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A Value Chain Analysis of the Uzbekistan Cherry Industry - Case Study in Samarkand Province

Korea Rural Economic Institute

연구 담당

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Preface

The Korean KAPEX Implementation team organized by the Korea Rural Economic Institute (KREI) visited Uzbekistan in February, 2017 for the purpose of working out the details of a joint research (JR) on “A Value Chain Analysis of the Uzbekistan Cherry Industry”. During its visit, KREI had a series of discussions with the Scientific-Research Institute of Horticulture, Viticulture and Winemaking named after Academician M.Mirzaev (SRI) with respect to the desirable measures to be taken by both Parties for the successful implementation of the JR.

A JR team has been organized and composed of experts from KREI and SRI with involving of independent experts. A JR was realized from May to September 2017 with a financial support of KREI.

The responsibilities of the JR team were predicted as:

- identifying the most critical areas for value chain of the Samarkand cherry industry;
- implementing extensive survey(s) and study;
- deriving issues and problems;
- recommending measures to initiate policy programs to address the problems
- formulating proposals for future Official Development Assistance projects based on the outcomes.

In addition, relevant information and data will be consolidated for the future collaboration.

An Uzbek part of JR team was responsible for the full cycle of JR. Korean experts in the field of value chain have provided necessary technical guidance and advices.

Moreover, one member of JR team from Uzbekistan has been invited to the KAPEX Academy in Korea for 3 months in order to use Korean approaches, methods and tools for assessing the value chain of agricultural products. This was an important step further achieving the best high-standards results of JR.

ACKNOWLEDGEMENTS

The Joint Research team would like to express gratitude to all those who supported us over the length of our research and who gave us the opportunity to complete this report.

First, we want to express our sincere appreciations to Dr. Lee Dae Seob, for his kind support, professional suggestions and his good terms with us. We learned a lot from him over these months. Furthermore, we would like to thank Prof. Dr. Saimnazarov Yuldash for the interest he showed to our work and his kind support.

We are also greatly indebted to the Korea Rural Economic Institute (KREI) for the financial support of our JR and their interest in research and culture of our home-country.

Many thanks to Dr. Choi Ji-Hyeon and Ms. Lee Yoonjung from KREI for their continuously support and help.

We wish to extend our great thanks to Mr. Akhmedjanov Jamshid, the Director of the Samarkand branch of Scientific-Research Institute of Horticulture, Viticulture and Winemaking named after Academician M.Mirzaev, for providing us through Samarkand province, his help, suggestions, and support. Without him we could not have collected so huge data from our field study.

This report could not have been written without the data of the farms and dehkan farms obtained in six study areas in Samarkand province. We would like to express our gratitude to all respondents who were willing to participate in our field study.

We highly appreciate to all who are representing in this list and everyone other who are not, but who someway or other is related to our JR during this

period.

The views expressed in this report are exclusively those of the authors, and do not necessarily reflect the views of any organization involved in carrying out the JR.

Tashkent, September 2017

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LIST OF ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
BRC	British Retail Consortium
CER	Center for Economic Research
CIS	Commonwealth of Independent States
CSR	Corporate Social Responsibility
EU	European Union
FAO	Food and Agricultural Organization of the United Nations
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GOU	Government of Uzbekistan
GPS	Global Positional System
GVC	Global Value Chain
Ha	Hectare
ICCO	Interchurch Organization for Development Cooperation
JR	Joint Research
JV	
KAPEX	Agricultural Policy Experiences for Food Security
KFY	The Village Assembly of Citizens
Kg	Kilogram
KREI	Korea Rural Economic Institute
LLC	Limited Liability Company
MAWR	Ministry of Agriculture and Water Recourses
MNCs	Multi-National Companies
NGO	Non-Governmental Organization
NIE	New Institutional Economics
PPP	Purchasing Power Parity
RMA	Rapid Market Appraisal
SDC	Swiss Agency for Development and Cooperation
SME	Small and medium-sized enterprises
SQF	Safe Quality Food
SRI	Scientific-Research Institute of Horticulture, Viticulture and Winemaking named after academician M.Mirzaev
TCE	Transaction Cost Economics
UAE	United Arab Emirates
UNDP	United Nations Development Program
UNGC	United Nations Global Compact
USA	United States of America

USAID	United States Agency for International Development
USD	United States' Dollar
UZS	Uzbek Soum
Uzstandart	Uzbek Agency for Standardization, Metrology and Certification
UzStat	State Statistical Committee of the Republic of Uzbekistan
WB	World Bank
WBCSD	World Business Council for Sustainable Development
WFP	World Food Program
WOC	World Organization of Creditors
WRI	World Resources Institute
WTO	World Trade Organization

Chapter 1

Introduction

This chapter shortly describes the current statement of fruits production in Uzbekistan. In particular, plant area, harvest volume, the potential of Uzbek fruits export by destination and the place of Uzbekistan on international and foreign markets. The background of the Joint Research (JR) is describes the main policy steps toward improvement fruit sector in Uzbekistan. Problem statement, main and specific objects as well as methodology of JR is also described here.

1 Background of the JR

Uzbekistan is one the leading producers of fruits in Central Asia. According to Food and Agriculture Organization statistics, Uzbekistan is among the top five producers of apricots in the world, the sixth largest producer of cherries, and 17th in apple production (FAO, 2016).

Uzbekistan's continental climate with hot summers is ideal for growing apple, pears, pomegranates, cherries, apricots, peaches and other popular fruit crops.

The sector of deciduous, stone fruits and berries is one of fastest developing and prospective areas in Uzbekistan's agriculture. Moreover, since 2005, the increased production of fruits and berries was considerably higher than that of planted areas, due to an increase in yields. Fruits and berries production has increased 97.9 percent in the past decade. The considerable production growth is mainly attributed to increased domestic demand and growing exports.

Over the last 7 years, the Government of Uzbekistan (GOU) has adopted several decrees and acts to further develop fruit production, renovate existing fruit orchards, and establish new ones. The GOU has recognized the importance of alternative crops such as fruits and vegetables to the national economy. More than 35,000 hectares of new orchards were established in Uzbekistan over the past five years, and the GOU is planning to establish an additional 10,000 ha of high-density orchards in 2017. This reflects a gradual transition from inefficient cotton production to other high-value crops, which use water and other inputs more efficiently (Yuldashbaev and Paulson, 2014).

About 69 percent of Uzbekistan's fruits are consumed fresh, while 11 percent is exported. About 20 percent, on average, is destined for processing as for confitures, jams, juices, dried fruits, etc.

Of the 65 types of fruit and vegetables exported by the country, fresh cherries had the highest share in terms of value (14.4%), followed by raisins (12.8%) and fresh apricots (7.63%) (Uzagroexport, 2017).

Uzbekistan's main export markets are its neighboring Commonwealth of Independent States (CIS) countries, in particular Russia and Kazakhstan, as well as some European and Asian countries (Yuldashbaev and Paulson, 2014).

Cherries offer great potential for increasing exports to non-traditional regional markets, with exporters suggesting that Uzbek prices are competitive in Europe and Asia. There is also a possible opportunity to capture Korean and Japanese markets share in the Asia Pacific region in the short to medium term.

2. Problem statement

The fragile nature and short shelf life of cherries creates risk at all levels of the Uzbek cherry value chain and limits the sales window to few days, from the time it is harvested to the time it is purchased by the end-consumer. Improved post-harvest measures such as hydro cooling will significantly help increase shelf life, thereby reducing risk, increasing the producer's negotiating power in domestic markets, as well as opening up opportunities in export markets.

Hence, one of the major problems existing in this sector is postharvest losses resulting from improper harvesting (damage during harvesting), poor handling, poor hygiene in packaging (wooden pallets are rarely disinfected) and inadequate storage after harvesting. The Uzbek cherry value chain is dominated by smallholder production, less than 0.5 ha in area. Usually small growers do not have packing centers that collect large amounts of fresh fruits, store, calibrate and package the produce for the local or export markets. Most are primary producers of fruits and mainly concentrate on production, giving limited attention to harvesting, which results in bruises and damage to products. Also, little attention is given to the temperature of the product during and after harvest, which is critical to the later stages of processing, packaging, storage, distribution and sale of cherries (USAID, 2014).

3. JR objectives

The main objective of the JR is to assess the cherry value chain.

Following the main objective, the specific objectives of the JR are:

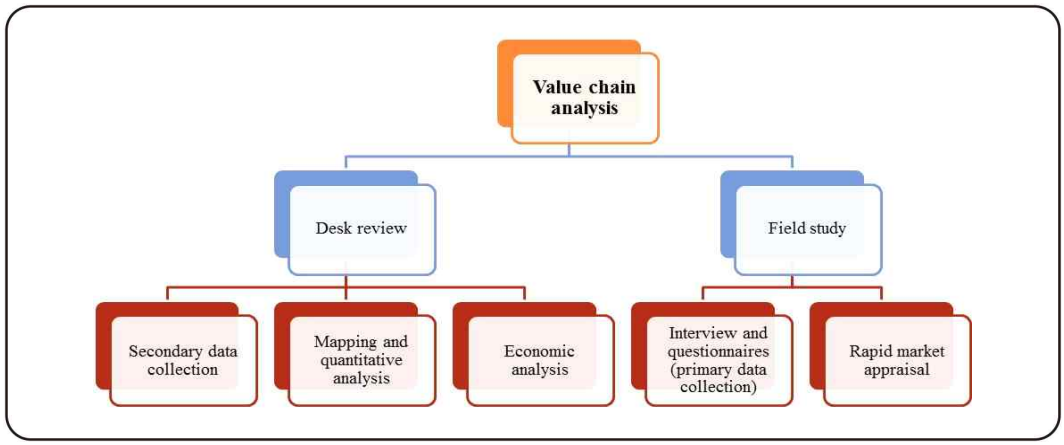
- Determine a problem cherry value chain segments with focus on beneficiaries making business in Samarkand province;
- Determine market and investment attractiveness for actors involved to cherry value chain;
- Development of recommendations for improvement cherry value chain;
- Identification of potential partners from governmental, public and private sectors to improve cherry value chain on provincial and state levels.

4. Methodological approach

The proposed methodology of the JR was consists from the desk review and the field study as is shown in the figure 1.1.

The principal instrument of the JR was a primary data collection through the field study. Field study was conducted by the JR team using developed semi-structured questionnaire indicated in Annex 1.

〈Figure 1.1〉 Value chain analysis methodology



Source: Adopted from Itibaev (2009).

4.1. Secondary data collection / Desk review

Secondary data collected contains a number of published and non-published reports, articles, papers, journals and books obtained from different sources.

The main sources of local secondary data were Scientific-Research Institute of Horticulture, Viticulture and Winemaking named after academician M. Mirzaev and Ministry of Agriculture and Water Recourses of the Republic of Uzbekistan (MAWR). From these institutions the data concerning land use was obtained. The data on area under the different fruit crops on provincial level, as well crop production and crop yield was obtained from these sources.

Samarkand provincial branch and Ishtikhan, Payaryk, Samarkand, Tailak and Urgut regional branches of Uzbekistan Statistical Department (UzStat) help with the official statistical data on area planted, number of farmers and dehkans, production and export volumes, etc.

Offices of Local authorities (Hokimiyats) of Samarkand province and particularly of Ishtikhan, Payaryk, Samarkand, Tailak and Urgut regions and other small branches of local authorities as “The village assembly of citizens” (local abbreviation is “KFY”) were the main sources of secondary data on regional level. The maps of study regions were also obtained here.

Besides local secondary data and taking into account the international level of the JR some secondary data was obtained from different international databases and literatures: United Nations Development Program (UNDP), USAID, Food and Agricultural Organization (FAO), World Bank (WB), Asian Development Bank (ADB), Helvetas Inc.; and others. The data from their reports of research conducted in Uzbekistan and other Central Asian countries and concerning value chain was obtained.

During the data collection several meetings were made with the representatives of the international organizations in Uzbekistan in order to understand

deeper obtained information and data.

The combination of secondary data and literature related to the topic permitted to formulate objectives as well as to achieve the main goals of the JR.

The main needed secondary data and its sources are indicated in table 1.1.

〈Table 1.1〉 The main needed secondary data and its sources

Data	Source
Demand. Production volume. Sales volume. Import. Export.	– International trade centre (ITC) – Centre for the Promotion of Imports from developing countries (CBI) – Trade International Markets – USDA – Others
Market structure and distribution channels	– Provincial and district branches of agriculture services of local authorities (Hokimiyat)
Relevant quality standards	– Phytosanitary station – Quarantine agency – Standardization, Metrology and Certification Agency
The best practice of competitive business	– Literature review

In order to achieve the best results on secondary data collection, following methods were used:

- Functional analysis (mapping) of the chain “Production-Processing-Trading-Consumption” and its actors;
- Quantitative analysis by category/cluster of actors including: production volume, sales volume, consumption volume, market share, and income;
- Value added distribution assessment in whole and among actors. Rarely this dada is available, otherwise field study is necessary.

4.2. Primary data collection / Field study

Primary data was collected through interviewing and questioning of actors involved to cherry value chain. For this purpose semi-structured questionnaire has been developed. The main needed primary data and its sources shown in table 1.2.

〈Table 1.2〉 The main needed primary data and its sources

Data	Source
Crop budget	– Interviewing and questioning of producers (farmers/dehkans)
Market climate and weakness	– Interviewing of wholesalers, traders, trade companies, Chamber of commerce and industry, custom.
Characteristics of products (quality, quantity, seasonality)	– Interviewing/questioning of local producers, processors and traders.
Competitive environment (main players) and relations among actors	– Interviewing of experts
Rapid market appraisal	– See table 1.3

Moreover, in order to expose the real demand and requirement volume for consumers and for assessing competitive environment the rapid market appraisal (RMA) was conducted. The main approaches of RMA explored in table 1.3.

〈Table 1.3〉 Rapid Market Appraisal techniques

No	Marketing Variables	Aspects f variable	Actions to be considered
1	Product (what to produce)	Variety, quality, design, characteristics, brand, packaging, sizes, services, guarantees.	The product supplied must satisfy a need and should ideally be in high demand. Moreover product must include features that are appreciated in the market (e.g. quality, appearance, size, packaging). Farmers need to grow crops and varieties for which there is strong demand and to dry, clean, sort, and grade the produce according to requirements of purchaser.
2	Price, (at what price to sell)	Price lists, discounts, price margins, credit conditions	The product must be sold for the right price which is competitive, and generates a profit to the supplier. Farmers can influence prices

No	Marketing Variables	Aspects f variable	Actions to be considered
			through the choice of crop and quality management practices. Farmers can also influence the price of their products through the choice of market place and buyer, and through co-operation with other producers in the marketing and processing spheres.
3	Place (distribution channels and where to sell)	Market sales points, spatial coverage of market sales points, locations within markets, inventories of products, transportation channels.	A product should be sold at the best possible place or market which depends on the benefits, cost and risks associated with different market options. It must also be noted that buyers in different market places may have different product requirements. For example, local collectors usually buy very small volumes of un-sorted produce directly from individual farmers. From another hand supermarkets or importers in foreign markets require a much larger volume of standardized products.
4	Promotion (how to promote the product)	Promotion includes advertising, personal sales, trade and consumer promotions and public relations.	It is necessary that producers or suppliers promote their product in order to maximize sales and prices. They also need to be in regular discussions and information exchange with buyers to inform potential buyers of the products, their characteristics, and the volumes available. Farmers are particularly well positioned to engage and coordinate transactions with buyers when selling as a group.
5*	Potential for further development	Jobs created, technology, investment attractiveness, innovations.	What kind of further possibilities for project development? Anticipated investment and limitations.

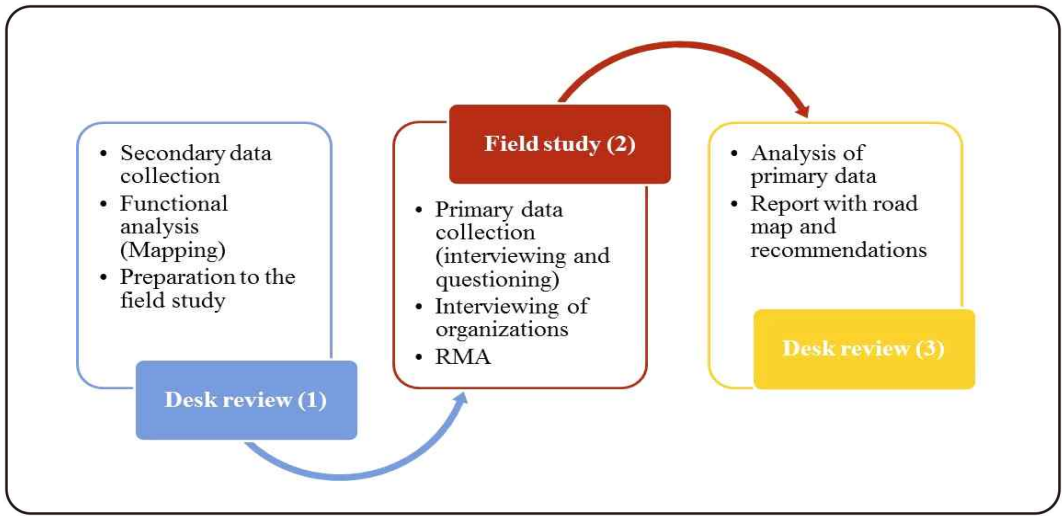
Source: Adopted and modified from Wandschneider et al., 2005

4.3 Data processing

All collected data was processed through MS Excel. We believe this is the best option for data manipulation with view of calculation and adjusting the cost of production; assessing added value distribution; determination the investment attractiveness of business; and so on. Depending on value chain actors we also proposed to use other methods of analysis: Tree of problems; SWOT anal-

ysis; analysis of risk of project development. Figure 1.2 explains the proposed process of cherry value chain analysis.

〈Figure 1.2〉 Cherry value chain analysis process



Source: Adopted and modified from Itibaev, 2009

Chapter 2

THEORETICAL APPROACHES FOR VALUE CHAIN

This chapter describes the basic theoretical approaches to value chain. International definition of value chain, its actors and difficulties on international, regional and local levels also exposed by this chapter. The chapter also proposes key elements for the investigation and assessment of value chains in developing country by discussing the potential contribution of the main theoretical streams in the literature. Based on theoretical streams and the constraints to upgrading of value chain, a framework for value chain analysis in developing countries is also included in this chapter.

1. Definitions of value chain

So far, there is not generally recognized or generally accepted definition of value chain. Nevertheless, scientific literature indicates a number of value chain definitions which are described below.

On contrary, SustainAbility et al. (2007) claims that value chain has clear

definitions in business literature and operational thinking. By their opinion "Value chain encompasses thinking about the value created by the chain, particularly for end-use customers". Looking on how sustainability is incorporated into conventional supply chains, a considering of the wider context of the value of activity - to the suppliers themselves, to the end-users and a range of other stakeholders, including communities and governments is necessary.

Porter (1985) mentioned the main idea of the value chain which is "based on the process view of organizations, the idea of seeing a manufacturing (or service) organization as a system, made up of subsystems each with inputs, transformation processes and outputs". Inputs, transformation processes, and outputs involve the consumption and acquisition of resources such as money, labour, materials, equipment, buildings, land, administration and management. The costs and profits are hence determined and affected by value chain activities carrying out.

Kaplinsky and Morris (2001) describe that "The value chain - is the full range of activities which are required to bring a product or service from conception, through the different phases of production, delivery to final consumers, and final disposal after use". Hence, the production per se is only one of a number of value added links. Moreover, there are ranges of activities within each link of the chain. In addition to the manifold links in a value chain, typically intermediary producers in a particular value chain may feed into a number of different value chains involving a combination of physical transformation and the input of various producer services.

McCormick and Schmitz (2002) describe the value chain as "activities required to bring a product from its conception to the final consumer". The concept of the global value chain recognizes that the design, production and marketing of products involve a chain of activities divided among enterprises located in different places. The value chain has to be include all of a product's

stages of development, from its design, to sourced raw materials and intermediate inputs, marketing, distribution, and support to the final consumer.

Ivarsson and Alvstam (2005) see the value chain as "A product by which new forms of production, technologies, logistics, labor processes and organizational relations and networks are introduced".

World Business Council for Sustainable Development (2011) asserts that "A value chain refers to the full life cycle of a product or process, including material sourcing, production, consumption and disposal/recycling processes"

Greenhouse Gas Protocol (2011) indicates that "Value chain refers to all of the upstream and downstream activities associated with the operations of the reporting company, including the use of sold products by consumers and the end-of-life treatment of sold products after consumer use".

Frederick (2016) and The Global Value Chains Initiative mentioned that "The value chain describes the full range of activities that firms and workers do to bring a product from its conception to its end use and beyond". This range of activities implies design, production, marketing, distribution, promotion and support to the final consumer and can be contained within a single firm/producer or divided among different firms/producers. Value chain activities can produce goods and/or services, and can be contained within a single geographical location or spread over wider areas.

The Cambridge University and its Institute for Sustainability Leadership (2017) define that "The 'value chain' concept builds ··· to consider the manner in which value is added along the chain, both to the product/service and the actors involved". From a sustainability perspective, 'value chain' explicitly references internal and external stakeholders in the value-creation process.

2. Theoretical streams on value chain in scientific literature

During the past decades there has been extensive theory building in the field of value chains (Lazzarini et al., 2001), reflected in many definitions and analytical approaches. Scientific disciplines that add to the value chain theory development can be grouped into four streams with different perspectives on inter-company relationships:

- Global value chain analysis focuses on the position of the lead firm in value chains and power relationships between developing country producers and developed country markets or multi-national companies (MNCs).
- Social network theory focuses on the inter-relationships between economic and social interactions in production networks composed of multiple relationships between value chain actors.
- Supply chain management studies and control of flows of products and services.
- New institutional economics studies the governance/organization of transactions between companies.

Global Value Chain Analysis

The Global Value Chain (GVC) analysis originates from the commodity chain approach (Gereffi, 1999) and investigates relationships between multi-national companies, the "lead firms", and other participants in international value chains. Hence, relationships and information asymmetry are key concepts in the analysis of global value chains in this theoretical stream power and focuses on governance and upgrading opportunities in value chains of developing countries (Gereffi, 1999, Gereffi et al., 2005; Kaplinsky, 2000; Kaplinsky and Morris,

2002; Sturgeon, 2001; Gibbon, 2001; Gibbon et al., 2008).

Kaplinsky (2001) made an important contribution to this theoretical stream by viewing value chains as repositories of rent which arises from unequal access to resources, scarcity of resources and from differential productivity of factors, including knowledge and skills.

Nadvi (2004) extends the GVC view to the poverty perspective by investigating the impact of engagement of local actors in GVCs on employment and income. He finds that employment and income are positively affected by inclusion of companies in GVC, in particular when MNCs are involved. Moreover, workers in GVCs become increasingly vulnerable to changing employment contracts and work casualization.

Supply Chain Management

A literature stream that investigates management of operations in value chains - is supply chain management, which emerged in the literature of the 1980s and initially focused on logistics planning and optimization of inventories across the supply chain.

Supply chain management is customer oriented, and aims towards the integration of business planning and balancing supply and demand across the entire supply chain from initial producer to the ultimate customer/consumer (Bowersox and Closs, 1996; Cooper et al., 1997).

The term value chain was first brought up by Michael Porter (1985) which reflecting the value adding character of business processes within the company borders. Supply chain as well as value chain approaches focus on primary processes, i.e. transformation and transaction processes in and across vertically related companies. From the developing country perspective, supply chain management focuses more on process and quality improvement and optimization of distribution processes.

A third literature stream focuses on governance of bilateral transactions between companies.

New Institutional Economics

New institutional economics (NIE), transaction cost economics (TCE) and agency theory, investigates the rationale for governance choices with view of in-company and inter-company organizational relationships (Rindfleisch and Heide, 1997; Williamson 1985; 1999). Companies select the governance form which could lead to minimize transaction costs, under conditions of bounded rationality and opportunistic partners' behavior. Value chain actors safeguard against risk of opportunism through monitoring systems, specific organizational arrangements (such as contracts) and joint investment. In agency theory one party - the principal delegates work to another - the agent, who performs that work (Eisenhardt, 1989). Hence, governance solutions defined by agency theory ranges between measurement of output of the supplying party/agent transferring risk to the agent, and measurement of behavior/processes of the agent transferring risk to the principal.

NIE is increasingly used to determine the best agreement/contract for developing country producers in highly uncertain business environments with opportunistic behavior of actors involved and institutional weak enforcement regimes (Ruben et al, 2007).

Social Network Approach

The fourth theoretical stream for developing country value chain research is social network theory which views companies as embedded in a complex of horizontal, vertical and business support relationships with other companies and supporting inputs/services, including advisory services, credit facilitators and transportation companies. According to network theory, relationships are not on-

ly shaped by economic considerations. Other concepts like trust, reputation and power also have a key impact on the structure and duration of inter-company relationships (Uzzi, 1997). Since the 1990s, social capital theory has become an important branch within the network approach. Network relations may enhance the social capital of a company, by making it feasible to get easier access to information, technical know-how and financial support (Coleman, 1990; Burt, 1997) and by encouraging knowledge transfer between network partners (Humphrey and Schmitz, 2002), thereby reducing transaction costs and improving access to markets (Gulati, 1998). In the last decade a lot of literature has emerged in the field of regional clusters, where intra-cluster vertical and horizontal relationships may support efficiency and effectiveness of business networks (Giuliani et al., 2005). Literature in the context of NIE argues that trust, reputation and dependencies dampen opportunistic behavior, implying that inter-firm relationships are more complex than NIE would predict (Gereffi et al., 2005; Lu et al., 2008; Ruben et al., 2007).

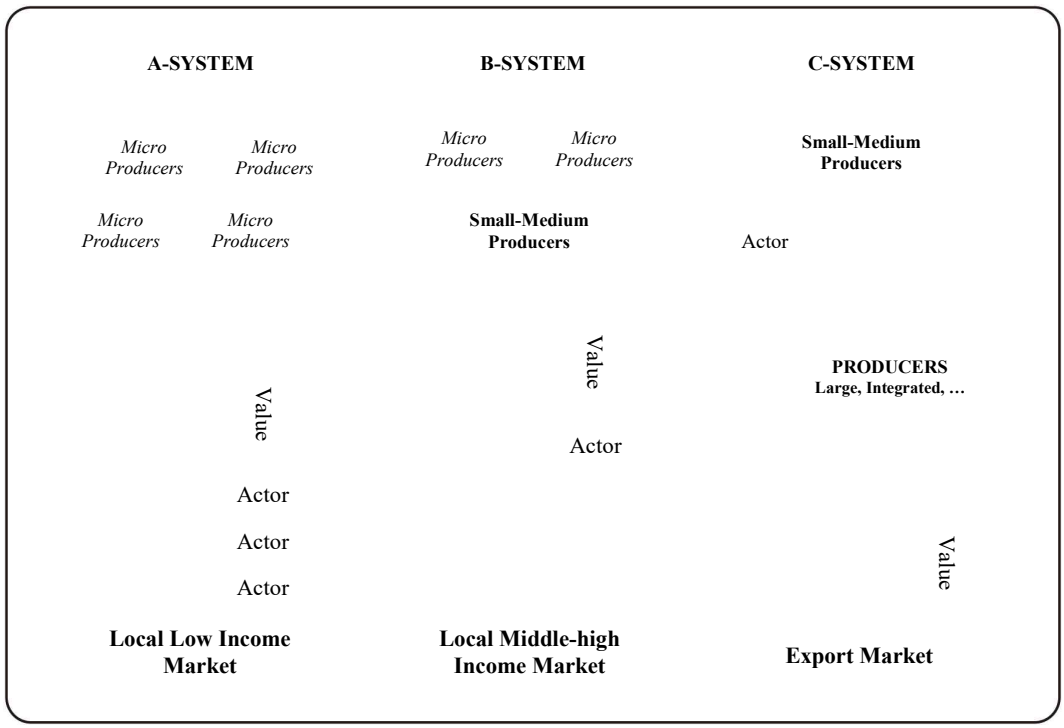
3. Value chain in developing countries

As it follows by the main definitions described above, the main aim of a value chain is to produce value added products or services for a market, by transforming resources and by the use of infrastructures – within the opportunities and constraints of its institutional environment. Therefore, constraints for value chain development are related to local, regional, international market access and market orientation (Grunert et al., 2005), factor conditions such as available resources and physical infrastructures (Porter, 1990) and regulative, cognitive and normative institutions (Scott, 1995).

Market Access and Market Orientation

Quality demands, internationalization and market differentiation have led to the emergence of distinct food sub-systems in developing countries with specific quality and/or safety requirements, leaning on local, national and international markets channels.

〈Figure 2.1〉 Economic sub-systems in developing countries



Source: Adopted from Ruben et al., 2007

The A-system characterized as the local low-income chain. Producers are usually small with traditional production systems. These chains aim at local market outlets with staple products. Local value chains may deliver to local markets. However, these chains may also connect to low-end markets further away. Because of many intermediary parties (traders), these A-system chains

are relatively long, implying limited availability of (end-) market information, distribution of value added over a large number of actors, and longer transportation distances (both in distance and time). A-systems in developing countries deliver a high share of agricultural production volume which often enters into complex distribution networks for local markets in different places. But these products generate relatively little value.

The B-system characterized as the local middle to high income chain when producers aim at the emerging supermarket sector in many developing countries. The majority of volume in these chains is delivered by small and/or medium size producers, organized in cooperatives and/or linked in subcontracting arrangements. The value generated is larger due to the production volume produced by B-systems is smaller than that of A-systems. In turn, B-systems increasingly produce according to national and sometimes international retail quality and safety standards.

Finally, the C-system characterized as the export chain and completely focused on export, although low quality or rejected products are sold at the national, mostly retail market. The trend is towards increasing economies of scale and foreign direct investments. Here export chains become more integrated and with fewer actors. The value added is relatively high although volumes are small compared to local markets.

These sub-systems function largely independently, although one system may use input from another system to balance demand and supply as it shown in figure 2.1: the flow between the A and B-systems. The co-existence of such weakly connected sub-systems poses important challenges to the development of harmonized quality and safety standards in developing countries (Ruben et al., 2007).

Market access is dependent on producers' technological capabilities, available infrastructures, bargaining power and market knowledge, as well as orientation.

Market orientation and market knowledge are conditional to market access.

The more heterogeneous the end-market, the more market-oriented activities are expected to take place by upstream parties in the chain. Market orientation should be present at multiple parties in the chain, in particular for non-commoditized products with high value added. Therefore, various parties in the chain up to the primary producer should have knowledge of and be willing to comply to demands in the value chain's end-market in order to be able to participate in high value adding value chains. Hence, a key condition for producers to be included in successful value chains is that they have access to market information and possess the ability to translate it to market intelligence (Grunert, 2006).

Resources and Infrastructures

Getting access to markets is not a sufficient pre-condition for developing country value chains to be able to sell their products. Conditional for these chains to be successful is supporting infrastructures, resources including knowledge and capabilities. Porter (1990) described that factor conditions relate to the nation's endowment with resources including physical, human, knowledge, technology and infrastructure. These factors enable or constrain value chain upgrading. Typical constraints faced by companies in developing countries include lack of specialized skills and difficult access to technology, inputs, market, information, credit and external services (Giuliano et al., 2005):

- Low levels of available physical resources such as input materials for production and other input supplies such as water and energy constrain value chain upgrading. For example, high energy costs in many developing countries limit growth possibilities for companies and value chains.
- The geographic position of a company or value chain may impact its competitive position, for example when it is located too far from high-value markets.

- Availability of educated labor and the availability of knowledge on production, distribution, and marketing is an important condition for innovative behavior of value chain actors.
- The availability of technology to be used in the value chain for production and distribution.

The basic condition for value chain development and upgrading are availability of resources and the presence of an adequate distribution and communication infrastructure. Weak infrastructures interferes products efficient flows to markets and exchange of market information upstream in value chains.

Institutional Limitations

The next component relatively characterized business environment of value chains is institutions.

Institutions undoubtedly impact organizational life. According to Scott (1995), institutions may be regulative, normative and cognitive:

- Regulative institutions encompass legislation and government regulations and policies that companies can use and/or have to comply with.
- Normative institutions are included business practices and policies as well as ethical standards.
- Cognitive institutions reflect the way people interpret and make sense of the world around on the basis of rules and schemata. Hence, diverse cultural belief systems, values and identities inform people in different roles as consumers, producers, policy makers, citizens, etc. (Scott, 1995).

Developing countries are often characterized by institutional voids, defined as "situations where institutional arrangements that support markets are absent, weak or fail to accomplish the role expected from them" (Marti and Mair, 2008). Government legislation, regulations and policies can constrain value chain upgrading by setting trade barriers for production materials and production

technology, by limiting the flow of national and international information, by imposing unfavorable taxes and by denying infrastructural investments that would benefit value chains. In the same time, business practices and business relationships' characteristics can limit value adding and profit orientation in valued chains. Moreover, cognitive institutions can limit a free flow of knowledge and information, labor mobility, and relationships between communities.

Murphy (2007) stated that facilitating government that supports innovation and upgrading is often considered conditional for development. Moreover, the institutional environment of developing country shaped by producers standards, norms and regulations set by Western retailers and industries and supported and enforced by local governments and NGOs (Perez-Aleman and Sandilands, 2008; Rissgaard, 2009).

4. Developing Country Value Chain Analysis Composition

The value chain composition conceptualize a value chain as a network of horizontally and vertically related companies that jointly aim to work towards providing products or services to a market. Ruben et al. (2007) characterize a value chain by its network structure, the way value is added and governance form of value chain actors.

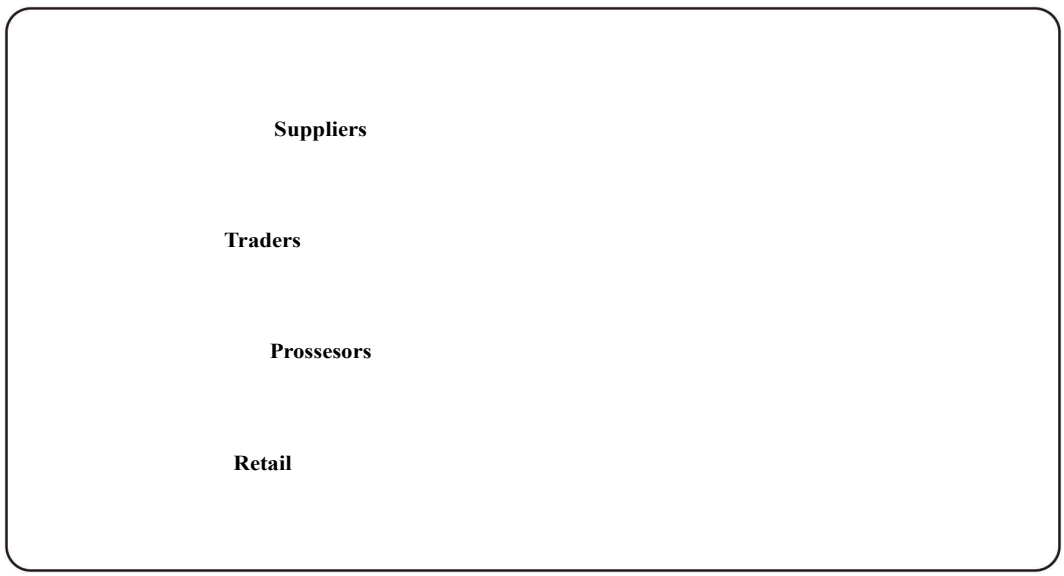
4.1. Network structure

A network structure has two dimensions: vertical and horizontal. The vertical dimension reflects the flow of products and services from primary producer up to

end-consumer. The horizontal dimension reflects relationships between actors in the same chain link, such as the link between farmers, for example. Lazarrini et al. (2001) developed the concept of the “Netchain” to show the interrelationships between the horizontal and vertical dimensions in value chains (see figure 2.2).

Figure 2.2 explores vertical relationships between the various value chain links and horizontal relationships between actors in the same link. Vertically relationships may follow any stage in the value chain as well as to skip value chain links, for example, relationships between traders and retail. Horizontal relationships between actors in the value chain can also have various shapes, such as farmer cooperatives or price agreements between traders. The structure of a network is largely dependent on the market channels that are chosen by various parties. A marketing channel bridges the gap between producers and market and may be defined as a value chain or supply chain forming a “channel” for products and services that are intended for sale at a certain markets.

〈Figure 2.2〉 Netchain



Source: Adopted and modified from Lazzarini et al. (2001)

Channel choices are heavily constrained by market access limitations such as supporting infrastructures to reach markets, access to demand and price information and specific demands from these markets such as production according to quality standards. Moreover, the ability of companies to take part in market channels is strongly related to markets characteristics, knowledge of market demands and the technological abilities of producer. Hence, the more heterogeneous and dynamic the supply of raw material to the value chain, the more market-oriented activities can be expected to take place in the value chain upstream. Conversely, from an end-user market perspective, the extent of heterogeneity and dynamism of end-user markets is a determinant of the degree of market orientation in the chain (Grunert et al., 2005).

Market channels vertically structure the value chain/network. By the opinion of Gereffi (1999) and Fitter and Kaplinsky (2001), the horizontal dimension is shaped by purchasing, production and delivery dependencies between parties that are positioned in the same value chain links, such as sourcing or marketing cooperatives, or collaborative agreements between small and medium size processors, such as exchange of packaging materials in case of demand fluctuations. It may be clear that market access, market information and exchange of information through the vertical chain, but also control of quality standards, may be strongly stimulated and enabled by horizontal collaboration and information exchange, through communication of knowledge and joint investments in supporting systems (Gibbon, 2001).

4.2. Value Added

Value added is created at different stages and by different actors throughout the value chain and may be related to quality, costs, delivery times, delivery

flexibility, innovativeness, etc. The size of value added is decided by the end-customer's willingness to pay. Opportunities for a company to add value depend on a number of factors, such as market size and diversity, technological capabilities of actors, etc. Moreover, market information on product and process requirements is a way to being able to produce the right value for the right market. In this respect finding value adding opportunities is related to the relaxation of market access constraints in existing markets as well as to finding opportunities in new markets and in setting up new market channels to address these markets.

Kaplinsky (2000) divided a value added capture into five major categories:

- trade rents - forthcoming from production scarcities or trade policies;
- technological rents - related to asymmetric command over technologies;
- organizational rents - related to management skills;
- relational rents - related to inter-firm networks, clusters and alliances;
- branding rents - derived from brand name prominence.

A number of conditions have to be met in order to capture these rents such as availability of resources, knowledge and capabilities of chain actors, the infrastructure to bring the products to a market and comparative advantage in that market. Kaplinsky (2000) underlined that access to high income yielding activities, with high added value, requires participation in global value chains aiming at markets demanding products with high added value. As discussed before, these global value chains are often supported by foreign direct investments and linked through long-term relationships.

For commodities with low value added, however, the terms of trade with developed countries are in a downwards spiral (Fitter and Kaplinsky, 2001; Kaplinsky and Morris, 2002). For example, the upstream part of the value chain for food production is not very suited for product differentiation, due to the most food chains heterogeneity of raw materials upstream in the value chain is

not exploited for serving market heterogeneity downstream in the chain. Raw materials are first made homogeneous and are differentiated again in processing and distribution stages, because of the high costs of separating and controlling various materials flows upstream in the chain (Grunert, 2006). In international value chains this upstream part is in most cases located in developing countries. Hence, this is another explanation of why only little value added production in these chains takes place in developing countries.

Traditional commodity chains such as coffee for example, increasingly show differentiation tendencies. Nowadays in Western coffee specialty stores (such as Starbucks) the cost of coffee only represents a small proportion of the price of a cup of coffee which is only 4% in the case of a cappuccino (Fitter and Kaplinsky, 2001. The remainder is in the ambiance, the brand, etc. For this type of specialty products, branding and adding additional value has become a conditional strategy to gain market share (Gereffi, 1999). Moreover, branding and labeling of developing country producers specialty products is constrained through the private-label policies of many Western supermarket chains.

Safety and quality of the product play the main role in value adding in food production. Quality can be divided into intrinsic characteristics of the product itself such as taste and color, and extrinsic characteristics of the process which cannot be measured on the product, e.g. organic or fair trade production. Since the 1990s, retailers from developed countries have defined various standards for the production and processing of food, in order to safeguard the quality and safety of end-products such as British Retail Consortium (BRC), Gobal-GAP, Safe Quality Food (SQF). Compliance with standards implies high certification costs for producers and high monitoring costs for buyers (Giovanucci and Reardon, 2001).

Finally, the value added is produced in value chains aiming at certain markets and constituting a number of actors.

4.3. Governance of Value Chain Actors

Firms in value chains are linked in a variety of sourcing and contracting relationships. The literature distinguishes two perspectives in the concept of governance of developing country value chains:

- the transaction perspective that focuses on governance of transactions in vertical bilateral relationships between firms (Rindfleisch and Heide, 1997; Williamson, 1999);
- the global value chain perspective, where power relationships, the position of the "lead-firm" and consequences of the distribution of value added are the subject of study (Gibbon et al., 2008). Gereffi (1999) defines governance as: "authority and power relationships that determine how financial, material and human resources are allocated and flow within a chain".

Transactions between firms are governed under conditions of bounded rationality and opportunism of the actors involved. Transaction characteristics are largely explanatory for governance structures in a value chain. If transaction costs are low, actors will favor market governance. If they are high, they favor contracting or integration, thereby lowering these costs. Governance forms range from market relationship, through hybrid governance forms/contracts to vertical integration or hierarchy (Williamson, 1999).

Poor physical infrastructures (storage facilities, roads, telecommunication, etc.), weak institutional infrastructures (government support, sanction systems, etc.), unbalanced relationships in trade (dependencies, opportunistic buyer behavior) and unfavorable social and political conditions lead to uncertainties and risks for developing country producers. Hence, transactions are enabled and have to be supported by exchange of information on product/service characteristics and delivery conditions. Information exchange between companies in developing countries is in many cases hampered by information asymmetries be-

tween chain partners, lacking communication infrastructures, and diffuse market channel structures which makes monitoring of transactions difficult (David and Han, 2004; Grover and Malhotra, 2003). An extremely promising development in this respect is the increasing use of communication technologies such as mobile phones, internet, etc. by producers in developing countries, enabling them to transfer information about market demands and sales opportunities (Trienekens and Willems, 2007). At the same time, in the context of the food sector the introduction of quality and certification schemes goes hand-in-hand with increased monitoring and control by, in most cases, buyers from developed countries and more integrated governance in the value chain, such as long-term contracts, thereby reducing the uncertainties stipulated above (Hueth et al., 1999). In this regard the use of standards implies reduction of coordination costs, but it may also reduce innovation capabilities that could lead to new value added, as innovation and standardization seem to be opposite forces in value chain development (Dolan and Humphrey, 2004).

Gereffi et al. (2005) recommended a categorization based on factors explaining the structure and organization of chains:

- the complexity of information and transfer of knowledge required to sustain a particular transaction, with respect to product and process specifications;
- the extent to which this information and knowledge can be codified and transmitted efficiently and without transaction-specific investment between the parties to the transaction;
- the actual and potential suppliers capabilities in relation to the requirements of the transaction.

Hence, suppliers roughly rank from commodity suppliers, delivering products through arms-length market relationships, to turn-key suppliers, delivering customer-specific products produced with advanced capabilities (Gereffi et al.,

2005). Moving from turn-key to commodity supplier information asymmetry and power balance is in most cases in favor of the developed country value chain partner (Sturgeon, 2001). The increasing supplier's capabilities and subsequent value chain de-commoditization can lead to more balanced power and bargaining relationships in such chains. Additionally, horizontal relationships, in particular farmers' cooperatives or associations increase bargaining power of small farmers and at the same time lower transaction costs for retailers associated with purchasing from smaller farms (Fitter and Kaplinsky, 2001).

4.4. Value Added Distribution

Distribution of value added over actors is strongly related to the chain's governance form and depends on the power and bargaining position of actors, information asymmetry between chain stages and the technology used in production cycle. Although inclusion in global value chains often brings a larger share of value added to developing country producers (Nadvi, 2004), prices in global markets do not automatically translate into prices for developing country suppliers. The choice of governance regime in trade relationships is strictly depends on differences in market power. A powerful party can dictate governance mechanisms (Schmitz, 1999). In this respect, small-scale producers depend in many cases on downstream parties in the chain, such as intermediaries, transporters or exporters, for input supplies and credits on the one hand and market access on the other.

Trust and number and intensity of relationships play in communities with strong social structures an important role in view of collaborative agreements between horizontal parties and a subsequent increase of bargaining power. Therefore, the embeddedness of small-scale producers in a network of social re-

lationships can provide them with the social capital to strengthen their position in the value chain (Gulati, 1998; Coleman, 1990). Trust plays an important role in both horizontal and vertical relationships. Moreover, trust is dependent on the duration of a relationship, consistency of exchanges between parties and economic and social reputation and replaces more integrated governance mechanism as a safeguard against opportunistic behavior and to keep transaction costs low.

5. Value Chain Upgrading

Kaplinsky and Morris (2001) give the following directions in which value chain actors can be upgraded:

- increasing the efficiency of internal operations;
- enhancing inter-firm linkages;
- introducing new products;
- changing the mix of activities conducted within the firm.

In turn, based on these four directions the following upgrading options are proposed by Pietrobelli and Saliola (2008): entering higher unit value market niches, entering new sectors, undertaking new productive functions and in all cases enlarging the technological capabilities of the firms. Usually, the upgrading of value chains is achieved through attention to multiple business aspects, such as combined attention to upgrading of product and process, upgrading of collaborative product in combination with contractual arrangements.

Following chapter 2.4 described above the composition of value chain analysis, we will describe the main directions of upgrading for value chain network structure, value added, and value chain governance.

5.1. Network Structure Upgrading

The network structure upgrading includes upgrading of both horizontal and vertical relationships focusing on taking part in the right market channel. The previous sections described that collaboration with horizontal partners may include joint purchasing of production inputs, joint use of production facilities and joint marketing of products. Moreover, horizontal collaboration might result in product differentiation combining value adding activities with other sectors of the economy - so called inter-sectoral upgrading. The set of studies on developing country value chains e.g. Roy and Thorat (2008), Bijman (2007), Rammohan and Sundaresan (2003) focus on upgrading of horizontal relationships through the development of producer associations and/or cooperatives. The main approaches and findings of some of these studies will be discussed by the next chapter.

Upgrading of vertical network relationships should focus on being part of the right channel aiming at the right market. Value chains of developing country are now increasingly trying to differentiate their market outlets. This in turn makes them less dependent on their current customers or industries. However, it is difficult in particular for small producers, to move to another market channel. Alternatively developing country producers might look for channels to more easily accessible markets (Humphrey, 2006).

5.2. Value Added Upgrading

Most approaches to upgrading focus on upgrading of value added production which can take various forms:

- upgrading of products and packaging;

- upgrading of processes;
- functional upgrading, insourcing production or distribution functions;
- inter-sectorial upgrading, when chain actors introduce value adding processes from other sectors to offer new products or services: for example, a farmer who enters into agro-tourism or green-tourism activities.

The upgrading of product and process is the most common in developing country value chains. Functional and inter-sectorial upgrading occur less often as most developing country producers are still commodity suppliers for value chain partners from developed countries. Humphrey and Schmitz (2002) show that inclusion in global value chains may facilitate product and process upgrading.

Value added in products upgrading is always related to potential market demands and can be related to intrinsic (product quality, composition, packaging, etc.) and extrinsic product attributes, which are related to characteristics of typical process. In the last decennia attention paid by consumers from developed countries to these extrinsic characteristics has increased considerably, leading companies to increase their attention to corporate social responsibility (CSR), ranging from issues such as labor circumstances to issues such as animal welfare. This has led to a boom in the introduction of CSR principles by industries and retailers in developed countries, offering opportunities for value added niche market production by developing country producers (Maloni and Brown, 2006).

Process upgrading focuses on the upgrading the product and on the optimization of production and distribution processes. The latter includes introduction of new technologies such as automated production and packaging lines, cooling installations and modern transportation technology as well as improved communication facilities in the supply chain such as internet connection, GPS systems or the intense use of mobile phones in production and trans-

portation planning (Francis et al., 2008).

As was discussed before, a key issue for developing country producers is functional upgrading, for example to perform value adding activities in developing countries instead of just being commodity producers of products to be upgraded in the developed customer country. Aside from in production stages of the value chain, functional upgrading can also take place in intermediary functions, such as in the export sector, where exporters can achieve a role in collection, category management, packaging and sales of products (Dolan and Humphrey, 2000).

The developments in the apparel sector are a typical example of how value adding activities have been moved from developed to developing countries leading to new and more fine-meshed industry structures worldwide. In the most cases primary processing activities are increasingly moved to developing countries. In turn, specialized processing, branding and marketing are still largely located in developed countries. Lowering of tariffs through the new WTO agreements and market differentiation by developing country producers as a response to increasing market segmentation in developed countries can support further development of value added production in developing countries (Gereffi, 1999).

5.3. Value Chain Governance Upgrading

Any modern market-oriented chain has a tendency to become shorter with involving fewer actors as intermediaries between producers and downstream parties in the chain become superfluous because of the emergence of direct trading relationships between large producers and downstream parties. The transformation of export-oriented producers to producer-exporters in some countries

to achieve the lower transaction costs and exert full control over the supply chain is a good example. Inter-company relationships in such chains are often enforced by processors or exporters transaction-specific investments to decrease delivery uncertainty and increase quality and quality consistency of deliveries. Investments in cold stores, seeds, pesticides, credits could be considered here. In general, increased collaboration of actors in value chains may increase market power and facilitate a smooth flow of products and information (Gibbon et a.l, 2008).

Quality standards and certification are in particular relevant for business relationships and are often included in contracts in many food chains. Mostly in all vertically integrated companies certification by an independent party is of less importance, although the use of standards may be required.

Business relationships are supported by agreements between the parties involved which can range from oral agreements to written contracts. A distinction can be made between a classical version of a comprehensive contract (where everything is fixed ex ante for the entire duration of the contract, covered by the law of contract) or a relational version (allowing for gaps not closed by contract law, embedded in a social system of relationships and subject to continuous re-negotiations) (Hanna and Walsh, 2008). Because there is no such thing as a "complete" contract – especially not in developing countries with weakly developed institutional structures – many companies tend to prefer relational contracts implying interpersonal relationships and trust (Giuliani et al., 2005).

Summarizing all above mentioned, the main steps toward upgrading of developing country value chains are:

- addressing markets offered opportunities for increasing value added;
- innovation in products, marketing activities, and processes;
- vertical and horizontal organizational arrangements that enable chains to capture value from markets for various chain actors.

Chapter 3

LITERATURE REVIEW AND JUSTIFICATION OF THE JOINT RESEARCH

There are many opinions in scientific literature on value chain problems and value chain function improvement and upgrading. Some of scientific bases were described in previous chapter. Detailed description of value chain issues in developing world are described below.

In the study of the Indian grape cooperative Roy and Thorat (2008) conclude that upgrading capabilities are largely related to the combined attention to innovative marketing in export markets and concurrent provision of technical assistance, inputs and information to farmers.

Fisman and Khanna (2004) who describe how the establishment of business groups in underdeveloped Indian regions may support the entire development of the region when large business groups attract supporting industries that can stimulate economic development. Such groups spread the costs of infrastructure buildings over more assets than a single firm. Therefore, these improvements could lead to more enjoyable for skilled workers to live in the area and rotation of such workers is commonly used by the groups. Additionally, these groups usually have good relationships with government in order to facilitate land-intensive projects. Finally, the establishment in less-developed regions in India is

often supported by tax reductions from the government.

Upgrading of vertical network relationships should focus on being part of the right channel aiming at the right market. In order to be less dependent on current customers developing country value chains are increasingly trying to differentiate their market outlets. Alternatively producers from developing country might look for channels to more easily accessible markets. Such, for example, South African fresh producers accessing emerging economy markets in Asia, Brazilian pork aiming at the Russian market where quality and safety demands are less severe than in the EU, or Mango producers from Burkina Faso that aim at the Niger domestic market instead of at the European market (Nadvi, 2004; Trienekens and Willems, 2007; Humphrey, 2006).

Horizontal collaboration between actors is in many cases considered an important enabler to upgrading the value chain. Mesquita and Lazzarini (2008) found that strong network ties between companies help substitute for the lack of a strong institutional setting to support arrangements between companies and in value chains. Small and medium size enterprises (SMEs) can exploit complementary competencies, share knowledge, technologies and inputs. Moreover, they are able to develop greater responsiveness to global demands and as a result to attain greater export levels. Lu et al (2008), in their study of relationship between social capital in China and performance of vegetables chains, finds that producers with tighter social relationships with other economic actors in the value chain tend to be more successful.

Giuliani et al (2005) studied relationships between clustering and innovation focusing in many countries of the Latin America. They found that upgrading of product and process may be strongly supported by knowledge and technology in related industries. In case of agriculture they are plants, seeds, fertilizers, etc. Also, public-private action through business-government-research institute collaboration can support innovation and upgrading processes in these clusters.

Insufficient government support and lack of collaboration due to mistrust (stealing of ideas) prevent cluster development – is the Murphy (2007) considered from his study on the Tanzanian furniture industry in Mwanza.

The study conducted by Umetaliev (2010) based on the principles of logistics allowed to develop an action plan in the segment of dried fruit market. He advises to identify consistently and inter-connectedly the goods, producers and consumers, create logistics centers for a single process of goods movement in the market.

Stopkca et al (2011) in their Moldovan tomato value chain analysis (for EU market) underlined among others the main problems of tomato value chain as: inability for meat market requirements for quality; Inability to supply sufficient volumes and low productivity; producers are not following instructions regarding the safe use of pesticides and insecticides and are not using proper methods and facilities for storing the pesticides and insecticides; producers have not or have a limited knowledge about effective crop protection; etc. Later, they propose some tools for avoid these and other problems in order to improve the tomato value chain, for example: need to adopt the European Catalogue for plant varieties; need to register automatically the phytosanitary products registered in EU and to simplify the registration process of the new phytosanitary products that comes from outside of EU; need to increase the capacities of seed laboratory testing; need to reform legal, regulatory, and institutional framework for food safety and phitosanitary standards; need to increase the laboratory capacity for products testing and certifications; need to revise the Custom Tariff and reduce tariffs on imported packaging materials and package; etc.

Kirimi et al (2011) studied the maize marketing and trade policy in Kenya along with the main difficulties of Kenyan maize value chain, which have been dominated by three major challenges. The first challenge concerns the classic food price dilemma: how to keep farm prices enough high to provide pro-

duction incentives for farmers while at the same time keeping them enough low to ensure access to food for poorest population. The second challenge has been how to effectively deal with food price instability, which is frequently identified as a major impediment to growth the smallholder's productivity and food security. A third challenge is the growing problem of access to land and the shrinking size of smallholder farms. In view of their aims and detected problems they propose the following policy recommendations: to raise public investment in maize seed breeding and agronomic research in order to improve it in smallholder crop productivity; to explore options for improving public and private extension programs to enable farmers to adopt improved farm technologies generated; to support training programs to enable smallholders to develop more effective marketing strategies and to negotiate more effectively with traders, in order to raise the prices that they receive for their maize; to review the rationale for denying import licenses when applied for by traders; to consider the costs and benefits from the standpoint of governments of transitioning from discretionary trade and marketing policy to adherence to more systematic rules-based policies.

Helvetas and ICCO (2013) have identified the extent to which the difficulties in accessing financial resources from processing enterprises and farmers producing raw materials for them correspond to reality, what kind of difficulties and what financial instruments are currently being used in the fruit and vegetable sector of Kyrgyzstan. For these purposes all participants in the value chain were interviewed, including farmers, processors and representatives of banks and microfinance organizations. One of the main problems that they discovered was the financial illiteracy of the participants in the value chain's lower-level. Hence, they recommend: to review the legal and regulatory framework of the financial market in terms of stimulating production and reducing administrative barriers; to reduce operational costs in the context of competition for customers

will lead to cheaper loans and increase their availability for farmers and processors of agricultural products; to organize the regular trainings, seminars for all value chain operators (especially for farmers), and to introduce a new financial tools in the courses of professional development; to jointly consult producers and representatives of banks on the development of mutually beneficial new banking products; to train bank employees in the specifics of lending to agriculture and, in particular, the fruit and vegetable sector; to introduce a very important tool as the agricultural exchange.

ICCO (2013) in their study tried to analyze the value chains of four agricultural products in the Sogd province of Tajikistan, namely apricots, tomatoes, onions, and greenhouse tomato. They mentioned that the local micro-finances institutes and supporting consulting institutions are progressing at educating and providing financial instruments to the Sogd province farmers to produce a better quality product of a larger quantity at lower cost. The agribusiness in this region is steadily developing but it also facing major issues with the streamlining the value chains. However, one of the main issues is the financial illiteracy of farmers. Moreover they found a set of problems during the production and post-harvest periods: poor planning and administration- nursery owners mix varieties and therefore they cannot guarantee the varieties they sell; poor pest management; poor irrigation; etc. Hence authors provide us by the following recommendations: to expand the orchards of those specific varieties that are best suited for drying and export; preferential loans for creating new orchards and orchards rehabilitation; micro-leasing and seasonal loans (pay as you harvest) to investment in irrigation systems: loan guarantees/direct financial support to farmers; introduction of modern technology, include aseptic packaging for fruits; purchase the processing equipment for apricot; construction the cool warehousing the export of fresh apricot; financing establishment transportation facilities to prevent loses and stabilize prices; building or renovating storage fa-

cilities for apricot; technical assistance for farmers on proper picking, sorting, pitting and drying to reduce post-harvest loses; training for farmers on efficient use of chemicals and fertilizers for successful fight against pests and diseases; conduct trainings on advanced technology of orchard cultivation; technical assistance on input use and application to prevent fungus and pest damage, plant protection; much attention needs to be paid to the issue of crop loss due to inefficient harvesting techniques, sorting, calibration, loss in storage and transportation; etc.

UNDP and Ministry for Foreign Affairs of Finland (2014) in their report on value chain of fruit and vegetable production in Tajikistan, indicated similar to previous authors recommendations and problems, the main of which are: limited access to financial resources on acceptable terms; weak development of cooperative relations in the agro-industrial complex; absence of qualified specialists capable of orienting and developing in the current market conditions; deteriorated, obsolete production lines and equipment at processing plants; inefficient use of productive capacity, as well as the production of non-competitive products; a narrow range of products; weak marketing and product promotion; complicated export-import procedures; lack of effective relationships between value chain operators; non-compliance of the produced products with international quality and food safety standards; etc.

Itibaev in his report dedicated to the value chain analysis for dried apricot in Tajikistan (2010a) and report dedicated to value chain analysis for potato in Kyrgyzstan (2010b) indicated the main problem as a lack of knowledge and use of modern technologies in fruits and vegetables growing and processing. Moreover the inadequate regional and state supporting from the government born untrusting relationship between farmers and supporting organization that makes these problems deeper. Itibaev (2010a; 2010b) proposes to conducts special and technical courses/trainings for local producers and processors such as:

“start your business”; agricultural marketing; innovative methods for growing, storing, transporting, sorting, packaging, processing of agricultural products; assistance in branding of local products and their sale through sustainable distribution channels through a new created procurement terminal; renovation of orchards by organizing nursery of fruits varieties seedlings and through the local supporting organizations such as “Agroprom”; diversification of products - expansion of the range of final products.

CER and UNDP (2016) analyzed the main fruit and vegetable production of Uzbekistan. They described the major problems of fruit and vegetable value chain as: complicated export control procedures; limited access to financial resources for producers and exporters; disadvantages in export insurance system; licensing of procurement organizations; insufficient volumes for storage of agricultural production; inadequate packaging of fruits and vegetables; incompleteness of quality assessment and certification system for export products; etc. In turn they recommend: the formation of a modern logistics system through the creation of multimodal trade and logistics centers, geographically by the main centers of production of fruits and vegetables; to develop the promotion of brand ″Made in Uzbekistan″ which is widely known in the CIS countries, but few known in far-abroad countries; to create a new system of certification and standardization of fruit and vegetable products, a system of laboratories for certification of these products, equipped with modern equipment; to abolish the excise tax and reduce customs payments for imported intermediate materials and raw materials.

In addition, Yuldashbaev and Paulson (2014) in their short report on fruit and vegetable industry analysis of Uzbekistan underlined that one of the major problems existing in this sector is postharvest losses resulting from improper harvesting (damage during harvesting), poor handling, poor hygiene in packaging, and inadequate storage after harvesting. They mentioned that Uzbekistan’s fruit

and vegetable industry needs newer technology and equipment related to cooling, processing, packaging and storage to improve the quality and longevity of fruits and vegetables. Integrated chains of production need to be introduced to maintain the cold chain and utilize new technologies and best practices throughout production, transportation, processing and storage of sensitive categories of fruit and vegetables to improve quality, safety and efficacy. Moreover, they observed a high demand for packaging materials, such as cardboard, paper, glass, aluminum foil, and shrink wrap, but these materials are not produced in the country. Small scale processing equipment is in demand and is more affordable for small businesses.

All above mentioned literature gave us a set of ideas and possibility to choose the own “red line” for conducting JR.

Chapter 4

METHODOLOGY, DATA COLLECTION AND PROCESSING

This chapter describes the process of data collection. The first part consists of the study design and sampling design. The second part describes the methods of primary data collection and contains the description of developed questionnaire and procedures of interviewing. Secondary data collection and its sources are indicated in the third section. The overview of data processing steps and techniques is discussed in the last section of this chapter.

1. Study design and sampling design

Study area selection

Five regions of Samarkand province of Uzbekistan were selected as the study area: Ishtikhan, Payaryk, Samarkand, Tailak and Urgut. Moreover, following the statistic data obtained we decided to include Samarkand city as well.

The main selection criteria were that each of these regions is one of the biggest cherry producers in Samarkand province. Preliminarily, on the stage of in-

ception report, other regions were chosen. Later they were changed because they did not correspond the main objectives of the JR.

Sampling units and sampling size

The dehkan farms and farms were selected as sampling units of the JR so far it corresponds to research objectives and KREI requirements.

As was mentioned before, dehkan farm is a family small-scale farm that produces and sells agricultural products on the basis of the personal labor of family members on the household plot granted to the family head for lifelong inheritable possession. Farm is an independent economic entity, leading a commodity agricultural production using leased land plots for horticulture, viticulture, vegetable growing and cultivation of other crops.

Initially 128 dehkan farmers and 45 farmers were interviewed by questionnaires. Later it was found that answers of 8 dehkan farmers and 5 of farmers were incomplete, hence not applicable for analyses. Thus, 120 dehkan farms and 40 farms in total were investigated.

Sample recruitment

The "snowball effect" was selected as an instrument for sample recruitment. This method involves using informants to identify cases that would be useful to include in the study. "Snowball effect" uses insiders' knowledge to maximize the chance that the respondents included in the final sample are strong cases to include in research (Lewis-Beck et al., 2004). In the case of our JR, every asked farmer or/and dehkan farmer suggested to address the investigators to the following farmer.

Field study steps and procedures

Before starting primary data collection, several meetings with representatives

of local authorities on different levels took place in the study area. Moreover, statistic committees of Samarkand province and its regional branches were visited in order to obtain secondary data on cherry. Main general secondary data needed for the JR was obtained from these sources. Group discussions on cherry value chain conducted and moderated by the JR team members and in order to get deep information for conclusions and recommendations.

2. Primary data collection – the field study

Primary data collection was conducted by the JR team members in each study region during the field study from May 2017 to July 2017. This period was chosen non-randomly. Exactly this period is the season of cherry maturation and harvesting.

Primary data was collected through the interviewing households by the semi-structured questionnaire, which was pre-tested in the end of May 2017 in order to modify and/or abort some questions. It is also necessary for proving the understandability of all questions for obtaining best results. In a majority of cases the heads of dehkan farm and farm were interviewed.

The completed questionnaire consists of the following information: farm size; main cherry varieties produced; yield; sales/export quantity and destination; production process; post-harvest process; and quantitative data and opinions of respondents (see Appendix 1).

The household questionnaires have been developed in English at first in order to be approved by KREI. Then it was translated to Uzbek in order to increase the understandability of all questions for respondents. After completing all questionnaires and upon their retrieval, the analyses have been made in English. Hence, all answers were translated into English again.

3. Data processing

Before starting any kind of analysis it is necessary to input all data collected through questionnaires into the database in digital form. Therefore, a selection of computer software is required. For these purposes the Microsoft Office Excel for Windows 2007 was used. Microsoft Office Excel for Windows 2003 was used to combine the data from the questionnaire and in order to be later manipulated and analyzed.

Chapter 5

OVERVIEW OF AFRICULTURE IN UZBEKISTAN AND IN JR AREA

1. General overview of Uzbekistan

Uzbekistan has a border with Tajikistan, Turkmenistan, Kyrgyzstan, Kazakhstan and Afghanistan. Uzbekistan has an area of 450 000 square kilometers, similar in size to Morocco or California, and is a so-called double land-locked country completely surrounded by countries that also do not have direct access to the sea (see Figure 5.1). It has a dry arid climate with agriculture restricted to 11 percent of intensely cultivated and irrigated river valleys (ADB, 2004). The population is estimated to be 32 million and of which nearly 52 percent live in densely populated rural areas (UzStat, 2016). Uzbekistan is recognized as one of the world's biggest producer and exporter of cotton. The country is also a large producer of gold, oil and gas, and a significant producer of minerals and machinery (UzStat, 2016).

〈Figure 5.1〉 The map of Uzbekistan

Uzbekistan gained its independence from the Soviet Union in 1991 and since that time the government has embarked on its own cautious transition to a market oriented economy while maintaining features of the old Soviet command economy with subsidies, trade restrictions and tight controls on production and prices. Although the transition is not completed, cumulatively Uzbekistan is recognized as having achieved respectable progress (ADB, 2004).

Uzbekistan's economy declined after 1991 during the first years of transition but recovered after 1995 as the cumulative effect of policy reforms took effect and positive growth occurred. Gross Domestic Product (GDP) grew at an annual rate of four percent between 1998 and 2003 and then increased to seven per-

cent - eight percent.

According to the World Organization of Creditors, the Uzbekistan economy was almost unaffected by the global economic crisis of 2008/2009. In 2008-2010, Uzbekistan GDP increased by 8.1-9.0 percent, due to favorable commodity prices and government stimulus package. Nevertheless, the Uzbekistan economy still faces such important issues as increasing inflationary pressures and the increasing role of government in the economy (WOC, 2012).

Uzbekistan is predominantly a rural society and agriculture has always been and is nowadays the dominant sector of the country's economy. While more than a half of Uzbekistan's population lives in rural areas, agriculture employs around 60 percent of the rural population and 35 percent of the total active population in the country. The share of agriculture is nearly 17 percent of Uzbekistan's GDP. The export of agricultural production (in particular of cotton fiber) accounts for approximately 40 percent of total exports (UzStat, 2016). Agriculture is also the key source of government revenue, primarily through cotton production and taxation. Moreover, the processing of primary agricultural output (food processing, dairy products production, cotton processing, etc.) represents a significant part of industrial activities and contributes to about 5 percent of the GDP.

Main agricultural areas are located in the basins of the Amu Darya and the Syr Darya rivers which supply about 70 percent of irrigation water. Large expansion of irrigated lands during 1960s to late 1980s resulted in excessive water takeoff from these rivers causing drying out of the Aral Sea, increasing soil salinity, and other adverse environmental impacts (ADB, 2009).

Uzbekistan's crop sector is dominated by cotton and by wheat, which are also called "strategic crops" or "state order crops". Approximately sixty percent of the value of agricultural production comes from the crop sector and the remainder from the livestock sector. Cotton is the most important crop

economically. This “strategic crop”, produced in irrigated areas throughout the country, accounts for about forty percent of cultivated land and makes up about forty percent of export earnings (UNDP, 2010). It makes Uzbekistan the fifth largest cotton producer and the second largest cotton exporter in the world.

Since declaring independence and as a result of the self-sufficiency food policy adopted by the Uzbek government, the wheat was admitted as the second “strategic crop”. It accounts for about thirty percent of the cultivated area (UNDP, 2010). The rest of the cultivated area is used for growing fruits and vegetables. Uzbekistan continues to be one of the major suppliers of fresh and processed fruits and vegetables in Central Asian region (WFP, 2008).

The state maintains tight control over the production of cotton and wheat, but state planning controls on all other crops have been removed allowing farmers individual choice regarding production. For cotton the state order is a hundred percent of production, while for wheat it is fifty percent (i.e. another fifty percent of production can be sold on the open market). The amount of the state order for cotton and wheat is fixed by the government annually and refers not only to the quantity of each crop to be produced in each region but also the crop areas to be assigned to these two crops. At the regional and local levels, these overall quotas are broken down into specific quantities and areas for each farm (SDC, 2011).

In addition to setting quotas for the production of cotton and wheat, the state also controls inputs through the annual credits (state loans) for production costs. These are tied to specific quantities of the various inputs and disbursement of the funds is controlled by the bank where the farmer’s account is located. The whole system is detrimental to improving productivity because the farmer has little flexibility to vary inputs according to the particular needs of his land or to adjust methods to improve outputs (SDC, 2011).

The production of all other crops are not controlled by the state, but since

the state order specifies area as well as output, many farmers do not have land available (or only small areas) for other, often more profitable crops. Some farmers are able to grow second crops on some of the wheat area after the wheat has been harvested, if irrigation water is available. Restrictions on the availability of water, however, means that the extent of this practice appears to be limited (ADB, 2009).

Animal husbandry in Uzbekistan is specialized not only in production of foodstuffs as meat, dairy products and eggs, but also in the production of raw materials that include cocoons of mulberry silkworms and karakul (sheep's fell) that are highly demanded in the world markets (WFP, 2008).

Summarizing all above mentioned, Uzbekistan's agricultural policy has been determined by several objectives: stabilization of cotton export revenues; achieving self-sufficiency in wheat production; insuring government revenues through implicit taxation of agricultural products (cotton and wheat) and keeping low food prices on local market. To achieve these objectives the Uzbekistan government has adopted a slow and regulated approach to land reform, and has maintained state controls over the production, procurement, pricing and marketing of "strategic crops". The government has also maintained the state monopoly on the supply and marketing of agricultural inputs, and restricted trade by banning exports of key agricultural commodities (cereals and livestock) and importing most key foods (sugar, vegetable oils) in a centralized manner through a state trading company. Thus, the liberalization of production and domestic markets has been limited to some agricultural sub-sectors such as livestock, fruits and vegetables (World Bank, 2003; ADB, 2009).

1.1. Land fund and qualitative evaluation of irrigated land in Uzbekistan

Based on data from the State Committee Goskomgeodezkadastr land fund of the Republic of Uzbekistan (as of 01 January 2017) is 20 147 thousand ha, with the distribution by land use as is shown in table 5.1 below.

〈Table 5.1〉 Land fund of Uzbekistan (thousand ha)

Total Land Area,	20 174.0
including:	
- agricultural lands	15 483.4
- household plots	618.2
- others (forest plantations, etc.)	4 072.4
Irrigated agricultural lands	3 708.8
Total land under agricultural crops	3 706.7

Source: State Committee Goskomgeodezkadastr of the Republic of Uzbekistan (2017)

Bonitet score is the qualitative index of soil fertility that takes into account soil humus content, soil texture, salinity and other parameters. It is needed for calculation of the unified land tax and prediction of crop yields. Table 5.2 shows that based on 2011 evaluation of Scientific-Research Institute of Soil Science and Agro-chemistry, the average bonitet score of irrigated land in Uzbekistan was 55 points.

〈Table 5.2〉 Land quality in Uzbekistan

Indices	Bonitet Score	Land Area, ha	Share, %
Irrigated lands		3 665 546	100
Including: Marginal lands	01-20	1 968	0.1
Below medium quality	21-40	736 294	20.1
Medium quality	41-60	1 875 058	51.2
Good quality	61-80	977 211	26.7
Best quality	81-100	75 015	2.0

Source: Scientific-Research Institute of Soil Science and Agro-chemistry (2011)

1.2. Categories of agricultural commodity producers in Uzbekistan

There are three categories of agricultural commodity producers in Uzbekistan:

- Dehkan farm is a family small-scale farm that produces and sells agricultural products on the basis of the personal labor of family members on the household plot granted to the family head for lifelong inheritable possession. Dehkan farm has usually small and represents by 0.35-0.5 ha each.
- Farm is an independent economic entity, leading a commodity agricultural production using leased land plots for horticulture, viticulture, vegetable growing and cultivation of other crops. Farms could have an area no less than 5 hectares.
- Limited liability company (LLC) is an economic company established by one or several persons, the authorized fund (authorized capital) of which is divided into the shares determined by the constituent documents. LLC can have any size of land leased by the state and has a right to use this land not only for the purposes of agricultural production, but also for the location of the entire infrastructure of the production/processing chain to

the final desired product.

Farms are the main producers of agricultural production in Uzbekistan. As a result of land plots optimization conducted in 2016, number of farms in Uzbekistan in 2016 was 101 070. Table 5.3 below shows that the average size of land plot per one farm is 36.1 ha. And the biggest farm size is observed in cotton and wheat produced farms.

〈Table 5.3〉 Number and average area of farms in Uzbekistan

	Number	Average farm area, ha
Total	101 070	36.1
Cotton and wheat growing farms	60 695	52.7
Vegetables and melons growing farms	3 655	8.1
Orchards and vineyards farms	24 730	6.8
Livestock farms	6 572	31.2
Others	5 418	8.3

Source: Decree of the Cabinet of Ministers of the Republic of Uzbekistan No. 362, dated 15 December 2015

As it shown in table 5.3, cotton and wheat growing farms have an average area of 52.7 ha. Vegetables and melons farms – 8.1 ha and orchards and vineyard farms have an average area of 6.8 ha.

Number of dehkan farms in Uzbekistan in 2016, was 4 681 378. Average size of land plot per one dehkan farm is 0.18 ha for growing agricultural crops, orchards and vineyards. Mainly dehkan farms produce livestock products, potato, vegetables and fruits.

1.3. Crop distribution and cropping pattern in Uzbekistan

Irrigated land area under crops for all producers' categories was 3637.4 thousand ha in 2016. Cropping pattern was as follows: 46.4 percent of cereals, 34.8 percent of cotton, 2.3 percent of potato, 5.7 percent of vegetables, 1.6 percent of melons, and 9.2 percent of forage crops.

Distribution of the total crops planting area among farms, dehkan farms and LLC is 84.7 percent, 15.4 percent and 17.5 percent respectively.

The main crops in the Republic of Uzbekistan are cotton and wheat, and 87.6 percent of total planted area is under these crops. As it shown in table 5.4 below the area under cereals in 2016 was 1689.4 thousand ha with an average yield of 4.5 ton/ha. Share of farms in total production of cereals and cotton is 85.4 percent and 99.2 percent respectively.

〈Table 5.4〉 Crops area, yields and gross production by all producers' categories in Uzbekistan in 2016

	All Producers' Categories	Including:			All Producers' Categories	Including:		
		Farms	Dehkan Farms	LLC		Farms	Dehkan Farms	LLC
	Total Planted Area (thousand ha)				Yield (ton/ha)			
Cereals	1689.4	1442.4	210.6	36.4	45.0	4.37	5.69	2.77
Incl: Wheat	1446.1	1255.3	169.6	21.2	47.9	4.66	5.98	2.98
Cotton	1265.1	1255.6	0	9.5	23.4	2.34		1.55
Potato	84.6	18.1	65.7	0.8	225.1	21.29	22.87	20.5
Vegetables	206.0	75.3	127.4	3.3	271.1	25.89	28.08	17.16
Melons	58.8	31.7	25.9	1.2	209.4	19.74	22.67	14.59
Forage crops	333.5	257.7	44.3	31.5	n/a	n/a	n/a	n/a
Total crops area	3637.4	3080.8	473.9	82.7				
Fruits and Berries	279.6	172.0	84.1	23.5	134.5	10.39	19.43	6.02
Vineyards	131.2	85.4	41	4.8	142.3	11.61	20.01	8.01

	All Producers' Categories	Including: Farms	Dehkan Farms	LLC	All Producers' Categories	Including: Farms	Dehkan Farms	LLC
	Gross Production (thousand ton)				Share of Planted Area (%)			
Cereals	8261.3	6640.4	1514.0	106.9	100	85.38	12.47	2.15
Incl: Wheat	6934.9	5845.8	1024.3	64.8	100	86.81	11.73	1.47
Cotton	2959.0	2944.3	0	14.7	100	99.25	0	0.75
Potato	2958.4	684.8	2251.5	22.1	100	21.39	77.66	0.95
Vegetables	11275.8	3925.7	7253.3	96.8	100	36.55	61.84	1.60
Melons	2044.9	1013,5	999,3	32,1	100	53,91	44,05	2.04
Forage crops	n/a	n/a	n/a	n/a	100	77.27	13.28	9.45
Fruits and Berries	3042.8	1393.1	1586.9	62.8	100	84.70	13.03	2.27
Vineyards	1735.8	921.4	788.8	25.6	100	61.52	30.08	8.40

Source: State Statistics Committee of the Republic of Uzbekistan (2016)

There are perennial plantations in Uzbekistan with 279.6 thousand ha of orchards and 131.2 thousand ha of vineyards. Farms possess 45.8 percent of orchards and 53.1 percent of vineyards. The rest of plantations area belongs to dehkan farms. The average yield of orchards and vineyards is 13.5 ton/ha and 14.2 ton/ha respectively.

2. General overview of Samarkand province

Samarkand province is located in the central part of Uzbekistan in Zerafshan river basin. It borders to Navoi province on the North-West, to Djizak province on the North-East, to Kashkadarya province on the South and to the Republic of Tajikistan on the East. The province's center is Smarkand city. The area of Samarkand province is 16.77 thousand square km. As of 01 January 2017, the

total population is 3651.7 thousand inhabitants, including 1389.1 thousand (38.04%) of urban and 2262.6 thousand (61.96%) of rural population. Population density in Samarkand province is 217.8 people per square km.

2.1. Land fund and qualitative evaluation of irrigated land in Samarkand province

Based on data from the State Committee Goskomgeodezkadastr land fund of the province (as of 01 January 2017) is 1504.6 thousand ha, with the distribution by land use described in table 5.5.

〈Table 5.5〉 Land fund of Samarkand province (thousand ha)

Total Land Area,	1 504.6
including:	
- agricultural land area	1 227.3
- household plots	79.4
- others (forest plantations, etc.)	197.9
Irrigated agricultural lands	309.3
Total land area under various crops	359.0

Source: State Committee Goskomgeodezkadastr of the Republic of Uzbekistan (2017)

Table 5.6 shows the average bonitet score of irrigated land by the Samarkand province is 59.3. It is enough high score in comparison with the average Uzbek score of 55.

〈Table 5.6〉 Land quality in Samarkand province

Indices	Bonitet Score	Land Area, ha	Share, %
Irrigated lands		306 406	100
Including: Marginal lands	01-20	0	0
Below medium quality	21-40	10 713	3.5

Indices	Bonitet Score	Land Area, ha	Share, %
Medium quality	41-60	158 667	51.8
Good quality	61-80	121 624	39.7
Best quality	81-100	15 402	5.0

Source: Scientific-Research Institute of Soil Science and Agro-chemistry (2011)

2.2. Agricultural commodity producers in Samarkand province

Farms of the Samarkand province are the main producers of agricultural production. The number of farms in province in 2016 was 12.641. Average size of land plot per one farm is 32.1 ha.

Information on number of farms in Samarkand province's districts is presented in table 5.7 below.

〈Table 5.7〉 Number and average area of Farms in districts of Samarkand province

	Districts	Total Number of Farms		Including:			
				Vegetables and melons growing farms		Orchards and vineyards farms	
		Number of farms	Average farm area, ha	Number of farms	Average farm area, ha	Number of farms	Average farm area, ha
1	Akdarya	775	29.0	68	5.5	168	9.6
2	Bulungur	1730	17.1	308	6.9	255	9.0
3	Djambay	1203	24.4			94	8.5
4	Ishtikhan	954	34.2	46	7.1	324	9.9
5	Kattakurgan	782	61.5			81	9
6	Koshrabat	329	48.3			101	9
7	Narpay	451	59.5			64	9
8	Nurabad	552	81.6	5	5.6	22	9
9	Payaryk	1310	36.1			217	9
10	Pastdargom	1534	31.9	1	5.1	511	8
11	Pakhtachi	482	38			76	9.7
12	Samarkand	617	14			283	9.8
13	Tailak	867	17			68	8.3
14	Urgut	1055	20			258	9.6
	Samarkand province, Total	12641	32	428	6.7	2522	9.3

Source: Decree of the Cabinet of Ministers of the Republic of Uzbekistan No. 362, dated 15 December 2015

Number of dehkan farms in Samarkand province in 2016 was 511151. Average size of land plot per one dehkan farm is 0.18 ha for growing agricultural crops, orchards and vineyards.

2.3. Crop distribution and cropping pattern in Samarkand province

In 2015, irrigated land area under crops for all producers' categories was 345.9 thousand ha. Cropping pattern was as follows: 53.5 percent of cereals, 26.0 percent of cotton, 3.8 percent of potato, 8.6 percent of vegetables, 0.9 percent of melons, and 7.3 percent of forage crops.

Distribution of the total crops planting area among farms, dehkan farms and LLC is 82.3 percent, 20.2 percent and 6.6 percent respectively.

The main crops in Samarkand province as in whole Uzbekistan are cereals and cotton and 86.2 percent of the total planted area is under these crops. As can be seen from table 5.8 below in 2016 area under cereals in Samarkand province was 185.0 thousand ha with an average yield of 4.59 ton/ha.

Share of farms in the total production of cereals and cotton is 79.5 percent and 99.7 percent respectively.

〈Table 5.8〉 Crops area, yields and gross production by all producers' categories in Samarkand province in 2016

	All Producers' Categories	Including:			All Producers' Categories	Including:		
		Farms	Dehkan Farms	LLC		Farms	Dehkan Farms	LLC
	Total Planted Area (thousand ha)				Yield (ton/ha)			
Cereals	185.0	155.9	26.2	2.9	45.9	4.32	6.48	2.10
Incl: Wheat	172.1	146.2	23.6	2.3	46.9	4.46	6.43	1.91
Cotton	89.8	89.5	0	0.3	24.2	2.42		2033
Potato	13.0	3.2	9.8	0	291.2	29.28	29.10	18021

	All Producers' Categories	Including:			All Producers' Categories	Including:		
		Farms	Dehkan Farms	LLC		Farms	Dehkan Farms	LLC
Vegetables	29.9	17.5	12.2	0.2	309.3	30.44	31.95	10.19
Melons	3.0	1.7	1.3	0	232.5	24.37	22.29	2.79
Forage crops	25.2	16.9	7.9	0.4	n/a	n/a	n/a	n/a
Total crops area	345.9	284.7	57.4	3.8				
Fruits and Berries	37.3	18.7	11.1	7.5	136.6	11.95	17.17	10.18
Vineyards	39.0	29.1	9.0	0.9	157.7	13.69	23.87	5.46
	Gross Production (thousand ton)				Share of Planted Area (%)			
Cereals	875.6	696.7	172.7	6.2	100	84.27	14.16	1.57
Incl: Wheat	808.3	651.9	151.9	4.5	100	84.95	13.71	1.34
Cotton	217.4	216.7	0	0.7	100	99.67	0.00	0.33
Potato	619.2	185.2	433.4	0.6	100	24.62	75.38	0.00
Vegetables	1767.9	1020.6	742.1	5.2	100	58.53	40.80	0.67
Melons	123.4	61.5	61.7	0.2	100	56.67	43.33	0.00
Forage crops	n/a	n/a	n/a	n/a	100	67.06	31.35	1.59
Fruits and Berries	413.3	204.0	184.6	24.7	100	82.31	16.59	1.10
Vineyards	607.1	396.9	205.3	4.9	100	50.13	29.76	20.11

Source: State Committee on Statistics of the Republic of Uzbekistan (2016)

There are perennial plantations in Samarkand province with 37.3 thousand ha of orchards and 39.0 thousand ha of vineyards. Farms possess 49.4 percent of orchards and 65.4 percent of vineyards. The rest of plantations area belongs to dehkan farms. The average yield of orchards and vineyards is 13.7 ton/ha and 15.8 ton/ha respectively.

Summarizing all data described above, it is interesting to observe the share of Samarkand province in total planted area and fruits production in Uzbekistan. The dynamics of planted area and fruits production in Uzbekistan and particularly in Samarkand province shown in table 5.9.

〈Table 5.9〉 Production and plant area of fruits in Uzbekistan

		Plant area (thousandha)	Gross Production (thousand ton)
2011	Uzbekistan, total	244.3	1878.8
	Samarkand province	30.5	251.2
	Share of Samarkand province, %	12.5	13.4
2013	Uzbekistan, total	254.6	2261.1
	Samarkand province	30.2	300.7
	Share of Samarkand province, %	11.9	13.3
2016	Uzbekistan, total	279.6	3042.8
	Samarkand province	37.3	413.3
	Share of Samarkand province, %	13.3	13.6

Source: State Statistic committee of Uzbekistan (2016)

As it seen, the planted area of fruits is increasing from year to year: from 244.3 thousand ha in 2011 up to 279.6 thousand ha in 2016. In the same time, the share of Samarkand province in Uzbek planted area is more or less stable.

3. Cherry industry in Uzbekistan

Today, Uzbekistan is Central Asia's largest producer of fruit and vegetables. In recent years, the country has grown into a major exporter of fruit and vegetable products. Previously, they were traditionally delivered mainly to Russia, Kazakhstan and other CIS countries, while today they are shipped to the markets of over 120 countries. The map of supplies has expanded largely due to the establishment of exports to Indonesia, Norway, Mongolia, Saudi Arabia, Slovakia, USA, Thailand, and Japan.

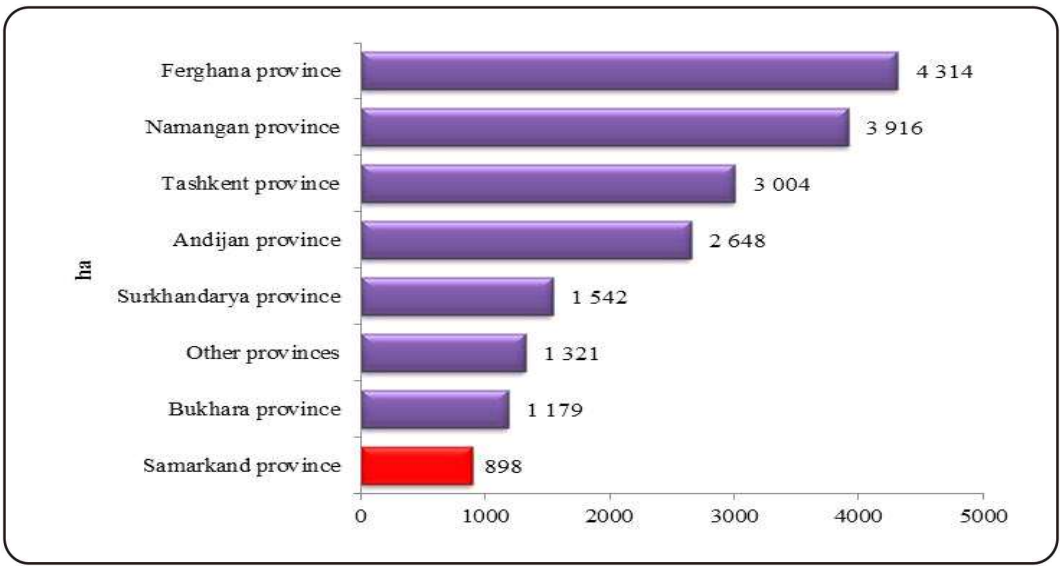
Currently, Uzbekistan is on the fifth place in the world on the volume of cherry production. Annually, Uzbekistan produces 100,000 tons of cherries a

year, of which at least 30 percent exported to CIS and other countries.

According to the marketing researches, fresh and dried fruits and vegetables are in high demand in Baltic countries, European and South-East Asian countries. Currently, the Uzbek companies are working to find new foreign partners for shipment of fresh fruits and vegetables from Uzbekistan to the United Arab Emirates, Japan, South Korea, France, Germany and other states.

Figure 5.2 explores the main producers of cherry in Uzbekistan. As it shown, the biggest planted area of cherry is situated in Ferghana Valley combined Ferghana, Namangan and Andijan provinces, which poses respectively the first, the second and the fourth place within Uzbekistan by cherry planted area and occupied more than 11 thousand ha. Then Tashkent, Surkhandarya and Bukhara province are stated. Samarkand province is in the middle of the list with only 898 ha of cherry.

〈Figure 5.2〉 The main producers of cherry in Uzbekistan



Source: State Statistic committee of Uzbekistan, 2016

In 2016, Uzbekistan exported cherries for over US$50 million. According to Uzagroexport, the figure will grow next years.

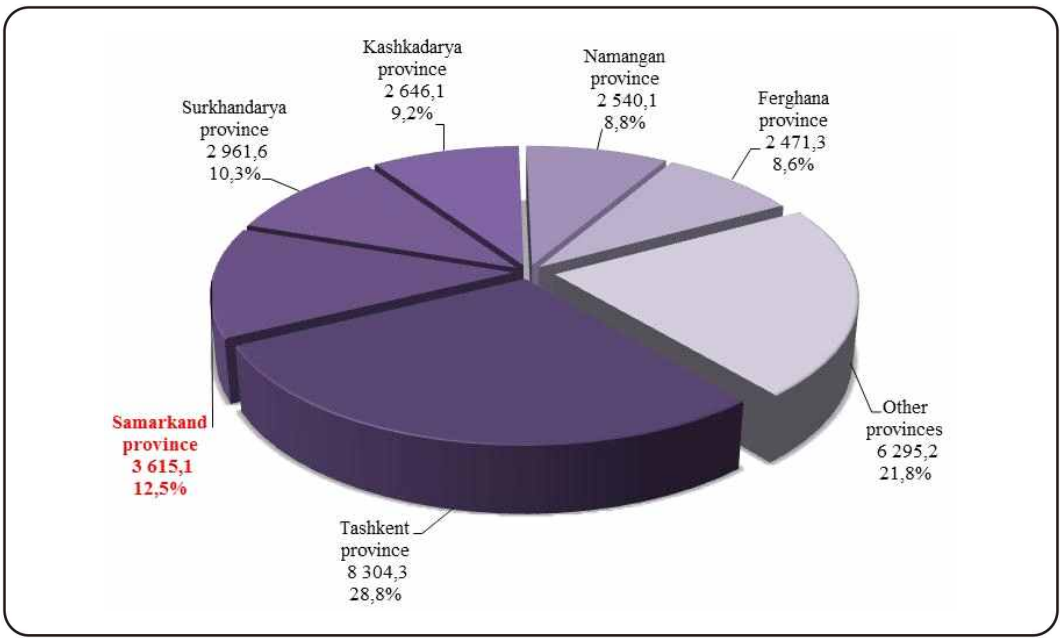
At the same time, Uzagroexport together with interested bodies is working on increasing the volume of exports, but also on diversifying and expanding the geography of exports of the Uzbek cherry.

In 2017, Uzbekistan exported cherries to such countries as Great Britain, the United Arab Emirates and other countries along with main export markets.

Figure 5.3 shows the main exporters of cherry from Uzbekistan.

Hence, Tashkent province is the biggest exporter of cherry from Uzbekistan due to the high yield of cherry and its geographical statement – it is situated on the border with Kazakhstan. Tashkent province share 28.8 percent of total exported cherry following by Samarkand and Surkhandarya provinces accordingly shared 12.5 percent and 10.3 percent.

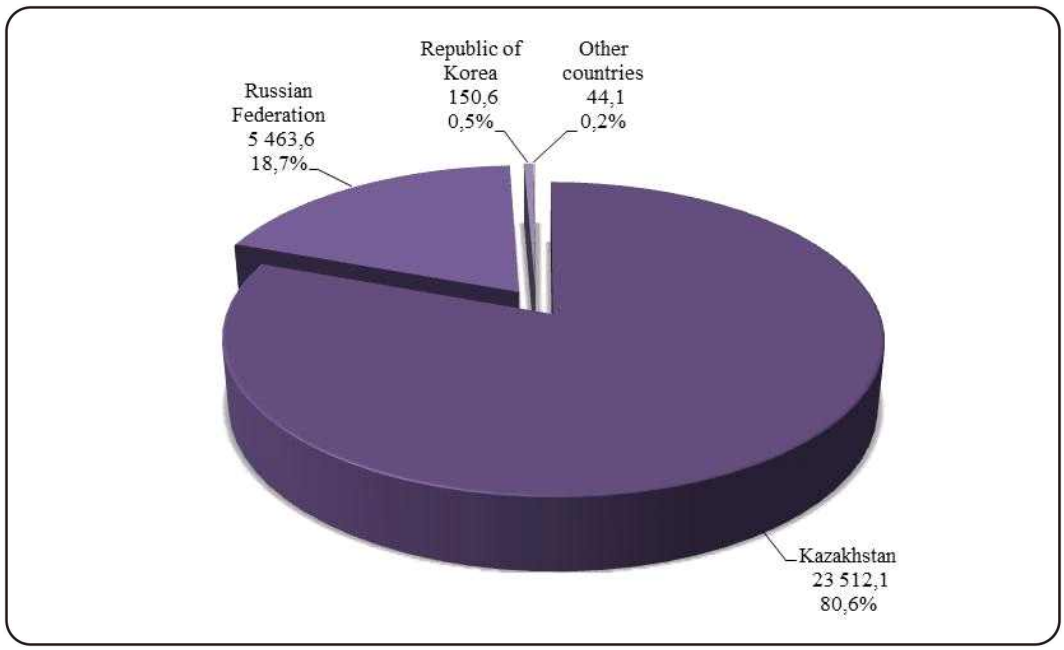
〈Figure 5.3〉 Export of Uzbek cherry by provinces in 2016



Source: State Statistic committee of Uzbekistan, 2016

The main destinations of cherry export are indicated in figure 5.4.

〈Figure 5.4. Export of Uzbek cherry by destination in 2016



Source: State Statistic committee of Uzbekistan, 2016

Here it is clear seen that the main importers of Uzbek cherry in 2016 are Kazakhstan and Russia, accordingly imported 80.6 percent and 18.7 percent. And only 0.5 percent or 150 tons were exported to South Korea, which is very perspective market for Uzbek cherry as well as for other fruits and vegetables.

After careful study of the requirements of the Korean side, the ban on export of Uzbek cherries to South Korea was removed in 2017. Uzbekistan signed contracts on export of cherries and started to shipment.

Korean partners appreciated the quality of Uzbek cherries and plan to expand the range and volume of imports of fruit and vegetable products. In particular, an agreement has been reached for export of garnet and melon fruits.

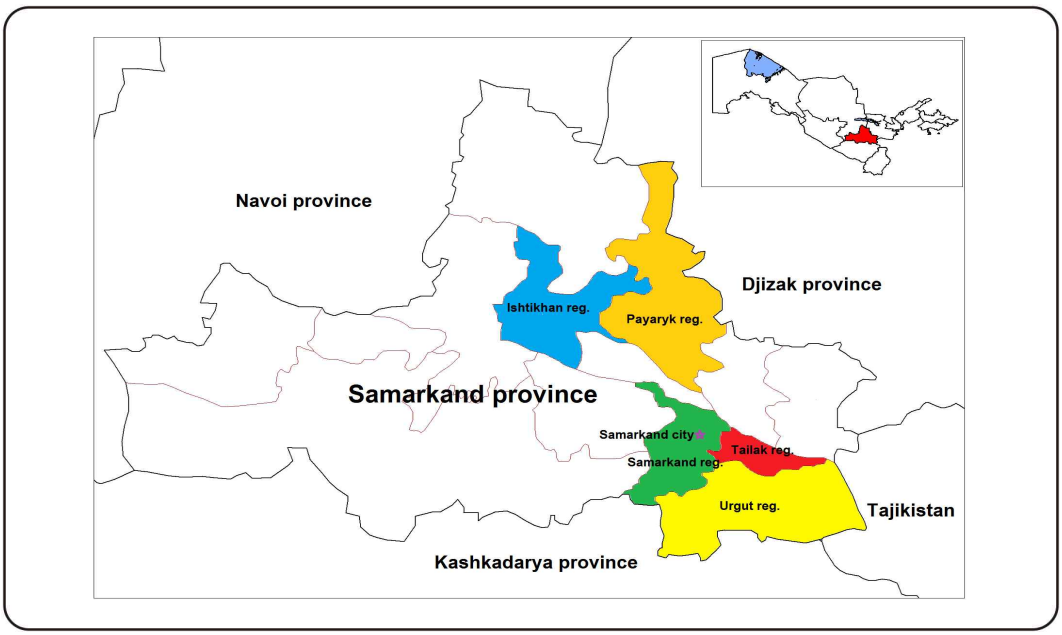
4. Cherry industry in Samarkand province

4.1. Joint research area

As it was mentioned before, the JR area is situated in Samarkand province and consists (see figure 5.5):

- Ishtikhan region;
- Payaryk region;
- Samarkand region;
- Tailak region;
- Urgut region;
- Samarkand city.

〈Figure 5.5〉 Geographical position of the JR area.



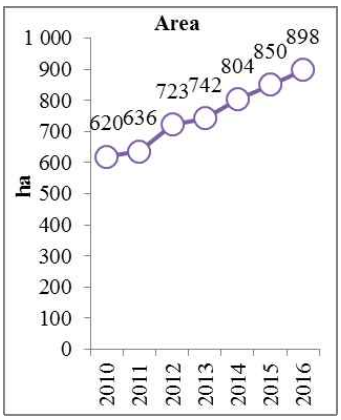
Source: www.gov.uz; www.samarkand.uz

These regions have been selected not randomly. According to UzStat (2016) these are the main cherry producers in Samarkand region.

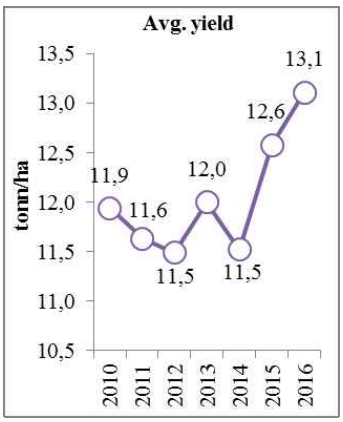
4.2. Cherry production and export in Samarkand province

The area planted by cherry in Samarkand province is continuously increasing from year to year. Figure 5.6 shows that it rises from 620 ha in 2010 to 898 ha in 2016.

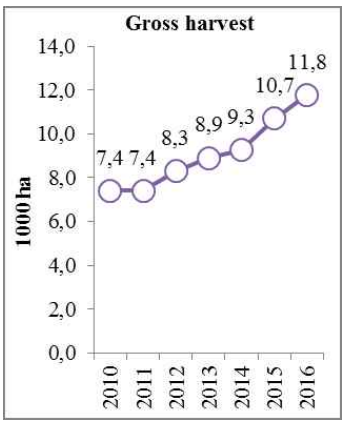
〈Figure 5.6〉 Cherry planted area in Samarkand province



〈Figure 5.7〉 Average yield of cherry in Samarkand province



〈Figure 5.8〉 Gross harvest of cherry in Samarkand province



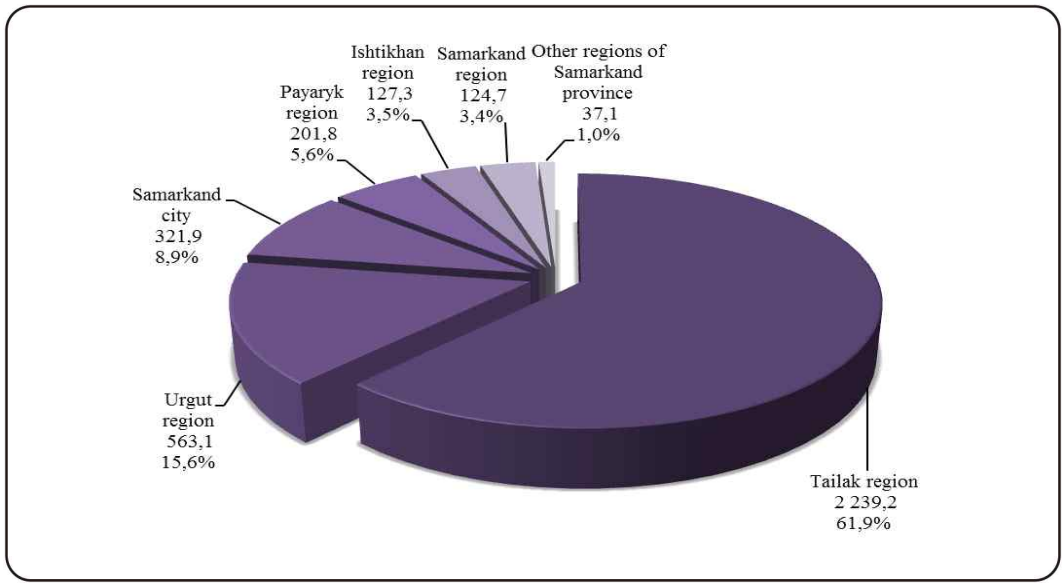
Source: State Statistic committee of Uzbekistan, 2016

Average yield in Samarkand province is defined as stable. Despite a few years as 2012 when the water scarcity was observed and 2014, when there were unexpected spring frosts and heavy rains. Figure 5.7 shows the average yield of cherry from 11.5 to 13.1 ton per ha, depending on the season, variety of cherry and other factors.

Due to the planted area increasing, the gross harvest of cherry is also increased. Figure 5.8 shows that the gross harvest of Samarkand cherry was increased from 7.4 thousand ton in 2010 and 2011 to 11.8 thousand ton in 2016. The rising of the gross harvest also can be explained by renovation of cherry orchards by new modern varieties of cherry trees, fully following the agro-technologies, increasing of farmers' knowledge, and so on.

Moreover, thanks to increasing of gross harvest, farmers from the JR area got the possibility to export their cherry abroad. Figure 5.9 shows that the main exporter of Samarkand province is Tailak region which exports 61.9 percent of all Samarkand cherry basically to Russia. The second place is occupied by Urgut region with 15.6 percent followed by Samarkand city where in general dehkan farms are the main producers of cherry. Other than JR area regions of Samarkand province exports only 1 percent of all cherry produced what is confirming the correct choice of JR area.

〈Figure 5.8〉 Export of Samarkand cherries by regions in 2016, ton



Source: State Statistic committee of Uzbekistan, 2016

Chapter 6

DESCRIPTIVE FINDINGS OF THE FIELD STUDY

This chapter describes the main findings observed during the field study. Results include quantitative and qualitative primary data obtained from the JR area during the field study.

1. Cherry varieties produced in JR area

There are more than 30 varieties of cherry, produced in Samarkand province including black, red, red and yellow, and yellow. The major cherry varieties produced in analyzed dehkan farms and farms are described below.

Bakhor

“Bakhor” was bred in the Samarkand branch of the Scientific-Research Institute of Horticulture, Viticulture and Winemaking named after academician M.Mirzaev from crossing varieties Francis and Savry-Surkhany. It is characterized by drought resistance, but gives a high yields due to irrigation only. The

fruit ripening period is early - the first or second decade of May. The tree is strong, fast-growing, with a round and spreading crown of medium density. In fruiting enters the fourth year of planting.

Napoleon (black)

The fruits are large with the average weight of 8-9 g., broadly heart-shaped, dark red. The flesh of the fruit is dark red, tender, medium juiciness, dense, sweet taste, with a slight pleasant sourness. Tasting assessment of fresh fruits - 5 points. A stone is of medium size, separated from the pulp. Transportability of fruits is high. The variety is universal. The fruits contain: dry substances - 19.1%, sugars - 13.8, acids - 0.33%, vitamin C - 15-16.8 mg%. The average yield: from 11-year-old trees – 11.2 ton/ha (44.8 kg from a tree), from 13-year-olds – 16.4 ton/ha (65.8 kg from the tree). “Bakhor” is resistant to mushroom diseases.

The cherry-tree “Napoleon (black)” is strong-built - 6,0-6,5 m tall, the crown is wide spherical, thick-leafed.

The fruits are large - 6,0-6,5 g., dimensions 23 x 20 x 18 mm. The shape of the fetus varies from elongated-oval to broad-hearted, the color dark red, almost black. The flesh of the fruit is dense, semi-bodily, of medium juiciness, the skin is thick, dense. The pulp and the juice are dark red. The taste is sweet with medium acidity. Tasting assessment of fresh fruits - 4.9 points. Stone is of medium size, ovoid, with sharpening to the base.

Shelf life of “Napoleon (black)” is good - up to 10-14 days, transportability

is very high. This variety is universal - fruits are a valuable for dessert product, as well as raw materials for the production of compotes, jams, etc.

The maturity period is late - June. Yield per year is 28.0 kg from a tree or 9.3 ton/ha. Winter hardiness of the variety is above average. The beginning of fructification is from 4-5 years after disembarkation into the orchard. “Napoleon (black)” is resistant to diseases.

Burlat

This variety of cherry is middle spring with a round dense crown. Skeletal branches are light brown, with lenticles often located on the cortex. The shoots are slightly curved, light brown. Fruits with an average mass of 6.4 grams or more, flat-rounded with full maturation, black and red, with a clearly defined line of the abdominal suture, the juice is dark red. The pulp is dark red, medium-density, contains dry substances- 14.7%, sugars- 11.2%, free acids- 0.6%, ascorbic acid- 6 mg per 100 grams of wet weight. The stone is round-oval, large, with pronounced lateral ribs, well separated from the pulp, makes up 6.3% of the total weight of the fetus.

“Burlat” is a good early industrial variety of cherry, characterized by good commodity and taste qualities of fruits in combination with dense flesh. Fruits are intended mainly for fresh consumption, but are also suitable for processing. “Burlat” is very suitable for transportation. Plants enter fruiting for 4-5 years. Flowering and ripening of fruits are early - 1 decade of June. “Burlat” shows relative stability to mushroom diseases, susceptible to cracking of fruits after the rain. Productivity is good: trees aged 11-17 give an average of 80 kg of yield.

Melitopolskaya (Black)

“Melitopolskaya (black)” is drought-resistant variety of cherry, with higher winter hardiness of flower buds and flower resistance to spring frosts. The fruit ripening period is the second-third decade of June. The tree is a medium-sized tree, with a broad, medium-thick crown. In the fruiting begins for the fifth or sixth year.

The fruits are dark red, cordate, flat on the side of the seam, with a rounded apex and a middle depression at the base. The average weight of the fruit is 6-7 g. The skin is thin, dense, shiny. The flesh of the fruit is dark red, semi-bodily, medium juiciness, wine-sweet taste, with a pleasant refreshing acidity. The stone is bone, tapering to apex, of medium size.

This variety is suitable for fresh consumption and processing. Tasting assessment of fresh fruits – 4.8 points. The fruits contain: dry substances- 18.0%, sugars- 12.7, acids- 0.68%, vitamin C- 6.35 mg%.

The average yield for 10-years-old tree is 11.2 ton/ha. The maximum is 20.0 ton/ha.

“Melitopolskaya (black)” is resistant to bacterial cancer.

2. Average area planted and yield of cherry

The main producers of cherry in JR area are dehkan farms and farms. During the field study it was found that the average area of dehkan farm produced cherry is 0.4 ha. In the same time the average area planted by cherry in farm is 3 ha, see figure 6.1

Despite farms have more area and more trees, they obtain a lower yield in comparison to dehkan farms, i.e. 6.8 ton/ha versus 8.7 ton/ha. That could be explained by the fact that dehkan farmers are always near of their orchards, they care more intensively of their orchards and by them own.

Dehkan farmers have a possibility to quickly react on unattended natural disasters such as rain, hail, frosts, drought, etc. and cope these problems. Farmer in turn is not always near of his/her garden and not able to notice such problems and quickly to react on them.

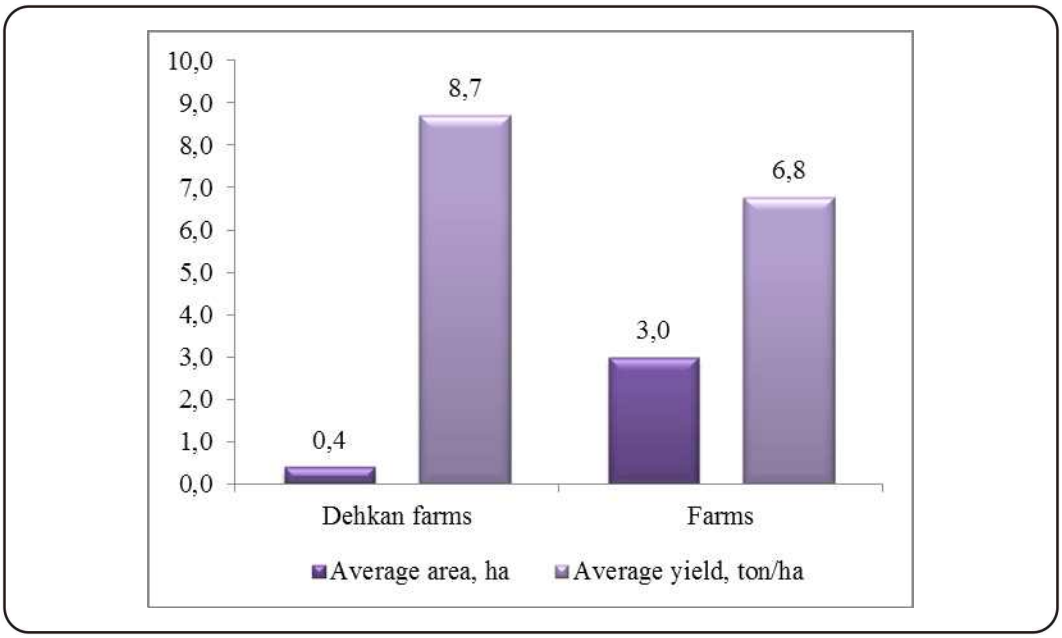
3. Fertilizers and agro-chemicals used by cherry producers

Basically the yield and quality of cherry depends on fertilizers and agro-chemicals using in quality and in quantity. Figure 6.2 shows the main fertilizers used by cherry producers in JR area.

The main fertilizers used by cherry producers are: ammophos, potash fertilizers and manure. In rare case some of farmers use another fertilizers but their amount is too low for analyzing them.

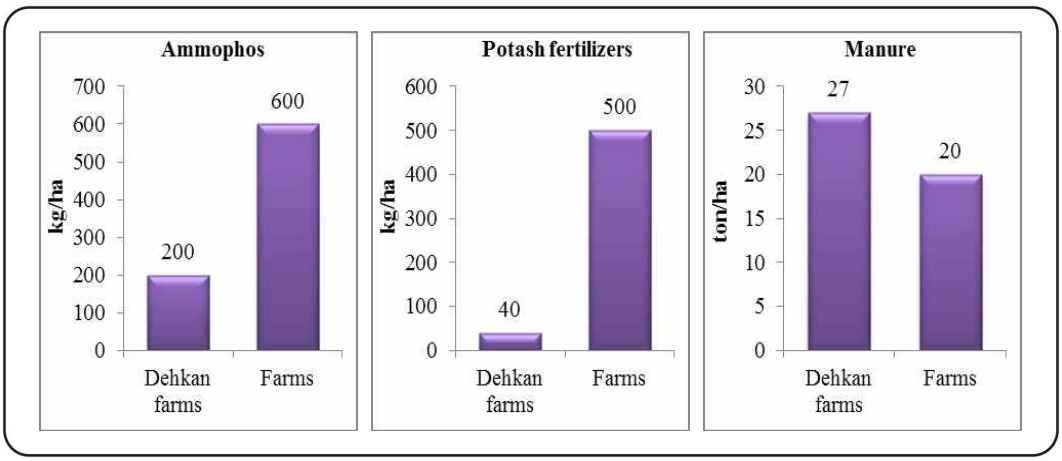
As it shown in figure 6.2 dehkan farms use much less non-organic fertilizers in comparison to farms. For example dehkan farms use tree times less of ammophos and more than ten times less of potash fertilizers than farms use. From another hand they use much more organic fertilizers such as manure: 27 ton/ha versus 20 ton/ha using by farms. Nevertheless, as it shown in chapter 5.5.2 dehkan farms have a higher yield of cherry. Hence, the using of fertilizers by our opinion plays not so important role as a carrying of orchard. Finally, dehkan farms produce more organic cherry in comparison to farms, what is important quality indicator for foreign buyers.

〈Figure 6.1〉 The average area planted and average yield of cherry in dehkan farms and farms in JR area



Source: Own calculation based on primary data collected through the field study in May–July 2017

〈Figure 6.2〉 Main fertilizers used by cherry producers in JR area



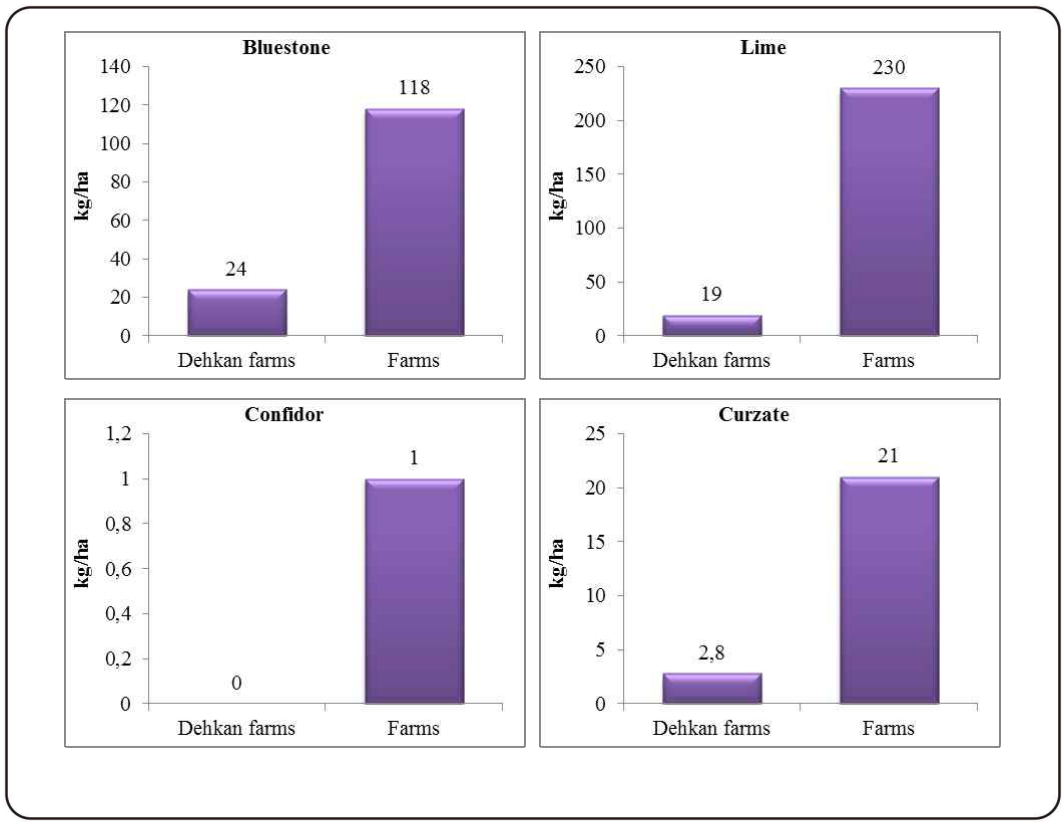
Source: Own calculation based on primary data collected through the field study in May–July 2017

All fertilizers purchased by both dehkan farms and farms in special shops situated in regions of Samarkand regions. Not all farmers are satisfied by their quality, but could not purchase imported fertilizers of the highest quality due to high prices.

In order to achieve high yield and especially high quality of cherry production it is necessary to use agro-chemicals. Samarkand province is a not problematic with view of plant protection, hence agro-chemicals are used not in a big quality.

Figure 6.3 explores the main kinds of agro-chemicals used by cherry producers in JR area.

〈Figure 6.3〉 Main agro-chemicals used by cherry producers in JR area



Source: Own calculation based on primary data collected through the field study in May-July 2017

The main agro-chemicals used by cherry producers in JR area are: “bluestone”,” lime”, “Confidor” and “Curzate”. As it shown in figure 6.3 farms again use much more agro-chemicals for their orchards then dehkan farms. Even sometimes farmers use agro-chemicals that do not used by dehkan farms- the case with “Confidor”.

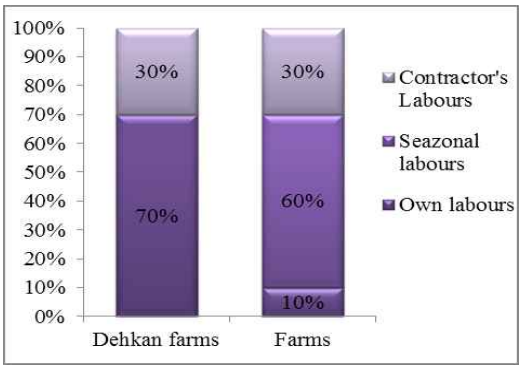
As in case with fertilizers, all producers purchase agro-chemicals in special shops and even sometimes in field-shops. The quality of agro-chemicals enough high hence all producers are able to purchase it.

4. Harvesting and post-harvesting of cherry in JR area

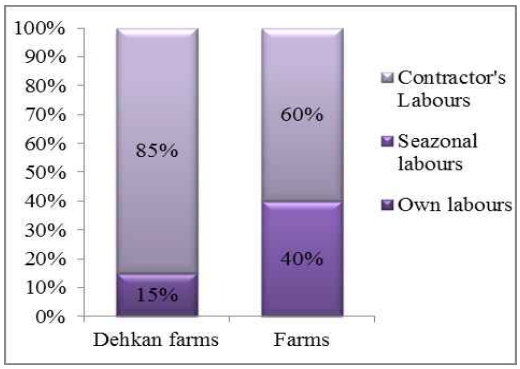
Harvesting and post-harvesting procedures are one of the mains factors influencing cherry quality. Especially it is important when we are speaking about the cherry quality corresponding to exporters’ requirements.

Figures 6.4 and 6.5 show who harvest, sort and pack produced cherry in JR area.

〈Figure 6.4〉 Harvesting of cherry in JR area



〈Figure 6.5〉 Sorting and packaging of cherry in JR area



Source: Own calculation based on primary data collected through the field study in May-July 2017

As it shown in figure 6.4, dehkan farms harvest 70 percent of their cherry by themselves or by their family members and 30 percent of their cherry harvested by contractor's labour. In turn, due to a bigger size of planted area, only 10 percent of farms' cherry is harvested by own labour. Another 60 percent of cherry is harvested by seasonal labour on the basis of payment per day or per kilogram. The rest 30 percent is harvested by contractor's labour because they care about each fruit due to its aim to be exported.

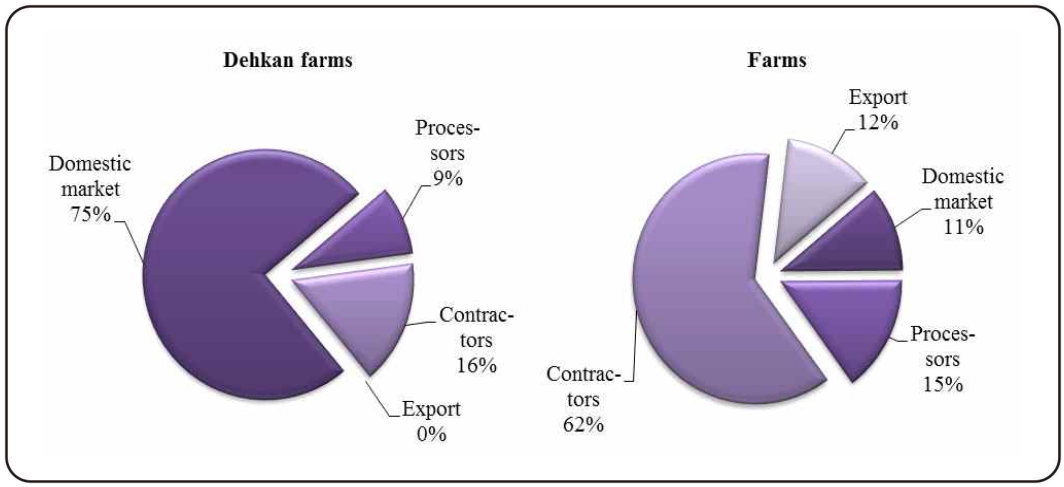
Figure 6.5 shows that contractor pay a high attention to the sorting and packaging of cherry. Hence, the majority of cherry both in dehkan farms (85%) and farms (60%) is sorted and packing by contractor's labour. This is also can be explained by the fact that contractors trust their labours in view to avoid of mistakes in sorting. That will permit them to get a higher price on the market.

5. Cherry sale channels

Our analysis shows that not all produced cherry is exported abroad. Some volume of cherry is still for local market and for own consumption. Moreover, not all producers are able to sell their cherry for export due to a number of reasons such as: small production volume; unavailability to sell by expected price; absence of real sale channels, etc. These reasons will be described in the next chapter of the report.

Figure 6.6 describes the main channels of cherry sale.

〈Figure 6.6〉 The main sale channels of cherry produced in JR area



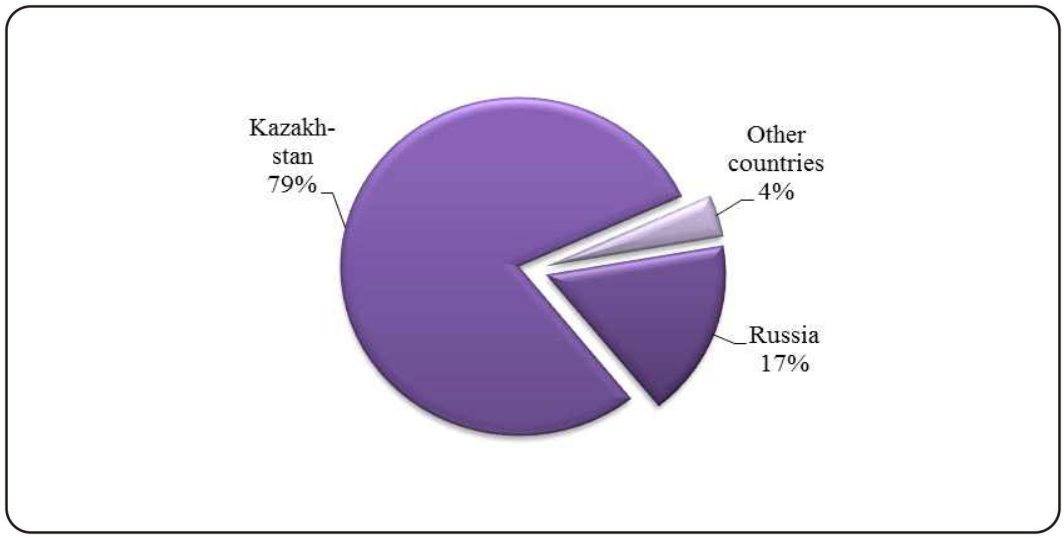
Source: Own calculation based on primary data collected through the field study in May–July 2017

Figure 6.6 shows that dehkan farms are not able to export their cherry directly. Hence they sell it to the contractor, who in most cases is exporter. Contractor basically get cherry of the highest quality, this explains why dehkan farms sell only 16 percent of their cherry to contractor. Also, as it was mentioned above dehkan farms not produce adequate volume of cherry to born a high interest from the exporter side. Other 75 percent of dehkan farms' cherry is sale on domestic market and 9 percent is purchased by processors due to a low quality of such cherry and consequently – low price.

In turn 62 percent of farms' cherry is contracted by exporters yet in the beginning of the year. Another 12 percent they are able to export by themselves. Remains of cherry go to the domestic market (11%) and to processors (15%). Figure 6.7 explores the analyzed producers' cherry export by destination

The interviewing of cherry producers in JR area permitted us to recognize the main export destinations of cherry. It was observed, that 79 percent of that cherry which is exported goes to Kazakhstan, 17 percent – to Russia and only 4 percent to other countries such as Arab Emirates.

〈Figure 6.7〉 JR area cherry export by destination



Source: Own calculation based on primary data collected through the field study in May–July 2017

Chapter 7

CHERRY VALUE CHAIN ANALYSIS

The proposed methodology for value chain analysis is the most comprehensive and tested in practice and takes into account all the specific issues of the target area and joint research.

The main purpose of market assessment was to determine the competitiveness of Samarkand cherry, including an analysis of the opportunities and limitations of its promotion on the market. The main issues of market analysis are: what sorts of cherries are produced in Samarkand province and are available in its markets, at what price, in what volumes, where and how is the cherry sold, who and how deliver cherries to the market, etc.

The main advantage of rapid market appraisal - it will allow to determine the market and investment potential of cherry along the value chain, the main trends of market development, conditions for entering the market and possible trade barriers.

1. Rapid Cherry Market Appraisal

The largest food market in Samarkand province is Siab market situated in Samarkand city. A wide range of cherries is presented in quality, appearance and price on the market during the season, e.g. from May to July. Moreover there are a number of large stores and supermarkets (such as “Korzinka.uz” and “Makro”), where the cherry is sold, both packaged and in bulk. Many local consumers prefer to buy cherries in markets/bazaars, as there is a wide choice and opportunity to purchase cherry at a lower price. Buyers assess the quality of cherries in appearance and taste, because if cherry is sold in bulk, then in Uzbekistan it is not forbidden to taste it.

This market assessment is based on the results of interview of cherry value chain actors in four dimensions: product, price, place and promotion.

1.1. Product

Samarkand province is one of the biggest cherry producers in the Republic of Uzbekistan, as well as one of the main suppliers of cherries both to domestic and foreign markets.

To date more than 30 varieties of cherries of different colours and sizes are grown in the Samarkand province. Some varieties are grown for commodity production, others are for pollination of the first ones.

Some varieties, such as "Bakhor" are derived by local selectors. Others were brought to the territory of Uzbekistan at different times.

Buyers of cherry are almost the entire population of Uzbekistan and importers, mainly from Russia and Kazakhstan. Most local consumers prefer late

cherry varieties due to their more pronounced taste and low price during the season. Exporters prefer to buy cherries on earlier terms, in order to get ahead of competitors in foreign markets.

1.2. Price

The retail price for 1 kg of cherry in summer 2017 varied from 8,000 UZS to 25,000 UZS (1.8-5 USD). The price varies depending on the quality of cherry, variety and presentation. Most of producers sell their cherry through retailers who turn their resale by a retail operator. It also happens when relatives of producer can be engaged in trade and especially common among dehkan farmers. Large export-companies are not interested in all cherry varieties produced in Samarkand province. They choose the best cherries in accordance with the standards and requests of customers from abroad.

In total, 69 percent of the total volume of finished products of Samarkand province is exported, 20 percent is sold on the domestic market of Uzbekistan and only 11 percent remains for personal consumption in farms (UzStat, 2016).

1.3. Place

The main places for sale the Samarkand cherry, as described above, are the internal markets of Samarkand city, large supermarkets, stores and small shops. Our observations showed that in bazaars of Samarkand more than 50 small, medium and large commercial operators engaged in trade of cherries in summer of 2017. Each seller pays rent for the trading area inside the market and pays the certificate, according to the approved tariff scale.

1.4. Promotion

None of the commercial operators answered questions about the promotion of cherry sales by organizing various advertising campaigns. And only one of the respondents knew about the exhibition of cherry, held this year in Tashkent, where he was going to participate.

In most cases cherry is sold in the bazaars in bulk. Here conventional (non-refrigerating) trucks are used for internal transportation.

But as it was noted, the key factors of success in the sale on the market are: convenient location of the outlet, product quality, promotion, assortment and good customer service.

2. Functional analysis of the cherry value chain

Functional analysis helps to determine the sequence of the product supply chain from producer to consumer, as well as to analyze the value chain operators and the nature of their relationship among each other.

Figure 7.1 shows the functional map of the cherry value chain in JR area. We believe this map could be used for other regions in Uzbekistan too.

〈Figure 7.1〉 Functional map of cherry value chain

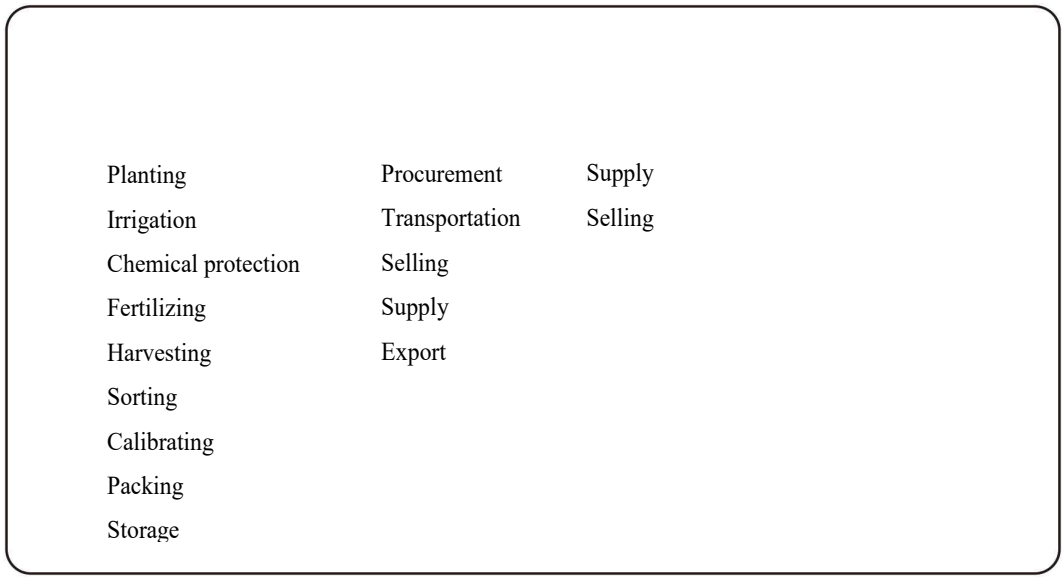
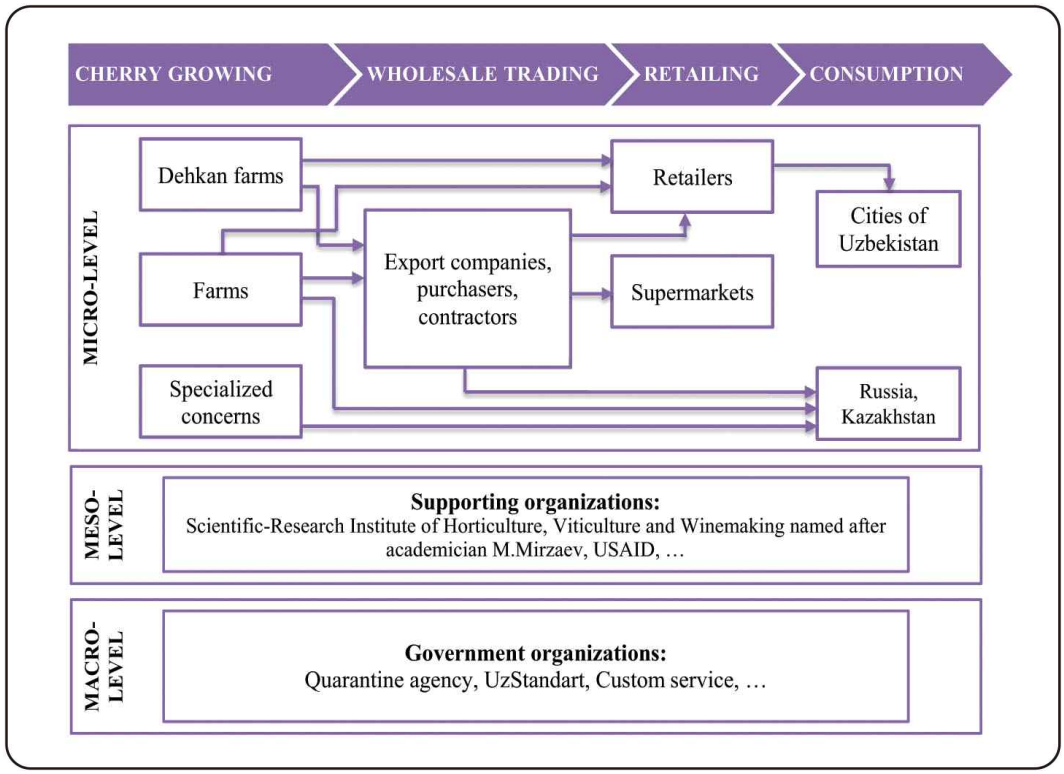


Figure 7.1 describes that the value chain in our case consists from the following stages:

- Cherry growing. This stage includes the planting of all input for cherry production such as cherry seedlings delivery and planting, irrigation; chemical protection; fertilizing, harvesting, sorting, calibrating, packing, storage and other labour or financial inputs.
- Wholesale trading including procurement of cherry, transportation, selling, supply and export.
- Retailing, when we speak about the local market, which includes supply and selling.
- Consumption by local population or population abroad.

After the mapping of cherry value chain it is necessary to indicate its main actors. In Samarkand province's cherry value chain we found the actors indicated in figure 7.2.

〈Figure 7.2〉 Cherry value chain actors



The micro-level of value chain actors is represented by dehkan farms, farms and specialized concerns. Following the aim of JR we decided to do not analyze specialized concerns and concentrate our attention on small-scale cherry producers. In turn, these specialized concerns have large area of orchards, modern technologies of irrigation, all logistical infrastructures including sorting, calibration, cooling chambers, packaging, processing and so on. Moreover, they are able to export their production directly to the buyer abroad.

Following the figure 7.2 dehkan farms have an opportunity to sell their cherry to retailers for the local market. Another way is to be contracted by export company in order to sell the highest quality cherry by the highest price. Dehkan farms are usually do not have a possibility to export their cherry directly due

to a small amount of cherry produced.

The next actor of cherry value chain on the micro-level is farm. Farms have an advantage on dehkan farms in view of more possibilities for selling their cherry by/through different channels. They could sell cherry to retailers for the local market. Also, they could be contacted by the export company/contactor with the following selling in local market or abroad. Moreover, large and successful farmers have an opportunity to export their cherry directly – not using any retail services.

To date, the relationship between operators is unpredictable and depends on market conditions. Not always there are any contractual agreements between producer, supplier and buyer.

In practice, in June and July, large contractors come and examine the best cherry orchards. In the event when contractor liked the orchard, he makes an advance payment for the future harvest to dehkan farm or farm in order to pre-order the necessary amount of cherry.

When analyzing a value chain, it is necessary to scan the environment – who and how influences on its actors. During our field study we found a number of service/supporting organizations that represent the meso-level of the value chain. These organizations provide (by virtue of their capabilities) support to local producers. This includes the Samarkand branch of the Institute of Horticulture, Viticulture and Winemaking named after Academician M. Mirzaev. This organization is engaged in training farmers, introducing new modern varieties of fruit trees, adapting agro-technical measures, etc. Another important supporting institution that we discovered on the field is USAID in Uzbekistan, which is implementing the project “Agricultural Value chain activity in Uzbekistan” which aims to improve the quality and volume of agricultural production and post-harvest handling and production, facilitate market linkages, and link educational institutions with private sector demand.

In general, at the meso-level of the cherry subsector, there is not enough donor projects aimed to increase the efficiency of cherry production throughout the chain.

At the macro-level, the value chain has traditionally represented by state institutions that carry out licensing and/or licensing activities such as quarantine, customs and the Uzbek Agency for Standardization, Metrology and Certification ("Uzstandart"). The involvement of these structures takes place in the case of cherry exports to foreign countries.

3. Economic analysis

This section discusses the distribution of value added and profitability at the level of cherry value chain actors.

3.1. Assessment of the value added distribution at the level of cherry value chain actors

Virtually none of the cherry producers in Samarkand province keep a record of the cost of 1 kg of their cherry. Since, firstly, the entire production is small-scale, at the level of individual dehkan farms and farmers, which are not sufficiently observing the agro-technical norms for caring for the orchards. Even less attention is paid to the post-harvest operations. Accordingly, few of producers bear additional investment costs such as renovation of orchards with new varieties of seedlings, purchasing of quality fertilizers and chemicals, sorting, packaging, etc.

Nevertheless, based on the average market prices for raw materials and costs associated with the management of this cherry production, we calculated the profitability at the level of dehkan farm and farm. The resulted calculation of the cost price of 1 kg of cherry has conditional character if the producer will observe all norms of agro-technologies.

Table 7.1 provides all costs for produce 1 kg of cherry on the farm level.

〈Table 7.1〉 The cost price of 1 kg of cherry in farm

Costs	Farm
Fertilizers	0.08
Chemical plant protection	0.03
Fuels and lubricants	0.02
Renting of agricultural techniques	0.01
Salary of staff	0.04
Other costs (insurance, banking fee, etc)	0.01
Land tax	0.18
Pack	0.10
Pickling/calibrating/sorting/Packing	0.11
Transportation	0.01
Procurement	-
Other costs (sertification, standartization, brokerafe services, ets)	-
Total costs	0.59

Source: Own calculation based on primary data collected through the field study in May-July 2017

As it shown in table 7.1, the farm pays all costs linked with cherry production and post-harvesting. Hence, the total cost price of 1 kg of cherry from the farmer is USD 0.59.

Table 7.2 provides all costs for produce 1 kg of cherry on the dehkan farm level.

〈Table 7.2〉 The cost price of 1 kg of cherry in dehkan farm

Costs	Farm
Fertilizers	0.04
Chemical plant protection	0.04
Fuels and lubricants	-
Renting of agricultural techniques	-
Salary of staff	-
Other costs (insurance, banking fee, etc)	-
Land tax	0.02
Pack	-
Pickling/calibrating/sorting/Packing	-
Transportation	-
Procurement	-
Other costs (certification, standardization, broker services, etc)	-
Total costs	0.10

Source: Own calculation based on primary data collected through the field study in May-July 2017

As it shown in table 7.2, the dehkan farm pays not all costs linked with cherry production and all the more with post-harvesting. Dehkan farms usually do not use any techniques and seasonal labour; use much less fertilizers and agro-chemicals in comparison to farms as described in previous chapter; have not any postharvest measures. Hence, the total cost price of 1 kg of cherry from the dehkan farmer is USD 0.10.

Table 7.3 describes the total cost of 1 kg of cherry on export company level

〈Table 7.3〉 The cost price of 1 kg of cherry in export company

Costs	Farm
Fertilizers	-
Chemical plant protection	-
Fuels and lubricants	-
Renting of agricultural techniques	-
Salary of staff	-
Other costs (insurance, banking fee, etc)	-
Land tax	-
Pack	-
Pickling/calibrating/sorting/Packing	-
Transportation	0.01
Procurement	1.66
Other costs (certification, standardization, broker services, etc)	0.33
Total costs	2.0

Source: Own calculation based on primary data collected through the field study in May-July 2017

Table 7.3 explores that export company pays only for transportation, procurement and documentation such as licenses, certificates, etc. All costs linked with cherry production and with post-harvesting have been already covered by producers. Hence, the total cost price of 1 kg of cherry on the level of the export company is USD 2.0 including the procurement price of USD 1.66.

The profit of farm, dehkan farm and export company will be described in table 7.4 below.

3.2. Assessment of the value added distribution among cherry value chain actors

The value added distribution among actors was calculated with a deduction for raw materials at each level of the value chain actor. The level of retail operator was not considered by us due to fact that KREI requested the analysis of cherry value chain oriented for export.

〈Table 7.4〉 Value added distribution among cherry value chain actors

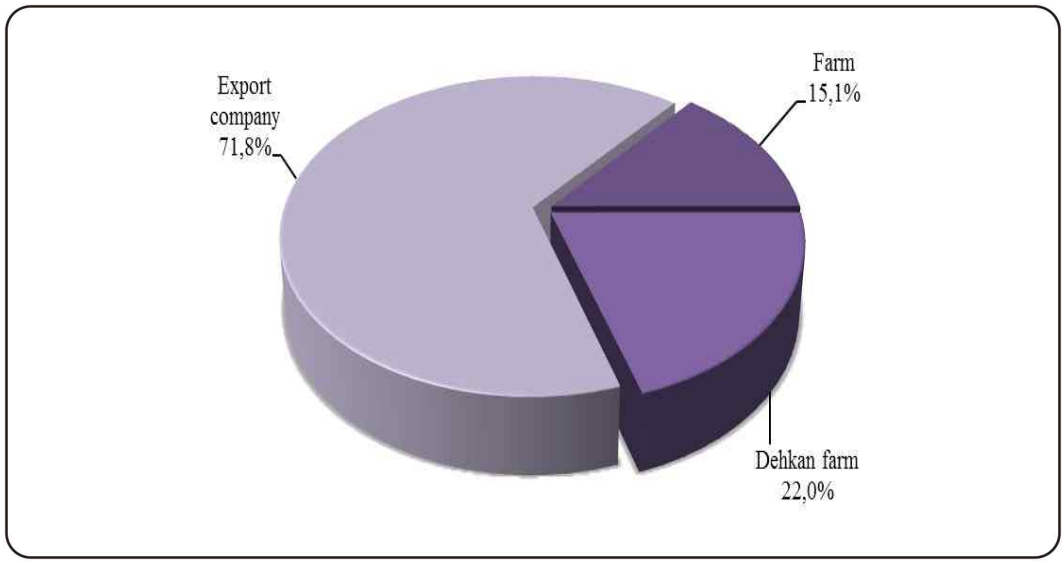
Costs	Farm	Dehkan farm	Export company
Fertilizers	0,08	0,04	-
Chemical plant protection	0,03	0,04	-
Fuels and lubricants	0,02	-	-
Renting of agricultural techniques	0,01	-	-
Salary of staff	0,04	-	-
Other costs (insurance, banking fee, etc)	0,01	-	-
Land tax	0,18	0,02	-
Pack	0,1	-	-
Pickling/calibrating/sorting/Packing	0,11	-	-
Transportation	0,01	-	0,01
Procurement	-	-	1,66
Other costs (certification, standardization, broker services, etc)	-	-	0,33
Total costs	0,59	0,1	2,0
Profit	1,07	1,56	5,10
Value added distribution, %	15,1	22,0	71,8

Source: Own calculation based on primary data collected through the field study in May-July 2017

Our calculations described in table 7.4 showed that the added value is distributed between producers and export company by the following ratio: USD 1.07 from the farmer, USD 1.56 from dehkan farmer and 5.12 from the export company. This calculation was base taking into account that the average procurement price by importer is USD 7.12.

Hence, the value added is distributed among operators as it shown in figure 7.3

〈Figure 7.3〉 Cherry value added distribution among actors



Source: Own calculation based on primary data collected through the field study in May–July 2017

Figure 7.3 shows that the value added distributed among value chain actors as follows: farms – 15.1 percent because they have a high cost of production; dehkan farms – 21.9 percent because they do not need so high costs for cherry producing due to own activities; export company - 71.9 percent due to low costs input for procurement and documentations only.

Despite the relatively high level of profitability of sales, the producer sells its cherry only once a year and receives for its work the total revenue for the product. On the contrary, the export company always has an advantage over the producers, because it has a longer time trade and collecting revenue for several months. Moreover export company always receives a higher income, but carries commercial risks associated with delivery and sale of product on the market.

As can be seen in our value chain analysis there is no important unit as processing on farm or dehkan farm level. Solving the problems associated with processing of cherries will allow farmers and dehkan farmers to get more in-

come, create additional jobs, introduce innovative methods to increase the yield, etc. But this is a topic for the next study.

Chapter 8

RECOMMENDATIONS FOR CHERRY VALUE CHAIN IMPROVEMENT

Following the literature reviewed and our findings in Samarkand province during the field study we propose a set of recommendations in order to improve the cherry value chain in Uzbekistan. Our recommendations mainly aimed South Korean market and consumers. Hence some of our recommendations needed the involvement of Korean human and financial inputs with intensive participation of Uzbek institutions.

- By our opinion it is necessary to organize a pilot greenhouse cherry orchard. Such orchards are very developed in many countries like South Korea, for example. The creation such kind of cherry orchards will permit to Uzbek farmers or/and dehkan farmers to produce the earliest harvest of cherry for external market. This in turn will lead a highest profit for producers and all other actors involved to the cherry value chain because Uzbek cheery will be earliest on the markets and consequently – the most expensive. The Samarkand branch of SRI has a huge potential for this purpose. It has an appropriate land area, access to water, electricity and gaz. For organizing the orchard itself following inputs are necessary: modern cherry seedlings; modern materials for construction the green-

house and its warming; modern agro-technologies. Moreover it is know-how for Uzbekistan and there are not any specialists able to realize this work and care for such kind of orchard. Hence it is proposed that the organization of greenhouse orchard and consultation in line with training for the local staff will conduct by Korean experts.

- Another important recommendation is to produce the cherry varieties which are in high demand on Korean market. Each country has own preferences in taste, color, sweetness, size, etc. Therefore any producer needs to adapt to customer tastes. Hence we propose to create a nursery of cherries varieties which are in high demand in Korea on the basis of the SRI. It is in future will permit the gradual renovation of old cherry orchards by modern high-yield orchards adapted to Uzbek conditions. The main pre-condition to realize this recommendation is trustworthy suppliers of seedlings which have to be selected by Korean experts.
- The next recommendation is very close related to post-harvest measures. As was described above, post-harvest loses is the main problem of the local cherry producers. We recommend to create and to develop the joint venture (JV) for harvesting and exporting cherries on the basis of the Samarkand branch of SRI with the active participation of Korean experts. The JV is recommended to create in form of cooperative which includes cherry producers and supporting organizations. In this case SRI will play a role of supporter which will be in close business relations with governmental bodies such as MAWR, local authorities and other state institutions involved in cherry value chain on meso- and macro-level. Moreover we propose to include this JV to the National Investment Program of Uzbekistan for a few upcoming years. This will permit to JV to obtain the state supporting, tax and administrative reliefs.
- In order to achieve the main aim of JV functionality, of course, the build-

ing of appropriate size is needed. From our field study we recognized, that the Samarkand branch of SRI has such a building. It is necessary to repair it in accordance with requirements of Korean experts. Moreover necessary supply communications such as water, electricity, canalization, etc., are needed to be installed. Then the necessary modern high-standard equipment for sorting, calibrating, labeling, packing, storing cherries is needed. In order to purchase this equipment, of course, huge investments are needed. By our opinion Korean side together with Uzbek side need to discuss the share of investments by all JV members with involvement of Korean importers, governmental, public and private sector of Uzbekistan. Here we also recommend to include the purchasing of equipment into the National Investment Program of Uzbekistan.

- It is well-known that the quarantine requirements of Korea are very strong. Hence we propose to create the mini-laboratory on quarantine research and analysis with participation of Korean and Uzbek experts. First of all, an appropriate building or premises for mini-laboratory is needed. Our field study confirms that the Samarkand branch of SRI has a few appropriate rooms for these purposes. Secondly, the purchasing of equipment need to be realized following all requirements of Korean experts, who will be responsible for this stage. The financial questions must be discussed together with SRI and Korean experts. The last, but not least – is the question of training of local experts in accordance with international standards. Here Korean experts will play a role of trainers in order to avoid any quarantine problems in the future.
- Our last recommendation is to assist in the branding of Uzbek cherries in Korean market and its sale through sustainable distribution channels through the established JV. The brands as “Made in Uzbekistan” or “Uzbek Garden” are well-known and very famous in Russia and

Kazakhstan. Uzbek production with these brands is loved by foreign consumers. Hence we recommend to develop the branding for Uzbek cherry for Korean market. The brand has to be developed in accordance with international and in particular Korean standards. Ministry of Foreign Economic Relations and Trade of Uzbekistan with participation of Korean experts are planned to implement this recommendation. This will permit to Samarkand cherry producers to increase their sales on foreign and international markets.

The set of our recommendations on cherry value chain improvement indicating main activities, implementers, expected results, potential risks and risks reduction measures are combined in table 8.1 below.

〈Table 8.1〉 Market requirements and upgrading needs for cherry value chain

Activity	Implementer	Expected result	Potential risks	Risk reduction measures
Creating a pilot greenhouse cherry orchard	Samarkand branch of SRI	Early harvesting ahead of competitors (as USA) by time for the supply of cherry to the Korean market	Lack of experience in maintaining such type of orchard. Uncertainty of effectiveness	A trustworthy supplier of seedlings and equipment. Permanent control and monitoring of agricultural activities by a Korean specialist/consultant. Training of local specialists
Creation on the basis of the SRI nursery of cherries varieties which are in high demand in Korea, for the subsequent renovation of old cherry orchards	Samarkand branch of SRI and KREI	The nursery is created. Seedlings are distributed. Old gardens are updated	Seedlings did not adapt. Or of inadequate quality	Trustworthy supplier of seedlings selected by KREI
Creation of a joint venture (JV) for harvesting and exporting cherries on the basis of the SRI	Samarkand branch of SRI and KREI	JV is created. Export channels are established. Export potential of cherry from Samarkand region increased	Difficulties with obtaining the necessary documents from the local authorities	Close cooperation between MAWR and the Head Office of the SRI with the local authorities of Samarkand province. Inclusion of the created JV to the National Investment Program of Uzbekistan
Allocating a building of the appropriate size for JV to accommodate equipment for sorting/calibrating/labeling/packing/storing cherries	Samarkand hokimiyat and SRI	An empty building is located on the territory of the SRI. The building is repaired by SRI	The building is not suitable by parameters. Problems with supply communications	Make the building in accordance with the parameters of the equipment. Installing the supply communications
Purchase/investment allocation for the purshase an innovative equipment to JV for sorting/calibrating/labeling/ packing/ storage of cherries	KREI	Appropriate equipment purchased	Problems with the volume of allocated investments. Inconsistency between planned and actual delivery and equipment installation dates. Lack of qualified personnel to work on equipment	Inclusion of these investments to the National Investment Program of Uzbekistan. Control over the fulfillment of investment obligations

Activity	Implementer	Expected result	Potential risks	Risk reduction measures
Creation of mini-laboratories for quarantine on the basis of SRI	SRI	A mini-laboratory for quarantine is created. Quarantine control of pilot cherry orchard is provided. New cherry meets the quarantine requirements of the Korean partners	Inconsistency of the allocated premises for the laboratory	Make the premises in accordance with the parameters of the laboratory. Installing the supply communications
Purchase/allocation of investments for the purchase of innovative equipment for a mini-laboratory	KREI	Appropriate equipment purchased	Problems with the volume of allocated investments. Inconsistency between planned and actual delivery and equipment installation dates. Lack of qualified personnel to work on equipment	Inclusion of these investments to the National Investment Program of Uzbekistan. Control over the fulfillment of investment obligations
Conducting trainings for local specialists in the use and management of equipment for the JV and laboratory	KREI	A series of trainings is conducted. Qualification of local specialists is increased	Lack of funds to conduct a sufficient number of trainings	Finding funds from SRI budget
Assist in the branding of Uzbek cherries in Korean market and its sale through sustainable distribution channels through the established JV	Ministry of Foreign Economic Relations and Trade	The brand isdeveloped in accordance with international standards. Sales volume is increased	Sales volume is not increased	Creation and improvement of branding strategies of Uzbek cherries exporters

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APPENDICES

Appendix 1. Semi-structured questionnaire

1. GENERAL INFORMATION

Region		
No		
Farm size, ha		
New/intensive orchard		
Old orchard		
Varieties of cherry	*Bakhor*	
Average yield ton/ha		
Share of cherry for export in %		
Where do you export cherry (country)?		

2. PRODUCTION

2.1.1. Where do you purchase seedlings?			
2.1.2. Average price, sum/seedling			
2.1.3. Any problems with purchasing seedlings?	1. 2. 3. …		
2.2.1. What kind of fertilizers do you use?	*Name*	*Quantity, kg*	*Price, sum/kg*

2.2.2. Where do you purchase fertilizers?			
2.2.3. Any problems with purchasing fertilizers?	1. 2. 3. …		
2.3.1. What kind of agro-chemicals do you use?	*Name*	*Quantity, kg*	*Price, sum/kg*
2.3.2. Where do you purchase agro-chemicals?			
2.3.3. Any problems with purchasing agro-chemicals?	1. 2. 3.		
2.4.1. What kind of irrigation do you use and on which area?	Gravity irrigation	*ha*	
	Drip irrigation	*ha*	
	Pump irrigation	*ha*	
	Other	*ha*	
2.4.2. What is the cost of water per year per ha?	Gravity irrigation - *sum*		
	Drip irrigation - *sum*		
	Pump irrigation - *sum*		
	Other - *sum*		
2.4.3. What is the price of drip irrigation equipment, sum/ha?			
2.4.4. What is the cost of O&M of drip irrigation sum/year?			
2.4.5. Any problems with water availability/ delivery services/etc?	1. 2. 3.		
2.5.1. What is the cost of agro-technical operations, sum/ha?	Manual operations -		
	Technical operations -		
2.6.1. Do you receive any financial support? If yes, please indicate an amount in sum.	From government -		
	Non-government organization/donors -		
	Agricultural credits -		

3. POST-HARVESTING

3.1.1. Who harvest cherry? (please indicate the number of labours)	Own labours -	person
	Seasonal labours-	person
	Labours of contractor -	person
3.1.2. What is the average daily wage?	Own labours -	sum
	Seasonal labours -	sum
	Labours of contractor -	sum
3.2.1. Who sort cherry? (please indicate the number of labours)	Own labours -	person
	Seasonal labours -	person
	Labours of contractor -	person
3.2.2. What is the average daily wage?	Own labours -	sum
	Seasonal labours -	sum
	Labours of contractor -	sum
3.3.1. Who pack cherry? (please indicate the number of labours)	Own labours -	person
	Seasonal labours -	person
	Labours of contractor -	person
3.3.2. What is the average daily wage?	Own labours -	sum
	Seasonal labours -	sum
	Labours of contractor -	sum

3.3.3. How do you pack cherry? (please, indicate the material and weight of the box in kg)	Destination	Weight of box, kg	Material
	For local wholesale market		
	For local market/supermarkets		
	For export		

3.3.4. Where do you purchase boxes?	Do it by ourselves	
	Contractor bring to us	
	We order it from the box producers	

3.3.5. What is the price of each box, sum?	For local wholesale market -	
	For local market/supermarkets -	
	For export -	
	I don't know. Contractor does it himself	

3.4.1. How do you transport cherry from field to storage?	Own vehicle	
	Rented vehicle	

	Contractor's vehicle	
	I transport my cherry directly to export	
3.4.2. What kind of transport do you use?	Tractor	
	Ordinary truck	
	Auto-refrigerator	
	Other (please notify)	
3.4.3. How much do you pay for transportation,sum/kg?		
3.5.1. How do you store your cherry?	Own cooling chamber	
	Rentedcooling chamber	
	Community/public cooling chamber	
	Contractor's cooling chamber	
	I don't store my cherry. I send it to the local market immediately.	
3.5.2. How much do you pay for storage the cherry, sum/kg/day?		
3.5.3. How many days you are able to store your cherry?	min	days
	max	days
3.6.1. What are the most types of postharvest loses do you have?	1. 2. 3.	
3.6.2. How do you think you could avoid these loses?	1. 2. 3.	

4. EXPORT

4.1. Where do you export your cherry? Country		
4.2. What kind of transport do you use?	Flight	
	Train	
	Truck	
4.3. What are the most criteria of cherry quality?	Size	
	Color	
	Sugar content	

4.4. What are the most demanded varieties of cherry?	1. 2. 3. …
4.5. What is the price of cherry on this step, sum/kg?	
4.6. What is the expected price of cherry in country of destination, $/kg?	
4.7. What are the phyto sanitary requirements of cherry for export?	1. 2. 3. …
4.7.1. How many time this process can take?	min days max days
4.8. What are the main required certificates you need to be issued? (Local, ISO, GAP,…)	1. 2. 3. …
4.8.1. How many time this process can take?	min days max days
4.9. What are the main difficulties/problems during the export process?	1. 2. 3. …
4.10. How do you think you could avoid these difficulties/problems?	1. 2. 3. …