Market Intelligence Fact Sheet (Format for results of RMA)

Botanical name of the crop – *Rubus idaeus L*

English name – Raspberry

Local (Armenian) name – Aznvamori (Ազնվամորի)

Photo 1 (full plant/tree)	Photo 2 (harvested fruits)
	
Photo 3 (processed product A)	**Photo 4 (processed product B)**
	

Botanical name of the crop – Rubuscaesius

English name – Blackberry

Local (Armenian) name – Mosh sovorakan (Մոշ սովորական)

Photo 1 (full plant/tree)	Photo 2 (harvested fruits)
	
Photo 3 (processed product A)	**Photo 4 (processed product B)**
	

1. Historical origin and cultivation history in project sites

The red raspberry (Rubus idaeus) is indigenous to Asia Minor and North America. Fruits were gathered from the wild by the people of Troy in the foothills of Mt. Ida around the time of Christ. Records of domestication were found in 4th century writings of Palladius, a Roman agriculturist, and seeds have been discovered at Roman forts in Britain. Therefore, the Romans are thought to have spread cultivation throughout Europe.

Determining the origins of the blackberry is difficult as they are known to grow wild in numerous regions including Asia, Europe, North America, and South America. Various claims have been made that the blackberry is native to each of these areas. While

blackberries have been utilized for various purposes for thousands of years, these were all wild blackberries. It was not until more modern times that blackberries have been domesticated and cultivated. The Greeks and the Romans are known to have used blackberries for medicine and Native Americans used them for as food, medicine, twine, and dye.

In the wild nature of Armenia, raspberry and blackberry have also been growing since time immemorial. And in the last decade its cultivation has become more active.

2. Conservation status now

The raspberry is the edible fruit of a multitude of plant species in the genus Rubus of the rose family, most of which are in the subgenus Idaeobatus; the name also applies to these plants themselves. Raspberries are perennial with woody stems. There are over 200 varieties of raspberries spread mainly in the temperate and subtropical zone of Asia, America, and Europe. 7 varieties of raspberry grow in Armenia.

The blackberry is an edible fruit produced by many species in the genus Rubus in the family Rosaceae, hybrids among these species within the subgenus Rubus, and hybrids between the subgenera Rubus and Idaeobatus. The taxonomy of the blackberries has historically been confused because of hybridization and apomixis, so that species have often been grouped together and called species aggregates. More than 600 varieties of blackberry are known. And 200 varieties cultivated. There are 11 varieties in the Republic of Armenia – Anatolian, Armenian, White, Cesium, est.

Also we have 2 varieties that included in Plants Red Book of Republic of Armenia – 1. Blackberry of Zangezhur, 2. Blackberry Takhtajyan.

Category:	**An endangered species.** **Endemic species.**
Protection events:	Protected at the Shikahogh State Reserve. It is necessary to organize research works to find new habitats, monitor the state of the population.

3. Nutritional values and unique traits

Raspberries –amount per 100 grams	
Calories 53	
Protein 1,2 g	
Vitamin A 0%	Vitamin C 43%
Calcium 2%	Iron 3%
Vitamin D 0%	Vitamin B-6 5%
Cobalamin 0%	Mangnesium 5%

Rich in vitamins, antioxidants, and fiber, raspberries are delicious fruits with many health benefits. They have a high concentration of ellagic acid, a phenolic compound that helps lower the risk of cancer.

The oil from raspberries has a sun protection factor. Furthermore, it helps to lose weight and also has anti-aging properties. By improving your immune system, these berries actually look after your overall health. These are easy to include in your diet. Either you include them in some recipes, eat them raw, or add the chilled raspberries to your drinks; all the forms tantalize your taste buds and provide nutrition at the same time.

The taste of these fruits is sweet and has a subtly sharp tinge. Raspberries easily melt in your mouth because of their soft and sweet texture. They come in a range of colors like pink, purple, black, yellow, orange, and white. They have two hybrids, namely loganberries and boysenberries. Most varieties are cultivated in California from June till October.

Raspberry Nutrition

They contain noteworthy amounts of polyphenolic antioxidants like anthocyanin pigments that are associated with optimal health. These berries also have a high proportion of dietary fiber. They are one of the plant foods with the highest ranking of fiber content. Of all contents, the fiber comprises around 20% of the berry's total weight.

According to the USDA National Nutrient Database, Raspberries are excellent sources of vitamin C, manganese, and dietary fiber. They are also rich in B vitamins, folic acid, copper, and iron. They have the highest concentration of antioxidant strength amongst all fruits. This is due to its high concentration of allergic acid, anthocyanins, garlic acid, quercetin, cyaniding, catechism, pelargonidin, kaempferol, and salicylic acid. However, yellow raspberries and other pale-colored fruits have a much lower percentage of anthocyanins.

Health Benefits of Raspberries

The health benefits of raspberries include their ability to aid in weight loss, improve skin health, and strengthen the immune system. Let's take closer look at the most common and useful benefits.

Weight loss. Raspberry is high in dietary fiber and manganese. Fiber aids in slowing down the digestive process, making you feel fuller for longer. The trace mineral manganese keeps your metabolic rate high, and thereby burns fat. If you are looking for a delicious and effective way to lose weight, raspberries can be the best natural option.

Reduce Wrinkles. Research conducted by the Department of Nutritional Sciences, Faculty of Medicine, and University of Toronto claims that raspberries have antioxidant potential that can prove beneficial for many health issues. The antioxidant powers of these berries actually come from vitamin C, which effectively helps reduce the age spots and discoloration. Raspberries work like magic on wrinkles. They protect the skin from the harmful sun rays. By filling in minor wrinkles, they can help you restore your youthful appearance.

Prevent Infections & Cancer. Raspberries are an excellent antioxidant-laden food that contains ellagic acid. A study, published in the Journal of Carcinogenesis, has shown that raspberry polyphenols exhibit anti-cancer effects.

Strengthen the Immune System. A 2016 study confirms that raspberries are rich in effective antioxidants as well phytonutrients. These elements proficiently reinforce your immune system and help your body fight diseases.

High Nutrient Value. Other than the outstanding phytonutrient content, raspberries are rich in traditional nutrients, primarily in the antioxidant and B vitamin categories. According to the USDA Nutrient Database, raspberries are an excellent source of manganese and vitamin C, two important antioxidant nutrients that protect the body's tissue from oxygen-related damage. [10] Raspberries are also good sources of riboflavin, niacin, folate, magnesium, potassium, and copper. When complemented with a strong B vitamin and mineral content, they are termed as excellent sources of dietary fiber. The nutrient content of raspberries makes them a great choice for having a negligible effect on blood sugar level.

Blackberry –amount per 100 grams	
Calories 43	
Protein 1,4 g	
Vitamin A 4%	Vitamin C 35%
Calcium 2%	Iron 3%
Vitamin D 0%	Vitamin B-6 5%
Cobalamin 0%	Mangnesium 5%

Health benefits of blackberry include better digestive health, strengthened immune defense, healthy functioning of the heart, prevention of cancer, and relief from endothelial dysfunction. Blackberry provides cognitive benefits and aids in enhancing memory, weight management, keeping the bones strong, skin care, improving vision, keeping disease-free eyes, and normal blood clotting. It may also serve as a valuable food during pregnancy owing to an impressive gamut of nutrients.

Nutritional Value of Blackberry

Blackberries are tasty and nutrient dense fruits which store a fine range of nourishing components. Vitamins provided by blackberries include vitamin A, vitamin B1 (thiamine), vitamin B2 (riboflavin), vitamin B3 (niacin), vitamin B6, folate, vitamin C (ascorbic acid), vitamin E (alpha-tocopherol), and vitamin K (phylloquinone). According to the USDA National Nutrient Database, the mineral wealth of blackberries includes calcium, iron, magnesium, phosphorous, potassium, and zinc. Blackberries are also a good source of amino acids and essential dietary fiber, and they do not contain any harmful cholesterol.

Health Benefits of Blackberry

Benefits of blackberry provide respite in various health conditions that have been discussed as under:

Antioxidant Potential. Blackberry contains a profuse amount of powerful antioxidants which protect the body in multiple ways. Components such as phenolic acids, flavonoids, and flavonols, particularly anthocyanosides, present in blackberry work against the harmful oxygen free molecules and counteract their action.

Anti-cancer Properties. Blackberry fruit is effective against the development of cancer including lung cancer, colon cancer, and esophageal cancer. The micro-nutrients present in blackberries exert a chemo-preventive effect and prevent the proliferation of malignant cells. Blackberry extracts inhibit carcinogenesis and associated cell signaling. It also possesses chemopreventive effects, according to a study publishedin Nutrition and Cancer by researchers of National Institute for Occupational Safety and Health.

Prevents Endothelial Dysfunction. Blackberries provide protection against the endothelial dysfunction which is characterized by an abnormal functioning of the inner lining of blood vessels. As suggested by a study cited in Elsevier's Life Science journal, they contain useful components such as cyanidin-3-O-glucoside, which fight the oxidative activity and help in normalizing multiple critical factors implicated in such conditions. It also helps in reducing DNA damage and guards against vascular failure.

Boosts Cognition. Blackberry also extends its beneficial effect in improving the cognitive functions of the body. A study was conducted by Dr. Barbara Shukitt-Hale, et al., USDA-ARS Human Nutrition Research Center on Aging at Tufts University, Boston on aged rats in 2013. The results suggest that the polyphenolic components present in blackberries help slow down the age-related decline in motor and cognitive activity attributing to their super antioxidant power. Regular consumption of blackberries may prove useful in enhancing memory performance and improving behavioral and neuronal functions.

Improves Digestion. Blackberries are a source of both insoluble and soluble fiber essential for the optimum functioning of the digestive system. Insoluble fiber in blackberries encourages easy and better absorption of water in the large intestine and adds bulk to the stools. This aids in regular bowel movements, freedom from constipation, and apt digestive health.

Healthy Heart. The richness of flavonols such as anthocyanins in blackberry makes it a heart-friendly fruit. Other useful components such as magnesium and fiber present in blackberries prevent the arteries from getting blocked and stimulate a smooth flow of blood. This reduces the risk of various heart diseases such as stroke and atherosclerosis and maintains cardiovascular health. Magnesium, in blackberries, also helps in regulating the blood pressure and prevents cardiac arrhythmia and irregular contraction.

Boosts Immunity. Blackberries help in improving the immune system of the body, due to the presence of phytoestrogens, vitamins, and minerals. Regular consumption of blackberries helps fight various pathogens and protects the body from infections and other fatal illnesses.

Healthy Bones. Blackberry contains vital minerals such as magnesium and calcium, which are essential for maintaining healthy bones. Calcium strengthens the bones and magnesium facilitates the absorption of calcium and potassium into the body. In addition to this, phosphorus present in blackberry aids in the regulation of calcium, thus assisting in building strong bones and also contributing to proper cellular functioning.

Normal Blood Clotting. Blackberries contain a good amount of vitamin K, which helps in normal clotting of blood. It also helps in preventing excessive bleeding from slight injuries and aids in healing wounds. Vitamin K present in blackberries is also essential for protein modification and plays an important role in protecting bones from osteoporosis.

4. Uses and derived products

Raspberries and blackberries are excellent fresh, frozen or canned or made into tea, jam, jelly or juice.

Fresh berries

Fresh raspberries and blackberries are popular berries in Armenia, known for their sweet, decadent flavor and culinary versatility. However, the lesser told story is that fresh raspberries and blackberries offer a host of nutritional benefits, while also being naturally low in energy density. The production and trade of berries, such as the blackberry and raspberry is rising for local market and for export. Also we already have examples of growing organic berries

Jam, preserves

The history of jam dates back to the Greeks, who used honey to preserve quinces. In the 16th century, cane sugar came to Europe from the new world, and it was used to preserve fruit, as well as berries hence the term preserves. All of these concoctions that we know today as jams, jellies, marmalades, and conserves are a mixture of fruit and sugar. The basic preparation involves crushing ripe fruit, berries to release its juice, then adding sugar and heating the mixture to a boil, cooking it until it's ready to set, and then placing the resulting syrupy mixture in jars for storage. Jams and preserves made from raspberry and blackberry has customer interest in Armenia

Raspberry Tea

Raspberry tea may consist of the fruit or dried leaves of the raspberry plant. Raspberry iced tea, a popular and refreshing summer beverage, is made by adding fresh raspberry juice or extract to black tea and serving it with ice. Raspberry leaf tea is bitterer and does not taste like raspberries. Both types of tea are beneficial; iced tea offers a wide array of antioxidant vitamins, while raspberry leaf tea is touted as a natural remedy and relaxant agent.

Red Raspberry Leaf Tea Nutrition Facts

Red raspberry leaf tea is a caffeine-free beverage. It's also low in calories, which may help support healthy weight management. However, it is somewhat lacking in other nutrients. With that in mind, red raspberry leaf tea is best used as a tool to help augment your antioxidant profile while you obtain essential nutrients from other foods.

Blackberry Tea

Blackberry leaves are known to be a good source of Vitamin C, have beneficial anti-inflammatory properties, and have been used medicinally since ancient times. Blackberry leaves are dried and decocted into tea for both their flavor and medicinal properties, including treatment of gastrointestinal upset and diarrhea.

Blackberry tea is labeled as a black tea. The tea usually contains a mixture of dried leaves and berries. It has a piquant, sweet and fruity taste. The tea is bright amber. Blackberry tea is able

to sooth the symptoms of diarrhea because it contains tannin, which is present in high concentrations in the plant's leaves and roots. Tannin has astringent qualities - that is, it is able to draw together or constrict tissues. Tannin is able to tighten the tissues along the intestinal track, reducing the chance of diarrhea. Blackberry tea can also help prevent dehydration by replenishing lost fluids during a bout of diarrhea.

Examples of commercial products available are: jams, preserves and teas produced by the companies like “SAM-HAR” LLC (Sipan), "Tamara Fruit" CJSC, TEREV foods, Agrolog CJSC, “Aveliats” LLC (Nayiri food), “Artashat Cannery” OJSC (ARTFOOD), “Euroterm CJSC” (Noyan premium), “Ararat” Food Factory Co.Ltd, “Armberry” CJSC, “Manana Tea”, “ABDA” LLC (Mountain tea), “Bizon-1” Co.Ltd.

5. Agricultural production

7 varieties of raspberry grow in Armenia- R. saxatilis, R. idaeus ets. In the wild nature raspberry grows in the forests of Gugark, Stepanavan, Dilijan, Tumanyan, Ijevan, Noyemberyan and other regions. Lori, Tavush, Gegharkunik, Syunik, Aragatsotn and other regions around Yerevan. Blackberry grow in Tavush, Lory, Syunik regions. Blackberry of Zangezhur, Blackberry Takhtajyan and Caucasus varieties are endemic and grows only in Syunik region.

Weather conditions should be considered in selecting the kinds of brambles to plant as well as the cultivars (varieties). Blackberry and raspberries will grow almost in all areas of Ararat and Gegharkunik regions. The fruit of some red raspberry cultivars may sunscald, but the problem generally is less severe in northeast. Blackberries do not survive extreme low temperatures and may be severely damaged by subzero temperatures, especially thorn less and trailing types. All brambles are self-fruitful, thus one cultivar will be adequate for pollination.

Harvesting and storing of berries

In Armenia except in large commercial plantings, raspberries and blackberries are usually harvested by hand. The berries are delicate and easily damaged by rough handling. Every farmer knows that for fresh use, they should pick ripe berries gently and collect them in shallow containers no more than four or five berries deep. Berries intended for processing can be picked into larger containers. Pick only healthy, intact fruit. Damaged berries leak juice and quickly rot.

Post-harvest handling

Blackberries and raspberries have a short shelf life. This varies among cultivars, but environmental conditions such as soil moisture, weather and plant nutrition can have a significant effect on shelf life and quality. Once picked, fresh raspberries do not have a very long shelf life. For this reason, selling them locally can add value. There are many ways in which this can be achieved. A lot of farms utilize a U-pick system or sell directly outside their farm using a farm stand. Many restaurants are eager to use local and organic produce, which could be another option for the fresh market sale of raspberries. One could also sell at nearby certified farmers' markets. Both raspberries and blackberries are used tremendously towards processed goods (juices, preserves, frozen items, tea, dessert wines, oils, etc.). One way to get added value to your processed raspberries is to be selective about which raspberries you process. Fall-bearing varieties can produce twice each year, once in the fall, usually producing a larger crop, and once in the summer. Depending on the market price for fresh and processed raspberries, one crop can be sold to the fresh market, while the other can be processed. Another way to add value when processing would be to use fruits that are not deemed aesthetic enough for the fresh market.

Irrigation

Since most raspberry and blackberry fields are not big, most of them have drip irrigation systems. Most importantly, potable water should be used whenever water might come in contact with the fruit, such as for frost protection, pesticide application or a mist cooling system in a high tunnel. It is common and acceptable to use ground or surface water for drip irrigation since there is minimal chance for berries to come into contact with the water.

6. Demand and consumer interests

The demand for fresh and other processed products from raspberry and blackberry is strong, especially in these times of health and nutrition awareness.

In recent years, food industry has been facing to high expectations that food products should meet consumers' demands for a healthy life style. Therefore, the role of food is not

only to satisfy hunger and provide necessary nutrients, but also to prevent nutrition-related diseases and improve consumers' physical and mental well-being. The growing interest in functional food leads to examination for new sources of bioactive compounds. In this regard, the importance of plant secondary metabolites and their potential effects on human health have been intensively studied.

Berries are rich sources of antioxidants and other bioactive compounds. Many studies claim that the dietary intake of these fruits has positive effects on human health, performance and disease. Besides high contents of fibers, vitamins and essentials minerals, raspberries and blackberries are known for their high contents of phenolic compounds, such as phenolic acids, tannins, flavonoids and anthocyanins. Raspberries (Rubus idaeus L.) and blackberries (Rubus fruticosus L.) are produced in more than 30 countries worldwide. Despite those berry fruits are often sold and consumed fresh, it represents less than 10% of produced berries, due to their perishability contributes to nutritional and microbiological deterioration and diminishes quality and health benefits. Thus, large fractions are processed into juices, jams, syrups, teas, yogurts, and as ingredients of various foods.

Type of packaging for fresh raspberry and blackberry, for juices and tea

Fresh Berries

Berries can be harvested into pulp paper baskets or plastic clamshell containers. Berries should not be piled more than two to three berries deep to avoid crushing. Blackberries and raspberries have a short shelf life. This varies among cultivars, but environmental conditions such as soil moisture, weather and plant nutrition can have a significant effect on shelf life and quality. Harvested fruit should be protected from direct sunlight, as this causes blackberries to turn red and become bitter. Berries should be cooled as quickly as possible after harvest to decrease respiration and reduce berry quality decline.

Raspberry and blackberry jam, preserves packaging

In local stores and supermarkets, raspberry and blackberry jams and preserves and juices produced by companies like "SAM-HAR" LLC (Sipan), "Tamara Fruit" CJSC, TEREV foods, , "Aveliats" LLC (Nayiri food), "Artashat Cannery" OJSC (ARTFOOD), "Euroterm CJSC" (Noyan premium), "Ararat" Food Factory Co.Ltd sell in a transparent glass jars and bottles in different volumes.

Raspberry and blackberry tea packaging

Basically tea is packed in paper bags or in paper containers in different volumes like 48 gr, 100 gr.

Buyer requirements or certification requirements

Market research has shown that currently there are number of farmers who produce fresh raspberry and blackberry, companies that produce preserves juices, compotes, syrups, tea, and oil. Each of these companies has the most popular type of products that consumers can always find in stores.

For the past 3-5 years we have good examples of farmers who applied for organic certification and now have organic orchards of raspberry and blackberry. Among them are individual farmers Samvel Gasparyan from Tavush region, POghos Hovhannisyan from Aragatsotn region, Victoria Raspberry Group

from Syunik region, Ghazaryan Family Farm from Kotayk Region, Manvel Traturyan and Hakob Baghdasaryan from Gegharkunik region, also Armberry CJSC that targets to become a leading company which produces organic and premium quality berries in Armenia through innovation, technological improvement and operational excellence.

7. Value Chain Map

An excess demand for Armenia's fresh fruits and berries exists, even in years with good crop yields. The main demand appears to be coming from the Russian markets, where Armenian fruit and berries have a traditional demand base amongst consumers. Domestically, demand far outweighs supply for the soft fleshed fruits and berries, which are still in high demand for the preparation of natural fruit juices, syrups and jams by households that prefer to prepare their own conserves for the winter periods. Fruit production is heavily dependent on weather. Most fruit varieties that grow in Armenian are not frost resistant, and the unfavorable weather conditions have resulted in low yields during recent years. Fruit processors in Armenia have to compete with the fresh fruit market driving-up raw material costs. They need to specialize in non-standard products and high value markets. Processors in Armenia compete with international low cost producers. Processors in the foreign markets such as Turkey, South America and South East Asia are able to purchase their raw materials at relatively low prices, as supply is far in excess of the demand for fresh products. One potential market for Armenian processors would be the freeze dried and standard frozen fruit markets in Russia. There is very high demand for these products in the food processing industries there (mainly for yogurts). This market is also useful for the processing of relatively low quality fruits (i.e. those that are not suitable for fresh consumption).

Value Chain	Source of Future Growth	Growth Potential	Possible Interventions
Berries	Increasing demand for both fresh and processed berries in domestic and foreign markets	High	Further increase of cultivation areas through various motivational tools aimed at farmers

Berry orchards have grown at 21% between 2005 and 2017. Berry cultivation is triggered mainly by interest from food processing companies, which procure berries (mainly raspberry and strawberry, blackberry) at 650 AMD/kg (800-1500 AMD/kg in Yerevan). However, farmers fail to meet demand from food processing companies. Having tremendous demand, berry cultivation, even though growing rapidly, is still at infancy stage. Berry harvest figures do not include wild berries. In 2017, 916 tons of wild fruit and berries were collected. Berry orchards growth is the most dynamic in Aragatsotn (37%). Ararat and Armavir have also shows significant average growth of 7.4% and 8.3% annually. Meghri is the berry cultivation center in Syunik marz. Berries are consumed both fresh and processed.

Berries are processed for making preserves and juices. Berries are sensitive towards heat and transportation. To be exported fresh, berries must be deep-frozen. Only one food processing company owns deep-freezer in Armenia. Currently berry export, both fresh and preserved, is insignificant; however, this is determined by limited supply. Fresh and processed berry demand is growing in international markets as consumers show significant interest towards healthy, niche products increases. Among target products berries are the fastest growing export products, with some categories such as fresh cranberry growing at 23.8%.

Value Chain Map actors are the same as for other priority crops. Since there are many farmers who grow berries as an additional part of their farm in small orchards the total yield is unknown.