development and management through training and exposure visits to successful apricot producers of Gilgit and other major apricot producing areas of Pakistan to encourage learning and build links for exchanging knowledge and information.
- Establish and support an apricot growers association and plan and undertake activities to increase information sharing and coordination among concerned stakeholders.
- Undertake activities for improving farmers' access to information especially on markets (market requirement in terms of market demand, quality and quantity and prices). Financial support should be made available to farmers.

For improving fruit processing

- Major losses reported by apricot producers are post-harvest losses, due in part to the short shelf-life of the fruit and a lack of access to markets. Fortunately, there is a huge scope for developing profitable microenterprise based on fruit processing leading to employment at home for women and youth and an increase in income in Chitral. The Pakistan Council of Scientific and Industrial Research (PCSIR) laboratory based in Skardu has developed techniques to successfully process damaged and poor quality fruit to make value-added products such as jam, jelly, and juice, which are in great demand in down country markets. Train farmers, particularly women and youth, to make jams and jellies to further enhance household income and resilience in Chitral.
- Quality of dried fruit is a major cause of concern. Currently, farmers dry the fruits in the sun, where they catch dust and are exposed to flies and other insects that deteriorate the quality. Some fruits are not properly dried and become contaminated by fungus, spoiling their taste and quality. Therefore, introducing an appropriate facility for the proper drying of fruits is recommended. Simple cheap technology, like the solar dryer system developed by Pakistan Agricultural Research Council scientists, may be promoted. Apricot dried through this system is dust-free, looks good, retains its taste, and fetches a good price (Jan, 2006).

- Train farmers in proper harvesting, picking, grading, processing (drying), and packing of apricot for enhancing the quality of fruit to meet market requirements.
- One of the main reasons for major post-harvest losses of apricot in the district is the lack of proper storage systems. Therefore, developing on-farm and off-farm storage facilities is recommended.
- Currently, farmers produce apricot seed kernels and sell them to the traders that visit them. They do not extract their oil and make value-added products, such as scrubs and cosmetic products which are in great demand in high-end markets. Therefore, introducing a technical facility in the area to extract apricot oil is recommended. This can enhance farmers' income many times compared to selling seed kernels.

For marketing

- Farmers in the district are selling apricot products without packing and packaging, and most of the traders are not ready to buy the products without proper packing and complete packaging. Appropriate packing material is also not available to farmers in the area. Therefore, introducing appropriate packing material and designing market-appropriate packaging is recommended. Apricot producers should be trained in packing and packaging the fruit.
- Traders are not providing any technical assistance and information about market requirements and market development to the farmers. Due to their lack of interaction and communication with traders, producers find it difficult to develop apricot products according to market demand. Therefore, organizing interactive sessions or workshops for apricot producers, traders, and other concerned stakeholders in different regions of Chitral is recommended. These sessions will provide a platform for the traders and producers to share information and discuss the market requirements of apricot product. This link between traders and producers can be developed by organizing fruit exhibitions.

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Himalica is funded by the European Union

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ISBN 978 92 9115 XXX X