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Markets 4 Meghri

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Upgrading Markets of Sub-Tropical Fruits in Meghri, Southern Armenia

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1. Rationale of the project and presentation of the report

The Markets for Meghri project (M4M) is a project funded by the Swiss agency for Development and Cooperation (SDC) that aims at fostering economic development and employment in Syunik Marz. It is implemented by Intercooperation a long standing Swiss implementing partner of SDC; and Shen an Armenian NGO active in rural development since its early years.

The M4M project focuses on upgrading the fresh and processed value chains of subtropical fruits from the Meghri region as a leverage to unleash rural entrepreneurship and enhance income of rural families.

Earlier fact finding enquiries revealed that the main potential of the region lies in the cultivation and marketing of **pomegranate, persimmons and figs**.

The project focused its inception phase on analysing the market constraints of those three value chains and on identifying interventions that would upgrade them.

The following report is the result of those analyses and describes the likely interventions that the project will implement in the coming years to address the constraints that have so far prevented the value chains to grow. The next five chapters will successively describe the context; the conceptual and methodological approaches retained by the project; the findings of the value chains analyses, the key component of the upgrading strategy and finally some highlights of the key interventions.

2. Context of Interventions

The Meghri district in the Syunik province in the South of Armenia is of strategic importance for the country as a corridor for the second open border of Armenia with Iran. The region has favourable, sub-tropical conditions for agricultural production. Traditionally, fruits and vegetables were grown in Meghri supplying urban centres and local processing facilities. Production, processing and commercialisation suffered a severe decline after the break-up of the Soviet Union and ensuing regional conflicts. Closed borders impeded input supply and access to markets. The kolkhozes and sovkhozes were divided into small-holder family farms leading to a decline of the technology in use. Government support services were only partially replaced by private actors. The difficult economic situation led to an increased internal emigration. Land and infrastructure suffer from degradation and natural disasters. As a result of the sharp shift from commercial agriculture towards subsistence farming as nearly the only source of survival for the population, the livelihood conditions of rural families drastically changed. The region is particularly vulnerable due to its remoteness from the main centre of economic activities – the capital.

2.1 Horticulture in Meghri Region

Horticulture is a valid opportunity for the population of this region as rural households in the Meghri region are smallholders. Meghri enjoys favourable climatic conditions, permitting the production of a rare variety of fruits – pomegranates, persimmons, figs, apricots, peaches, cornelian cherries. Around 600 hectares are currently under cultivation for fruits (an increase of 29 percent from 2003 to 2007) and 60 hectares for vegetables (an increase of 16.6 percent). During Soviet times, fruits

cultivation was done on a large scale, supplying fruits to Meghri cannery and winery, as well as fresh to the market of the Soviet Union. With the privatisation and the disruption of the Soviet market, cultivation and production of fruits has fallen drastically in the region. The Meghri cannery currently operates at an estimated 20 to 30 percent of its former capacity. The Meghri winery barely procures grapes from local vineyards trying to shift towards production of pomegranate wine.

2.2 Subtropical Fruits: Their History and Potential

The geographical location of Meghri provides this region with the opportunity to offer unique fruits such as pomegranates, figs and persimmons, thus giving it a comparative advantage in the national market. Thus Meghri enjoys the privilege of a nationwide good reputation for its exceptionally tasty fruit.

The cultivation of the pomegranate has a long history in Transcaucasia, where decayed remains of pomegranates dating back to 1000 BC have been found. The Kur-Araks lowland (in Azerbaijan) is the largest area in this region where pomegranate is cultivated. Pomegranate is consumed both fresh and processed – in the form of juice or wine. It is believed that Meghri pomegranates can be widely used for wine, however to produce pomegranate juice the processors would also need other varieties of fruit not grown in Meghri currently. Another form of processing is using pomegranate seeds as a spice added during food preparation, which is mainly done in Indian cuisine. Pomegranate peel is used in cosmetics as well as in medicine as a natural antibiotic.

The edible fig is believed to be one of the first plants cultivated on the Earth and is useful for the pH balance in the body. They are an important source of potassium helping to regulate blood pressure. Fig is consumed fresh and processed – in the form of dried fruit, jam and sweet preserve.

Persimmon is native to China where it has been cultivated for centuries. It is rich in fibres as well as in vitamins A and C. Persimmon is consumed mainly fresh. The only form of processing for persimmon is drying, although there are other suggestions for processing – a persimmon pulp.

2.3 Major Actors in the Sector

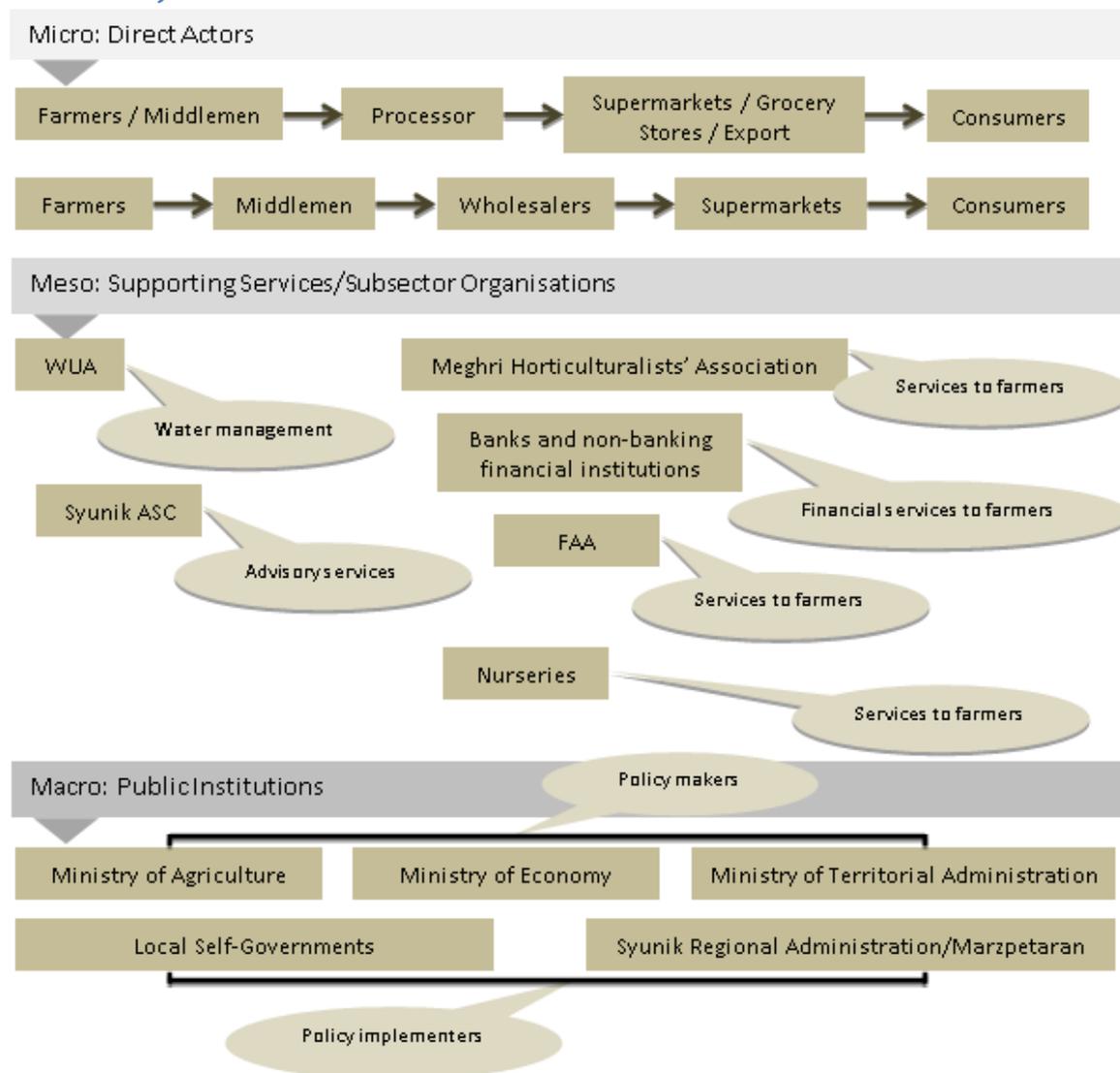


Figure 1: Meghri market map

2.3.1 The Core – Fresh fruit value chain

Farmers: There are just over 1'800 farmers in the Meghri region, out of which about 80% are targeted by the project because they are either already involved in or have the potential to turn to commercial horticulture. The details are given below:

| | Farmers | Area (ha) |
|-------------|---------|-----------|
| Pomegranate | 1210 | 154 |
| Persimmon | 1240 | 104 |
| Figs | 1082 | 77 |

Their land is fragmented and very small in average. In towns the average area per HH is less than 0.25 ha; in Araks riverside zone – about 0.75 ha, and in mid-zone¹ – more than 0.5 ha. In most cases cultivation is extensive, with low productivity, minimum use of agricultural inputs of suspicious origin and quality as well as limited use of agricultural machinery. Farmers do not work in a consolidated manner which directly affects their marketing and bargaining power, and eventually leads to low income.

Middlemen are usually individuals operating informal businesses and are seasonally involved in Meghri fruit marketing. The relationship between middlemen and producers are mainly established due to a multiannual cooperation between them. In some cases middlemen even provide **prepayments to secure their supply and support the farmers**. In some rare cases, barter still occurs in the region, when second grade fruit are exchanged for household commodities, grocery, as well as other vegetables and fruit not grown in the region.

Fruits purchased from farmers are transported and cool stored by middlemen predominantly within Yerevan vicinity – Masis and Artashat regions. The fruits are mainly marketed in wholesale and retail green-markets to semi-bulk intermediaries, processors, supermarkets and other market actors further down the supply chain.

There is one big **wholesale market** in a suburb of Yerevan – Malatia – where most of the transactions of fresh fruit are carried out. In addition to this, there are a couple of smaller ones with smaller volumes. Generally consumers for this wholesale market are **green-market** actors as well as **semi-bulk** intermediaries. The latter ones include supermarket procurement officers, as well as catering service providers – i.e. restaurants, hotels, etc. It should be stated that there is storage available near Malatia market where the produce can be stored to be purchased by those market actors involved in re-selling.

The fruit reaches the final consumer through **supermarkets**, open green markets and **green-groceries**. The procurement of fresh fruit by supermarkets is done either by procurement officers or via semi-bulk intermediaries as the second most important channel of distribution. There are exceptional cases when the farmers themselves bring the produce to supermarkets. As stated by SAS supermarket representative up to 30% of the overall sales volumes of pomegranate come from Meghri. Persimmon is mainly brought from Meghri although there is some of the produce imported from Georgia. In case of figs, they come predominantly from Meghri and a much smaller part is from Tavush Marz of Armenia (Ijevan and Noyemberyan). The latter one is not equal to Meghri produce in its both qualitative and taste characteristics. Only a small part of the produce is sold in the regional market through local middlemen who barter or buy fruit from Meghri and sell it in Kapan and/or Goris green markets.

2.3.2 The Core – Processed fruit value chain

The value chain for processed fruits involves many of the actors described for the fresh one and the following in addition:

¹ See Appendix 1 for Meghri map and community grouping.

Meghri cannery and Meghri winery are the main **processors** active in the region in addition to which there are several cottage industries producing dried fruits. *Meghri Cannery* produces preserves that are well known among Armenian consumers for their **high quality**. Currently the technology used in the cannery is out-dated and they are trying to obtain **loans for the renovation and modernisation** of the equipment as a result of which it is expected that the production levels would increase. It should be stated that Meghri Cannery had a good reputation in the former Soviet Union mainly known for its sweet preserves, particularly walnut, fig, quince, etc. *Meghri winery* is the only winery in the Syunik Marz, but it is currently operating irregularly and at a very low capacity. **The winery has lost its market share for grape wine and has started targeting pomegranate wine**. However, the Meghri winery does not have capacities in marketing its products due to the lack of human capital and therefore sells its **pomegranate wine to other Armenian wineries from Yerevan** (such as MAP and Proshyan winery), which then are in charge of marketing the product on the national and export markets (mostly Russia).

Processors elsewhere in Armenia – wine and juice producers: MAP winery is an important brandy and wine producer in Armenia with established markets (both local and export). The winery produces pomegranate wine and is expanding its volumes. Pomegranates are partially procured from Meghri although not consistently. **Wine processors do not have any preferences in terms of specific pomegranate variety**, while **juice producers need a different variety of pomegranates** to those grown in Meghri. **Juice producers, and in particular large processors, are only interested in contractual relations with reliable producers, who can offer large quantities**. Currently the procurement is organised in two ways – the produce is brought to processors either by farmers or by middlemen who consolidate the offer; and the processing company collects the produce from farmers in Meghri. **Moreover, a couple of years ago Sandora (owned by PepsiCo) organised fruit collection in Nrnadzor**.

2.3.3 Supporting functions and influencing rules

Meghri Horticulturalists' Association has been active in the region since 2001. It was formed by a small group of 8 farmers with the main purpose to establish an orchard and nursery, to organise joint input supply and further marketing of the produce. The association currently has 64 members with 85ha land cultivated. Amongst other activities the association is responsible for providing saplings to those farmers preselected within the frame of an IFAD funded project.

FAA: Federation of Agricultural Associations was formed in 2001 as a Union of eight agricultural cooperatives. Amongst other projects run by the FAA, the following are of particular interest to the project: ARMIS Market information system (Information on retail and wholesale agriproduce prices in the markets of Yerevan, Armavir, Gyumri and Vanadzor through SMS service. Currently due to limited financing ARMIS provides market info only from one Yerevan wholesale market – Malatia), as well as warehousing, marketing and delivery service for agriproduce for both FAA members and other non-member farmers starting from.

There are nine **nurseries** in Meghri on a total area of about **12,000 m²**. The main varieties cultivated in these nurseries are persimmon, pomegranate, peach, apricot and fig. The nurseries have a capacity from **30,000 to 100,000** saplings per year in total. There is a **stable demand for saplings mainly from local farmers, but also from producers of other regions**. The nurseries in Meghri use traditional growing technologies and sell already grafted tree stock. There are several big importers

of **agricultural inputs**, mainly from Russia and CIS countries as well as from Georgia and Iran. The distribution is mainly organised in the vicinity of Yerevan as well as the nearby marzes. However, due to a very limited and non-consolidated demand from Meghri, the vendors have no interest in supplying to the region.

Financial service providers: There are two banks present in Meghri, **VTB** and **Ardshinvestbank (ASHIB)**, but neither of them is involved in agricultural lending. The two banks provide loans to businesses or individuals (consumer and housing loans). All loans need to be covered by collateral (real estate, cars, jewellery, gold). Both banks offer different types of deposit and money transfer. The only credit organisation present in Meghri with a representative office is **SEF international** (an MFI funded and founded by World Vision). SEF has loans for agriculture (but without grace period and monthly repayments) and all loans are individual loans. SEF international does not offer savings or other financial services.

Agricultural Support Centre of Syunik is a profit organisation established in 1999 with a mission to support the farmers in their agricultural activities through providing advisory services and capacity development. It has three agents in Meghri region (but only one horticulturalist, the two others being respectively a veterinarian and an agricultural machinery engineer), however, with scarce funding these agents are not able to provide sufficient services to farmers. Their activities include: organisation of training; information and know-how transfer; R&D functions; raising public awareness; acting as an intermediary in the supply of inputs. The ASC is so far the only public extension system.

Meghri **Water Users Association** is an organisation established voluntarily by water users. It is a non-profit legal entity that operates in the public interest to carry out the operation and maintenance of irrigation systems. The WUAs supply water to users located in their service areas. Even though the state is subsidising 50% of irrigation fees, the maintenance of irrigation networks as well as the pumping stations are out-dated which results in poor water management.

In addition to these, central, regional and local **government bodies** also act as market participants at different levels of the market map. These include the Ministry of Agriculture, Territorial Administration, Economy, as well as Syunik regional government (marzpetaran) and local municipalities.

3. Value Chain Analysis

The analysis included a mapping of all value chain actors (producers, processors, traders/intermediaries, wholesalers, and retailers), an assessment of all value chain supporters (nurseries, input suppliers, advisory service providers, financial institutions, agricultural education institutes) as well as the identification of all formal and informal rules influencing the value chains.

3.1 Market Analysis

The markets for fresh and processed fruits are established. Consumption levels are already fairly high but the evolution of the retail sector will impact the consumption habits: higher quality fresh products with improved traceability (quality standards) will become the rule. From the processing value chain side, a foreseen increase of demand for fruits by the juice and wine sector is foreseen.

The supply of fresh and processed fruits from Meghri is organised along two different value chains. The value chain of fresh fruit is mainly going through the following stages – **production; transportation and storage; trade and distribution; and retail sale**. The actors of the market involved in these transactions are as follows accordingly – farmers; middlemen; wholesale (plus semi-bulk) buyers; and supermarkets and green-groceries.

Based on national statistics fresh fruit 2009 production levels in Armenia – and Meghri in particular – are given in the table below:

| | Armenia | Meghri | Share |
|-------------|----------|---------|-------|
| Pomegranate | 427.9 t | 307.2 t | 72% |
| Persimmon | 1104.3 t | 463.8 t | 42% |
| Fig | 519.8 t | 132.5 t | 25% |

The value chain of processed fruit shows that there could be two possible ways for the processors to obtain fruit – through the normal chain of fresh produce, or through a ‘shorter’ route without the participation of middlemen.

A consumption habits and purchasing behaviour survey showed that the Armenian market of fruits and vegetables has a potential to grow. 40% of the lower income HHs can increase both their production volumes as well as varieties (throughout all seasons) if their income increases. Armenian consumers are quite conservative and in general the level **of satisfaction with existing varieties and supply/availability of fruits and vegetables is rather high**: 44% consider Armenian fruits as “very good”/with no disadvantages and over 90% of consumers could not name varieties or species that are not available in the market. Sub-tropical fruits such as pomegranate, figs and persimmon are well known and accepted by Armenian consumers and are a regular item in the standard diet. There is a tendency for a national preference and fruits from Meghri could substitute those imported provided they have a proper promotion. **Amongst factors influencing the purchase of fruits and vegetables priority is given to freshness, price, external look/appearance and taste**. *Sorting, grading, packaging, labelling* and other factors are of significantly less importance to Armenian consumers.

In addition to that survey, several interactions with various value chain stakeholders underline that the demand does exist and is hardly met by the Armenian production. For instance, supermarkets struggle to secure their supplies and rely mainly on imports, when, as they declared, they would welcome a supply from Armenian producers and particularly from Meghri if that could meet their procurement expectations. There have been specific suggestions by supermarkets on developing a scheme of quality standards for farmers.

It is worth mentioning that during the recent years pomegranate wine has gained popularity in global market in addition to the CIS countries, where it was known even from Soviet times, the potential of the demand for pomegranate wine as well as juice in the international market is rather

big. For instance, **the MAP winery has received an order of around 500 t of pomegranate wine from the German market.**

3.2 Economic Analysis

The analysis of the price trends and distribution of the added value revealed that farmers do capture an already significant part of the latter. Prices seem to be fairly stable over years (indeed shortages in the Armenian production are compensated by imports from neighbouring regions and countries: Nagorno Karabakh, Iran). Also the analysis revealed that the **fruits from Meghri do not have any price advantage**, rather the opposite since transportation costs tend to lower their competitiveness. If Meghri wants to compete on the national market a differentiation strategy is needed. Value addition is limited to processing of fruits, there is hardly any post-harvest management that would be easing the flow of fresh produce to the final market – here the project sees room for improvement in collaboration with intermediaries. On the national market, fruits from Meghri are known as good quality products but at the same time the varieties grown in the region are not those in high demand on the market (particularly true for pomegranate and also with figs to some extent). Therefore the question remains unanswered whether the image of Meghri is really an asset in the efforts to upgrade the value chains. From an international benchmarking point of view, Armenia does not appear as a strong competitor and produce from Iran and Turkey make it difficult for Armenian producers to keep their position on the market. In terms of volumes, the current level of production is less than what the area could produce. Provided the market develops there is scope for improving the yields, expanding the cultivated areas and increasing rural income.

3.3 Constraints

There are constraints to increasing production, which is why farmers have not already grown more fruit for the eager buyers. The most significant constraints are²:

1. Lack of access to quality inputs (fertilisers and pesticides);
2. Lack of access to quality nurseries able to provide new, more productive and healthy varieties of fruit trees and advice on how to cultivate the trees;
3. Lack of access to up to date knowledge on improved farming techniques;
4. Lack of access to financial services so farmers can invest in their orchards;
5. Lack of access to business skills training so farmers can better understand how to develop and invest in their business;
6. Lack of access to market information meaning that farmers are not always well-placed to negotiate with middlemen;
7. Lack of consistent price differentiation by supermarkets for different quality fruit meaning farmers cannot reliably expect a higher price for higher quality fruit;
8. Poor methods of packing and transport of fruit by middlemen which means a proportion of fruit is damaged or destroyed; and

² Irrigation is also an important part of fig, persimmon and pomegranate production and poor irrigation can be a severe constraint. However, after consideration the project has decided not to specifically focus on irrigation. Several sources and project investigations have indicated that changing infrastructure and practice will be extremely difficult. However, it is believed that significant impact can be created through addressing other constraints. Irrigation will be addressed indirectly through technical farm management training and cross-cutting aspects, such as good governance.

9. Low levels of industrial processing in the Meghri region which means low demand for the low quality fruit that is only suitable for processing (not for sale in fresh markets).

Figure 1 below is a diagram of the fruit market system which also shows the constraining issues. In the core of the market is the value chain running from the farmers to the consumers via intermediaries and supermarkets. Supporting the value chain is a number of functions that are generally not working well i.e. they are constraining growth in the core of the market. There is also an aspect of the rules governing the system, namely price and quality differentiation, which is not functioning well.

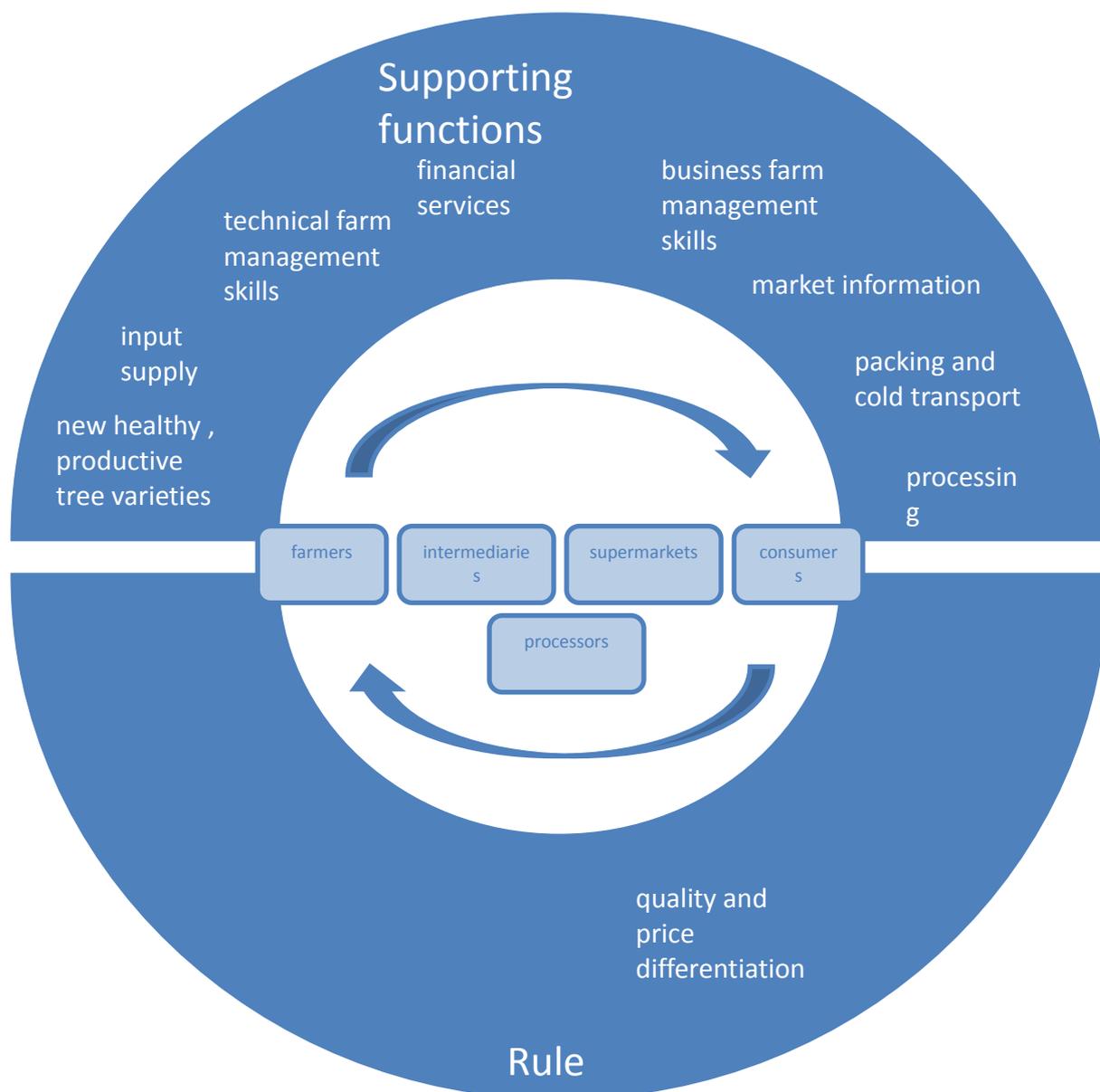


Figure 2: Diagram of fruit market system

3.3.1 Market system constraints

Commercial horticulture depends heavily on the availability and use of inputs. There is a close connection between inputs and the productivity of orchards. Moreover, the usage of inputs (fertilisers, pesticides) strongly affects the quality of fruit which has the dual effect of reducing waste and creating potentially higher value produce. This can increase incomes for farmers. Despite the importance of inputs there are no input suppliers directly linked to the Meghri region which means farmers are unable to access inputs and are disconnected from innovations in horticulture.

The constraints identified with regard to nurseries are that they lack technical, business and marketing capacity. There are nine nurseries in the Meghri region but they do not compete with each other as commercial businesses. With one exception they are just an extension of a sole farmer's orchard that he uses to prepare saplings for personal use. One nursery is owned by the Meghri Horticulturalists' Association but the quality of their saplings is also low and they are not sold on a commercial basis. Essentially the nurseries are not currently good enough to support the development of commercial horticulture. They cannot produce highly productive and disease-free saplings of the varieties demanded by the market. (The DRR assessment done in the region has claimed that frost damage can be reduced through better adapted varieties.) Nor do they actively promote their products and services.

Farmers are not usually trained in business management which means they may struggle to make informed decisions about how to manage their agricultural assets i.e. orchards. In particular this might affect their decisions on how and when to make investments. This is exacerbated by the lack of access to financial services. This is a combination of the relatively small client base of the area – banks may not see the value of placing an office in Meghri – and a mutual lack of knowledge between banks and their potential customers.

There are only two banks with a presence in Meghri, VTB and Ardshinvestbank and one MFI, SEF. They do not tend to offer suitable products for fruit farmers. Other banks, perhaps with more appropriate products, do not have an office or representative in the region. This means farmers have little knowledge about the whole range of potential products and banks have little information on fruit farmers as potential customers.

There are a number of constraints to farmers receiving higher prices for higher quality fruit.

- Higher quality fruit on the farm does not always reach the consumer as high quality fruit. Once it leaves the farm it can be damaged through inadequate packing and a lack of cold transport technology. Figs in particular are highly sensitive to damage. Thus some fruit that left the farmer in good condition cannot be sold as high quality fruit. Some will be lower quality and some will have to be thrown away.
- Quality differentiation in the market is inconsistent. Sometimes higher quality fruit earns a considerably higher price, sometimes it does earn only a small premium. The reasons for this instability are complex but it seems that at least part of the explanation is that supermarkets are not consistent in their pricing strategies.

Farmers' ability to negotiate a higher price is restricted by the limited market information available to them and their knowledge of how to negotiate successfully.

There will always be a certain proportion of low quality fruit that cannot be sold in the fresh fruit market. This fruit can generate revenue for the farmers if it can be sold for processing (which does not require the same quality of fruit as the fresh market). If processors are reluctant to purchase this lower quality fruit it may be disposed of, fed to animals or made into vodka. The major constraint to farmers in Meghri selling a higher proportion of their lower quality of fruit is limited demand because of a very small processing industry. Of course the project will not try to increase the volume of low quality fruit, only the proportion that is sold.

4. Value Chain Upgrading Strategy

4.1 Vision, Goal and Strategy

The overall goal of the project is to *contribute towards poverty alleviation in Meghri*. The project purpose reads as follows: *Small-scale horticulture producers (value chains of fig, persimmon and pomegranate) have an increased and sustainable income through higher profitability of production and improved access to markets.*

4.2 Foreseen Interventions to upgrade the sub-tropical fruits value chains

Markets for Meghri has designed five areas of interventions (outcomes) to tackle the main constraints to farmers increasing their production and profitability. The interventions use a facilitative approach, intended to foster sustainable changes in the market.

a. Outcome 1. Enhancing productivity through improved inputs and skills for farmers:

This outcome focuses on increasing productivity through helping farmers to access inputs and skills that are currently unavailable or difficult to access. This outcome has a strong emphasis on improving the agricultural processes for growing fruit. Three strands include improving the technical farm management training available to farmers, working on the supply and demand sides of input provision and the introduction of contract farming arrangements.

b. Outcome 2. Enhancing productivity through developing nurseries.

Outcome 2 is specifically focused on nurseries as providers of high quality varieties of fruit tree saplings, some inputs such as pesticides and embedded services such as technical advice on the cultivation of different varieties. This also puts the emphasis on the agricultural aspects of fruit production. This outcome is similar to the first outcome in the emphasis on improving inputs and skills for farmers.

c. Outcome 3. Enhancing productivity through farm business management skills and investment.

Outcome 3 considers a different type of supporting function necessary for successful fruit production, namely financial services. Without capital, farmers often find themselves unable to invest in purchasing good quality trees to replace old trees or extend their orchard. This capital can be credit or savings: often farmers struggle to access both types of service. The financial services intervention is supported by the development of farm business management skills so farmers have better understanding of the business context i.e. when, where and how to invest.

d. Outcome 4. Increasing value of high quality fresh fruit for farmers.

Aside from increasing production and yields, farmers can expect to raise their incomes through receiving higher prices for higher quality fruit. This intervention concentrates on ensuring that some of the extra value created through the consumer's readiness to pay a higher price for higher quality fruit is shared with the farmer. One element of the intervention is improving the farmers' bargaining power by developing their negotiating skills and increasing access to market information. Another element is ensuring value is not lost when high quality fruit is transported to market. Inadequate packing and lack of cold transport means fruit can be damaged or even destroyed in transit. This will entail working with intermediaries to improve their practices and technologies. The final element looks at the prevalence of price differentiation across the market and through the value chain. Where price differentiation is weak or inconsistent, the project will work to ensure clearer and more reliable implementation.

e. Outcome 5. Increasing demand for low quality fruit through processing

This outcome aims to contribute towards farmers' increased incomes by raising the proportion of low quality fruit that farmers sell to processors instead of discarding it or using it unproductively. By working with processors to improve their businesses it is expected that demand for the low quality fruit suitable for processing will increase and farmers will be able to supply such produce.

4.2.1 Enhancing productivity through improved inputs and skills for farmers

4.2.1.1 Intervention strategy

The intervention strategy will work from both the demand (farmers) and supply (input suppliers) side to improve input supply. The project will support farmers to create consolidated demand for inputs to make it more attractive for input suppliers to supply to Meghri. It will encourage farmers to assess the necessity and economic feasibility of using certain types of inputs (fertilizers, pesticides etc.) to make decisions on the procurement of inputs. The project will discuss with input suppliers the obstacles they face in doing business in the Meghri region. The project will support both sides with detailed and analyzed information, ensuring the information flow will be sustained. The project will also consider partners from public sector such as the Syunik marzpetaran, which has been previously involved in supporting the communities to procure inputs at relatively cheap prices. The project may collaborate with Meghri Horticulturalists' Association and use the channels of the Agricultural Support Centre to achieve this outcome.

To improve technical farm management, in particular the use of improved farming techniques, the project will have a combined strategy of direct provision of training and the establishment of sustainable delivery of this technical farm management training. This dual approach is in recognition of the extremely weak market for training in Meghri and the probable difficulties of establishing genuine commercial provision.

Since farmers lack up to date knowledge and inputs to produce quality crops, contract farming will be piloted as a way to strengthen the links between producers and buyers. This can have the advantage of the buyer providing the inputs or training necessary for successful fruit production, or at least the credit for the inputs. Some processors have already expressed interest in the idea and are ready to invest in the region. The project will help both sides obtain the information necessary to establish such arrangements.

4.2.1.2 Anticipated changes at service level

As a result of this intervention farmers will have better coordination capacity for procurement of inputs. Farmers will understand and value the usage of certain inputs which would lead to increased demand and therefore purchase of desirable fertilizers and pesticides. The project will assess the capacity of the Meghri Horticulturalists' Association to perform this coordinating function in the future.

The main service level change based on the project's support to interested input suppliers to better assess the potential demand for inputs in the Meghri region will be an increase in promotion activities by input suppliers. In combination with better coordinated buying by farmers it is anticipated that input suppliers will increase their sales to the Meghri region.

At service level contract farming will increase access to embedded services and inputs.

4.2.1.3 Anticipated changes at farm level

The intervention will mitigate the production problems farmers have been suffering. In particular to be able to produce quality crops farmers need access to quality inputs (fertilizers, pesticides) and adequate technical knowledge on farm management. If the project can stimulate these changes at a service level at a farm level we could expect:

- Farmers will buy and plant more quality trees due to increased knowledge in farm management (including efficient usage of water) and external investments by fruit buyers or other investors;
- Potentially increased area under cultivation if trees are not bought just as replacements (and farmers have fallow land or purchase new plots);
- Increased yields and decreased pest and disease damage as a result of application of technical knowledge and inputs;
- A higher proportion of quality fruits.

Overall farmers will increase the quantity and quality of fruits. Increased quantity would lead to increased revenue. The quality would lead to a higher price, raising the incomes and profitability of farmers. Profitability would be partly achieved through a reduced cost of production.

4.2.2 Enhancing productivity through developing nurseries

4.2.2.1 Intervention strategy

The intervention strategy will aim to strengthen the technical, business and marketing capacities of nurseries. It will put a focus on supporting the nurseries to produce productive and disease-free saplings. The varieties produced should respond to farmers' needs. The nurseries must have robust and sustainable approaches to developing their businesses in the future. They will also need to have sustainable access to new knowledge and up to date information on horticulture developments.

4.2.2.2 Anticipated changes at service level

As a result of the intervention, new healthy and highly productive varieties of trees will appear in the market. The nurseries will also improve their business promotion capacity. These two changes will result in increased sales of quality trees and increased awareness of nurseries' products and services among farmers. The range and quality of embedded services and inputs will increase.

4.2.2.3 Anticipated changes at farm level

Having access to the services of commercial nurseries will benefit farmers in a number of ways. As with inputs and farming techniques, it will strengthen production side of their business. Farmers will have productive and healthy trees planted with higher resistance to negative influences such as pests, disease and frost. Quality trees will also give higher yields resulting in lower production costs and increased revenues for farmers. Farming techniques should also improve as a result of increased embedded services. For example, farmers will use appropriate fertilizers and pesticides to reduce pest and disease damage and increase the quality of their produce.

4.2.3 Enhancing productivity through farm business management skills and investment

4.2.3.1 Intervention strategy

Improved business management skills, such as understanding and tracking profitability, would help farmers make informed choices and help them exploit improved access to financial services. Improving farmers' access to financial services is likely to be a challenging aspect of the project. There are 3325 households in Meghri which only offers a small customer base for any financial institution. Nevertheless, the lack of competition means the first bank or MFI to attract customers would have a clear advantage. Farmers have expressed interest in accessing financial services. The project's strategy is threefold:

- To improve farmers' business management skills;
- To support financial institutions to expand in Meghri; and
- To improve farmers' access to information on financial products.

Together these strands of the intervention are intended to expose both sets of market players to each other in the expectation that increased knowledge will increase the provision and uptake of financial services. This will be supported by farmers' better understanding of key business concepts and principles, relevant to their fruit businesses.

4.2.3.2 Anticipated changes at service level

The main changes at service level should be an increase in promotion by financial institutions and an increase in advisors who can provide information to farmers on financial products. Farmers often do not know the details of available financial products to inform their decisions on investment into orchards. Addressing this constraint should yield an increase in the demand and usage of financial services. In addition, there should be an increase in farmers' business management skills through training.

4.2.3.3 Anticipated changes at farm level

At farm level, increased usage of financial services is expected to enable farmers to buy and plant good quality trees and use quality fertilisers and pesticides. These inputs can be unaffordable for farmers without access to at least a small amount of credit. The increased planting of good quality trees may increase the area under orchard cultivation and will also reduce losses and damage from disease and pests. Fertilisers and pesticides will also reduce losses from these sources as well as increasing yields. Overall this should increase production, reduce the proportion of low quality fruit and increase the proportion of high quality fruit.

There are two main impacts anticipated from improved business management skills: improved decision making through better understanding of business principles; and the supervision by farmers of middlemen harvesting their fruit. Supervision of harvesting should improve the grading of high and low quality fruit allowing each to be sold to the most appropriate buyer and maximising the farmers' incomes.

4.2.4 Increasing value of high quality fresh fruit for farmers

4.2.4.1 Intervention strategy

The project has designed three directions for the intervention strategy for to increase the value of high quality fresh fruit for farmers. First, working with middlemen to improve packing and cold transport of fruit. This may involve linking middlemen with financial services so they can access credit to purchase the necessary technology or with experts in packing/packaging and transport whether in supermarkets, specialist consultants or middlemen handling other products. Second, extending quality differentiation in the market. Initially this will probably focus on supermarkets that have customers willing to pay a premium for higher quality fruit. The intention is to generate more consistency in higher quality fruit earning a higher price and in some of this extra value reaching farmers. Third, working with farmers to improve their access to market information and negotiating skills. This is supposed to complement the other two parts of the intervention by strengthening the farmers' ability to take a share of extra value in the chain.

4.2.4.2 Anticipated changes at service level

Under the first direction of the intervention strategy it is expected that there will be improved packing and cold transport of fruit from Meghri. This should have two consequences: a) reduced loss of fruit during transport; and b) reduced damage to fruit during transport. The immediate benefit of this will be an increase in intermediaries' revenues. The project recognises that intermediaries will not automatically share this increased revenue with the farmers by paying them a higher price. This is why the third direction of the strategy is to bolster the farmers' negotiating position by training them and increasing their access to market information. Similarly, if at the service level more supermarkets establish consistent differentiated pricing for different qualities of fruit (the second direction of the strategy), the intermediaries will have to claim a share of this extra value of which the farmers in turn will have to claim a share. The first step towards this will be the development of forums or information flows which improve farmers' access to information.

Under this outcome, the project needs to be aware of the level of competition in the market, both at the supermarket level and between intermediaries. While the project cannot increase competition in terms of the number of market players, it aims to stimulate other changes in the environment that may increase competition, for example improving farmers' negotiating skills and access to market information.

4.2.4.3 Anticipated changes at farm level

At farm level, farmers' more effective negotiation skills should enable them to more frequently receive a higher price for higher quality produce. This will raise the profitability of their fruit farming and increase their incomes.

4.2.5 Increasing demand for low quality fruit through processors

4.2.5.1 *Intervention strategy*

The strategy for increasing demand for low quality fruit is to boost the processing industry in Meghri. The project will work with the existing cannery in Meghri to develop its business and with other processors interested in expanding or establishing a business in the region. In addition the project will investigate the possibilities of supporting processors to arrange contract farming so they have a steady supply of the fruit required for processing. This may not necessarily be lower quality fruit but different varieties specifically grown for processing rather than sale as fresh fruit.

4.2.5.2 *Anticipated changes at service level*

The major change anticipated at service level is an expanded processing industry with higher demand for lower quality fruit. There may also be new contract farming arrangements established which provide embedded services and inputs to farmers.

4.2.5.3 *Anticipated changes at farm level*

The key change at farm level through increased demand for lower quality fruit will simply be an increased proportion of lower quality fruit sold to processors. The project is not aiming to increase the volumes of lower quality fruit sold because farmers nearly always receive better prices for fresh fruit. The goal is to reduce the proportion of low quality fruit that is disposed of or used unproductively. Contract farming between processors and farmers will have different impact at the farm level. The provision of embedded services and inputs will increase the number of quality trees planted, improve the farming techniques used and the use of quality fertilisers and pesticides. These changes will lead to increased area under cultivation, increased yields and reduced damage from pests and disease. All of which should increase production and the proportion of high quality while reducing the proportion of low quality fruit that ends up being thrown away. Ultimately more fruit should be sold at higher prices which raises the profitability of fruit farming and consequently raises incomes.

5. Appendices

5.1 Appendix 1: Meghri Map

