ALCP | Alliances Lesser Caucasus Programme

The Characteristics of Beekeeping in Ajara Region

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ALCP | Alliances Lesser Caucasus Programme

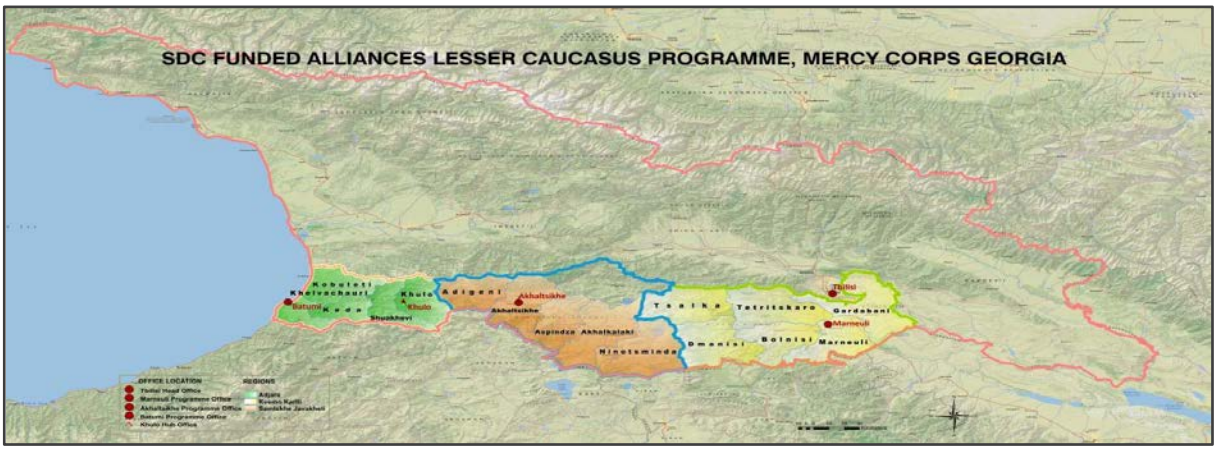
The Alliances Lesser Caucasus Programme (ALCP) is a Swiss Agency for Development and Cooperation market development project implemented by Mercy Corps Georgia working in the dairy, beef, sheep and honey sub-sectors in the Kvemo Kartli (KK), Samtskhe Javakheti (SJ) and Ajara (AJ) regions in Southern Georgia, regions all highly dependent on livestock production. The programme has been audited according to the Donor Committee for Enterprise Development (DCED) Standard and is committed to the successful implementation and measuring of Women's Economic Empowerment.

Project Time Frame: *The ALCP began on March 1st 2014 and is set to run until February 28th 2019, incorporating a second phase of Alliances Kvemo Kartli of three years implementation and two years standby, of four years implementation and one year standby in Ajara and from January 1st 2015 a two year standby phase for the former Alliances SJ, which will have completed six years of inception and implementation in December 2014.*

Our Partners: *The programme works in partnership with the International Association of Agricultural Development (IAAD) and has scope to contract locally grounded technical expertise through sub contracts for Gender, Governance and DRR.*

The Goal of the ALCP *is to contribute to poverty alleviation and the transition to a durable market economy for the livestock sector in the selected regions of KK, SJ and AJ, by creating sustainable changes in the dairy, beef, sheep and honey market systems for the ultimate equitable benefit of small, poor farmers, regardless of gender or ethnicity. The programme is run according to the* ***M4P (Making Markets Work for the Poor Approach)*** *a market systems development approach which* ***facilitates*** *key market players in the relevant value chains to address key constraints in core markets and supporting functions to exploit pro poor opportunities for growth. Sustainability is built in through a minimum co-investment of 35% from the market players with whom it invests.*

Targets: *The previous phases of the Alliances programme have considerably exceeded their targets, impact which is now being bolstered by the appearance of crowding in.* ***The ALCP Target*** *is to reach 24,000 households which is 20% of poor households in the programme area, who will benefit directly and indirectly through improved services, markets and operating environment, with increased income from sales, reduced production & transaction costs, increased net worth and employment. 90% of Alliances-KK supported business will still be operating without programme support by the end of the programme and 49,000 (41%) households will have improved awareness of local Disaster Risk Reduction (DRR) directly related to livestock production. For more information please go to: www.alcp.ge*



EXECUTIVE SUMMARY

Ajara region is one of the biggest producers of Georgian honey. Officially, it accounts for 16% of the total production of honey in Georgia. Beekeeping in this region has been a traditional agricultural activity for centuries. Before the implementation of modern beekeeping with frame hives, traditional *Gejuri* beekeeping[1] using a *Jara*, a hive made from a tree trunk was practiced and is still quite extensively used today. Beekeepers have transmitted their knowledge from generation to generation. However, since the collapse of the Soviet Union and the introduction of modern beekeeping techniques this knowledge transfer has weakened. Today interest in local honey is high as evinced by the number of Turkish intermediaries smuggling it to Turkey. Ajara is known for its mono-floral chestnut honey the price of which is much higher than poli-floral blossom honey.

From March 2014 the Alliances Lesser Caucasus Programme (ALCP) carried out research regarding the agricultural sector of Ajara: *Ajara Market Analysis, Focus Group Survey Ajara* and *Baseline Survey in Khulo, Shuakhevi, Keda, Khelvachauri and Kobuleti Municipalities of Ajara Region of Georgia* (2014)[2] which contain a comprehensive section on the beekeeping sector. The research identified beekeeping as one of the high relevance agricultural sectors of Ajara with good pro-poor potential and as a vital sector for both the agri-tourism sector and conservation and bio diversity friendly agriculture based livelihoods. This review was subsequently undertaken to triangulate and build on the findings of the research mentioned above and to provide the data which will be used to design and underpin successful interventions in the honey market system.

This research was conducted in two parts: *Part 1: A literature review* and *Part 2 Beekeeping in Ajara: Results*. Part 1 examined existing research pertaining to beekeeping in Georgia and key aspects of beekeeping in general, to form part of the foundation for the further analysis and interpretation of the results specific to Ajara. Part 2 contains an analysis of the official data, documents regarding beekeeping and key informant interviews with beekeepers, government and private sector representatives.

Part 2 divides the honey market system into three main components. These components are core market, supporting functions and rules. The research has provided information on patterns of beekeeping in the region, production methods, the core market of bee products and honey, access to inputs and information, rules and regulations, key market actors, constraints and the pro-poor opportunities within the sector.

The results confirmed the high dependence of the core market on Turkey and the Turkish intermediaries who take honey in Turkey. This is in spite of a Turkish ban on Georgian honey, which is linked to an inability of local authorities to issue veterinary certification for exporting the honey due to the absence of the requisite laboratory and proper monitoring system. In Turkey, the price of the honey is higher than local market prices in Georgia especially for chestnut honey. This causes beekeepers of the region keep honey and wait for Turkish intermediaries to sell it to them directly. This in turn leads to instability in the local market and high prices. The high price is also related to high production costs and the low productivity of the hive.

Lack of information is the one of the key constraints for beekeepers in AJ. Beekeeping requires a high level of skill and knowledge. Most of the beekeepers are amateurs and have limited access to specific

[1] Please see Additional Information Box 1 p8

[2] All available on the downloads page of the ALCP website www.alcp.ge

information regarding the care of bees, bee diseases and other factors that negatively affect productivity and increase risks of production. Lack of information regarding the selection and use of vet medicines, as well as poor access and quality often leads to inefficiency and raises costs. Low productivity can also be related to genetic degradation of honeybee species through mixing with other species with lower productivity. Productivity also depends on transhumance which allows beekeepers to collect honey several times throughout the year by following the flowering period at different altitudes. Many beekeepers do not do this due to the high risk and cost of transportation amongst other issues.

The risk of disease remains high, as local authorities do not have the registering and monitoring system of diseases due to the lack of resources, like infrastructure and qualified personnel. This lack of quality control of honey on the market and special laboratories having service of chemical analysis for residues of antibiotics and pesticides in honey, creates distrust and negative image amongst consumers who believe that honey is adulterated with sugar. The lack of the correct laboratory facilitates and system leads to a lack of accessible certification which also creates a barrier to the export of honey.

Despite these constraints beekeeping in AJ still has potential for development. A high demand for honey from Turkey and the development of both urban and rural tourism offer good pro-poor drivers. Overcoming the constraints regarding information, inputs, market regulation and infrastructure provides the opportunity to raise productivity, reduce risks and open new markets.

The report is divided into the following sections:

1. Introduction
2. Part 1: Literature Review
3. Part 2: Beekeeping in Ajara
4. Main Findings and Recommendations
5. Bibliography
6. Annex 1: Research Methodology
7. Annex 2: Additional Research Data

INTRODUCTION

The aim of this research was to determine the characteristics of beekeeping in Ajara region. Beekeeping and the honey market system are complex. Beekeeping requires knowledge of proper care, prevention of diseases, making or purchasing inputs, transhumance, breeding, harvesting and processing of products and sales. It is a sector that requires governmental support. This research is a tool to form complete picture of the beekeeping sector and its components that is essential for successful planning of the interventions in the sector.

In the light of the *Ajara Market Analysis* carried out in 2014, Alliances Lesser Caucasus Programme (ALCP) identified that beekeeping has a high relevance to the programme and high pro-poor potential in Ajara. The report concluded that:

- *High pro-poor potential:* Small Scale Livestock Producers (SSLPs) in the majority of villages own bee colonies. They collect honey once or twice a year. They consume and sell surplus legally in the local market or illegally to Turkish traders during the year.
- *Strong drivers:* high demand and export potential for honey especially in the neighboring countries (e.g. Turkey), where the price of honey is considerably higher compared to local market.
- *Constraints for beekeepers:* uncertainty over export and government support to the sector, lack of regulation over quality control and fragmented supply due to non-existent testing/certification; poor access to the market, inputs and information.
- *Pro-poor opportunities:* potential to improve supporting functions and market conditions for farmers so that they possess higher bargaining power.

It was considered important to the programme that the market analysis be triangulated and used as the basis for more in depth research at the beekeeping level as honey is a new market system in the ALCP. Therefore the research comprises of Part 1: A literature review which gives an overview of beekeeping generally and Part 2: a sector analysis with results based on statistically significant sample of SSLPs and key stakeholders in programme area.

The literature review was prepared on the basis of desk research of the available and pertinent publications concerning beekeeping in Georgia and aspects of beekeeping in general. The cited publications are listed in the section *The Bibliography*. The literature review includes:

- A History of beekeeping in Georgia
- Bee products which are produced in Georgia and in the world in general
- Bee species widespread in Georgia
- Transhumance of bee colonies in Georgia
- Breeding and swarming of bees in Georgia
- Bee diseases widespread in Georgia

The second part of the research is *Beekeeping in Ajara* and is based on the ALCP research documents *Market Analysis Ajara* (2014), *Focus Group Survey Ajara* (2014), *Baseline Survey in Khulo, Shuakhevi, Keda, Khelvachauri and Kobuleti municipalities of Ajara region of Georgia* (2014), key

informants interviewers and market stakeholders[3]. This part of the research concerns the market system of the beekeeping sector and is built on M4P approach (Making Markets Work for the Poor) on which the programme is run. The market system is divided into three parts:

- *Core market*: describes the basic function of supply and demand
- *Supporting functions*: deals with inputs necessary for beekeeping, the access to them, constraints, transhumance of bee colonies, gender roles and responsibilities in the sector.
- *Rules:* formal and informal rules related to the sector; relates to smuggling, quality control, export constraints, public distrust of honey quality, government control and support of the sector, diseases control, etc.

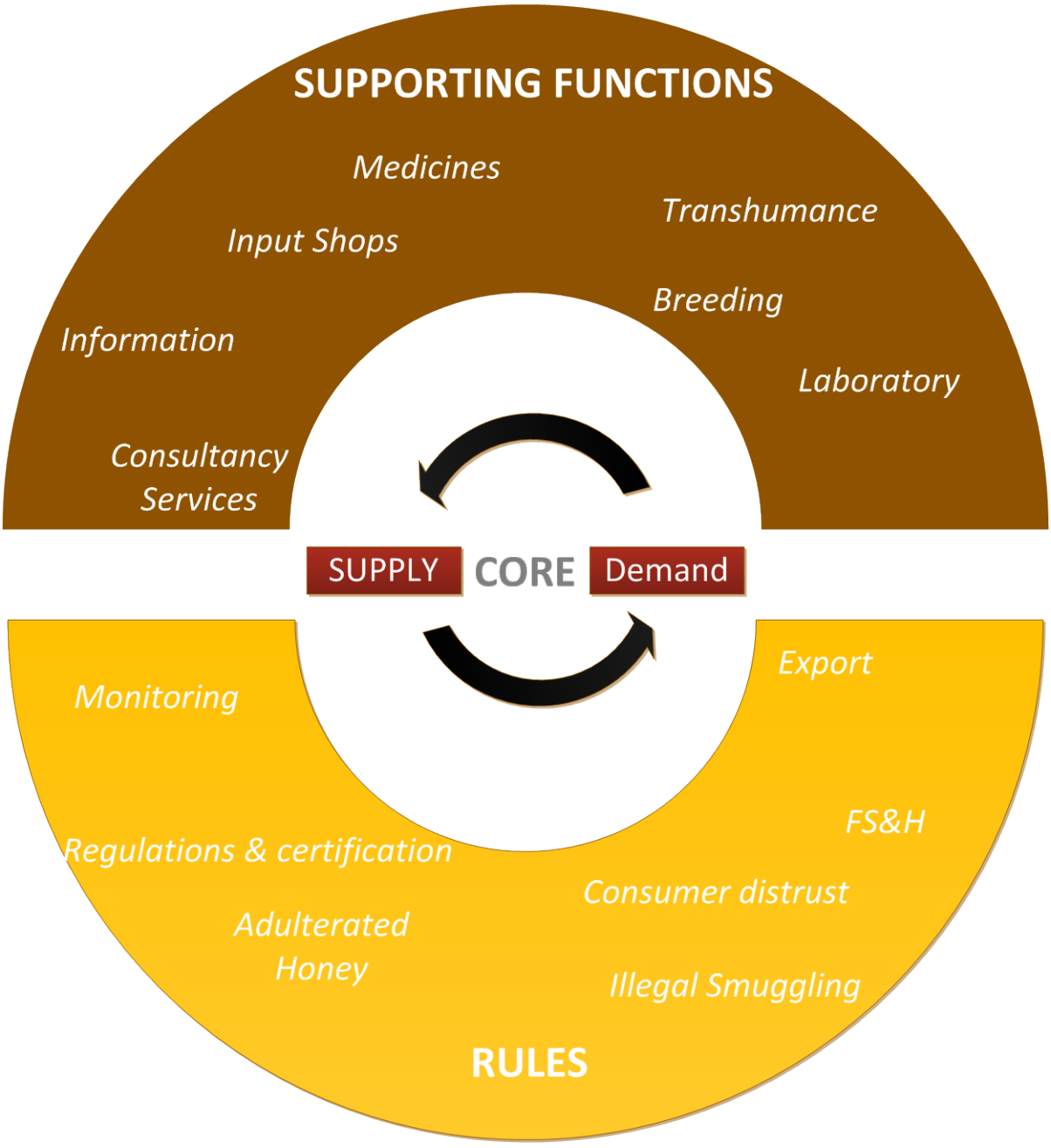


Figure 1: Honey Market System

[3]The target group of Focus Group Survey and Baseline Survey were SSLPs in general and not focused just on beekeeping. Therefore more interviews were conducted with key informants and market stakeholders to fill the information gaps. Information about sampling is given in *Annex 1*.

PART 1: A LITERATURE REVIEW REGARDING BEEKEEPING IN GEORGIA

BEEKEEPING IN GEORGIA: HISTORY HIGHLIGHTS

BEEKEEPING BEFORE THE 20TH CENTURY

Since ancient times, beekeeping has been practiced in Georgia as one of the main economic activities of the population. According to the historical records (*Robakidze*, 1955), beekeeping in Georgia went through a similar development path to other countries:

- Humans of the upper Paleolithic period had knowledge about extraction methods of wild honey (and collecting bee products);
- Intermediate stage was Semi domestic beekeeping (hanging hollow logs *jara* up on the tree);
- Domestic beekeeping in ancient times (IV century BC) the use in Western Georgia of wooden bars so called "Gejuri" beekeeping and in the eastern lowland zone – the use of staves or skeps "kokoza". In this period beekeeping was strongly developed: in Phasis and Dioskuria (ancient cities located in Kolkheti lowland) where selling points (markets) were arranged and honey and wax were sold in the west (Ist century BC). There was a high demand for wax due to its use in metallurgy during that time. Furthermore, according to the Greek historian and general Xenophon, and later geographer Strabo, the Greek and Roman conquerors of Colchis were defeated due to honey placed on the roads by Colchic people. Soldiers were poisoned by honey and stripped of their fighting ability. Since then many observers have confirmed the properties of the local honey (Thresh; Plugge; Sharov; Krause and Rollov, cited. *Kupcis* 1929.) They identified the plant species, of which bees collect nectar containing poisons (grayanotoxin). Several methods for biological (*Grobov*, 1987), microscopic and chemical (*Kupcis*, 1929) analysis of this poisonous honey, as well as a method for its treatment (Madzgarashvili, Alanina, & Bregadze, The method of disposal of toxic honey , 1983) were developed.

According to historical records of the Middle Ages (D. *Andguladze*, 1968), a large amount of Georgian honey and wax were exported to Europe, which confirms that beekeeping was developed in Georgia. Another proof of this are records of Georgian historian and geographer Prince Vakhusti Bagrationi (18th century). Obviously, the primitive methods of beekeeping had a negative impact on productivity, especially in the destruction[4] of the bee colony when collecting honey, from which most of the productive colonies suffered (negative selection).

BEEKEEPING IN THE SOVIET PERIOD

In the 19th century, due to several inventions (frame hives, artificial honeycomb[5], honey extractors), beekeeping in Georgia began gradually moving towards modern practice and in the 20th century took a modern form. In addition, from the second half of the 20th century, soviet beekeeping took the course of creation and development of bee breeding in the southern zone of the USSR (Caucasus, Central Asia). The climate conditions in the south allowed breeding earlier than in the north. So the bee breeding centers in southern zones produced early mated queen bees and bee swarms for the North (other republics of USSR and foreign countries), where the period of flowering and pollination begins later. For this purpose in 1976, seven breeding centers were created in Georgia (Tsnori, Kvareli,

[4] Usually hives were broken into using smoke to destroy the bees and honeycombs along with eggs and larvae were destroyed in the process of honey harvesting. Before the invention of hives with frames, it was almost impossible for beekeepers to influence the productivity of bee colony.

[5] Beeswax foundation or honeycomb base (afterwards referred as honeycomb) is a sheet made of wax with a base honeycomb. It is used in beekeeping to give the bees a foundation on which they can build the honeycomb. Wax foundation is considered one of the most important inventions in modern beekeeping as it saves time on building a honeycomb which is stronger and reduces number of drones in beehive.

Dusheti, Kharagauli, Samtredia, Mukhuri and Sokhumi) as well as beekeeping associations. From these centers only Mukhuri produced queen bees for breeding.[6]

There were also plans for a test station for beekeeping to be established in Georgia, which was supposed to continue the traditions of the sericulture and apiculture stations founded at the end of the 19th century. But unfortunately it did not happen: the testing station and stud farms failed to work efficiently together[7]. The Testing Station (hereinafter referred to as the Institute) failed to become the organizer of a highly productive breeding base. As a result selection works in studs fell, followed by defective production of breeding material: Georgia lost its preeminence in bee breeding, especially with the influence of "Krasnaya Polyana" a powerful stud farm created to the immediate vicinity of its borders (RSFSR). Hence, Russia became a major manufacturer of Georgian gray long tongue bees (*Apis mellifera caucasica*).

Table 1: Gejuri Beekeeping

Additional Information Box 1 *Gejuri Beekeeping*	
 	***Gejuri beekeeping.*** *This technology of beekeeping was common until the beginning of 20th century (before transition to frame beehives). In Gejuri beekeeping an old type of hive which locals call a Jara. It is usually made by cutting of wooden log vertically into two parts and cutting out middle part (heartwood and sapwood) after which a bee swarm is settled there. Mostly these hives are made from linden or chestnut logs and hanged on trees. Unlike the modern hive there are no artificial comb and frames in it. Bees make the comb by themselves which takes much more time and energy and therefore productivity is less. At the end of the bee activity period, the beekeeper begins extracting honey from the hive. As there are no comb frames in beehive, extracting is made by cutting half part the comb in the hive. The other part is left as forage for overwintering of bees. This type of beekeeping has several disadvantages: inability to make selection of queen bees, artificial swarming, provide treatment against bee diseases, changing comb frames and others. Besides that there is a big risk of killing a high proportion of bees and larvae. Extraction of the honey is made only by pressing which precludes re-using of beeswax foundation.* *This type of beekeeping is still practiced in Ajara. Some Gejuri beehives can be found on the beech trees (bears can`t climb on it) in Ajara region. This type of beekeeping was widespread in Ajara for a long time but from the 20th century it has been replaced by modern type of hives. At present, in Ajara only a few beekeepers keep a few of this type of hive. Recently, however Gejuri beekeeping has growing interest from tourists and in the case of proper approach has prospects of development as a part of eco-tourism sector.*

BEEKEEPING AT PRESENT

The end of the 20th century was a particularly hard time for the Georgian beekeeping industry: with the collapse of the USSR beekeeping breeding centers and later the closure of the beekeeping research institute. The collapse of the USSR's complicated agricultural supply chain, civil war and political instability stopped the re-equipment of the industry and it was left on the level of 1950s.

[6] Breeding of bees is very difficult to control. As a queen bee mates with up to 20 drones in the "air". So for breeding of "clear" species isolated spaces are necessary to avoid "foreign" species drones.
Breeding has 3 levels:1.Breeding core _ deep selection works with "clear" species to breed species for reproduction core.2. Reproduction core _ selection and breeding works with reproduction core to create "strong" queen bees or colonies for selling.3. Customer _ usual breeding process made by beekeeper for strengthening or multiply an apiary.

[7] Poor coordination and practice and competition.

Beekeeping continued in the private sector and small holder production, which could not ensure the development of the industry due to lack of financial and other resources. Georgia lost its foreign market. Despite the growing number of bee hives, their productivity has not substantially increased mainly because of: destruction of honey flora and cultivation of non-honey plants (cereal) on domestic farms, limited demand on honey due to decreased PPP[8] of the population and export restriction due to an inability to provide the necessary checks and certification.

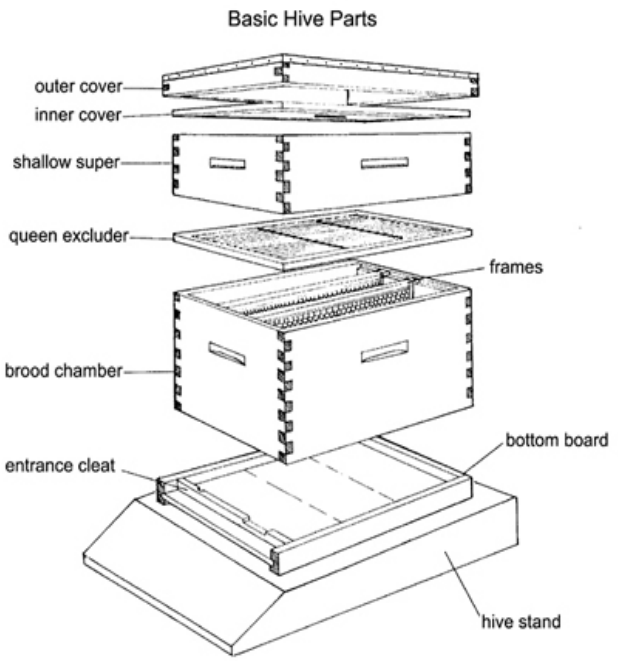
Table 2: Members of a bee colony

Additional Information Box 2 *The Bee Colony*	
 Queen	***Queen*** *_ a central figure in the colony, as a rule, there is only one adult, mated queen in a hive, in which case the bees will usually follow and fiercely protect her. She is usually the mother of most, if not all, the bees in the hive. For short periods, there is sometimes another queen in the hive until the old queen bee leaves the colony with some part of swarm and settles in another place creating a new colony or until the old queen is killed. The queens are developed from larvae selected by worker bees and specially fed in order to become sexually mature. Queen bee differs from the rest of the colony members (worker and drone bees) by color, weight and life expectancy, which is usually 2-3 years. The main function of the queen bee is egg-laying, ensuring a constant renewal of colony generations in an active season and the integrity of the colony through secretion of special substances (pheromones) with further extension of it across the whole colony which helps its members to recognize one another.*
 Worker	***Worker*** *_ the major representatives of a colony. Worker bees are female undeveloped queen bees. They perform the main work in a colony:* - *Processing and storing of nectar and the production other products;* - *Protection of the colony from enemies;* - *Rising young generations;* - *Building of honeycomb base;* - *Maintaining proper microclimate in a beehive;* - *Feeding and caring for the queen bee.* *The life expectancy of worker bees in high season (spring &summer) spans 25-35 days and for fall generation of bees 5-6 months (overwintering from fall to spring).*
 Drone	***Drone*** *_ the male honey bee which are the product of an unfertilized egg. There can be a few hundred of drones in a colony. Unlike the female worker bee, drones do not have stingers and do not participate in nectar and pollen gathering. A drones' primary role is to mate with a fertile queen and maintaining a proper microclimate (temperature) in the beehive. Usually they appear in spring and disappear (die or are ejected by workers from hive) in late autumn right to the period when pollen and nectar gathering ends which is the swarming period when the colony begins dividing into two colonies*
	***Life cycle of a bee colony*** *_ the active development of a bee colony begins in the spring when working capacity is growing through increase in egg laying by the queen bee it reaches its peak at the end of May and beginning of June. At this period also begins the natural swarming of bees. After strengthening a colony the gathering of pollen and nectar begins achieving a maximum at the end of summer (August). The amount of the bees in the colony gradually decreases with the ending of flowering period. At this period newly hatched generation of bees are preparing for overwintering through the accumulation of fat and protein in a body of worker bee and the ejection of drones from the hive. In Georgia wintering begins in November. During the winter time bees cluster in elliptic groups between frames on the bottom of beehive and move to the top with consumption of the forage in combs. Clustering bees also generate body heat and keep proper temperature in beehive. At the end of the winter colony prepares for growing new generation.*

[8] Purchase Power Parity

All of the 6 types (honey, wax, propolis, pollen, royal jelly and bee venom) of bee products are produced by beekeepers in Georgia however in a limited quantity due to lack of appropriate technology and know-how. Few of these products are produced in formal enterprises (i.e. most of them are homemade). Honey is considered to be the most valuable bee product and source of income for beekeepers. Next to honey the sale of wax is the most widespread since it can easily be exchanged with artificial honeycomb. What is often neglected however is the value of the role of bees in the pollination of agricultural crops[9].

Table 3: Beehive

Additional Information Box 3 *The Hive*	
	***The Beehive*** *in the modern sense is a man-made enclosed structure made from wood or other material. The first beehive with a frame structure is believed to have been invented by Ukrainian beekeeper Petro Prokopovych in 1814*[10] *(Root et al., 1982). It allowed the beekeeper to open the beehive and work with the bees without their destruction. Subsequently beehives have been developed: Dadant-Blatt*[11] *beehives and Langstrot-Root*[12] *hives are currently spread throughout the world. Obviously, beehives have undergone diverse constructive change in different countries but the core of the body remained the same: 1) one or two brood chambers for egg-laying and forage storing 2) the Upper Honey Super box where the bees stores honey (also can be several) 3) Bottom board with entrance cleat 4) Inner cover: provides separation from an overly hot or cold outer cover and can be used as a shelf for feeding or other purposes 5) Outer cover: provides weather protection for the hive 6) Queen excluder is a selective barrier inside the beehive that allows worker bees but not the larger queens and drones to traverse the barrier 7) Frames and foundation: wooden or plastic frames with wax or plastic sheets with honeycomb impression where bees build wax honey combs. In addition, there are different design hive stands (metal or wood), canvas cover and pillow which are arranged on top of a hive for protection from cold and overheating. Frame hives can be vertical (several boxes located on top each other) or horizontal (frames are arranged in one box side by side).*

[9] The value of bee pollination to the US alone is estimated at over $16 billion, with over 30% of all food crops pollinated by bees. https://beespotter.org/topics/economics/

[10] Invention of frame beehives is also linked with polish beekeeper Johann Dzierzon (1838) and others. However, the frame structure beehive, which is close to the modern, has been patented in the US in 1851 by American beekeeper L. L. Langstroth. In Langstroth hive frames are removed from the top. This design has become the most widespread in the world.

[11] Charles Dadant (20 May 1817 – 26 July 1902) was a French-American beekeeper. Along with Petro Prokopovych, Dadant is considered one of the founding fathers of modern beekeeping.

[12] Amos Ives Root (1839–1923) was an Ohio entrepreneur who developed innovative techniques for beekeeping during the latter 19th century. He developed and "simplified the " Langsroth beehive model. He is also well known for his book "ABC of Bee Culture" published in 1879. It is also known as the "encyclopaedia of beekeeping" which continues to be updated in the present day.

Additional Information Box 4 ***Beekeeping Products***	
	***Honey*** *is the product which is produced after processing the nectar and plant heather by bees. Its final formation occurs in the bee hive after the evaporation most of the water content and adding invertase which serves mainly to break complex sugar molecules down into simple sugar molecules. Ripened or also called mature honey contains 17% of water, up to 95% sugar (absolute dry substance), also proteins, vitamins, enzymes and mineral substances. In the human digestive system honey is directly absorbed in the blood without digestion. In addition to the usage of honey in food and beverages, it is used for medical purposes, to increase body tone and so forth.*
	***Beeswax*** *is formed by wax-producing glands of bees, located on the inner sides of sternites. It is exuded in a liquid form and then is formed like solid plates. Honey bees use the beeswax to build honeycomb cells in which their young are raised and honey and pollen are stored. Thus, beeswax is an essential element for the existence and functioning of the bee family. It is considered that the bee sacrifices between 1-3.5kg of honey to wax production. Beeswax has many and varied uses. Primarily, it is used by the bees in making their honeycomb foundation. Apart from this, beeswax is used in cosmetics and pharmaceuticals, manufacturing electronic components, covering metals, lost-wax crafting an etc.*
	***Pollen*** *is a plant's male reproductive cell which is dropped on the bee body during the nectar collection process. Bees travel from plant to plant collecting pollen, then they mix it with nectar from the plant and bring to the beehive in a pollen basket. For bees pollen is a source of proteins, fat, minerals and vitamins. Due to the pollen characteristic of spoiling quickly bees preserve it by putting it in a comb and adding honey. Then in this mixture fermentation process of lactic acid is carried on that destroy reproduction of fungi and the product received is called bee bread. The content of proteins in bee bread is quite high -20-25% that enables worker bees to produce milk that is then used to feed queen bee and pupas. Pollen is very interesting and significant product that is used to improve human health (recover power after hard physical work, overcome diseases); it is also used for nutrition as an appetite stimulant for athletes, sick and weak kids and etc.*
	***Propolis*** *(bee glue) has been known since ancient times. It is a resinous substance that bees gather from the plant buds and stems. After processing it is collected in different parts of the hive and contributes to the disinfection of bee family. Thanks to the different substances it contains that have multilateral effects (antiviral, antimicrobial, fungicidal). Propolis's chemical composition is broad, but the most principal substance it contains is flavonoids. It has to be stored in the dark and hypoxic areas. Propolis is mainly used for its anti-inflammatory properties. Also it is utilized in veterinary medicine as it has a positive effect in animals' nutrition*
	***Bee venom*** *(Apitoxin) is formed by venom glands located under the abdomen and enters into enemy's body through the sting. The venom is destined to repel enemies. As the sting lodges in the victim's skin it is lost from the bee's abdomen that leads to the bee's death in minutes. Venom is complex substance that contains melittin, apamins, adolapins, enzymes, alpa-glucosidase and others. As it contains proteins too bee venom effect skin cells causing pain and swelling around the sting area. Bee venom leads to blood vessels growth and improves blood circulation in the human's body. Bee venom is used for treating various diseases such as rheumatoid arthritis, nerve pains and so on. Today scientists use the electric shock method to take bee venom from bee body.*

	***Royal jelly*** *is complex substance, which is secreted from the hypopharyngeal gland of the worker bee. It contains proteins (more than 60% of dry substances), enzymes, sugar, decenoic acid, mineral substances and others. Royal jelly intended for queen bees and queen larvae are extremely nutritious. It has various health beneficial properties. Royal jelly is used in a natural way as well as after processing and is utilized to increase body tone, against different diseases and etc.*

BEE SPECIES WIDESPREAD IN GEORGIA

The beekeeping sector worldwide is mainly represented by a few well-known honey bee species. The western honey bee (*Apis mellifera*) is native to Europe, Asia and Africa. During the early 1600s it was introduced to North America, with other European subspecies introduced two centuries later. Since then, it has spread throughout the Americas. Western honey bees evolved into geographic races as they spread from Africa into Eurasia and 28 subspecies based on these geographic variations are recognized. These include the European Dark (also called *Russian*), the Italian yellow (*Apis mellifera ligustica*), the Georgian gray (known as the Caucasusian), Ukrainian (also *Carpathian*), Persian yellow (also *Armenian*), African and others. In Georgia, two main species of honey bee are present, the Caucasian honey bee (*Apis Mellifera Caucasic*a) which is well-known worldwide and the yellow honey bee which is spread in lowlands of Georgia believed according to the various researchers (V.Eristavi, 1949; V.Taktakishvili & G.Taktakishvili, 2010 and others) to be derived from the Persian or so called Armenian bee (*Apis mellifera remipes*), however no scientific research or genetic test was conducted. Description of these two species are given in Table 4 below.

Table 4: Species of bees widespread in Georgia

Additional Information Box 5 *Caucasian Honey Bee Breeds*	
	***Caucasian Grey honeybee (Apis mellifera caucasica).*** *Mountain grey long tongue or Caucasian honey bee has a longer tongue (7,1-7,25 mm in size) compared to other bees which allows it to get nectar from the deep flowers and carry out more effective pollination; They have a:* *Smaller body (85-95 mg worker bees) and strong wings and powerful muscles;* *Special ability to obtain nectar;* *Moderate overwintering in the case of long cold winter;* *Queen bees moderate egg laying ability (1500-2000 pieces per day);* *Rapid migration feature from plant to plant;* *High honey productivity*
	***Caucasian yellow honeybee (Apis mellifera remipes).*** *Honey bee with yellow colored abdomen which is spread in the lowlands of Georgia. The yellow bees are characterized by comparatively low honey productivity, higher egg laying, tendency for swarming and more aggressive behavior*

In the 1960s', the government passed a resolution, which prohibited the import of the other species of bees into Georgia. However, this was mostly propaganda and had little real effect. In recent decades, following the collapse of the main breeding centers and uncontrolled transhumance (i.e. beekeepers lack the information regarding other apiaries present at the pastures since there is no registration of apiaries in Georgia, which results in mixing Caucasian grey honeybee with Caucasian yellow honeybee) has led to weakening of the Caucasian grey honeybee breed.

In the 2000's, the Ministry of Agriculture of Georgia developed a testing scheme of breed characteristics (line, crossbreed, etc.) in beekeeping, whose implementation was entrusted to the Department of Animal Breeding and Institute of beekeeping. But a short time later the Animal Breeding Department was abolished.

TRANSHUMANCE IN BEEKEEPING

Transhumance is practiced to allow the extraction of nectar from flowering plants located at different altitudes. Beehives are placed in groups (3-4), they are properly secured and loaded on the transport vehicle by a tractor or vehicle with loading equipment and transported by tractor-trailer or truck. The transhumance of bees increases their honey productivity but it also raises risks of death of the bees due to stress whilst being transported. In Georgia bees can be relocated up to 3-4 times per year.

Transhumance is very important means of increasing honey productivity but several factors prevent reaching a full-scale effect:

1. For transhumance it is necessary to have well-tuned mechanized equipment for loading hives which practically does not exist in Georgia. Beekeeper-enthusiasts often build a variety of construction mechanisms for loading hives on the car trailers. In addition car trailers do not allow for the loading of more than two rows of hives which also decreases efficiency. There is presently no regulation and control of transhumance process by the Government authorities in Georgia, which would set requirements and standards for beekeepers.
2. The roads leading to the transhumance locations are often in a poor condition, which makes access difficult. Where pastures can be accessed by roads in satisfactory condition, they are overcrowded with beehives, which limits productivity as well as increasing the risk of disease;
3. Pasture resources are not used systematically. Leading to over and under use see above Re: access.
4. No activities are carried out to support and develop honey flora on pastures. Deforestation as well as the destruction of windbreaks in which trees which were sources of nectar were present.
5. Limited income and high fuel prices for rented transport limits activity.

These are the main factors preventing an increase in the number of beehives and their honey productivity resulting in limited income, high production costs and therefore low competitiveness.

According to the natural and climatic conditions there are 3 main zones in beekeeping in Georgia:

1. ***Lowland.*** *Alazani valley, near the Gardabani nature reserve and Colchis lowland*. Here bees are concentrated in the early spring period as the honey plants begin flowering in February-March. It is worth mentioning that some late flowering honey plants also flower at the end of the season (September-October). This greatly contributes to the strengthening of bee colonies which is effective means for the rejuvenation of wintering colonies. These plants are "Shoroknis Tsotskhi" (L. *Limonium meyeri*, Alazani valley), "Suro" (L. *Hedera*, Gardabani forests) and "Okrotskepla" (L. *Solidago virgaurea*, seaside). It should be noted that presence of "Suro" and "Okrotskepla" in winter reserves is undesirable due to the rapid crystallization of honey.
2. ***Middle zone*** _ the majority of honey collection occurs here as the main honey plant arrays are found here. Beehives are generally transported to this zone from the first decade of May when the lowland honey plant flowering ends. The exception is sunflowers in Kakheti region where flowering ends in June-July (being seeded in a different period);
3. ***Mountain zone*** _ the place where beehives are transported from middle zone, from the middle of June until the end of summer. The main honey plants are found in the forests with chestnut,

linden (subalpine zone) and grasses on the alpine fields. Honey from this zone has high taste qualities and a desirable biochemical composition although frequent changes of weather typical for mountain parts may often suspend pollination early.

Figure 2 shows the main routes for honey bee transhumance although these routes are not always followed. For example, sometimes beehives are moved from east Georgia to the west where the honey flora is more abundant, particularly in Racha region where local households keep relatively few beehives and also in Zemo Imereti (the mountainous part of Imereti region) on chestnut and linden woodland.

Figure 2: Transhumance routes

Source: Primary Source

BREEDING IN PRACTICAL BEEKEEPING

There are basically two kinds of breeding in beekeeping: natural and artificial.

NATURAL BREEDING

Natural breeding is characterized by swarming which is determined by the genetic features of a bee colony and their living conditions: the narrowness of the cell and an abundance of an unemployed younger generation. Natural swarming is the oldest type of bee breeding. For example, In “Gejuri” beekeeping this is the only way. The process is usually conducted in the spring and early summer, in other times wild colonies cannot feed themselves which leads to death. In swarming time, the number of unemployed young bees in a hive rise. They force the queen bee to lay queen bee eggs and follow them to a new place to settle which the young swarm prepares in advance. Beekeepers cannot control this processes and can lead to large losses in swarm.

This method has been known since ancient time and a number of negative consequences accompany it: unequal division of the colony, hatching undesirable queen bees from remaining old queen cells, the risk of loss during the fertilization process and others. This method of breeding is most common in

practical beekeeping, as the majority of the beekeepers do not have knowledge in artificial breeding methods. It encourages the preservation of bees with low productivity and the instinct for natural swarming. This method of reproduction does not make it possible to improve bee breeding and cannot prevent beekeepers from the risk of losing a swarm. Modern beekeepers always try to avoid uncontrolled swarming as it directly affects the honey productivity of the colony.

ARTIFICIAL BREEDING

Artificial breeding allows the beekeeper to mitigate the negative consequences of natural swarming: i.e. conduct artificial breeding of queen bees in the most productive colonies, conduct their selection during the embryonic development process, improve colony conditions for timely (early) formation of an artificial swarm, reinforcing colonies to the point which is required for mastering nectar reserves, producing selective-breeding works in the hive and minimizing the natural instinct of swarming.

Beekeepers try to anticipate swarming and assist the bees to reproduce in a more controlled fashion by "splitting hives" or making "nucs". Nucs, or nucleus colonies, are small honey bee colonies created from larger colonies. A nucleus colony can be used to prevent overcrowding in a larger, healthy colony by splitting some of the population off to a new colony. A nuc can also be used to care for spare queens. A nuc hive has all the features of a standard 10 frame (it may be even 5) hive except with a reduced width.

Beekeepers use the ability of the bees to produce new queens to increase their colonies in a procedure for the artificial breeding of a swarm (also called splitting a colony). The beekeeper takes care of the rearing of queen bees in advance for future recruitment of a colony by swarm. The beekeeper removes several frames of brood combs from a healthy colony (high-yield colony) with combs containing eggs or larvae less than three days old and places it into a developed colony with abundant forage (honey and pollen). As soon as the bees realize they have no queen, they set about constructing queen cells using the eggs or larvae they have in the combs with them. The queen cell is put into a nuc together with a sufficient number of attendant worker bees. When the virgin queen emerges and matures (a process that takes around five to seven days from the point at which she emerges), she flies out and mates with up to 20 drones before returning to the mating nuc[13]. After that the queen bee begins to lay eggs. At this time, the beekeeper has prepared the swarm from other beehives for their settlement with the already mated queen into a new hive. However, a lot of work is required to lead the swarm to the colony (8-9 frames): with support through brood combs (from other beehives), artificial comb, etc. As a rule, honey production is not planned for these colonies in the first year.

Quite a large number of beekeepers produce artificial swarms not only for their own needs, but also for sale, but not everyone is capable of the artificial breeding of queen bees.The basic means of removing the aforementioned constraints is creating competent bee breeding centers that will ensure the production of fertilized queen bees and high-quality swarms. Practical steps in this direction have been already taken by several farms ("Mukhuri" and others).

DISEASES AND PESTS IN BEEKEEPING

Those negative factors affecting the existence of the bee are divided into several groups: infectious, invasive and noncontagious diseases.

[13] Mating nucs are a special type of nuc that may be even smaller than nucs that use standard size frames. A place where they are located with drone hives is called mating yard.

The most dangerous and hard to annihilate is American Foulbrood (AFB) of the adult bee. Against this disease, beekeepers in Georgia use drugs with the effect of treating the clinical signs not the infection itself. In Georgia, the method of mass destruction of the bee colonies or the whole hives, as it was recommended in USA is not used for fighting the disease. Instead the antibiotic Hydrochloric Acid Oxtetracycline (Terramycin) is used. Cobalt-60, or Ethylene oxide should be used for the disinfection of beekeeping equipment or irradiation with accelerated electrons (Shimanuki et al, 2010), which is not available in Georgia. Other infectious diseases (Nosemosis, Aspergillus and Ascospheros) are less pervasive, because of the well-known and effective methods against them. The reasons for the spread of these diseases could be related to poor conditions (e.g. heather honey as a winter supply[14], frequent rains) in bee hives.

VARROA

The Varroa mite is the most dangerous invasive pest, it is caused by the Varroa mite which feeds off the bodily fluid of adult, pupal and larval honey bees and may transmit viruses damaging to bees such as deformed wings. Due to the large number of infected bees, various methods, which were difficult to implement, have been developed since 1970s. Recently developed drugs are characterized with high efficiency (effect of killing the ticks is 95% higher) and demand less effort (prepared based on the Fluvastatin, or used though impregnation of cardboards). However every drug should be replaced with new one after using it for some period of time (2-3 years), to avoid the formation of resistant ticks, that are much harder to fight against. The threat from other invasive diseases (Acarapidosis, Braulosis) is much lower, as drugs used against Varroa are also effective regarding these diseases. And also, the occurrence of Acarapidosis is quite rare and only happens in some regions.

OTHER THREATS

Noncontagious diseases appear in the bee hive due to different factors: lack of feed, poisoning with pesticides, moths, heather and easily crystalized honey in the winter supplies, mice, destruction of bee colonies by merops and ants, etc.

Destruction of bee colonies happens quite often in practice due to lack of honey and beebread in a beehive or the over processing of too high a volume of sugar syrup by honey bees that causes early wearing out and weakening of a colony. In the case of the lack of honey and beebread, the use of non-traditional feeding methods (food sugar, processed soya flour, powdered milk, dry yeast) are proposed to approach same consistency of honey and beebread (*Madzgharashvili*, 2013). By these methods, the bee gets through winter with inverse sugar that could be given to the bee at any time during the year.

For the protection of bees from pesticides used on crops, different methods are used, like locking them in the beehive for some period of time, or moving them to another place (*Grobov* and others, 1987; *Srepanishvili*, 2012). Against the bee moth: processing of the honey comb at low temperature (-12 - 15^0C), poisoning gases (SO_2, Ozone, etc.), different chemical and biological drugs, sterilization of bee moths on 25-30^0C with warm air (45-48^0C) provoking the incubation of worms are employed. (*Madzgharashvili* and *Guchmazovi*, 2014).

During the winter, one of the threats to the existence of the bee is crystalized honey in honeycombs (of plush, goldenrod, rapeseed, etc.). The beekeeper should extract honey early and fill the food supply with inverse sugar. This helps to avoid negative influence of heather honey in the form of Nosemosis. During the winter time, fighting against mice is carried out in the traditional forms, and against ants the scattering of the ash on their nests on the surface of the soil is proposed by Taktakishvilebi (2010).

[14] Heather honey is a honey made from the heather flower nectar, which is not used for feeding the bees for overwintering. Therefore beekeepers try to avoid abundance of it in winter supply removing the frames with heather honey from a beehive.

COLONY COLLAPSE DISORDER (CCD)

In recent decades, the mass collapse of bee colonies has prompted serious concern in European and American countries. CCD occurs when the majority of worker bees in a colony disappears and leaves behind a queen, food and a few nurse bees to care for the remaining immature bees and the queen. It is not a new phenomenon in apiculture however occurrences of the phenomenon seemed to drastically increase across N America and Europe from 2006. There is no conclusive evidence to pinpoint an exclusive trigger however it seems clear that a range of factors are the likely cause including 1. Widespread use of pesticides including Neonicatinoids; 2. Fluvastatin used against Varroa; 3. Stress caused by frequent migrations during the active season; 4.Viral bee diseases; 5. Starvation; 6. Weakening of the immune system of the bees due to the above mentioned factors.

"Bees of all species are likely to encounter multiple stressors during their lives, and each is likely to reduce the ability of bees to cope with the others. A bee or bee colony that appears to have succumbed to a pathogen may not have died if it had not also been exposed to a sublethal dose of a pesticide and/or been subject to food stress (which might in turn be due to drought or heavy rain induced by climate change, or competition from a high density of honey bee hives placed nearby). Unfortunately, conducting well-replicated studies of the effects of multiple interacting stressors on bee colonies is exceedingly difficult. The number of stressor combinations rapidly becomes large, and exposure to stressors is hard or impossible to control with free-flying bees. Nonetheless, a strong argument can be made that it is the interaction among parasites, pesticides, and diet that lies at the heart of current bee health problems." [15]

It is not clear if this is occurring regularly in Georgia as there is no current data available.

[15] Goulson, Dave; Nicholls, Elizabeth; Botías, Cristina; Rotheray, Ellen L. (February 26, 2015). "Bee Declines Driven by Combined Stress from Parasites, Pesticides and Lack of Flowers". *Science* **347** (6229)

PART 2: BEEKEEPING IN AJARA

The following section provides a comprehensive discussion and an analysis of the constraints to the beekeeping sector. These are summarized in the Figure 3 below.

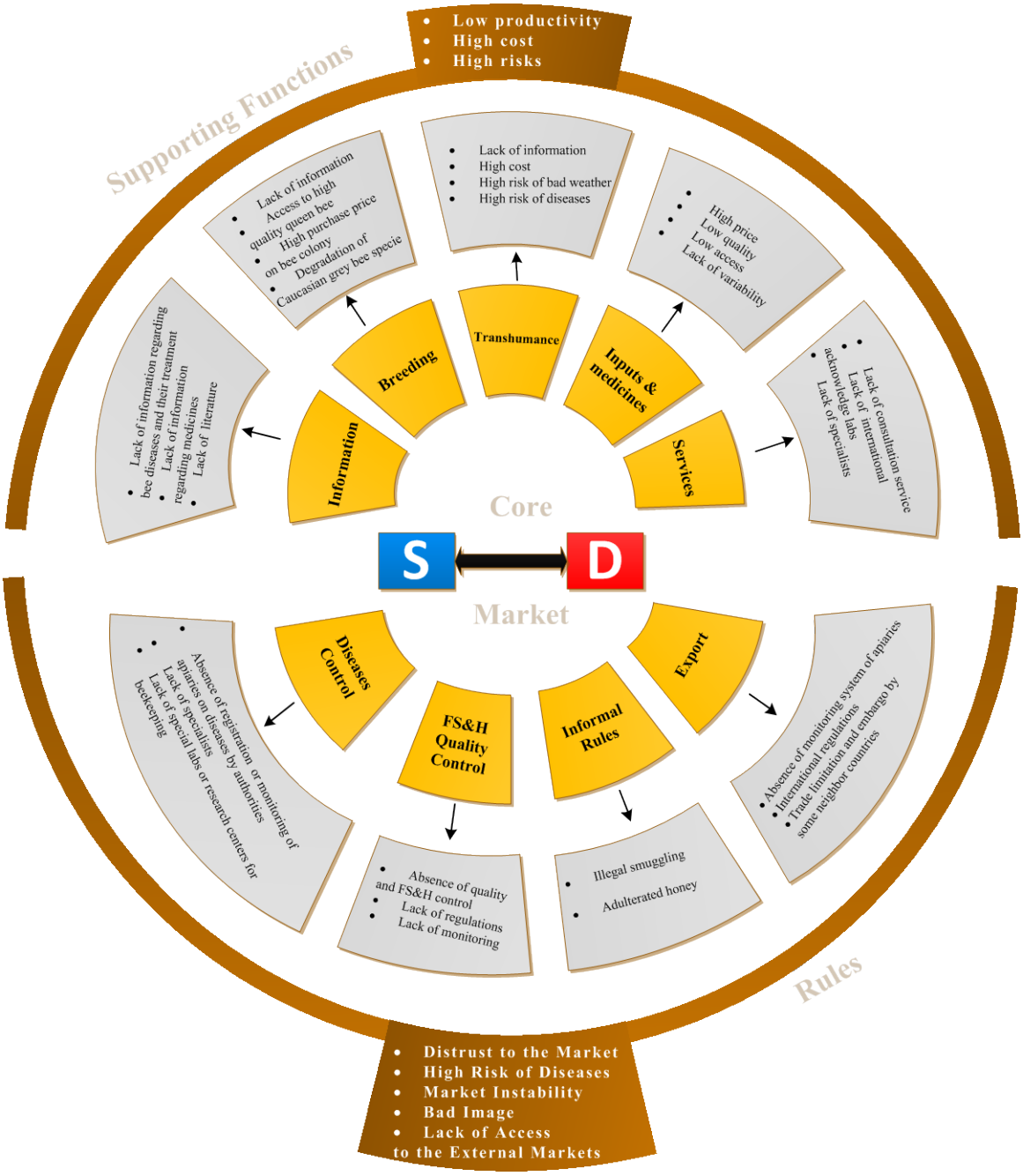


Figure 3: Systemic Constraints of Beekeeping in Ajara

Beekeeping has always been a traditional sector of agriculture in Ajara. However according to key informants beekeeping in Ajara amongst rural households has considerably declined in recent years[16] mainly due to the impact of *Varroa* and the out-migration of men (traditionally responsible for beekeeping) away from villages to urban areas and to seasonal work in Turkey. However honey is still considered an important primary and secondary source of income to the target group offering ecologically appropriate opportunities for development and growth in rural households particularly in those municipalities more climatically suited to its production. (see Table 5 and Figure 4).

Table 5: Honey sector in the Programme Area (data provided by Agro Service Centre (ASC) and FGS Estimations) [17]

	Khulo	Shuakhevi	Keda	Khelvachauri[18]	Majakhela[19]	Kobuleti	Total
# of Beekeepers[20]	*102*	*70*	*169*	*232*	*96*	*603*	*1272*
# of Beekeepers(ASC)	*73*	*26*	*176*	*130*	*N/A*	*213*	*618*
# of Bee Colonies	*1621*	*1024*	*2014*	*3952*	*2694*	*12706*	*24011*
# of Bee Colonies (ASC)	*1660*	*372*	*5919*	*7367*	*N/A*	*6910*	*22228*
Honey production (tonnes)	*31.6*	*20*	*39.3*	*77.1*	*66*	*247.8*	*482*
Honey production (tonnes) (ASC)	*32*	*20*	*39*	*77*	*N/A*	*248*	*363*
% of Beekeepers in Rural HH	**1.2%**	**1.4%**	**3.7%**	**1.5%**	**13.5%**	**3.7%**	**4.2%**

Source: Focus Group Survey Ajara(2014, Ministry of Agricultural of Ajara.

In Ajara there are three zones for beekeeping: low, middle and high. Keda, Kobuleti and Khelvachauri municipalities are mostly located in low and middle zones so the distances to other zones are much less for them than for high mountain municipalities (Shuakhevi and Khulo).

According to estimations made from the ALCP Ajara Focus Group Survey (FGS) around 1200 people are involved in beekeeping as a primary commercial enterprise with a substantial number of hives and keep an average of around 24 thousand bee colonies (figures for 2014). SSLPs who produce honey for sale usually keep more than 5 bee colonies with an average of 19 according to the FGS. This does not however take into full account however those with a smaller number of hives who produce honey for home consumption and the sale of excess, which could offer a considerable area for growth should constraints be removed. Beekeeping is considered an important source of income by the majority of SSLP's in Kobuleti, Khelvachauri and Keda municipalities due to climatic conditions[21] and better access to bee pasture[22] where beekeepers keep on average between 30-50 bee colonies each.[23]

[16] Key informant interviews estimate that currently up to 25% of rural HH's possess at least one hive where previously this was up to 40%. They also state that many now express their willingness to produce honey again.

[17]Note: according to key informant interviews with respondents from this sector, the data of the agro service center is not complete. For example, the data doesn`t include beekeepers from majakhela region while Majakhela is well known in Ajara by its honey (it is believed that 40% of honey collected in Ajara is from majakhela region). During the market analysis several other large beekeepers were identified who weren`t in the list provided by agro service center.

[18] Excluding villages of majakhela community

[19] Majakhela is located in Khelvachauri municipality (one of the communities) and is well known by its beekeeping traditions

[20] This figure reflects larger beekeepers for whom the sale of honey is a serious commercial enterprise. A rough % of SSLP's for whom honey is an important commodity for home consumption and for the sale of excess i.e. Those who own at least one hive is estimated at up to 25%.

[21] Nectar is collected on temperature of 16-24 °c

[22] See figure 24 in annex 2

[23] Due to severe winter in high mountain regions and the distance to lower zone pastures (high risks and transport expenses) it is difficult for farmers from khulo and Shuakhevi regions collect the honey in spring.

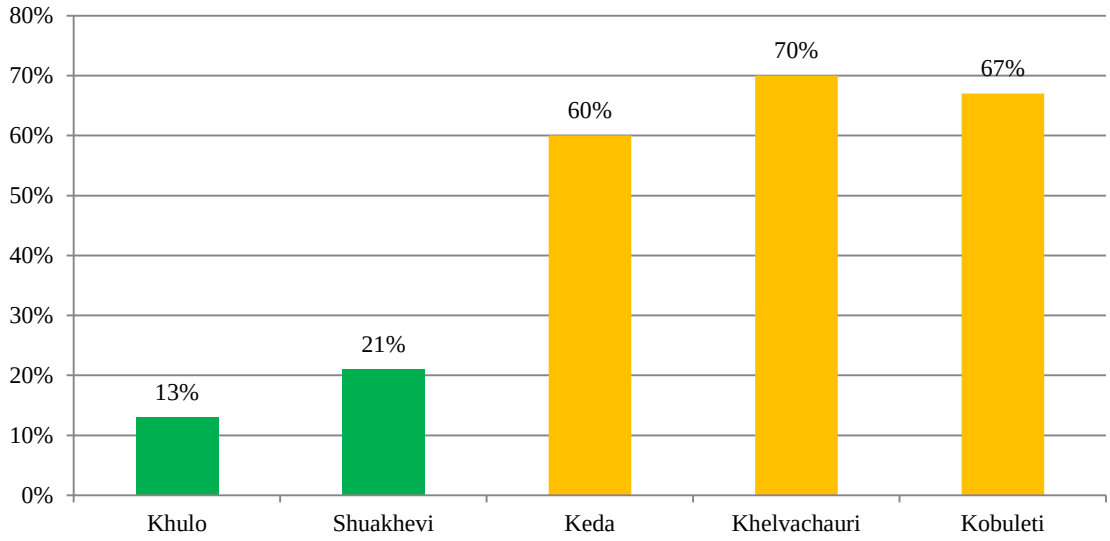


Figure 4: % of SSLP's considering Honey Production as a Main Income Generating Activity

Source: Focus Group Survey Ajara (2014)

Despite the fact that bee colonies can produce several products such as pollen, propolis or royal jelly, the major product from beekeeping in Ajara is a honey. Pollination unlike in developed countries is not perceived as a service, on the contrary beekeepers in Ajara have to pay or share income from honey with the owner of the pasture for using their land. Considering the fact that citrus growing is one of the leading agricultural activities especially in lowland zones of Ajara, investing in beekeeping can raise the productivity of their citrus plantations. Citrus is one of the crops that are pollinated by honey bees and honey productivity is considerably higher compared to other fruits.

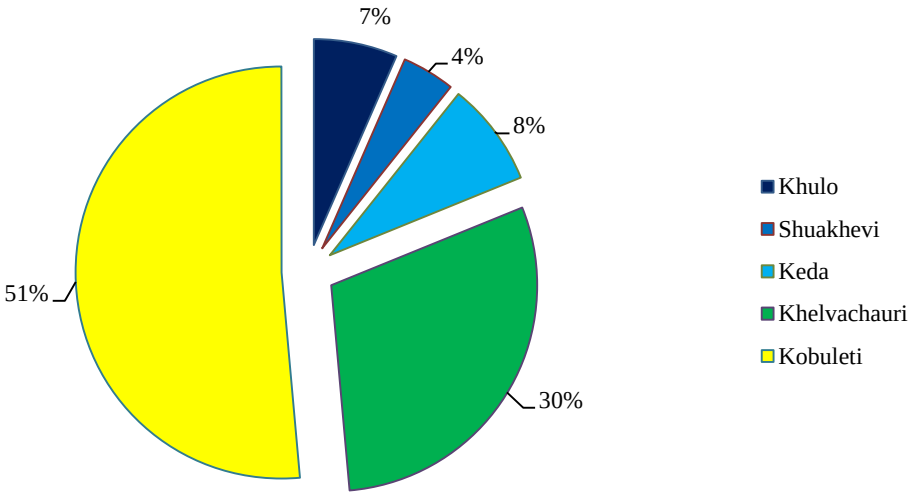


Figure 5: Estimated Honey Production in Ajara

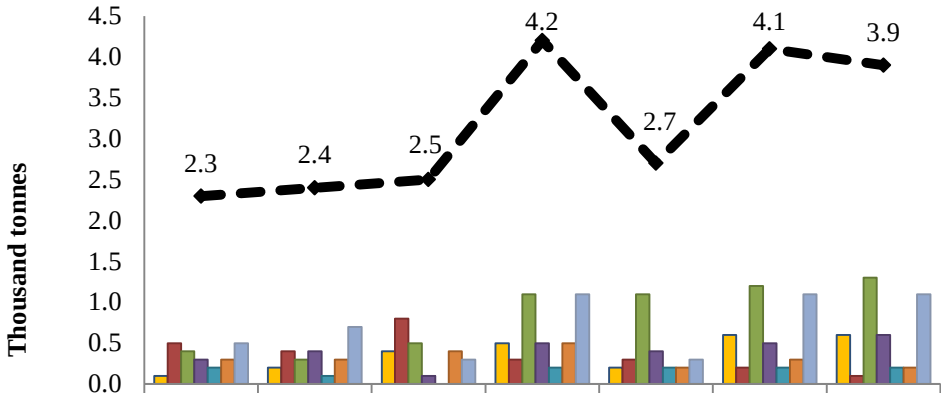
Source: Focus Group Survey Ajara (2014)

In Ajara it is possible to collect honey twice a year; in May (acacia, citrus, wild flower) and at the end of August (chestnut). Each bee colony yields an average of 15-20 kg of honey per year. Chestnut honey is prioritized because its price is much higher (15-20 GEL/ kg) than for blossom honey (10-15 GEL / kg). Honey is mainly collected twice yearly: early June (blossom honey) and late August (chestnut honey). Some beekeepers collect only chestnut honey as the risk of bad weather in spring is

high. Bad weather remains the biggest risk in beekeeping. According to FGS estimation, each year up to 500[24] tonnes of honey is collected in the region. The largest share belongs to Kobuleti and Khelvachauri municipalities (390 tonnes). More than 80% of AJ bee colonies are located in these municipalities.

CORE MARKET

HONEY MARKET SYSTEM



	2007	2008	2009	2010	2011	2012	2013
Ajara	0.1	0.2	0.4	0.5	0.2	0.6	0.6
Imereti	0.5	0.4	0.8	0.3	0.3	0.2	0.1
Samegrelo & Zemo SvanetI	0.4	0.3	0.5	1.1	1.1	1.2	1.3
Kakheti	0.3	0.4	0.1	0.5	0.4	0.5	0.6
Kvemo Kartly	0.2	0.1	0.0	0.2	0.2	0.2	0.2
Samtskhe-Javakheti	0.3	0.3	0.4	0.5	0.2	0.3	0.2
Other regions	0.5	0.7	0.3	1.1	0.3	1.1	1.1
Georgia	2.3	2.4	2.5	4.2	2.7	4.1	3.9

Figure 6: Honey production in Georgia

Source: National Statistics Office of Georgia

Ajara is one of the largest producers of honey in Georgia. According to the National Statistics Office of Georgia in 2013 Ajara collected at around 600 tonnes of honey which is at around 15% of honey produced in whole Georgia.[25] Georgian honey is considered to be one of the products with high export potential. Currently, due to different reasons such as lack of specialist certification laboratories[26] of honey and certification bodies for the quality control of honey, Georgia cannot officially export honey to neighboring countries nor to the EU despite the quotas they have according to international agreements. E.g. If Ajarian honey was certified according to the stipulations of Turkey,[27] 200 tonnes of honey can be exported from Georgia to Turkey with no custom duty according to a Free Trade Agreement (FTA) between Turkey and Georgia. In 2013, the value of exported honey was around 120 thousand USD while Georgia annually produces more than 4,000 tonnes of honey (nearly 24 million

[24] Due to bad weather in this year, beekeepers in AJ expect that the amount of collected honey will be less.
[25] The actual amount is hard to verify, Agro Service Centre data indicates 363 tonnes which does not contain the data for Majakhela Gorge which is the major honey producing area. ALCPAJ focus group data gave an estimation of 482 tonnes which includes the gorge.
[26] There is currently no such laboratory in Ajara or in Georgia as a whole although recently the Minister of Agriculture announced (July) that equipping such a laboratory was planned. The relatively small amount of honey that is exported is exported Lebanon and Saudi Arabia under special conditions after sending samples for testing.
[27] The FTA is quite vague but mentions general FS&H with ISO 2200 and issues related to traceability & classification of honey into types i.e. Wildflower, chestnut, acacia

USD). The Ajara honey sector presently has a high dependence on Turkey. Despite the import ban on uncertified honey by Turkey, Ajarian honey is mostly bought by Turkish intermediaries who smuggle honey to Turkey where the price is much higher. Many beekeepers prefer to sell honey to Turkish intermediaries rather than sell it to local markets due to the higher price offered compared to the local market. Lack of quality control limits the market through the general climate of distrust in the integrity of local honey for sale, with consumers believing that most honey for sale in the market is adulterated with added sugar which affects the price local consumers are willing to pay. Consumers feel assured of quality only when they 'know' the supplier personally. In addition to the problems related with to market access beekeepers complain of quality inputs including information and technical advice, lack of bee hive materials, the high prices of the equipment (filter, extractor, etc.), the non-availability of comb making facilities and a high risk of the degeneration of the queen bee.

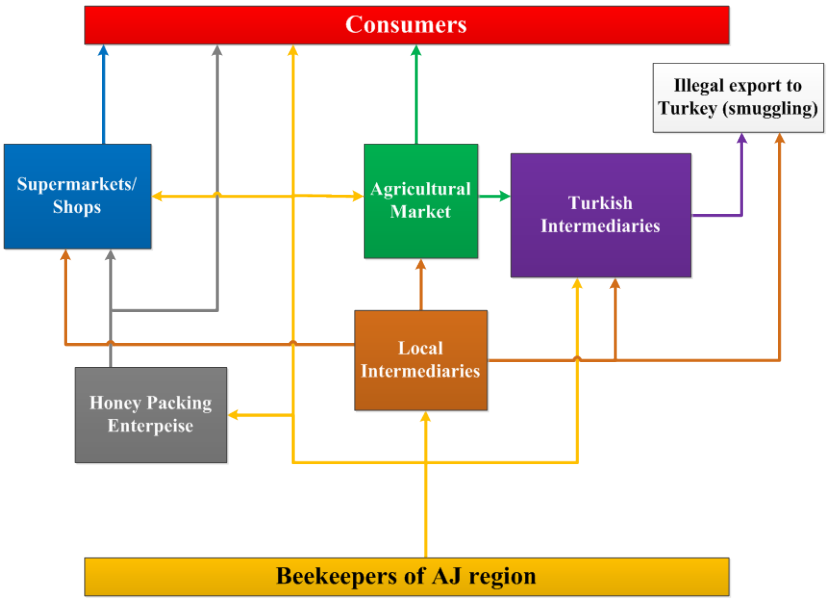


Figure 7: Honey market system chain

The honey market system has a high dependence on Turkish intermediaries, who transfer honey to Turkey by smuggling (officially honey can't be exported to Turkey due to lack of certification). The price of honey is quite high in Turkey. Turkish intermediaries offer a higher price for Georgian honey (18-20 GEL/kg), than local intermediaries (traders) on the market (15 GEL/kg). Local intermediaries are also oriented towards Turkish intermediaries. However over the last 2 years honey export to Turkey has become more difficult and many beekeepers keep honey at home for further sale to Turkish intermediaries who despite the restriction on the import of honey by Turkey regularly appear in the villages during the honey collecting season (from the beginning of September). The local market prices for honey are considered too low for the majority of beekeepers. The absence of laboratories in the region for quality testing and certification and the lack of information surrounding legislation for honey quality control contributes to a widespread belief in the into abundance of falsified honey (i.e. adulterated with sugar) on the market which significantly constrains the local market for the sale of honey with a subsequent impact on the local.

HONEY PROCESSING ENTERPRISES

In Ajara there are two companies dealing with the packaging/sorting of honey collected from local SSLPs. "Majakhela" Ltd is located in Khelvachauri and was established in 2010 with USAID co-financing. The company collects honey mostly from SSLPs in Majakhela gorge. Currently, they pack/sort 2-3 tonnes of honey yearly with a maximum capacity to process 20-30 tonnes. The company

sells its production in well-known Georgians supermarkets such as Smart, Carrefour and Goodwill. Despite that the key constraint that the company is currently facing is related to sales. The company sees the way out through exporting honey or in developing a specialist product to serve the local tourism market. Although the company has several linkages and offers regarding honey from other countries, it cannot export honey as the exporters as it requires veterinary and other documentation which is unavailable at present. The constraints to honey export are discussed in detail in the rules section rules.

The Association for Environmental Protection and Sustainable Development "Mta-Bari" is located in Chakvi (Kobuleti municipality). The Association was financed by international donor organizations. The main goal of the association is the cultivation of and support to Economically Important Species of Ajara Wild Flora in the Buffer Zone of Mtirala National Park. The association has an exhibition house for honey from the buffer zone (Mtirala National Park). They buy, sort/pack (not mechanized) honey from local beekeepers and sell up to 2-3 tonnes of honey yearly to local and foreign visitors. They also link wholesale buyers with local honey suppliers. “Mta-Bari” recently analyzed the their honey in the laboratory of MoAA for labeling their production. The chemical analysis showed that their honey is not adulterated. Several honey samples were also sent to the NFA who sent it in one of the laboratories of Latvia accredited by EU for deeper chemical analysis especially regarding veterinary drugs.

SUPPORTING FUNCTIONS

INPUTS FOR BEEKEEPERS

In Ajara most of the beekeepers have Dadant (also called Dadant-Blatt) type beehives. Usually their construction is two level type of hive with a brood chamber and one super. Such hives usually can hold up to 24 frames (12 in each hive body). Beehives are generally handmade by beekeepers themselves as the price of one hollow body of a beehive in shops reaches 140 GEL. Although, beekeepers purchase some materials for making frames i.e. special cut wooden boards, wire and honeycomb (foundation). Beekeepers usually use frames with honeycomb several times. Some of the beekeepers do not change honey comb for more than 3 years which is not recommended. Honeycomb is made by beeswax. Beekeepers either exchange beeswax at the beekeepers shop for honey comb or stamp out sheets at the honey sorting enterprise Majakhela Ltd in Khelvachauri or in a workshop located in Ozurgeti[28].

Beekeepers shops purchase beeswax from beekeepers and have it made in the enterprises mentioned above. The market price of beeswax on average is 15 GEL/kg. On average 13-14 honeycombs are made from 1 kg of beeswax. The price of printing 1 honeycomb is 0.20 GEL. The price of one honeycomb in local beekeepers shop is 1.50 GEL per honeycomb. There is another which is cheaper but it contains paraffin[29] and beekeepers avoid purchasing it. Some beekeepers also avoid purchasing of honeycombs in shops. The main reason is that bee diseases such as American and European foulbrood can be transmitted by old or diseased beeswax if it is not processed[30] properly. That is why some beekeepers prefer to purchase honeycombs from Turkey.

In addition, beekeepers purchase some supplies such as special clothing, smokers, special knives, brushes, drills for frames, extractor of honey and others. They are usually bought once for a long period unlike drugs (antibiotics and vitamins) which should be used several times through the year i.e.

[28] City in Guria (the region of Georgia neighbouring Ajara region)
[29] Paraffin wax - made from crude petroleum. It is a white insoluble odourless waxlike solid consisting mainly of alkane hydrocarbons with melting points in the range 50°-60°c, used in candles, waterproof paper, and as a sealing agent. Also called: paraffin
[30] thermal processing of beeswax at a temperature of 120-127 c^0

a beekeeper strengthens bee colony through vitamins, sugar syrup, stimulators and others in early spring preparing colony for active season or in late fall for overwintering. Average prices of supplies at local shops are given in the table (see table 6). The average cost of supplies for one colony for a beekeeper owning more than 50 bee colonies is believed to be about 3.5 GEL. The cost certainly grows with lower number of colonies and vice versa.

Table 6: Average prices and costs of supplies for beekeeping

Cost	Number	Price (GEL)	Total price (GEL)
Beehive body	*1*	*85*	*85*
Honeycomb (foundation)	*24*	*1,5*	*36*
Frame	*24*	*0,6*	*14,4*
Beehive total price			*135,4*
Clothes	*1*	*15*	*15*
Smoker	*1*	*15*	*15*
Chisel	*1*	*5*	*5*
Knife for cutting honeycomb	*1*	*20*	*20*
Bee brush	*1*	*5*	*5*
Special drill for frames	*1*	*25*	*25*
Honey extractor	*1*	*450*	*450*
Stainless tank (40-50 kg)	*1*	*50*	*50*
Supplies total			*585*
Vitamins and Sugar Syrup	*2*	*15*	*30*
Medicine and antibiotics	*3*	*10*	*30*
Transportation costs	*50 km*	*1.5*	*75*

Source: PMCG. Prospects for Export of Honey within the Free Trade Agreement with EU. (2014)

Nearly 90% of beekeepers who purchases inputs for beekeeping use Batumi beekeepers shops (see the figure 8). There are 3 beekeeping input supply shops in Batumi. Some vet pharmacies in the AJ programme area also stock a small amount of materials and medicines as well. Shops mostly import beekeeping materials from Turkey, Russia and Ukraine. Generally these materials are: artificial honey combs; wooden materials for building frames and hives; beeswax; veterinary medicinal products such as antibiotics, vitamins, stimulators for egg-laying and others; beekeeper clothes, instruments and other equipment. Shops also buy some products from beekeepers especially beeswax. Then shop takes it for printing honeycomb in Ozurgeti or Khelvachauri and sells them in their shop.

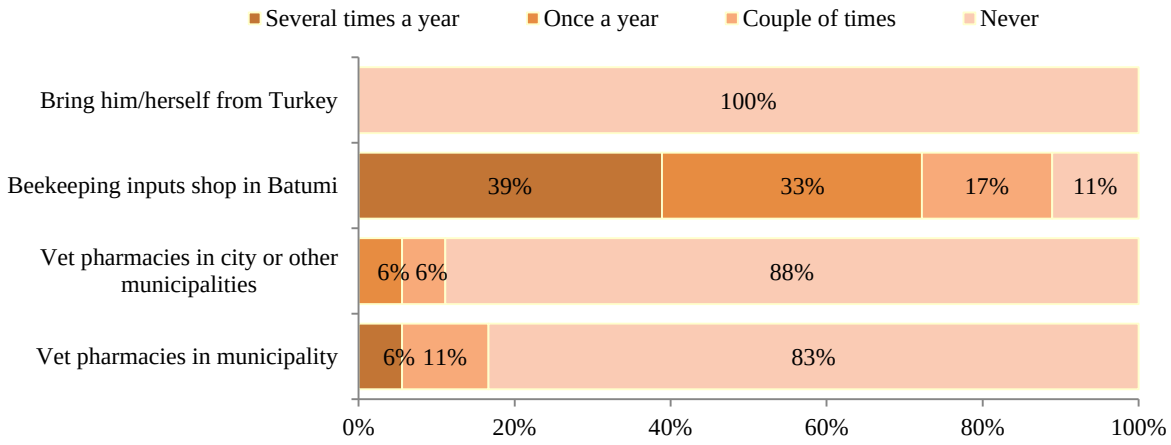


Figure 8: Frequency Farmers Purchase Inputs Needed for Beekeeping through Different Sources

Source: Baseline survey in Khulo, Shuakhevi, Keda, Khelvachauri and Kobuleti Municipalities of Ajara Region of Georgia.(2014).

The shop owners are also beekeepers so often they act as consultants for buyers especially regarding drugs. The most popular beekeepers shop is located in agricultural market. The owner of the shop is recognized as a good beekeeper and many beekeepers go to him. The shop often serves as a gathering place for beekeepers and place where beekeepers can compare notes. Besides Batumi beekeepers also go to shops of other regions especially Guria. Some of the beekeepers prefer to purchase materials in Turkey by themselves as materials are believed to be cheaper and better quality.

BREEDING

The majority of beekeepers in Ajara breed bee colonies on their own as the purchase price of one bee colony is 150-300 GEL considering the period which is high cost for local farmer. They use swarming period which in Ajara begins in spring and continues till early summer to raise the number of bee colonies. The natural swarming is caused because of an abundance of unemployed bees in a beehive which leads to division of the colony. When beekeeper (it can be also a member of his family) notices a swarming activity near beehive as the rule beekeeper puts empty nuc or beehive with frames near the beehive with bee swarm and the swarm moves and settles in it creating a new colony. This process need proper knowledge and experience to succeed in it. More facts about a natural and artificial breeding of a colony are given above. Most of the beekeepers in Ajara are amateurs and unfortunately have low access to information and modern technologies in beekeeping which impacts on the management of apiary e.g. many beekeepers don`t keep records which is necessary for beekeeping.

Beekeepers in Ajara generally breed a queen bee their by themselves. However some beekeepers also keep a certain amount of queen bees separately from the beehive to change queen bees in beehives in a case of need (death, reduction of egg-laying, diseases, etc.), many beekeepers do not replace old queen bees for a long time (more than 2-3 years) which is not recommended. Skilled beekeepers try to refresh colonies time by time through buying new queen bees. Queen bees are bought in Ajara, Guria, Samegrelo and Imereti regions. Commonly it is Batumi and Ozurgeti (Guria). The market price for one queen bee is 20-25 GEL. In Ajara there are several relatively large beekeepers who breed and sell queen bees but their capacity doesn't prevail exceed 500 queen bees on a season. Also there is a demand for Georgian bees from Turkish beekeepers especially from Turkish part of Matchakhela Gorge who come and buy queen bees. The majority of beekeepers prefer to keep pure Caucasian also called Georgian grey bee but due to several reasons (such as lack of breeding centers, degradation of the species by mixing with yellow bee species, lack of knowledge and finances) most of them do not

keep the pure honey bee species. Respectively, queen bees sold to Turkish beekeepers are not pure Caucasian breed which can affect negatively the market for queen bees.

TRANSHUMANCE

Most of the large beekeepers are engaged in transhumance, i.e. the transportation of the hives to different locations according to the season to benefit from the natural flowering times of different flora. Transhumance begins in early spring with the flowering of plants in the lowland and continues moving to the highland (flowering period there begins later than in lowland) till late summer and ending in late fall when the bee colony is prepared for overwintering. Ajarian beekeepers who are engaged in transhumance move their beehives in lowland of Khelvachauri or Kobuleti municipality (some of them move their bee colonies in neighbor regions Guria or Samegrelo) in early spring when flowering period begins and move to higher parts of the region. The most common locations for transhumance in Ajara region (see the map figure 9) are Kintrishi Gorge in Kobuleti, Majakhela Gorge in Khelvachauri and locations along Acharistskali Gorge till highlands of Khulo and Shuakhevi. By the end of summer, beekeepers usually try to bring beehives back to lowland where the air temperature is higher in winter than in the highlands and as it enables keepers[31] to work with their bee colonies.

Figure 9:Transhumance routes

Source: Primary Source

Beekeepers usually use their own or hired mini vans for transportation of beehives. The cost of the transportation on average is 100 GEL. Considering the specifics of mountain and road conditions beekeepers use common mini vans rather than trailers. Such a minivan usually can accommodate up to 50-60 beehives. Transhumance activity is generally planned beforehand. The loading process is done carefully considering air ventilation for beehives.

Usually, SSLP[32] owned farms are used for placing hives. In lowland villages of Kobuleti and Khelvachauri bees are kept in mandarin gardens. In the highlands of Ajara bees are kept near forests for chestnut honey and on open fields for blossom honey. As the rule beekeepers leave beehives to

[31] It is not recommended to open beehives on temperature lower than $15C^0$ as it can upset the microclimate in beehive which can lead to death of the colony.

[32] Small Scale Livestock Producer

their relatives. Terms of payment may be different i.e. fixed price on one beehive or share from harvest of honey.

Transhumance of bee colonies is required step for beekeeping however it contains risks. Unpredictable weather is biggest risk for beekeeper as the pollination activity of bees directly depends on temperature. Wild animals namely bears are a threat to beehives located near the forest. This risk is higher if beehives are located near the forests of protective areas (Majakhela, Mtirala and Kintrishi national parks) where bear attacks on domestic animals occur more frequently. Another risk can be the transmission of diseases. All these and other factors including financial and time costs complicate transhumance activity for beekeepers making some of them to unable to do it.

GENDER ROLES

Beekeeping is mostly in the male sphere. Most of the activities are done and controlled by men. They care and supervise bee colony life, giving antibiotics against diseases, vitamins and sugar syrup for strengthening the colony and stimulating egg-laying of bees. Although they often ask for help from other family members it is usually a boy. The beekeeper transmits his knowledge and experience to his son making beekeeping family business. But sometimes female members of family also help, i.e. extraction of honey from beehive or collecting beeswax (cleaning frames, etc.). It is worth mentioning that there are some women beekeepers in the region and almost all of them received the knowledge about beekeeping from their fathers.

Table 7: Gender Matrix in Beekeeping

Activities	W	M	G	B
Selling honey and beeswax	*O*	*X*		
Supervision and care of bee colonies		*X*		*O*
Purchasing of inputs (medicine, honeycombs, etc.)		*X*		
Artificial nutrition (sugar syrup and other vitamins)		*X*		*O*
Preventive activities against diseases (Varroa, nosema, etc.)		*X*		*O*
Breeding (natural swarming)	*O*	*X*	*O*	*O*
Transhumance of bee colonies		*X*		*O*
Extraction of honey and collecting of beeswax	*O*	*X*	*O*	*O*

Resources	Access				Control			
	W	M	G	B	W	M	G	B
Apiary (bee garden)	*O*	*X*		*O*		*X*		
Inputs, medicine, etc.	*O*	*X*		*O*		*X*		
Income from selling honey	*O*	*X*				*X*		
	X - leads				***O – in activity***			

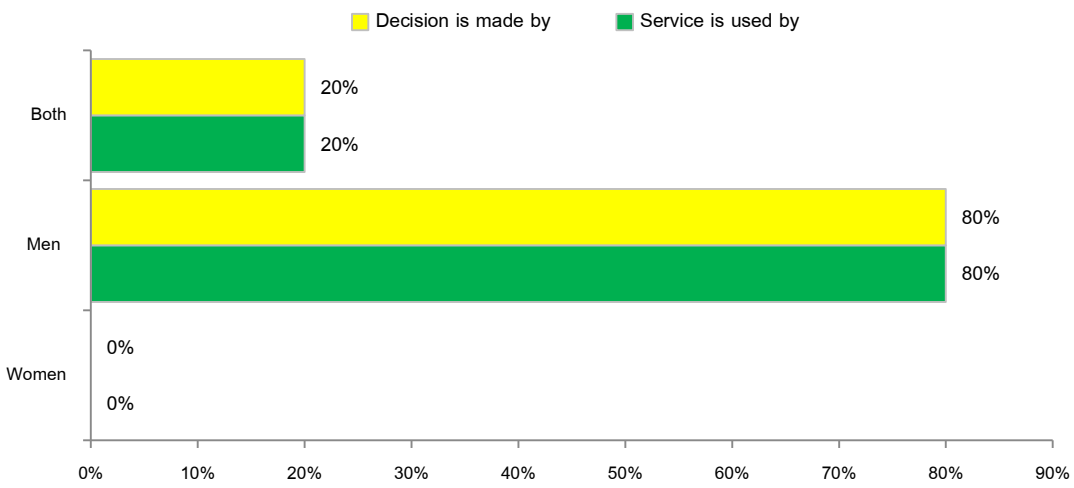


Figure 10: Access to and Decision Making over the Use of Honey Collectors' Services

Source: Baseline survey in Khulo, Shuakhevi, Keda, Khelvachauri and Kobuleti Municipalities of Ajara Region of Georgia.(2014).

Men make the decision about selling honey and control income. According to the baseline survey decisions about selling and using of intermediaries service in 80% of cases are made by men. Decisions about purchasing inputs for beekeeping is also made by man but in 89% of cases (see figure 11). All shops for beekeepers are owned by men but salespeople in some of them are women. Women's main role in trade sector is in the sale of honey.

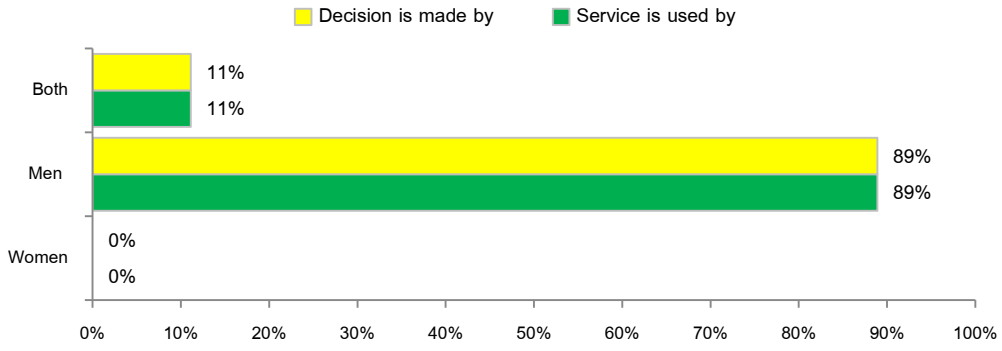


Figure 11: Access to and Decision Making over the Use of Beekeeping Input Providers' Services

Source: Baseline survey in Khulo, Shuakhevi, Keda, Khelvachauri and Kobuleti Municipalities of Ajara Region of Georgia.(2014).

DISEASE MONITORING AND CONTROL

Modern beekeeping is hard to imagine without proper veterinary support. Worldwide bee diseases have become common and Ajara region is no exception. According to the FGS bee diseases are mostly spread in Khelvachauri and Shuakhevi municipalities, the lowest % of focus group mentioning the diseases was in Kobuleti (see figure 12). In the programme area Varroa, Nosema, Ascospharea, American and European foulbrood are present. Most common are Nosema and Varroa in particular. The Varroa virus is most widespread and without proper treatment can cause huge damage to the beekeeper. Beekeepers use drugs against them but even drugs are sometimes powerless. This can be caused by adaptation of the parasite to certain drugs and it becomes inefficient, which makes important to be able to vary treatment. As the rule beekeepers don`t have quality information about veterinary drugs relying more on beekeeper shops or other more experienced beekeepers. Lack of information about bee diseases and absence of registration and control pose a serious threat for beekeeping. At present authorities do not register or monitor apiaries for diseases. The sector is left to take its course which causes bewilderment amongst beekeepers. The situation could block the attempts of the Georgian government to enter the EU market after signing the DCFTA agreement [33].

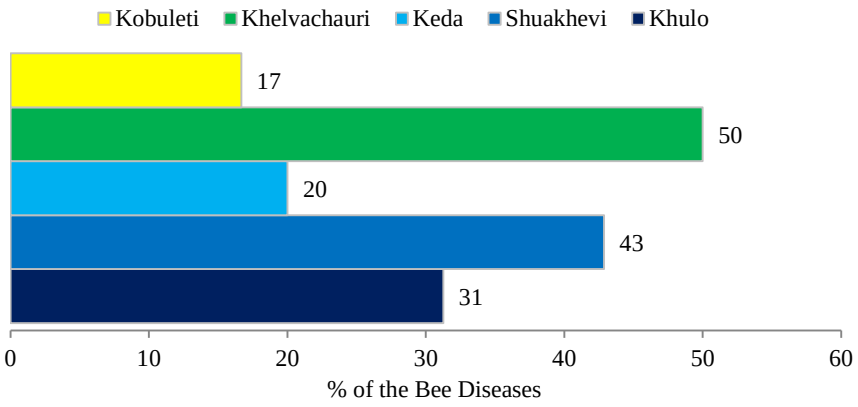


Figure 12:% of the Focus Groups Indicating Occurrence of Bee diseases in Municipalities

Source: Focus Group Survey Ajara (2014)

FOOD SAFETY AND HYGIENE: QUALITY CERTIFICATION

Quality testing and certification of honey remains the main constraint to market access for honey producers. It creates beliefs such as the existence of the widespread falsification of honey when the selling price is considerably lower than fixed market price. It also hinders legal export of honey in neighbor and other countries. In Georgia the technical requirements for honey were approved just recently. Before then, the only document related to the honey was the decree of the Ministry of Labor, Health and Social Affairs of Georgia about food raw materials and products quality and safety of sanitary norms and regulation (the ministry decree №301/N) which mainly deals with toxic elements and HMF[34] in honey. Even this is rarely checked.

[33] Georgia must harmonize its legislation with the requirements of EU among them is also monitoring and checking of apiaries. The EU specifies requirements regarding using of veterinary medicinal products for third countries which might force Georgian authorities to conduct outreach activities through Georgian beekeepers.

[34] Hydroxymethylfurfural (HMF), also (Hydroxymethyl or Oxymethylfurfural) is an organic compound derived from dehydration of certain sugars. This yellow low-melting solid is highly water-soluble. HMF is practically absent in fresh food, but it is naturally generated in sugar-

From 2012 the NFA began taking samples of honey from beekeepers and sending it to laboratory of BIOR[35] in Latvia for research on the appearance of veterinary medicinal products and other residues in Georgian honey for further research. In 2013 NFA sent 42 samples in which 17 exceeded residue limits of antibiotics. In 2014 NFA took 103 samples among them were samples taken from beekeepers in Ajara (NFA, 2014). According to the results nearly 30% of the samples exceeded residue limits. At present there are 10 laboratories which have an accreditation of checking honey but none of them have ability to make the full chemical analysis of honey which is required in EU countries (The Unified National Body of Accreditation, 2014). Particularly problematic is the identification of different residues of antibiotics, pesticides and other substances.

In August 2014 The Ministry of Agriculture of Georgia (MoA) commenced a project for instituting quality control standards for honey in line with EU directive 2001/110/EC. It was approved on December 26, 2014 (Resolution N714) and was put in force on 1st of July, 2015. The new honey technical regulation contains the definitions of honey and its categorization (such as blossom honey, chunk honey, comb honey, honeydew honey and etc.), laboratory requirements, composition criteria (see Table 8).

Anticipated difficulties in implementing the standards include; that moisture content of honey should not exceed 20% according to the standards but in western Georgia this level is hard to achieve[36]. In many cases honey moisture content varies from between 18%-21%. Issues related to traceability will also pose difficulties as currently apiaries are not registered with the MOA.

The checking of honey content for quality has a more positive outlook as most of the laboratories (including MOAA laboratory) are able to do the chemical analysis of honey content (honey quality) shown in Table 8 but none of them can make chemical analysis on residues (antibiotics, pesticides) which is required in several countries (e.g. EU, Turkey). This type of analyses requires specialist technical equipment (i.e. mass spectrometry). Currently the MOA is re-equipping a laboratory (Tbilisi) and intends to obtain accreditation by EU authorities by the end of 2015. The financial resources for this are already allocated in the government budget. In Ajara the Laboratory Research Center in Batumi owned by MoAA is the sole laboratory which can do basic testing. The price for checking one sample is around 90 GEL. The costs of reequipping the laboratory to enable quality testing to the new standards have been included in the draft budget for 2016 of the MoAA for approval by government. Cost estimated at 800,000 GEL.

containing food during heat-treatments like drying or cooking. HMF can be found in low amounts in honey and used as an indicator for excess heat-treatment. The level of the consistence can guarantee that the honey has not undergone heating during processing.

[35] Institute of Food Safety, Animal Health and Environment - "BIOR" is a newly formed public research institution in Latvia with a derived public person`s legal status. The Institute was founded as a result of consolidating of former department of the Latvian Food and Veterinary Service: “National Diagnostic Centre” and the State Agency “Latvian Fish Resources Agency.”

[36] Honey moisture content can be reduced by homogenization of honey, which means warming it up to 37C and mixing it for 5-10 hours, after which creamed honey is produced.

Table 8: Technical regulation of honey

Sugar content **Fructose and glucose content (sum of both)**	
Blossom honey	*>60g/100g*
Honeydew honey, blends of honeydew with blossom honey	*>45g/100g*
Sucrose content	
In general	*<5g/100g*
Citrus spp., false acacia(Robinia pseudoacacia), alfalfa (Medicago Sativa), Menzies Bankisia (Banksia menziesii), French honeysuckle (Hedysarum), Redgum(Eucalyptus camadulensis), leatherwood (Eucryphia lucida, Eucryphia milliganii)	*<10g/100g*
Lavender (Lavandula spp.), borage (Borago officinalis)	*<15g/100g*
Moisture content	
In general	*<20%*
Heather (callun) and baker`s honey in general	*<23%*
Baker`s honey from heather (callun)	*<25%*
Water-insoluble content	
In general	*<0,1g/100g*
Pressed honey	*<0,5g/100g*
Electrical conductivity	
Honey not listed above and blends of these honey	*<0,8 mS/cm*
Honeydew and chestnut honey and blends of them except with those listed above	*<0,8 mS/cm*
Exceptions: strawberry tree (Arbutusuned), bell heather, eucalyptus, lime, ling heather (calluna vulgari), manuka or jelly bush (leptospermur), tea tree (Melaleuca spp.)	
Free acid	
In general	*<50 milli-equivalents acid/1000 g*
Diastase activity and hydroxymethylfurfural content (HMF) determined after processing and blending	
Diastase activity in general (except baker`s honey)	*>8*
Honeys with low natural enzyme content (e.g. citrus honey) and an HMF content	*>3 - <15 mg/kg*
HMF content in general (except baker`s honey)	*<40 mg/kg*
Honeys of declared origin from regions with tropical climate and blends of these honey	*<80 mg/kg*

Source: Resolution of Government of Georgia N 714. (2014)

EXPORT

According to the National Statistics Office of Georgia in 2013 Georgia significantly increased honey export comparing to previous years. The export value reached 117 thousand USD and amounted 17 tonnes of honey which 6 times more than in 2012. At present Georgian honey can be exported in some Asian and African countries. In 2013 Georgia officially exported 12.9 tonnes in Libya. Other markets in recent times were Saudi Arabia, Azerbaijan, UAE, Iraq and Lebanon. It is worth to mention that official statistics don`t include honey which is smuggled in neighbor countries (e.g. Turkey) mostly in small batches. The exact volume of which is unknown.

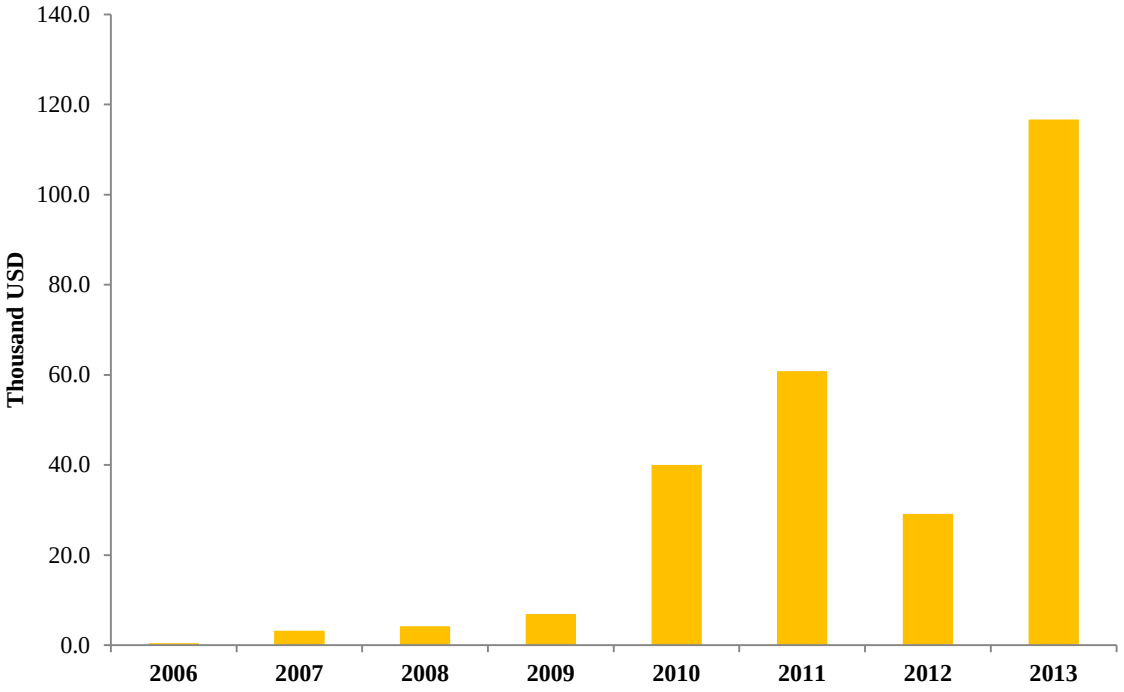


Figure 13: Export of Georgian honey

Source: National Statistics Office of Georgia

Despite the interest in Georgian honey from other countries, Georgian honey producers are often unable to export it. The main constraint remains the issuance of veterinary certification. In Georgia a Veterinary Certification for Export is issued by NFA according to government Resolution №430. The Definition of Veterinary Certification for Export is given in Table 9. Due to current lack of appropriate testing facilities according to the new standards export of honey is severely limited.

The honey export chain looks as follows (Figure 14): The exporter links with a honey producer and makes an order (often with requirements); the honey producer applies for Veterinary Certification (local authority organization); the NFA take samples of each batch which are sent to a laboratory for analyses. After that, all barrels belonging to the same batch are sealed (coded); after positive results a consignment can be shipped through border inspection posts where it can be checked (in the case when composition is different, it can be send back); the consignment is delivered to exporter with proper documentation (Vet certificate, chemical analyses, etc.).

Table 9: Veterinary Certification for Export

Additional Information Box 6 *Resolution N430*
Resolution N 430 *(December 31, 2010) deals with the issue of veterinary certification during export of animal products and other products which are subject of veterinary control. The veterinary certificate is issued by NFA or Revenue Service, a legal entity of public law of the Ministry of Finance of Georgia. It is mandatory for all legal entities and individuals interested exporting of animal and other products. 15 types of veterinary certificates among them for honey and beekeeping products can be issued. It contains information such as unique identification number, information about product, dates and other. It is issued based on an application form for each batch of product and export destination separately, not more than 10 calendar days before the product leaves the territory of Georgia. The veterinary certification comprises veterinary control procedures i.e. checking of attendant documents, physical checking of product and taking samples for analysis in the case of suspicion of diseases. If product doesn`t meet with requirements of importing country veterinary certificate is not issued. For export of honey and beekeeping products it is required that apiary should be free from bee diseases: Acariasis and Nosemosis during last 6 month; Varroa, American and European foulbrood during last 2 years. Also depending on import country can be requirement regarding residues of antibiotics and pesticides or radio-active contamination in honey.*

Source: Resolution of Government of Georgia N 430 (2010.)

EXPORT OF HONEY TO THE EU

The EU is the one of the biggest honey importers in the world. Almost 40% of honey in the EU is imported mainly from China (39%), Argentina (19%) and Mexico (11%) (PMCG, 2014).The biggest importers are Germany, Great Britain and France. European consumers prefer more milder and light-colored honey. The EU honey market is highly competitive market full of cheap honey. It is believed that in the case of exporting Georgian honey in EU market, it will have more chances and competitiveness in mono-flora (higher price and quality) rather than poly-flora honey sector.

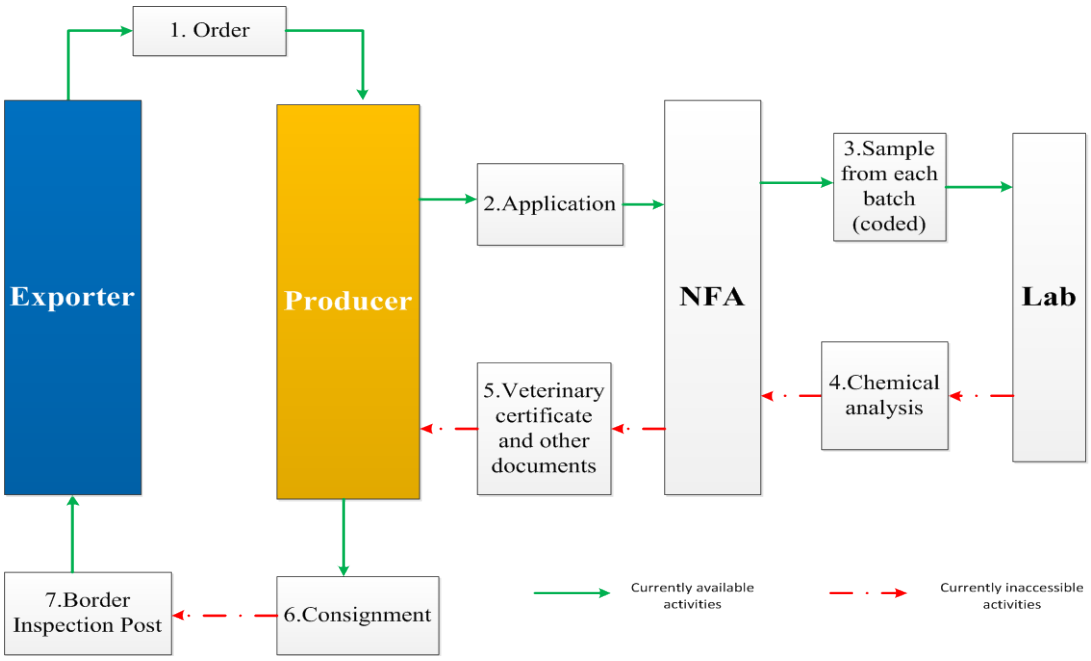


Figure 14: Honey export chain

Currently, Georgia cannot export honey into the EU. The EU sets special requirements for honey from non-EU countries. Firstly, the country should appear on the list of third countries authorized to export honey to the EU. The third country should submit a special residues monitoring plan (RMP) to become listed (see Table 10 for the definition of RMP). The RMP offers animal health guarantees equivalent to those in the EU. RMP is implemented according to Council Directive 96/23/EC of 29 April 1996. This is a complex document and it regulates monitoring substances and residues in all

animal products not only honey. It contains requirements for third countries on the monitoring of animal products: countries legislation, checking system, laboratories, etc. These are assessed by special commission of the EU.

Table 10: Residue Monitoring Plan

Additional Information Box 7
Residue Monitoring Plan (RMP) *is an annual document which submitted by EU countries and non-EU countries who wants to export animal or food of animal origin in EU. The document is approved by the European Commission. The aim of implementation of RMP is the detection of illegal use of substances in animal production and the misuse of authorized veterinary medicines. EU doesn`t allow the import of animal products from non-EU countries without approved RMP. A non-EU country must submit a plan with the guarantees it offers for the monitoring of the residues and substances in Annex I of the Directive 96/23 to get listed in third countries who are allowed to import animal origin products in EU. Key requirements of RMP are:* – *a centrally co-ordinated residue monitoring plan must be in place (Article 4);* – *a description of the legislation governing the authorization, distribution and use of veterinary medicines (Article 7);* – *the number of samples taken must comply with the sampling levels and frequencies of the Directive (Article 7, Annex IV).* *In the case of honey sampling frequency is 10 samples per 300 tonnes of annual production for human consumption for the first 3 000 tonnes and 1 sample for every 300 tonnes after exceeding the level. The approval of RMP by the Commission is the first step*[37] *for non-EU countries to get listed in Decision 2011/690. Non-EU countries should submit their RMP and results of the previous years of monitoring to the Commission by 31 March each year.*

Source: Council Directive 96/23/EC of 29 April 1996.

Georgia first applied to EU to become authorized to export fishery products and honey to the EU and requested to be listed on third countries list in 2014. (See following section for full list of implemented and anticipated activities). In response, an audit team comprised of two inspectors from the Food and Veterinary Office of European Commission (FVO) carried out an audit from 25 November to 5 December 2014 in order to evaluate the control systems in place governing the production of fishery products and honey intended for export to the European Union. Georgia has also submitted a residue monitoring plan to the Commission services in order to be authorized for export of honey. The main finding of audit regarding the honey was that the competent authority (NFA) '*has yet to secure an approved residue monitoring plan and as they themselves acknowledge, they are at an early stage of introducing the controls over the authorization and distribution of veterinary medicinal products*'[38]. Record keeping and monitoring systems are not currently kept in a way that allows the CA (Competent Authority i.e. NFA) to provide guarantees for EU eligibility. The audit provided recommendations aimed at rectifying identified shortcomings and enhancing the control system in place. If Georgia decides to proceed with its application to export honey to the EU, it should provide the Commission services with information on the actions taken, including a timetable for their completion, in order to address the recommendations in the final audit report.

After the approved residue monitoring plan is secured by the NFA, the competent authority of the country should issue a veterinary certification on each batch of consignment and imported through an approved EU Border Inspection Post. Honey product names, composition criteria and labeling requirement are regulated by Directive 2001/110/EC (see Table 11)[39].

[37] An approved RMP is one of the pre-requisites for export to the EU. EU animal and public health conditions must also be satisfied.
[38] http://ec.europa.eu/food/fvo/audit_reports/index.cfm
[39] A composition criterion on honey of EU is the similar to the Georgian technical regulation on honey.

Table 11: Product name and labeling criteria according EU

Designed product names	
According to origin	***blossom honey or nectar honey**: obtained from the nectar of plants*
	***honeydew honey**: obtained mainly from excretions of plant sucking insects(hemiptera) on the living part of plants or secretions of living parts of plants*
According to mode of production and/or pre sentation	***Comb honey**: stored by bees in the cells of freshly built broodless combs or thin comb foundation sheets made solely of beeswax and sold in sealed whole combs or sections of such combs*
	***chunk honey or cut comb honey**: contains one or more pieces of comb honey*
	***drained honey**: obtained by draining decapped broodles combs*
	***extracted honey**: obtained by centrifuging decapped broodless combs*
	***pressed honey**: obtained by pressing broodless combs with/or without the application of moderate heat not exceeding 45^0 C*
	***filtered honey**: obtained by removing foreign inorganic or organic matter in such a way as to result in the significant removal of pollen*
Baker`s honey	*Suitable for industrial use or as an ingredient in other foods which are then processed. Baker`s honey may have:* *1) a foreign taste or odor* *2) begun to ferment or have fermented* *3) been overheated*

Labeling requirements	
Product names	*Product names listed before may be replaced by the simple product name **"honey"** (except filtered honey, comb honey, chunk honey and baker`s honey)*
Baker`s honey	*In the case of baker`s honey, the words **"intended for cooking only"** must be indicated on the label close to the product name*
Country of origin	*The country of origin must appear on the label. If the honey originates in more than one country, the indication can be replaced by one of the following as appropriate:* ***"blend of EC honeys"*** ***"blend of non-EC honey"*** ***"blend of EC and non-EC honey"***

Source: Council Directive 2001/110/EC of 20 December 2001 relating to honey.

Another requirement is maximum residue limits regarding honey laid down for veterinary medicinal products and pesticides. Beekeeper should use only authorized veterinary drugs which are regulated by Regulation 470/2009 and Regulation 2377/90. The use of veterinary drugs containing pharmacological substances not listed in these documents is prohibited. There are also Maximum Residue Limits (MRL's) for pesticides (Regulation 396/2005) but MRLs set by the Regulation are frequently amended. Chemical analyses of these components (as EU requires) are partly unavailable in Georgian laboratories.

For third countries, import tax on honey is 17,3% but after signing DCFTA with EU Georgia (before GSP+) will be able to export it free within established quotas which probably will be at around 1500 tonnes.

MOA ACTIVITIES TO DATE REGARDING EXPORT

Enabling export to the EU and other countries is high priority for the Georgian government through the Ministry of Agriculture. Activities implemented to-date include:

- In 2013 and 2014, NFA sent samples of honey to laboratory in Latvia as none of the Georgian laboratories could perform the required analyses
- Beginning of 2014 Georgia applied to the EU to be become listed in third country list to be authorized to export honey to the EU
- EU commission carried out audit in Georgia from 25th of November to 5th of December 2014 to assess status for inclusion on list.
- Technical regulations for honey was put in force on 1st of July, 2015
- Laboratory of MoA is equipped and is installing all equipment properly
- 2014 NFA begins annual monitoring of the use of prohibited vet drugs in honey, Residue Monitoring Plan was prepared by NFA and presented to EU in 2014 and 2015
- The development strategy of honey sector for 2015-2020 has been introduced to the Agricultural Committee of the Parliament of Georgia[40]
- Meetings with beekeepers were held by NFA, where the quality control standards for honey were presented and the list of prohibited vet drugs was distributed

Activities to be implemented in future:

- Provide the EU Commission with information on the actions taken, including a timetable for their completion, in order to address the recommendations in the final audit report
- Approve of the development strategy of honey sector 2015-2020 by the Parliament and publish
- Ensure calibration of new equipment at the laboratory of MoA and accreditation of the laboratory by the end of 2015
- Approve draft budget of the MoAA for re-equipment of the MoAA laboratory by the parliament and ensure its re-equipment by 2016
- Improve NFA's control and monitoring system as technical regulation on honey is already in force
- Change resolution on permitted veterinary drugs to register prohibited drugs.
- Prepare Residue Monitoring Plan for 2016 and present to EU until 31st of March, 2016
- Ensure honey producers are able to homogenize honey to be eligible to export to EU

[40] Other government sector development activities include moa has prepared a project for supporting the development of honey cooperatives. The document has been sent to the prime minister and it will enter in force after his approval.
Vocational Education College "New wave" based in Kobuleti has introduced beekeeping modules in its educational programme. Studying is free and it is financed by the government. For the academic year 2015-2016, the places are limited to 20.

EXPORT TO GOST COUNTRIES

For 10 countries of CIS[41] (Azerbaijan, Armenia, Belarus, Kazakhstan, Kirgizstan, Moldova, Tajikistan, Uzbekistan, Russia and Ukraine) countries requirement for honey is regulated by GOST[42] 19792-2001. It regulates not only honey composition criteria and labeling but also methodology of chemical analyses of each substance (e.g. presence of pollen grains), transporting, requirements for inspection, keeping requirements and also links with other GOST requirements (e.g. GOST 5717 which regulate packing in glass jar). Considering to EU requirements a composition criterion of GOST is quite different (see table 12).

From neighboring countries Georgia officially exports around 2-2.5 tonnes of honey to Azerbaijan but real export is much higher as is the number of export countries. Turkish intermediaries are the key players who are smuggling Georgian honey in Turkey and selling it as Turkish. Honey is a highly consumed product in Turkey. The prices on honey products are much higher than in Georgia. Despite the export quota at amount 200 tonnes laid down in Free trade agreement between Georgia and Turkey, Georgia can`t export honey in Turkey as the export requirements on honey is similar to EU. Recently some Turkish intermediaries made chemical analyses of honey content in MOAA laboratory (Batumi) regarding the falsification and some of the samples showed a high level of sugar in it. In eastern Georgia many prefer to smuggle honey to Azerbaijan where price of honey is quite high (about 20-25 USD/kg) and Armenia which recently successfully developed its RMP and is able to export honey in EU. Export to Russia is currently unavailable but there are some negotiations ongoing regarding honey with Rosselkhoznadzor[43] and it is believed that soon honey will join the list of products permitted to be imported into Russia.

Table 12: Honey criteria according GOST standard

Characteristics and value for honey			
Index name	*All kinds, except false acacia and gossypium*	*false acacia*	*gossypium*
Odor	*pleasant, from faint to strong, without foreign odor*		*pleasant, delicate*
Taste	*sweet, pleasant, without foreign flavor*		
Presence of pollen grains	*not specified*	*presence of false acacia`s pollen grains*	*presence of gossypium`s pollen grains*
Water content	*<21%*	*<21%*	*<19%*
Reducing sugar content (absolute dry substance)	*>82%*	*>76%*	*>86%*
Sucrose content (absolute dry	*<6%*	*<10%*	*<5%*

[41] Commonwealth of independent states (CIS) is a regional organisation whose participating countries are former soviet republics (excluding Estonia, Latvia, Lithuania and Georgia who left it in 2008), formed during the breakup of the soviet union.

[42] GOS (Russian: ГОСТ) refers to a set of technical standards maintained by the Euro-Asian council for standardization, metrology and certification (easc), a regional standards organization operating under the auspices of the CIS. GOST standards were originally developed by the government of the soviet union as part of its national standardization strategy. The word GOST is an acronym for gosudarstvennyy standart (Russian: Государственный Стандарт), which means state standard.

[43] Federal Service for Veterinary and Phytosanitary Surveillance (rosselkhoznadzor) _ the federal executive body of the ministry of agriculture of Russia. Performs the functions of control and supervision in the areas of: veterinary medicine (including functions to protect the population from diseases common to humans and animals); plant protection; the use of pesticides and agrochemicals; ensure soil fertility; Selection achievements; in the quality and safety of grain and products of its processing

substance)			
Diastase activity (absolute dry substance), Gote unit	*>7*	*>5*	*>7*
HMF content	*<25 mg/kg*	*<25 mg/kg*	*<5 mg/kg*
Qualitative reaction on HMF	*negative*		
contamination	*not allowed*		
signs of fermentation	*not allowed*		
tin content	*<0,01%*	*<0,01%*	*<0,01%*
general acid	*<4,0 cm^3*	*<4,0 cm^3*	*<4,0 cm^3*

Source: Interstate Council for Standardization, Metrology and Certification. (2001). Natural Honey. Technical Requirements. GOST-19792-2001.

The enhancement of export potential of Georgian honey requires not only infrastructural re-equipment but also implementing of good monitoring practice by authorities (e.g. monitoring of diseases) and good beekeeping management by beekeepers (e.g. keeping records). It is worth to mention that chemical analyses for exporting will be quite expensive for beekeeper (cost of compositions and residues analysis is estimated at around 500 GEL per sample), therefore EU recommends small scale beekeepers work with other beekeepers (through cooperatives, etc.). In the case of honey sorting/packing enterprises may require some additional standards regarding FS&H (e.g. ISO 22000).

MAIN FINDINGS AND RECOMENDATIONS

SUMMARY MARKET ANALYSIS

The following tables and figures contain the summary market analysis i.e. the summary outputs based on the analysis of the information contained within this report and which provides the diagnostic on which the strategic framework for programme action is based. The information summarizes the key constraints to the sector and confirms that, the pro poor potential and existing drivers are high and allow for interventions which will drive growth in the sector and support growth in related sectors (i.e. rural tourism and sustainable livestock based livelihoods) and target the core programme target group (see below).

CORE PROGRAMME TARGET GROUP & PRO POOR POTENTIAL

The poor in Ajara are small scale livestock producers (SSLPs) owning up to 10 breeding female cows up to 5 bee colonies. 46% of SSLP's in Ajara consider beekeeping to be a key livelihood activity which rises to 66% in the three lower lying and steeper sided municipalities were honey production is more prevalent. They have access to up to 1ha of agricultural land and (46%) send their livestock to highland pastures, in amalgamated flocks. They are primarily livestock producers, but also grow citrus and persimmon, and cultivate crops including potatoes and maize and collect honey. They do not own tractors or implements but some do possess their own transport (car or minivan). They have limited access to more significant amounts of agricultural credit due to collateral restrictions and can access only micro loans. Generally they produce dairy products for home consumption and for sale selling mainly direct to consumers in small amounts in the towns and cities. Household income is 550 GEL per month[44]. According to the key informants of this survey 70% of their suppliers or customers fall into this category (see key informant interview table). Table 13 summarizes the high relevance, pro poor potential and impact potential for the sector and target group of specific interventions.

Table 13: Relevance & Pro Poor Potential and Intervention Impact Potential

	Relevance	*Pro-Poor Potential*	*Intervention Potential*
Honey & Beekeeping Sector			
	High: SSLPs in the majority of villages own bee colonies. They collect honey once or twice a year & consume at home and sell the surplus legally in the local market or illegally to Turkish traders during the year.	*High: high demand and export potential for honey especially in the neighboring countries (e.g. Turkey), where the price of honey is considerably higher compared to local market.*	*High: Interventions focused on facilitating access to supporting functions (veterinary i& beekeeping input supply, information, breeding services,) and removing constraints to market access in relation to packaging/labeling/marketing/business practice/regulations/FS&H/certification & export as well as bolstering the image of honey and beekeeping and amplifying and harnessing its role in boosting rural tourism, sustainable rural livelihoods, bio diversity and image.*

[44] Figure for rural resident across Georgia. Geostat 2013 (latest data). 28% of this (153 GEL) is salaried income.

Table 14 illustrates that systemic constraints to the core market are offset by the drivers and pro poor opportunities in the current climate offering significant leverage to conduct successful interventions in the sector.

Table 14: Systemic Constraints to the Core Market Drivers and Pro Poor Opportunities

Systemic Constraints	Drivers & Pro-Poor Opportunities
Honey Core Market	
- *Uncertainty over export and general government support to the sector means a high risk climate for honey producers.* - *Currently non-operational testing/certification laboratory & system for accredited certification for export.* - *Lack of regulation over quality control leading to widespread distrust in integrity of product limiting local sales i.e. people only buying from producers they know personally* - *Under-exploitation of role of beekeeping in promotion of rural Ajara including symbiosis with rural tourism, national parks and conservation of biodiversity and sustainable agro ecological livelihoods.* - *Fragmented supply due to high dependence on Turkish traders* - *Poor image and restricted local demand due to lack of trust in quality* - *Lack of sorting/ packaging facilities and marketing activities*	- *The government has established honey certification standards, is moving on installing and gaining accreditation for the requisite laboratory and signing Georgia onto the list of third countries.* - *Georgian demand high and relatively underexploited in more formalized outlets including HoReCa sector due to lack of appropriate testing/labeling/certification* - *Export demand for honey is high and Ajara region is well placed to engage in this market particularly the higher end mono floral honey sector. There is a potential to diversify export markets. Signing of the DCFTA with the EU means potential access to tariff free imports into the EU the largest honey importing market.* - *The government is promoting the development of rural tourism in which honey plays an important role,* - *Honey and beekeeping is increasingly being recognized globally and nationally as having significant benefits in addition to honey production alone, which include its role in enhancing rural tourism, culture and biodiversity.* - *Honey cooperative development is being supported by the EUENPARD programme and government.*

In Table 15 below are the potential opening interventions, entry points, target group and impact.

Table 15: Potential Opening Interventions and their Anticipated Impact

	Entry Point	Activity	Output	Impact
Supporting Functions/Production Inputs for SSLP's				
Veterinary Services & Disease Control General Husbandry for Productivity	*National input supplier*	*Expansion of a business outreach*	*Increased access to inputs and consultancy service for beekeepers* *Increased sales for the business*	*Improved health and value of apiary of beekeepers leading to improved productivity* *Increased sales and financial stability of the business*
Breeding	*Private entities with some economic focus focused on breeding*	*Building capacity and viability of enterprise*		
Information	*Beekeepers Association* *National input supplier* *TV* *Newspaper* *NFA* *MOA* *Other*	*Supplying information regarding care of bee, bee diseases and their treatment, vet medicines, market regulations through trainings, TV programme and publishing literature or other information materials, etc.*	*Improved awareness and capacity regarding beekeeping & key market information for beekeepers and key stakeholders*	*Improved and secured productivity of apiary & market access leading to increased income for beekeepers*
Access to finance	*Business development services (BDS)* *Government (GOV)* *Other*	*Facilitating credit programmes for beekeeping inputs, assisting beekeepers in applying for agricultural projects*	*Increased access to financial services for beekeepers*	*Increased income through improved apiary productivity for beekeepers*
Core Market/Market Access for SSLP's				
Production of Bee Products	*Honey processing enterprises*	*Facilitating SME's dealing with production of bee products through upgrading infrastructure, inventory and equipment, trainings concerning FS&H and other activities.*	*Increased volume and value of trade for honey processors from SSLPs facilitated* *Increased number of value chain actors in beekeeping sector gaining access to honey market*	*Increased sales and financial stability of a business* *Increased profitability for beekeepers through reduced production and transaction costs*
Quality Control (FS&H & monitoring)	*NFA* *FS&H experts* *Value-chain actors in honey sector*	*Facilitating quality and disease control through information, trainings and purchasing proper equipment with input supplier amongst other key market players.*	*Increased awareness regarding FS&H standards*	*Increased number value-chain actors complying with FS&H standards and able to access markets*

Export (requirements & legislation)	*NFA* *GOV* *Honey processing enterprises*	*Advocacy with key stakeholders regarding government activities towards testing and certification for export, monitoring and information transmission to beekeepers*	*Increased access to external markets for honey processing enterprises*	*Increased income and financial stability for honey processing enterprises through expanded external markets*
Rules/Operating Environment				
Image	*Beekeepers association* *Honey processing enterprises* *Department of Tourism and Resorts of AJ (DTRA)* *MOA* *NFA* *Other*	*Facilitating activities promoting Georgian honey*	*Increased awareness and improved image of Ajara region as an international tourism destination, offering clean and compliant products and various rural tourism opportunities through improved access to information*	*Increased sales for value-chain actors through increased demand for honey and other livestock products from AJ*
Rural Tourism	*Guesthouses* *Tourism agencies, DTRA* *Botanical Garden*	*Facilitating linkages with business operators*		

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4. *Key Informant Interviews (see Annex 1).*

ANNEX 1. RESEARCH METHOLOGY

The research was comprised of two main parts:

1. Desk study and literature review of existing sources on subject related beekeeping in Georgia.
2. Semi formal/formal closed ended questionnaires:
   - Questionnaire 1: A randomized SSLP surveys.
   - Questionnaire 2: Key informant interviews with beekeepers
   - Questionnaire 3: Key informant interviews with honey processing enterprises and input supply providers.
   - Questionnaire 4: Key informant interviews with government representatives

Questionnaire 1: *Small Scale Livestock Producer (SSLP) Farmers*

These are the main target beneficiaries of the programme and main producers of honey and other bee products.

Samples:

Focus group survey: 502 SSLP`s from 31 communities of all municipalities of Ajara region were randomly selected to document the perspectives, trends, attitudes and day-to-day activities of female and male farmers in relation to the supporting functions, core market and rules of the dairy, beef and honey sub sectors of the market. The survey sample size constituted 46% of 67[45] communities in these municipalities. Communities were chosen to reflect vartying agro ecological zones and other demographic factors such as religion and the number of FG`s reflects.

Table 16: Sample Description by Gender

		Male	Female	Total
Khulo	Number of focus groups	8	8	16
	Number of interviewees	99	52	151
Shuakhevi	Number of focus groups	7	7	14
	Number of interviewees	75	44	119
Keda	Number of focus groups	5	5	10
	Number of interviewees	29	34	63
Khelvachauri	Number of focus groups	5	5	10
	Number of interviewees	51	24	75
Kobuleti	Number of focus groups	6	6	12
	Number of interviewees	53	41	94
Total	Number of focus groups	31	31	62
	Number of interviewees	307	195	502

[45] According to new administration division the number of communities in Ajara at present reduced to 62

Baseline Survey: The baseline survey describes the baseline condition in Khulo, Shuakhevi, Keda, Khelvachauri and Kobuleti municipalities of Ajara region of Georgia. 360 randomly selected SSLP`s have been interviewed The survey sample size constituted to 95% significance level and 5% confidence level;

Questionnaire 2: Key informant interviews with beekeepers i.e. SSLP`s who are engaged in beekeeping.

Sample: It was interviewed 14 beekeepers from the different municipalities in accordance of the activity prevalence and the number of kept bee colonies.

Table 17: # of interviewed beekeepers by municipalities

Khulo	Shuakhevi	Keda	Khelvachauri	Kobuleti
2	1	3	4	4

Questionnaire 3: Key informant interviews with honey processing enterprises and input supply providers. The stakeholders who provide different services related to beekeeping.

Samples: Interviews with stakeholders of private sector such as owners of honey packing/sorting enterprise, input supply shops and honey sellers.

Table 18: Stakeholders interviewed

Stakeholders	#
Honey packing/sorting enterprise	2
Beekeepers input supply shop	3
Honey resellers in agricultural market	2

Questionnaire 4: Key informant interviews with government representatives as key stakeholders, in charge of decision making.

Sample: Interviews with the Deputy of Minister of MoAA, the Head of LEPL "Laboratory Research Center", the representatives of NFA and Ministry of Agriculture to provide information about regulations regarding quality check of bee products, requirements for export of honey, government activities in beekeeping sector, etc.

ANNEX 2. ADDITIONAL RESEARCH DATA

BEEKEEPING IN AJARA

Table 19: Description of Small, Medium and Large Bee Colony Ownership (FGS)

	Khulo	Shuakhevi	Keda	Khelvachauri	Kobuleti	Total
Small	7	7	7	5	13	8
Medium	20	22	24	22	30	23
Large	42	62	43	81	56	56

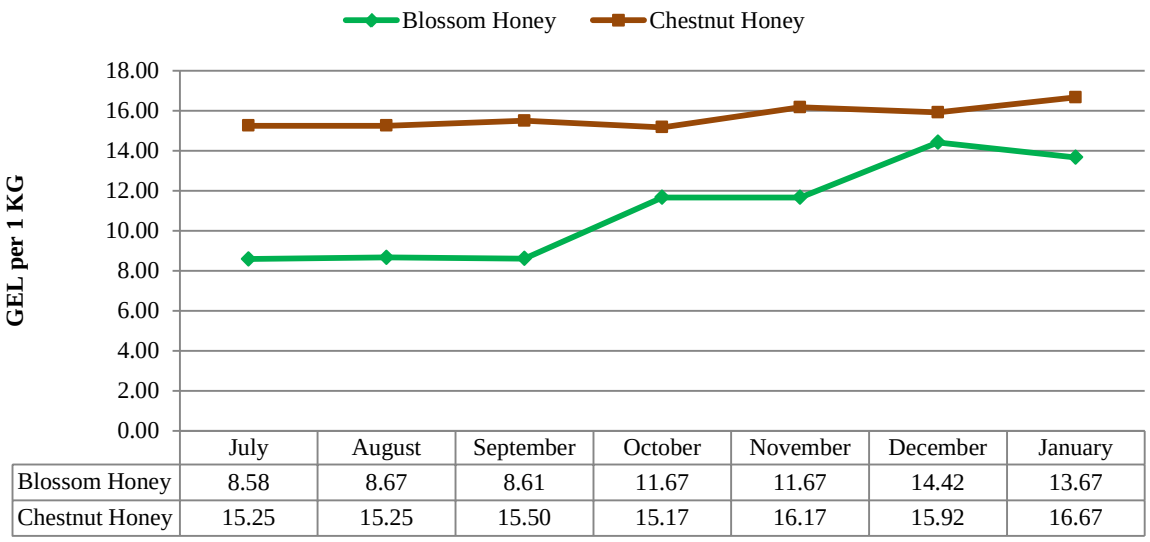
Source: Focus Group Survey Ajara (2014)

Table 20: Approximate of the Households in Community Engaged in Beekeeping (FGS, %)

	Khulo	Shuakhevi	Keda	Khelvachauri	Kobuleti	Total
Small	54	66	75	61	67	65
Medium	30	27	21	29	24	26
Large	16	7	4	10	9	9

Source: Focus Group Survey Ajara (2014)

HONEY MARKET SYSTEM



	July	August	September	October	November	December	January
Blossom Honey	8.58	8.67	8.61	11.67	11.67	14.42	13.67
Chestnut Honey	15.25	15.25	15.50	15.17	16.17	15.92	16.67

Figure 15: Honey Price (July, 2014-January, 2015; average)

Source: Primary research.

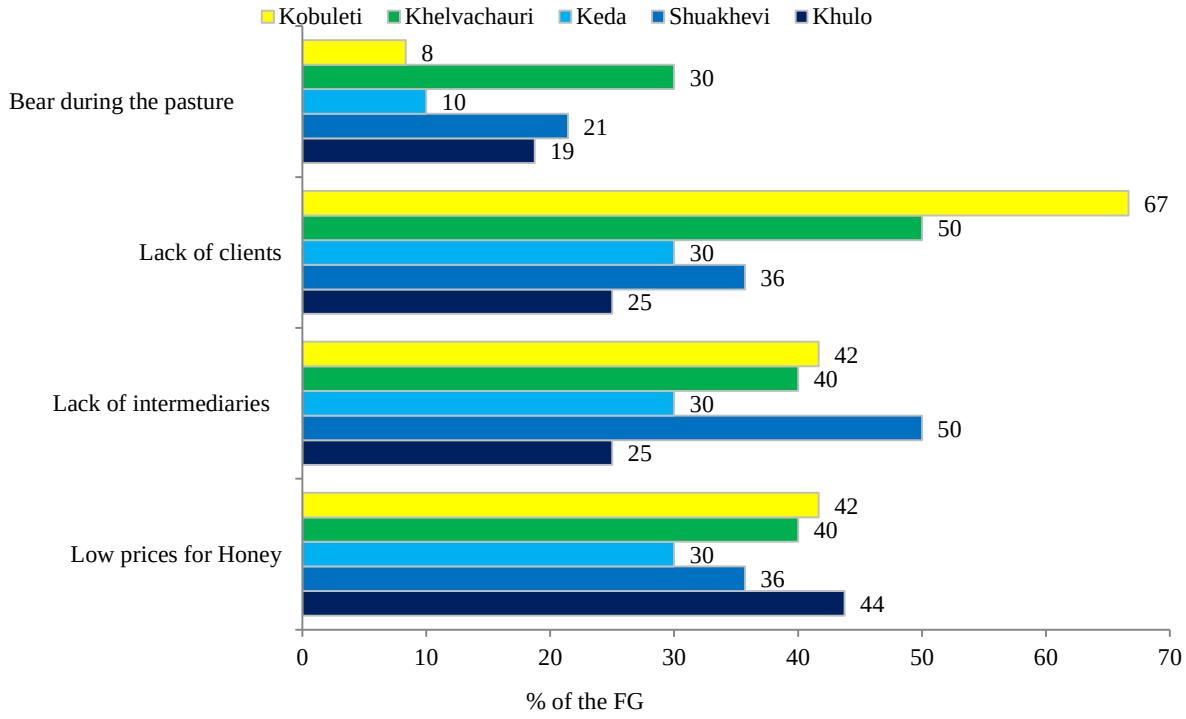


Figure 16: Focus Groups Naming Following to be the Drawback for Selling Honey

Source: Focus Group Survey Ajara (2014)

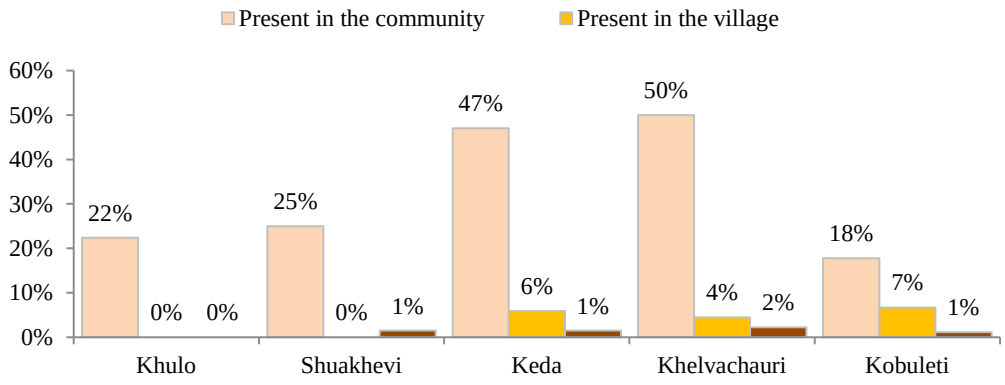


Figure 17: Farmers Having Access and Use Honey Intermediaries' Services

Source: Baseline survey in Khulo, Shuakhevi, Keda, Khelvachauri and Kobuleti Municipalities of Ajara Region of Georgia.(2014).

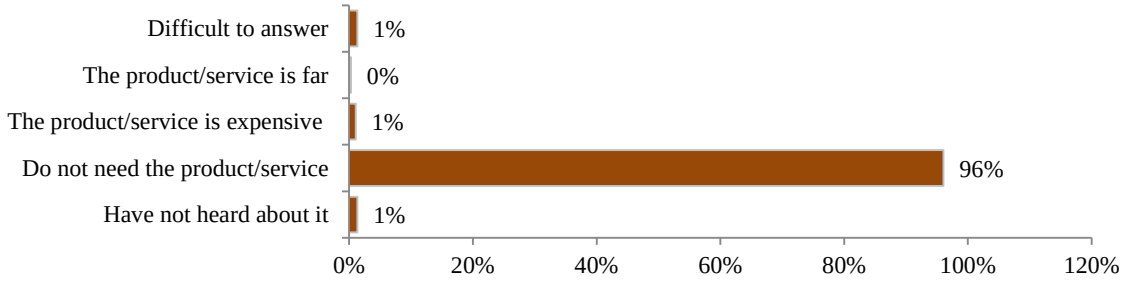


Figure 18: The Reasons Why Honey Intermediaries' Services are Not Used

Source: Baseline survey in Khulo, Shuakhevi, Keda, Khelvachauri and Kobuleti Municipalities of Ajara Region of Georgia.(2014).

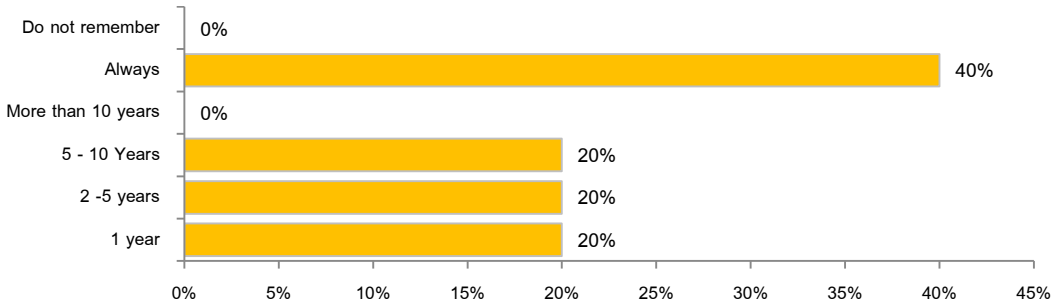


Figure 19: Number of Years Honey Intermediaries' Services Are Used

Source: Baseline survey in Khulo, Shuakhevi, Keda, Khelvachauri and Kobuleti Municipalities of Ajara Region of Georgia.(2014).

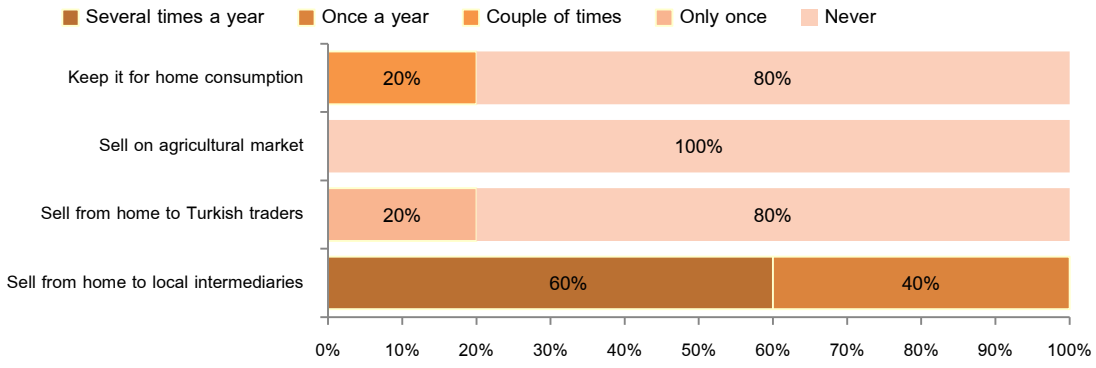


Figure 20: Frequency Farmers Market Honey and Bee Products by means of Different

Source: Baseline survey in Khulo, Shuakhevi, Keda, Khelvachauri and Kobuleti Municipalities of Ajara Region of Georgia.(2014).

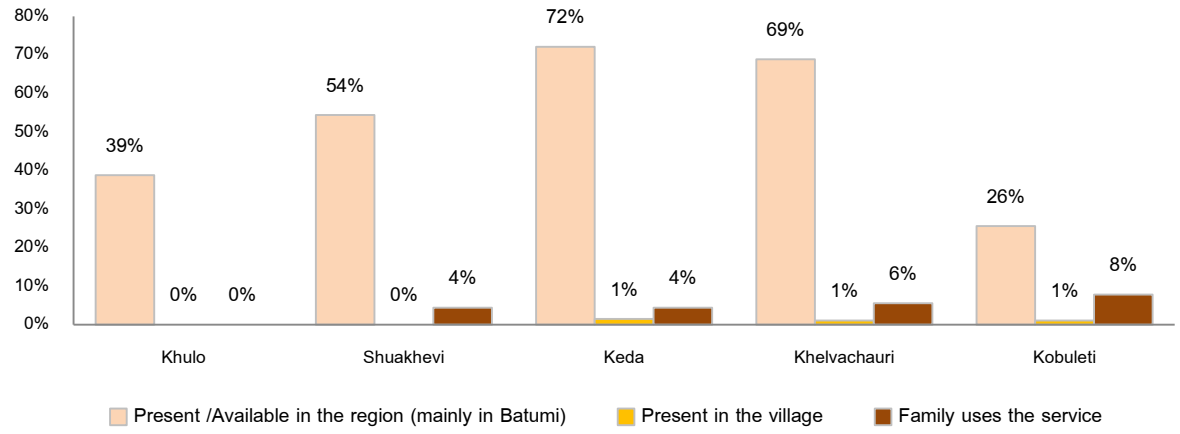


Figure 21: Farmers Having Access and Use Beekeeping Input Providers' Service

Source: Baseline survey in Khulo, Shuakhevi, Keda, Khelvachauri and Kobuleti Municipalities of Ajara Region of Georgia.(2014).

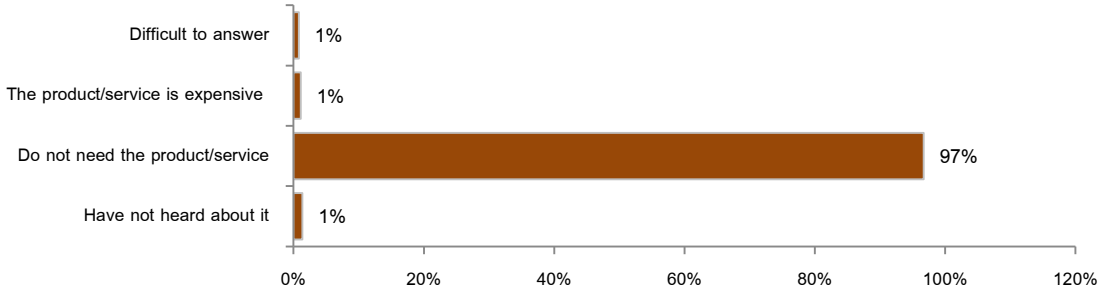


Figure 22: The Reasons Why Inputs for Beekeeping are Not Purchased

Source: Baseline survey in Khulo, Shuakhevi, Keda, Khelvachauri and Kobuleti Municipalities of Ajara Region of Georgia.(2014).

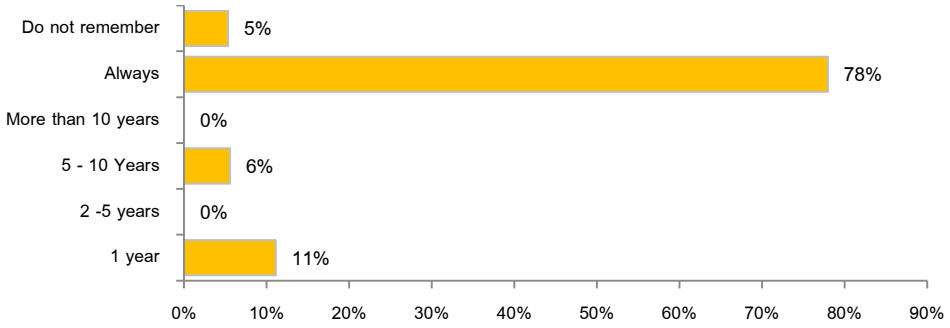


Figure 23: Number of Years Beekeeping Input Providers' Services Are Used

Source: Baseline survey in Khulo, Shuakhevi, Keda, Khelvachauri and Kobuleti Municipalities of Ajara Region of Georgia.(2014).

TRANSHUMANCE

Table 21 % of the Focus Groups who Say They Take Bees to Pastures

	Khulo	Shuakhevi	Keda	Khelvachauri	Kobuleti
% of Beekeepers who take bees to pastures	16	10	10	16	6

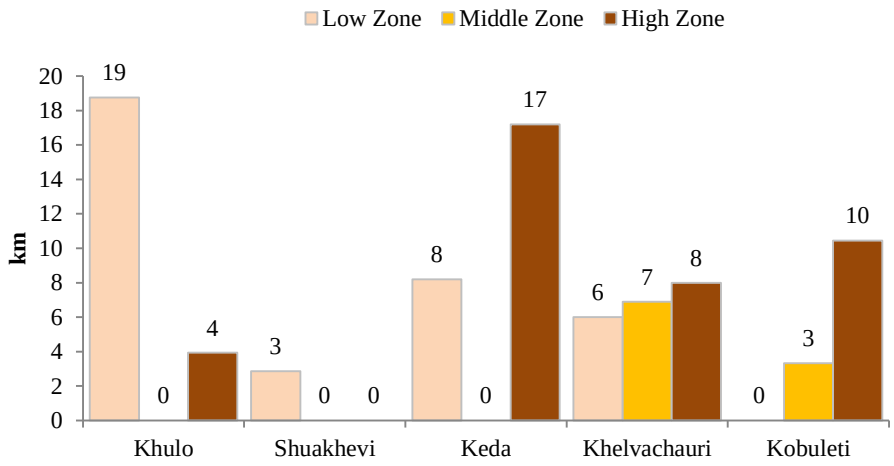


Figure 24: Distance of the pasture from village (km)

Source: Focus Group Survey Ajara (2014)