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KOSOVO NEW OPPORTUNITIES FOR AGRICULTURE PROGRAM

TABLE GRAPE TECHNICAL ASSISTANCE

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TABLE GRAPES
TECHNICAL ASSISTANCE

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BACKGROUND

USAID supports economic growth in Kosovo through programs that strengthen and improve competitiveness of Kosovo agribusinesses, improve the business environment, and encourage local economic development. Accordingly, USAID/Kosovo has awarded Tetra Tech ARD the task order for the New Opportunities in Agriculture in Kosovo Program.

The goal of the program is to increase economic growth in Kosovo through expanded, environmentally sustainable production and sales of value-added agricultural products by enabling producers and processors to compete regionally and globally. The program has the following components:

1. Products and farmers linked with markets:
2. Agriculture products diversified and increased;
3. Food quality and safety improved;
4. Increased affordable and accessible credits;
5. Improved coordination with the agriculture sector.

One of the traditional crops recommended to focus on in Kosovo is table grapes. Kosovo has many quality grape vineyards, but a majority of the vineyards have grown table grapes by utilizing wine vineyard cultivation techniques. Accordingly, the Program has sought technical assistance to promote and train growers on modern technologies for the production of table grapes in Kosovo.

PURPOSE OF ASSIGNMENT

The purpose of this assignment was to provide the Program with a road map for next steps in the development of Table Grapes production and post-harvest needs in Kosovo.

The objectives were to:

1. Assess table grape production in Kosovo in terms of its scale, potential and necessary actions to support its development;
2. Rank the table grape varieties appropriate for production in Kosovo it terms of each variety's ability to compete in export markets, generate sales and create jobs.
3. Indicate which table grape varieties the Program should invest in to maximize impact in terms of enhanced competitiveness in export EU markets regional export markets and local markets, potential sales in the medium term and potential jobs created;
4. Assess needs relative to post-harvest handling, storage and packaging of the recommended table grape varieties;
5. Provide recommendations for establishing/improving table grape production and post-harvest handling, storage and packaging of this crop.

EXECUTIVE SUMMARY

The assignment aimed to assess the table grape business in Kosovo, to understand its limitations and its potential. One such limitation and potential is the amount of table grapes that Kosovo imports. Table grapes from neighboring countries account for approximately 30% of Kosovo's table grape consumption. In order to substitute these imports, domestic production and quality of the table grapes would need to be increased. This report focuses on how growers can increase the table grape harvest per hectare, improve the quality of the domestic crop, and eventually use new varieties to supply Kosovo and potential external markets with those new varieties, from August to December each year.

The most important change that needs to take place, at present, in order to ensure that table grape production is increased in Kosovo, is that growers must learn the differences between table grape production and wine grape production. At present, grape growers are producing table grapes by using wine grape production systems; this, it is observed, leads to a decrease in yield of table grapes.

This proposed system-wide change to grow table grapes by utilizing table grape production techniques instead of wine grape production techniques will result in higher yields of better quality grape bunches at a low cost to growers. Specifically, by using table grape trellising systems, and by pruning and thinning foliage and bunches during the various growth stages, table grape harvests in Kosovo are expected to increase. Along the similar lines, at present, the trellising system that is being used for table grapes is the system meant for wine grapes. There is a specific table grape trellising system that should be implemented and used by table grape growers. The details of this trellising system as well as table grape specific cultural practices are explained below in the report section, *increasing harvest by changing best practices*.

By changing cultural practices as well as by making modifications to the trellising system, it is proposed that by year 2 of the Program, growers can increase grape growth by 2 bunches per vine. Following that, by year 4 of the Program, growers can increase grape growth by 4 bunches per vine. If this domestic growth pattern is followed and replicated, table grape imports can be off-set completely during the regular table grape season.

Once table grape imports are off-set with the increased domestic table grape production, it would then be in Kosovo's best interest to venture into the export markets, and try to tackle the off-season market with production of new varieties. At present, however, neither trying to tackle new markets, nor working with off-season new varieties are feasible; the table grape culture needs to be introduced and sustained amongst growers to fill a domestic demand and to substitute imports during the table grape season before export markets are decided upon.

This report also identifies the table grape varieties that the Program should invest in to increase the length of the table grape season from August to December. Post-harvest handling, storage and packaging needs are discussed in detail within the report, and recommendations are made in regards to phytosanitary standards as well as the creation of uniform packaging standards.

Additionally, specifications in regards to field days, a study tour, and round table workshops are noted throughout the report. These activities would provide table grape growers the chance to be further educated on the cultural practices of table grape growing.

FIELD ACTIVITIES TO ACHIEVE PURPOSES

Meetings with the following key players within the table grape industry in Kosovo:

- Vineyard Institute
  It was discussed with institute officials that there are about 3064 grape ha. planted with out of which approximately 600 ha are specifically focused on table grapes. The average yield varies from 9 – 12 tons/hectare. During the meeting, it was discussed that there is room for improvement of quality and quantity of table grapes, specifically focusing on pruning, support system, plant protection, introduction of new varieties and marketing technologies.
  .
- Ministry of Agriculture
  The minister was met with and during the presentation on the table grape industry (current practices and future of the industry), he showed interest and is willing to be involved in the 1st Field Day, which possibly will be in December. Within the Ministry are individuals who, it was observed, are industrious and who want to learn and improve and be part of the creation. They want to support the cause.

- City Mayors
  Met with one of the mayors, in Suhareka, who is a farmer by nature. The Suhareka Municipality has received 1.6 million Euro grants donated by Austrian ADA to support agriculture. The criteria for selection and application forms have been established. The farmers will apply for grants to the Municipality. The readiness to co-finance projects on table grapes through the grant fund was readily accepted by the mayor.

- USAID's New Opportunities for Agriculture Program Team
  Martin Wood, COP; Mr. Fatmir Selimi, DCOP; Michael Kimes, Chief Technical Officer; and Mr. Maxhun, Fruit Production Specialist.

- Muharrem Jupa
  Mr. Jupa is a fruit advisor and consultant and was interviewed to learn about the possibilities of the local advisors in the future steps for the rehabilitation of the table grape industry. Mr. Jupa stressed the importance of involving local advisors from the start of any table grape program to ensure that they can distribute knowledge to local growers.

Various companies were visited:

- Muja Company is one such company that was visited. During this visit, the company stated they would be ready to play the role of future supplier with required inputs, which are necessary for changing actual technologies.

- Stone Castle Company was visited. The company has privatized 2200 hectares of former SOW land; 600 hectares are vineyards, 100 hectares are planted with table grapes of standard varieties. The company currently has variety test plots, and the newest vineyards were planted in 1989.

- Haxhijaha company's owner Mr. Rzhidi Haxhijaha was met. The proper atomizer use within the vineyard was explained to him. To reach the maximum level of spray, it was discussed that the existing atomizers must be adjusted. Due to these discussions, Mr. Haxhijaha will travel to Slovenia to meet with Slovenian manufacturers in order to discuss possible adjustments of the atomizers.

Various growers were visited:

- The vine growers association, Vreshtari, was visited. There are about 1300 grower members within the association that own 1000 hectares of vineyards, out of which 120 hectares are currently for table grape production. Possible improvements of vineyard management were practically demonstrated to growers.

- Habib Elshani, table grape grower was visited. He is a MAFRD beneficiary and is planting table grapes and at present has 2.2 hectares planted with planting material imported from various areas – Italy, Slovenia and France. The grower is ready to accept new technologies and wants to increase his vineyard by an additional 4 hectares.

TASK FINDINGS AND RECOMMENDATIONS

The following tasks were specified in the Scope of Work for the assignment:

Task 1: Organize and conduct initial planning meeting with the Program and establish collaboration with key stakeholders

Task 2: Review past actions in the table grape industry in Kosovo

Task 3: Characterize within a production assessment report, and in as much detail as is practical, table grapes production in Kosovo.

> *3a: Production (volume, table grape varieties, pricing farm gate, structure, trends, prioritized opportunities)*
>
> *3b: Markets, market channels and key actors, characterization of demand*
>
> *3c: Prioritized development needs for the sector and principal barriers to development*
>
> *3d: Role of women and opportunities for youth and minorities in table grape development*

Task 4: Complete a detailed report on post-harvest handling, storage and packaging (and if there is call for it, processing);

Task 5: Determine next steps needed to pick, pack, haul and cool table grapes in order to penetrate export markets;

Task 6: Summaries of next steps activities for implementation with budget estimates;

Task 1, 2, 3:

Increasing harvest by improving best practices

There are numerous areas that can be improved upon within the current production practices of table grapes. The main two that will be discussed are the trellising systems as well as cultural practices such as pruning and thinning techniques. This section will discuss current table grape growing practices and will highlight new techniques to be introduced in order to increase the quality and quantity of production. This section will also focus on why intensive drip irrigation is not a necessary focus of the Program at this time. In this section, it is shown that by simply assisting growers to use a trellising system, and by improving the cultural practices and production techniques meant specifically for table grapes, that yields and quality of table grapes will increase in Kosovo.

A. Trellising System

At present, the trellising system being used for table grape production is one that is specific for wine grapes and is not appropriate for table grapes. Additionally, there are no cultural practices in place for the grape bunches to improve yields and quality. Without an appropriate table grape-specific trellising system and without any cultural practices being used by table grape growers, grape bunches are often found crowded and tangled into each other and usually leaning on the trunk of the vine. Furthermore, due to the high leaf density caused by a lack of table grape specific production techniques, the spraying applications used on the grapes cannot reach the bunches leaving the treatment

ineffective, and leaving the bunches more prone to fungal diseases. At present, the trellising system that is being used by table grape growers does not allow for the area under the leaves to have enough air circulation and due to this, the grape bunches becomes damp, adding to the problem. Unfortunately this can cause mildew and phomopsis on the grapes, which are treatable conditions but are at an additional expense.

By using the current wine system of trellising, the table grape vines grow upwards, and not outwards, making it easier for grape bunches to be tangled. With the new trellising system being proposed, the vines would be able to grow horizontally, using additional space to spread out, ensuring that each grape bunch receives better sun and air penetration than they would receive in their current trellising system used. This new system of trellising that is being proposed for table grape growers in Kosovo is called a "modified T". This system would build 3 or 4 brackets 30cm each onto each concrete post. Although not the most ideal trellis system, it is specific to Kosovo where 30cm is the longest that the brackets can be, when taking into consideration that current vineyard tractors would need to pass through the rows. If the brackets stay at or under 30cm in length, local tractors would not have to be changed and no additional agricultural equipment will need to be purchased. The concrete posts are currently in use and available in Kosovo. The "T" brackets built onto one post would each have wires that would connect to the "T" brackets built on the next post. These wires that would connect the "T" brackets would allow the vine canes to grow horizontally to support and enable the vines to grow outwards instead of directly straight up, leaving the bunches free to have proper ventilation and obtain enough air circulation and sun penetration for mitigation of diseases. Additionally, this "modified T" system of trellising would lead to better photosynthesis, leading to more yields and better quality grapes. (Again, refer to Annex I to see the diagram of the proposed trellising system for table grape growth.)

The western trellising systems are costly and due to the local vineyard conditions, and the available machinery in Kosovo, the western trellising system is not relevant for Kosovo for existing vineyards. In order to suit local, current machinery, and to help Kosovo table grape growers save costs, only a modification of the trellising system is needed. This "modified T" system of trellising for table grape production is what is being proposed.

B. Pruning and Thinning – Cultural Practices

There are not any table grape pruning or thinning practices being used in Kosovo for table grapes at present. Kosovar growers are not aware, nor are they educated, on the importance of these techniques. The changes that need to arise amongst table grape growers should include pruning of shoots, as well as grape and foliage thinning in order to better suit table grape production. These cultural practices are necessary to implement, as they will assist the grower to move away from a wine grape growing production system and ensure high yields without incurring costly expenses. These new practices and vineyard management techniques will, however, take time and be challenging to implement.

Pruning is one aspect of ensuring that the amount of vine shoots are increased per vine leading to more grape bunches. This production technique that leads to an increase of shoots can increase the amount of grapes grown. By having more shoots, there will be more flowering. And due to an increase in flowering, there will certainly be an increase in fruit set. Pruning is one method that can be considered an insurance policy against frosts and can help maintain and retain additional bunch survival.

There are three types of thinning cultural practices that table grape growers should use: bunch thinning, leaf or foliage thinning and berry cluster thinning. Each practice is described in detail below:

Bunch thinning is needed to take off excess bunches off of the vines once the fruit is set. It is better to select the best fruit bunches on the vine rather than not be able to choose any at all. Growers have the ability to decide which bunches to thin out for best quality and yield. In the event that one bunch has been affected by frost, the thinning method would allow for the farmer to take those bunches affected by frost off of the vines in order to save some of the crop.

Foliage thinning is an important aspect of table grape production. Top foliage on the south side of the field should grow in length for it to overhang and shade the grapes to ensure against sun-burning. However, it will be necessary for the foliage on the north side to be thinned because the sun is less intense on the north side of the trellis, which will increase air circulation and sunlight. Additional foliage can then grow on the south side providing further coverage from the strong sun rays coming from that direction.

Berry thinning can be defined as taking off the small berries, decayed berries and shriveled berries hanging on grape bunches, also called "shaping the bunch", or "shaping for bunch quality". Once small berries are removed from the bunch, each grape left on the bunch can then utilize the resources spared on the vine to increase in size.

The current yield and quality of the grape bunches is only 60% of what it can be. By making the aforementioned changes in table grape practices, the quantity and quality of grape bunches per harvest should rise by at least an additional 30% over two growing seasons.

C. Drip Irrigation

The common belief that drip irrigation is the solution to increased production in Kosovo is erroneous. This incorrect assumption is explained by focusing on the two types of drip irrigation systems, fertigation and assistant drip irrigation, and why they are unnecessary for Kosovo at this time:

- Intensive Drip Irrigation - In this system, the grower gets the vine to completely depend on the water and fertilizer supplied by the system. This one-unit system is called "fertigation". This professional system is expensive not only in terms of its initial cost but also in terms of its operational costs. It requires constant control by the grower of the variant fertilizer and water supply amounts according to the need of the vines during the different cultivation times.

  Even though this system is useful, it is suitable specifically for large areas with professional irrigation management. It is not suitable for established small farms that have been grown without any irrigation at all but have well-developed deep roots systems like the ones here in Kosovo. Kosovo soil and ground is well adapted to retaining wetness, and the vines have adapted to a natural way of finding water for uptake. In essence, the table grape plants have grown deep root systems. If the intensive drip irrigation system was to be implemented, these naturally deep root systems would naturally convert into shallow root systems, becoming dependent upon

the drip system, losing their deep root systems. This is why it is stated that Kosovo does not have a need for the intensive drip irrigation system.

It is to be noted, however, that this system can be used by new vineyards with new varieties interested in increasing their yield quickly.

- Assistant Drip Irrigation - With this system, the assistant drip irrigation is operated only a few times a year. It is also referred to as supplemental drip irrigation. This type of irrigation is used during the softening period, or also known as the sizing period of the grape maturation stage. This is the period of growth in which the berries fill with water and by adding water through the drip system, the berry size can increase quickly. The general knowledge of this type of an irrigation system is that by implementing its use, each berry can grow by one gram, having the total production per hectare increase up by four tons. It is possible to have each berry grow by two grams, making the production increase by 8 tons per hectare.

  This system is useful however the current situation with table grapes in Kosovo is such that the Program should not invest in this type of technology at this time. The most important investment that the Program can provide at the moment is to assist the growers in increasing their yields by focusing on implementing table grape cultural practices as well as a table grape trellising system.

New planting

The renewal planting rate of vines within the table grape sector worldwide averages widely between 2.5% to 10% of new vines per year. Recently, Kosovo's standard of living has increased, which has led to the expectation that the table grape consumer's demand will rise as well. In order to meet this demand, it is necessary to grow late varieties which can be kept in cold storage and supplied to the consumer throughout the month of August and through until December. This new demand would require the planting of no less than 10% of new vines per year in Kosovo. Any additional planting will lessen the fall import. (Refer to Annex III for new varieties of table grapes suggested).

Task 3b: Markets, market channels and key actors, characterization of demand

At present, the domestic table grape production should be increased for the domestic market by growing table grapes on a table grape-specific trellis system, and by using table grape cultural practices. Once these practices are in place, the domestic production can increase enough to off-set the table grape imports during the table grape season. Moreover, only once this takes place can Kosovo then entertain the thought of targeting additional markets and move table grapes to export markets.

However, with that said, the new varieties of grapes that have been proposed in this report are late varieties; both of the varieties are focused on the export market. Thus, the new varieties can be viewed as a preparatory phase to focus on exports within the next five or so years, but only after domestic production has off-set the table grape imports within Kosovo during the table grape season.

Please refer to key *field activities to achieve purposes* section to obtain a list of the key stakeholders – institutions, associations as well as individual growers – who will be

pivotal in ensuring that the table grape industry in Kosovo expands, as they each have incentive to cooperate and further the value chain.

Task 3c: Prioritized development needs for the sector and principal barriers to development

Trellising and Cultural Practices

The methods mentioned above take into consideration the road blocks that table grape growers face – they are producing their table grapes within a wine grape production system, which leads to a decrease in table grape yields as well as grape quality. Once growers start implementing the above mentioned recommendations, the quality and quantity of yields will increase, enough to substitute the 30% of the imported grapes during season, with Kosovo table grape production.

Professional Training – round table, field days, study tour

There is no current professional training being conducted at this time for table grape growers, but this training is necessary to expand the industry and create a table grape culture.

In order to assist the growers in understanding the required changes in best practices and to better understand the differences in table grape growing as opposed to wine grape growing, it is recommended that the Program hold a round table meeting for table grape growers designated for those specific technical aspects, as discussed above.

Additionally, field days, focusing on specific cultural practices would assist the growers to understand each cultural practice – pruning, leaf thinning, bunch thinning. Field days could also be focused on spraying practices, harvest practices and post-harvest practices.

Furthermore, a study tour might be arranged for Kosovo table grape growers in Italy, to visit not only vineyards but also testing laboratories as well.

Task 3d: Role of women and opportunities for youth and minorities in table grape development

Internship potential: Training of trainers

In addition to a lack of privatized training, the government is having difficulty in financing the training or internships for a new generation of table grape field service providers, or more specifically Kosovo youth.

Therefore, it is recommended that the industry become involved in working with one of the larger agrochemical insecticide/fungicide spray companies to assist in the funding of training some of the local instructors. The funding would be used to send these new instructors to travel the world to different table grape growing areas. They would be able to get hands on, in-depth training on cultural practices such as pruning and thinning, and would also obtain training in harvest and post-harvest handling and procedures.

It is proposed that after a year of training, the instructors would be come back to Kosovo and pass on the knowledge they gained to train a new generation of trainers. In order for the agrochemical company that initially invested in this process to be returned the investment, the trainer would charge a service fee to the growers they work with, for each visit to the farm. The trainers would also be required to instruct the growers on the proper usage of the investing company's insecticide/fungicide spray. By doing this, the investing company will eventually earn back their initial investment for the training of the inspectors.

Need more manpower in the vineyards

The growing techniques that are being suggested in this report focus on the necessary culture practices and table grape trellising systems. Today, the table grape growers in Kosovo do not employ enough field hands, and do not have enough workers for the vineyards to increase the quantity produced. In order to implement these improvements discussed in this report, and for better production and larger harvests, it will be beneficial for the growers to employ additional workers. Within every stage of improving the cultural practices of table grape production, additional labor will need to be added. This additional labor can very well be women, and/or minorities.

It will be important for growers to calculate individual gross margins at every step of table grape growing to have a better understanding of whether or not they will need to use additional labor, and how much as well.

Task 4: Complete a detailed report on post-harvest handling, storage and packaging (and if there is call for it, processing)

Cold storage facilities and warehouses

Please refer to *Task 5: pick, pack, haul, and cool grapes* section below.

Packaging Materials and Standards

In present day Kosovo, the standards for packaging table grapes and the materials to package the fruit are very basic. The harvesting and packaging are at the lowest level.

For example:

- The grape bunches are not cleaned during harvest. The damaged or under-developed grapes are not being removed.
- During packaging there is no separating material (such as packaging paper) between the wooden box and the fruit itself.

These low standards cannot continue for much longer. Once table grape growers are able to produce grapes at the level of quality that supermarkets desire, higher standards will be dictated to the growers. Kosovo is not at this stage yet; it was observed that the table grape growers have not reached the level of quality necessary for the domestic markets yet. However, when they do reach that level of quality, it is necessary that the key steps are in place in order to ensure that the grower is protected with certain standards to follow.

In order to mitigate a situation in which the supermarkets dictate the standards of grape quality necessary, it is in the Agricultural Ministry's best interest to be prepared and begin to adopt standards such as US N°.1 (Please refer to Annex II for the USDA table

grape standards). This will enable the Agricultural Ministry to decide the guidelines for the growers as opposed to the supermarkets, which will ensure a one-standard guideline for all growers to prescribe to and move towards as they market to various supermarkets.

With the development of marketing the produce to supermarket chains, the current wooden boxes being used to transport the table grapes will no longer be suitable. New boxes may be demanded by the supermarkets. It would be a good idea to prepare for this situation due to the fact that the small farmer will have to deal with the labor and cost of upgrading the boxes to suit the supermarket's demand. By constantly adjusting the packaging to fulfill the supermarket's demand, the grower's income will be hard hit. Adjusting packaging requirements during post harvest time will lower the grower's income per hectare.

Unfortunately, the supermarkets will not reimburse the grower for the additional cost incurred during packaging. In this situation, the only way that the grower has the ability to mitigate the loss of income due to supermarket packaging standards would be to expand their vineyard. This is not always a feasible or even reasonable method.

It is recommended that the grower be protected and supported with standard packaging requirements suitable for both supermarkets as well as growers before supermarket demands prevail and dictate to the grower what is needed. Unfortunately this situation exists all over the world, even in the United States: The demands of the supermarkets are too high, and are too expensive, and they have the ability to slow labor down, and thereby, slow down production. This can cause an ongoing battle between the grower and supermarkets, which is why it is important to finalize a packaging standard for Kosovo that will be suitable before the supermarkets even have the ability to demand an-ever changing series of higher standards that growers will find increasingly difficult to fulfill.

Phytosanitary Requirements

The phytosanitary situation in Kosovo needs to be greatly improved for the table grape industry to expand. This report focuses specifically on phytosanitary situation for plants, and the phytosanitary situation for fruits.

- Plants - There are no current standards for plants in Kosovo. Local or Serbian nurseries are propagating low standard plants which can cause great damage to the grower. Imported plants also can be a problem as the grower is at the mercy of the exporter and the exporter's standards, which may be low. It is recommended that some plants be uprooted and destroyed, and that an Italian lab - Vitroplant Italia, be contacted. They are known worldwide and have vast experience in phytosanitary requirements. They are also very experienced in establishing nurseries outside of Italy, which may be a step for Kosovo to move forward with creating standard phytosanitary standards for their growers, by starting with their nurseries.

- Fruits - Fruits imported into Kosovo are a source for diseases and insects which may not be indigenous to Kosovo. Diseases are noticeable at present-day throughout the agricultural areas of the country, although they are very basic at this point. The importers must demand that the fruit be treated before shipment. Suitable documents must be delivered by the exporter to the importer in order to guarantee that the fruit was in fact treated. A highly infectious disease or extremely harmful insect is an

expensive and dangerous risk for Kosovo. The cost to rectify damage from either is very expensive, costing millions to even billions of dollars in repair damages.

Task 5: Determine next steps needed to pick, pack, haul and cool table grapes in order to penetrate export markets

Before Kosovo can look to penetrate export markets, it is imperative that Kosovo tackle its own domestic production challenges within the table grape industry first. Once Kosovo table grape growers are able to substitute their own domestically produced grapes for grapes that are being imported from neighboring countries during the table grape season, growers can then look at export markets for sales. At present, the domestic market is the most crucial market to tackle.

Supply grapes for the late season

In order to avoid the need to import grapes and promote the domestic production of table grapes, Kosovo must do the following:

- Plant late varieties.
  It will be necessary for Kosovo table grape growers to grow new varieties. The new varieties suggested will ripen during Sept and Oct in order to extend the grape season and in order to reduce the pressure that growers face in the summer months. (Refer to Annex III for the list of new varieties suggested.) With appropriate infrastructure as outlined below – cooling containers, SO2 gas, and cold storage units, the shelf life of the new varieties will increase post-harvest.

- Regulate the marketing during the peak season.
  It is necessary to put in place a regulation which will help avoid a seasonality situation where an increase of 30% of production of 600 hectares during the summer months will lower the prices. Growers need to be able to put a part of their production in cold storage for a short period of time. When the harvest ends, they will then release the cold storage fruits to the market.

- Design gas-tight cooling containers.
  These on-farm cooling containers would assist Kosovo table grape growers by having a container by which a grower could immediately place the produce in before being transferred to either the SO2 warehouse gas chambers or the cold storage units.

- Build regional modern, economical, and professional cold storage units.
  Due to the fact that most of the growers are too small to finance their own cold storage units, it would be financially more efficient to have regional units. It is necessary to take into consideration the problem of power supply to the cold storage and packing warehouses and prepare proper infrastructures in advance. The cold storage need to be ready within two and a half years. They will need to be of Western Europe quality. Regarding the cooling of the unit, its cost efficiency is dependent on how well the unit is sealed and structured.

  The cold storage facilities that will be necessary for the new varieties of table grapes should be forced air cooling or rapid cooling systems. These systems would reduce

the temperature of the grapes coming from the field, stop respiration and extend shelf life.

An important point to make in regards to cold storage units is that the new varieties of grapes to be introduced would last in these systems, either air cooling or rapid cooling systems, for a minimum of 2 months, to a maximum of 3 months. Thus, the latest that those late variety grapes could be sold would be January. After January, the Southern Hemisphere grapes would then take on the market, as it becomes too cold in all of the Balkans at that time to grow grapes. If Kosovo imports any grapes post January, the grapes would be produced from other regions within the Southern Hemisphere.

- Build packaging warehouses next to every cold storage unit.
  The packing in the wood boxes without any proper packing materials shortens the fruits life in cold storage. In order to store fruit properly, it is important to purchase proper packaging material such as liners, and to use sulfur dioxide, SO2. This gas is an important one for grapes in the sense that it decreases the mold and mildew spore counts on the fruit. If the grapes are not fumigated with SO2 during post-harvest handling, the spores will spread and cause botrytis, also known as fruit rot. The SO2 helps give grapes a longer shelf life.

  An individual grower will not be able to pack this way, with the much needed SO2 gas. Therefore it is recommended that a packing warehouse which will be capable to receive small quantities of grapes from different growers be used. They will sort them and pack the grapes based on quality. They will store them until the release from cold storage. The knowledge on how to execute this concept is available worldwide and works well in many places worldwide.

Task 6: Summaries of next steps activities for implementation with budget estimates

Kosovo grape growers can modify many actions in order for quality and quantity of production to be increased. The quality and quantity of production can increase if growers become aware that the over-arching wine grape system of growing table grapes is constricting grape growth and that a table grape growing system is needed.

As this assignment was a short one, and due to the fact that current costs of inputs were unavailable during the assignment, a budget was not created for the following recommendations.

A. New system of trellising

The trellising system that was observed is a wine-grape trellising system, not to be used for table grape growth. The cost for adjusting the trellising system will be minimal, as the new table grape system would simply require 3 additional “T” brackets and additional wire on existing concrete posts being used.

B. Cultural Practices

Additionally, if the pruning and thinning practices discussed in this report are made apparent to growers, and implemented, the quality and quantity of table grapes will

improve. The costs of promoting these cultural practices rely on the cost of the field days (see below).

C. Field Days/RoundTable/Study Tour/Internships

These new practices that have been discussed will require the use of field days, in order for the growers to "see and believe" that the techniques are useful and worthy of implementing.

The most effective way to bring the knowledge and technology in the shortest period of time to the largest amount of growers is by hosting field days and round table discussions. During these field days, the grower will be educated with new information which he can implement on his own farms. Considering that at the moment there is no guidance at all but there is a desire to change and to pass knowledge on to the wide spread growers, field days are necessary.

There are a variety of topics that can be considered for field days: pruning (during winter time), thinning methods (May or June months), harvesting and post-harvest handling as well as potentially spraying.

Additionally, it will be useful for table grape growers here in Kosovo to take a study tour to Italy to view their laboratory, trellising systems and cultural practices being utilized on their vineyards.

The internship mentioned above in section *3d* focuses on the creation of a training of a trainer program, by which a private input supply and fertilizer company creates a new cadre of trainers by training youth. These newly trained youth would then train additional "trainers" to assist growers on their fields, thereby creating a privatized, incentivized extension service system.

D. New varieties

A larger challenge for growers will be to start growing the varieties that are suggested, in order to tap into later markets, so that domestic production can easily out-compete table grape imports.

E. Regional cold storage units

There is a great demand at present, and there will be an even greater demand after the new varieties are introduced to store the table grapes until they should be sold, in order to tap into the later markets and in order to expand table grape production to late October and even beyond into December. Due to the large financial costs of building cold storage units per farmer, it is recommended that regional cold storage units are built instead.

F. Collection and packaging warehouses

With the advent of cold storage units in certain regions, it is acknowledged that warehouses will be needed in order to assist the growers with sorting and packaging. These elements of post-harvest handling will be difficult for the growers to act upon on their own due to the costs that they would incur. In order to mitigate the growers from having to take packaging and sorting on their own, it is recommended that warehouses be built and trained in the standards of packaging and sorting.

G. Phytosanitary standards

It is recommended that the Ministry of Agriculture create standard phytosanitary requirements for the table grape growers to follow, so as to be compliant in order for them to potentially export once domestic production has substituted the imports of table grapes.

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE ACTIVITY

In conclusion, Kosovo table grapes have great potential to substitute for imports with domestic table grapes within the short-term. The domestic production has the potential to significantly increase within the next few years. The recommendations made in this report, in order to ensure that table grape production will increase, can be consolidated into three different realms: planting and harvesting; post-harvest handling and packaging; introduction of new varieties.

Once the planting and harvesting realm is focused on by using the various cultural practices needed and recommended within this report, and the table grape trellising system is set and used by growers, domestic production would substitute for imports of table grapes during the season. With the cultural practices in place, and with a table grape culture introduced and expanded upon in Kosovo, the planting and harvesting components of the table grape value chain would be greatly improved upon. Once a strong culture of growing table grapes is expanded, and production increases, the table grape industry in Kosovo would then be free to focus on additional markets by looking into new varieties for the off-season domestic market and into eventually looking into exports by commercially producing the new varieties.

At present, the country lacks late harvesting varieties, which are crucial in order to substitute imports from August until December. The two late varieties of grapes that are suggested are: red globe (seeded) and crimson seedless. It is also recommended that new vines be planted – 10% of new vines per year in order to meet the demand of growing late varieties. The world's average for renewal planting runs between 2.5% to 10% vines per year. These late varieties can be kept in cold storage and supplied to the consumer, filling demand during the later months of the year.

In the immediate term, it is best that Kosovo table grape growers adjust their trellising practices to one of table grape growing. Along with this, proper table grape training for the growers is also necessary. It is important that growers understand the difference in growing table grapes as opposed to growing wine grapes in regards to certain cultural practices during the various growing stages. It is also recommended that growers become educated on these table grape-specific practices through field days, round table discussions as well as study tours and a potential internship program.

As it stands today, the standards for harvesting and packing table grapes for sale are low. And as Kosovo moves to higher standards due to consumer demand and retail demand, wooden boxes will no longer be suitable, and packaging insulation between the box and the fruit will need to exist. It will be necessary for the Ministry of Agriculture to create a complete set of post-harvest standards which include packaging that the growers can be supported upon implementation. This will mitigate stringent demands placed upon the growers by supermarkets and will leave the system regulated by the Ministry of Agriculture instead of the supermarkets.

By incorporating planting modifications such as varietal changes, trellising changes, and by increasing the use of cultural practices, the quantity of grapes will increase, as will the

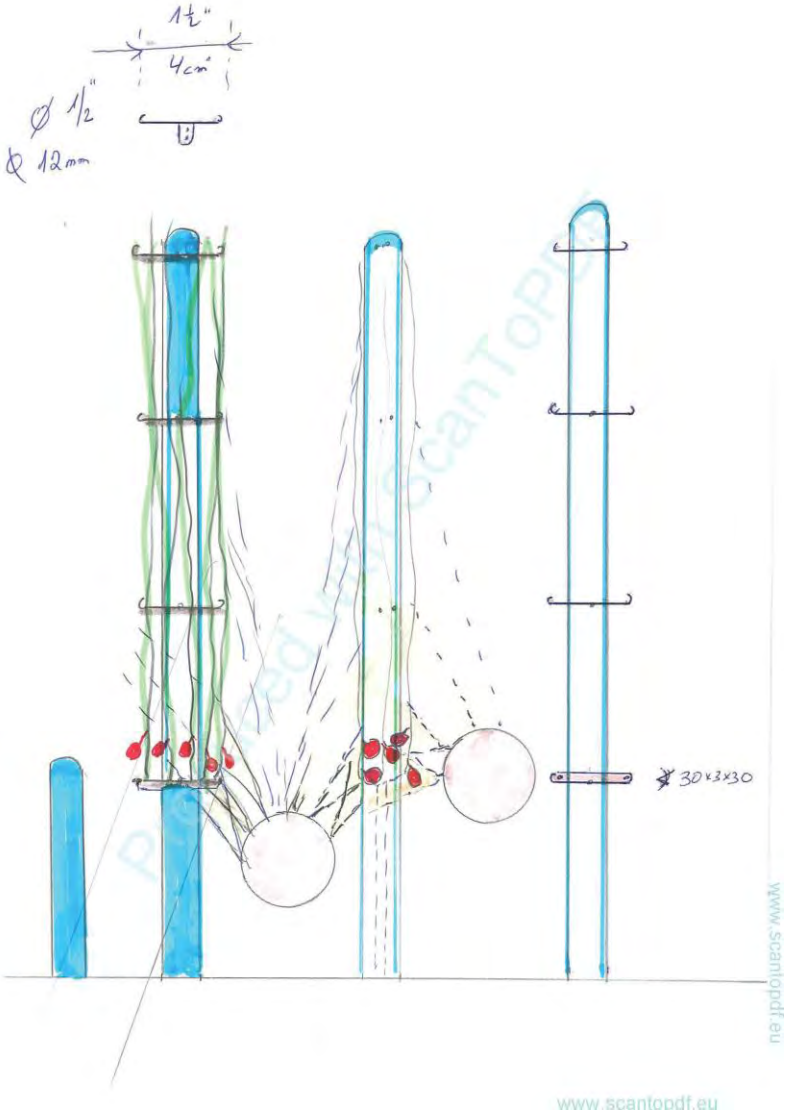
quality of grapes. By utilizing the production techniques and modifications indicated and recommended in this report, by year 2 of the Program, it is estimated that growers will be able to increase their production by 2 bunches per vine from their current state. Additionally, it is also estimated that if progress is maintained, by year 4 of the program, growers will be able to increase their production by 4 bunches per vine from the current state. This growth by year 4 can off-set domestic importation of the fruit.

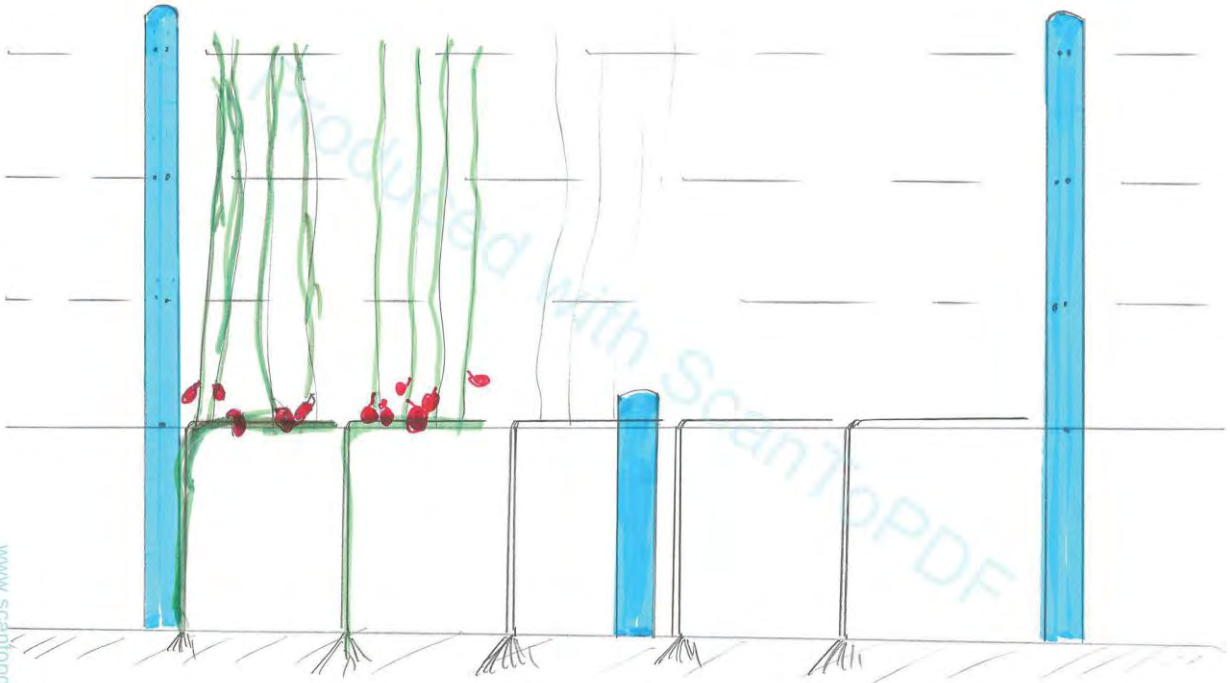
Without an increase in domestic production that off-sets imports, Kosovo should not look to export markets for their table grapes. Once domestic imports are substituted with domestic production during the season, however, Kosovo can then focus on exporting their increased table grape produce to neighboring countries and elsewhere.

ANNEXES

Annex I	Proposed trellising system sketch
Annex II	USDA Table Grape standards
Annex III	List of suggested varieties and their qualities
Annex IV	Photos of table grapes in Kosovo

ANNEX I: Table Grape Trellis Sketch





ANNEX II: USDA table grape standards

Taken from the United States Department of Agriculture
Agricultural Marketing Service
Fruit and Vegetable Programs
Fresh Products Branch

United States Standards for Grades of Table Grapes (European or Vinifera Type)

Effective March 29, 1999, (Reprinted - April 1999)1
United States Standards for Grades of Table Grapes (European or Vinifera Type) Grades
51.880 U.S. Extra Fancy Table.
51.881 U.S. Extra Fancy Export.
51.882 U.S. Fancy Table.
51.883 U.S. Fancy Export.
51.884 U.S. No. 1 Table.
51.885 U.S. No. 1 Institutional.

Tolerances
51.886 Tolerances.

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51.887 Application of tolerances.

Maturity Requirements
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Definitions
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51.900 Sunburn.
51.901 Damage.
51.902 Fairly well filled.
51.903 Excessively tight.
51.904 Shot berries.
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51.906 Well developed and strong.
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51.908 Serious damage.
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51.910 Straggly.
51.911 Container.2
51.912 Export.
51.913 Clusters.

Metric Conversion Table
51.914 Metric conversion table.

Grades
§51.880 U.S. Extra Fancy Table.
"U.S. Extra Fancy Table" consists of bunches of well developed grapes of one variety, except when designated as assorted varieties, which are uniform in appearance, well colored, and which meet the following requirements:

(a) Basic requirements for berries:
(1) Mature;
(2) Firm;
(3) Firmly attached to capstem;
(4) Not weak;
(5) Not shriveled at capstem;
(6) Not shattered;
(7) Not split or crushed;
(8) Not wet.

(b) Basic requirements for bunches:
(1) Fairly well filled;
(2) Not excessively tight for the variety.

(c) Basic requirements for stems:
(1) Well developed and strong;
(2) Not dry and brittle;
(3) At least yellowish-green in color except for Cardinal, Robin, Exotic, and Beauty Seedless varieties.

(d) Berries free from:
(1) Decay;
(2) Waterberry;
(3) Sunburn;
(4) Almeria Spot.
(e) Stems free from:
(1) Mold;
(2) Decay.

(f) Berries not damaged by:
(1) Any other cause.

(g) Bunches not damaged by:
(1) Shot berries;
(2) Dried berries;
(3) Other defective berries;

(4) Trimming away of defective berries;
(5) Any other cause.

(h) Stems not damaged by:
(1) Freezing;
(2) Any other cause.

(i) Size:
(1) For berries: Exclusive of shot berries and dried berries, not less than 90 percent, by count, of the berries on each bunch shall have the minimum diameters indicated for varieties as follows:
(i) Ribier, Cardinal, Robin, Exotic, Queen, Italia Muscat, and other similar varieties thirteen-sixteenths of an inch.
(ii) Other varieties eleven-sixteenths of an inch.

(2) For bunches:
(i) Not less than one-half pound.
(j) For tolerances see §51.886.

§51.881 U.S. Extra Fancy Export.
"U.S. Extra Fancy Export" consists of grapes which meet the requirements for U.S. Extra Fancy Table and, in addition, meet the packaging requirements set forth in §51.912.
§51.882 U.S. Fancy Table. "U.S. Fancy Table" consists of bunches of well developed grapes of one variety, except when designated as assorted varieties, which are at least reasonably well colored, uniform in appearance when so specified in connection with the grade, and which meet the following requirements:
(a) Basic requirements for berries:
(1) Mature;
(2) Firm;
(3) Firmly attached to capstem;
(4) Not weak;
(5) Not shriveled at capstem;
(6) Not shattered;
(7) Not split or crushed;
(8) Not wet.

(b) Basic requirements for bunches:
(1) Fairly well filled;
(2) Not excessively tight for the variety.

(c) Basic requirements for stems:
(1) Well developed and strong;
(2) Not dry and brittle.
(d) Berries free from:
(1) Decay;
(2) Waterberry;
(3) Sunburn;
(4) Almeria Spot.
(e) Stems free from:
(1) Mold;

(2) Decay.

(f) Berries not damaged by:
(1) Any other cause. 4

(g) Bunches not damaged by:
(1) Shot berries;
(2) Dried berries;
(3) Other defective berries;
(4) Trimming away of defective berries;
(5) Any other cause.

(h) Stems not damaged by:
(1) Freezing;
(2) Any other cause.

(i) Size:
(1) For berries: Exclusive of shot berries and dried berries, the following percentages, by count, of the berries on each bunch shall have the minimum diameters indicated for varieties as follows:
(i) For Ribier, Cardinal, Robin, Exotic, Queen, Italia Muscat, and other similar varieties, 90 percent shall be at least twelve-sixteenths of an inch;
(ii) For Thompson Seedless, Perlette, Delight, Beauty Seedless, Sugraone, Flame Seedless and other seedless varieties, 75 percent shall be at least ten-sixteenths of an inch; and,
(iii) For other varieties 90 percent shall be at least ten-sixteenths of an inch.

(2) For bunches:
(i) Not less than one-fourth pound.
(j) For tolerances see §51.886.

§51.883 U.S. Fancy Export.
"U.S. Fancy Export" consists of grapes which meet the requirements for U.S. Fancy Table, except that bunches shall weigh not less than one-half pound, and in addition meet the packaging requirements set forth in §51.912.

§51.884 U.S. No. 1 Table.
"U.S. No. 1 Table" consists of bunches of well developed grapes of one variety, except when designated as assorted varieties, which are at least fairly well colored, uniform in appearance when so specified in connection with the grade, and which meet the following requirements:
(a) Basic requirements for berries:
(1) Mature;
(2) Firm;
(3) Firmly attached to capstem;
(4) Not weak;
(5) Not materially shriveled at capstem;
(6) Not shattered;
(7) Not split or crushed;
(8) Not wet.

(b) Basic requirements for bunches:
(1) Not straggly.

(c) Basic requirements for stems:
(1) Not weak, or dry and brittle.

(d) Berries free from:
(1) Decay; 5
(2) Waterberry;
(3) Sunburn.
(e) Stems free from:
(1) Decay;
(2) Mold.

(f) Berries not damaged by:
(1) Any other cause.

(g) Bunches not damaged by:
(1) Shot berries;
(2) Dried berries;
(3) Other defective berries;
(4) Trimming away of defective berries;
(5) Any other cause.

(h) Stems not damaged by:
(1) Freezing;
(2) Any other cause.

(i) Size:
(1) For berries: Exclusive of shot berries and dried berries, 75 percent, by count, of the berries on each bunch shall have the minimum diameters indicated for varieties as follows:
(i) Thompson Seedless, Perlette, Delight, Beauty Seedless, Sugraone, Flame Seedless and other seedless varieties nine-sixteenths of an inch.
(ii) Other varieties ten-sixteenths of an inch.

(2) For bunches:
(i) Not less than one-fourth pound.
(j) For tolerances see §51.886.

§51.885 U.S. No. 1 Institutional.
"U.S. No. 1 Institutional" grapes must have no less than 95 percent of the containers in the lot legibly marked "Institutional Pack." Further requirements for this grade include grapes which consist of clusters and/or bunches of well developed grapes of one variety, except when designated as assorted varieties, which are at least fairly well colored, uniform in appearance when so specified in connection with the grade, and which meet the following requirements:

(a) Basic requirements for berries:
(1) Mature;

(2) Firm;
(3) Firmly attached to capstem;
(4) Not weak;
(5) Not materially shriveled at capstem;
(6) Not shattered;
(7) Not split or crushed;
(8) Not wet.

(b) Basic requirements for stems:
(1) Not weak, or dry and brittle.
(c) Berries free from:6
(1) Decay;
(2) Waterberry;
(3) Sunburn.
(d) Stems free from:
(1) Mold;
(2) Decay.

(e) Berries not damaged by:
(1) Any other cause.

(f) Bunches not damaged by:
(1) Shot berries;
(2) Dried berries;
(3) Other defective berries;
(4) Any other cause.

(g) Stems not damaged by:
(1) Freezing;
(2) Any other cause.

(h) Size:
(1) For berries: Exclusive of shot berries and dried berries, 75 percent, by count, of the berries on each bunch shall have the minimum diameters indicated for varieties as follows:
(i) Thompson Seedless, Perlette, Delight, Beauty Seedless, Sugraone, Flame Seedless and other seedless varieties nine-sixteenths of an inch.
(ii) Other varieties ten-sixteenths of an inch.

(2) For clusters/bunches: In this grade grapes shall consist of at least a two berry cluster ranging to clusters and/or bunches of grapes not greater than five ounces in weight. See Section 51.913.
(i) For tolerances see Section 51.886.

Tolerances
§51.886 Tolerances.
(a) No tolerances are provided in these standards for grapes which fail to meet the applicable maturity requirements other than the allowances specified in §51.888 or in the sampling and testing procedures of State maturity regulations.
(b) In order to allow for variations incident to proper grading and handling in each of the

foregoing grades except U.S. No. 1 Institutional, tolerances, by weight, other than for maturity, are provided as set forth in Tables I and II.Shipping Point, as used in these standards, means the point of origin of the shipment in the producing area or
1 at port of loading for ship stores or overseas shipment, or, in the case of shipments from outside the continental United States, the port of entry into the United States.

Table I -- Tolerances at Shipping Point
1 [Percent]

Factor U.S. Extra U.S. Fancy U.S. No. 1
Fancy Table
(A) For bunches failing to meet color requirements ---------- 10 10 10
(B) For bunches failing to meet requirements for minimum diameter of berries 10 10 10
(C) For bunches failing to meet stem color requirements ---------- 10
(D) For offsize bunches and for bunches and berries failing to meet the remaining requirements for the grade ---------- 8 8 8
Including in (D):
(a) For serious damage ---------- 2 2 2
And, including in (a): ½ of 1 ½ of 1 ½ of 1
(i) For decay ----------

Table II Tolerances En Route or at Destination [Percent]
Factor U.S. Extra U.S. Fancy U.S. No. 1
Fancy Table
(A) For bunches failing to meet color requirements ---------- 10 10 10
(B) For bunches failing to meet requirements for minimum diameter of berries 10 10 10
(C) For bunches failing to meet stem color requirements ---------- 10
(D) For offsize bunches and for bunches and berries failing to meet the remaining requirements for the grade ---------- 12 12 12
Including in (D):
(a) For permanent defects ---------- 8 8 8
(b) For serious damage---------- 4 4 4
And, including in (b):
(i) For serious damage by permanent defects--- 2 2 2
(ii) For decay ---------- 1 1 1
Shipping Point, as used in these standards, means the point of origin of the shipment in the producing area or 1 at port of loading for ship stores or overseas shipment, or, in the case of shipments from outside the continental United States, the port of entry into the United States.
(c) In order to allow for variations incident to proper grading and handling in the U.S. No. 1 Institutional grade only, tolerances, by weight, other than for maturity, are provided as set forth in Tables Ia and IIa of this section.

TABLE Ia -- TOLERANCES AT SHIPPING POINT FOR U.S. NO. 1 INSTITUTIONAL GRADE ONLY
Factor U.S. No. 1 Institutional
(A) For clusters/bunches failing to meet color requirements ---------- 10
(B) For clusters/bunches failing to meet requirements for minimum diameter of berries ---------- 10
(C) For offsize clusters/bunches ---------- 4

(D) For clusters/bunches and berries failing to meet the remaining requirements for the grade ---------- 8
Including in (D):
(a) For serious damage ---------- 2
And, including in (a):
(i) For decay ---------- ½ of 1

TABLE IIa -- TOLERANCES EN ROUTE OR AT DESTINATION FOR U.S. NO. 1 INSTITUTIONAL GRADE ONLY
Factor U.S. No. 1 Institutional
(A) For clusters/bunches failing to meet color requirements ---------- 10
(B) For clusters/bunches failing to meet requirements for minimum diameter of berries ---------- 10
(C) For offsize clusters/bunches ---------- 4
(D) For clusters/bunches and berries failing to meet the remaining requirements for the grade ---------- 12
Including in (D):
(a) For permanent defects ---------- 8
(b) For serious damage---------- 4
And, including in (b):
(i) For serious damage by permanent defects---------- 2
(ii) For decay ---------- 19

Application of Tolerances
§51.887 Application of tolerances.
The contents of the individual packages in any lot, based on sample inspection, are subject to the following limitations: Provided, That the averages for the entire lot are within the tolerances specified for the grade:
(a) For tolerances of 10 percent or more, individual packages may contain not more than one and one-half times the specified tolerance.
(b) For a tolerance of less than 10 percent, individual packages may contain not more than double the specified tolerance.

§ 51.888 Maturity requirements.
(a) In the case of grapes grown in Arizona or California, "mature" means grapes in any lot shall meet the maturity requirements for the variety as set forth in the applicable State Agricultural Laws and Regulations referenced in this section. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.

Copies may be obtained from, in the case of Arizona maturity regulations, Arizona Department of Agriculture, Citrus, Fruit and Vegetable Standardization, 1688 W. Adams, Phoenix, AZ 85007 or in the case of California maturity regulations, California Department of Food and Agriculture, Fruit and Vegetable Quality Control, Standardization Section, 1220 N Street, P.O. Box 942871, Sacramento, California 94271-0001 or copies of both regulations may be inspected at USDA, AMS, F&VD, FPB, Standardization Section, Room 2065-S, 14th and Independence Ave., Washington, DC 20250 or at the Office of the Federal Register, Suite 700, 800 North Capitol, Washington, DC.

(1) Arizona maturity regulations are contained in Chapter 4 - Plant Services Division, Article 7. Fruit And Vegetable Standardization, Section R3-4-733 Table Grape Standards, Effective January 6, 1994.
(2) California maturity regulations are contained in The California Code of Regulations, Title 3, Subchapter 4, Fresh Fruits, Nuts and Vegetables, Article 25 Table Grapes and Raisins, February 28, 1992.
(b) Grapes subject to U.S. import regulations shall meet the maturity requirements specified in such regulations.
(c) Grapes produced in States other than Arizona or California, or grapes imported from countries outside the United States during periods in which U.S. import regulations do not apply, shall meet the minimum percentage of soluble solids set forth in Table III as determined by use of a standard hand refractometer.

Table III
Variety Percent of soluble solids
Muscat ---------- 17.5
All varieties not listed in this table ---------- 16.5
Cardinal, Emperor, Perlette, Ribier, Olivette Blanche, Rish Baba, Red
Malaga, and similar varieties ---------- 15.5

Good characteristic color for black varieties means purple to black except that Ribier or similar varieties of grapes shall have at least two-thirds of the surface of the berry showing purple to black color. For red varieties good characteristic color means at least two-thirds of the surface of the berry is light red through dark red color; except, for the Tokay variety pink through dark red, and for the Cardinal variety light red through purple shall be permitted. Characteristic color for black varieties means reddish-purple to black except that Ribier or similar varieties of grapes shall have at least two-thirds of the surface of the berry showing reddish-purple to black color.

For red varieties characteristic color means at least two-thirds of the surface of the berry is pink to dark red; except, for the Tokay variety light pink through dark red and for the Cardinal variety light pink through purple color shall be permitted.

(1) The minimum percentage of soluble solids for any lot shall be determined from the juice of at least 10 percent, by weight, of whole bunches of the least mature grapes in that container which appears to have the least mature grapes. No lot shall be considered as failing to meet these requirements unless samples from two containers which appear to have the least mature grapes test below the required percentage of soluble solids.

Definitions
§51.889 Well developed grapes.
"Well developed" grapes means grapes which are not abnormally small for the variety.

§51.890 One variety.
"One variety" means that the grapes show similar varietal characteristics.

§51.891 Uniform in appearance.
"Uniform in appearance" means that not more than one-tenth of the containers in any lot show sufficient variation in color or size of berries to materially detract from the

appearance of the contents of the individual container, and that the stems are well developed and strong.

§51.892 Color terms.
The color terms "well colored," "reasonably well colored," and "fairly well colored" are defined in Table IV.

Table IV
Color terms Black varieties Red varieties White varieties
Well colored (U.S. Extra Each bunch shall have not Each bunch shall have not less No requirement. Fancy). less than 95 percent, by than 75 percent, by count, of count, of berries showing berries showing good characteristic color. Reasonably well colored. (U.S. Fancy) less than 85 percent, by than 66-2/3 percent, by count, of berries showing berries showing good characteristic color.

Tokay and Cardinal varieties shall have not less than 75 percent, by count, of berries showing characteristic color.

Fairly well colored (U.S. Each bunch shall have not Each bunch shall have not less No No. 1). less than 75 percent, by than 60 percent, by count, of count, of berries showing berries showing characteristic color.

§51.893 Firm.
"Firm" means that the berry does not yield more than slightly to moderate pressure and is not flabby or wilted.

§51.894 Weak.
"Weak" means that individual berries are somewhat translucent, watery and soft, may have relatively low sugar content, inferior flavor, or are of poor keeping quality.

§51.895 Shriveled at capstem.
"Shriveled at capstem" means that the berry shows more than slight wrinkling of the skin surrounding the capstem.

§51.896 Shattered.
"Shattered" means that the berry is separated from the bunch and may or may not have the capstem attached.

§51.897 Wet.
"Wet" means that the grapes are wet from moisture from crushed, leaking, or decayed berries or from rain. Grapes which are moist from dew or other moisture condensation such as that resulting from removing grapes from a refrigerator car or cold storage to a warmer location shall not be considered as wet.

§51.898 Decay.
"Decay" means any soft breakdown of the flesh or skin of the berry resulting from bacterial or fungus infection. Slight surface development of green mold (Cladosporium) shall not be considered decay.

§51.899 Waterberry.

"Waterberry" means a watery, soft, or flabby condition of the berry. Affected berries are low in sugar content, have tender skins, and are easily crushed. This is an advanced or more pronounced stage of the condition referred to as "weak".

§51.900 Sunburn.
"Sunburn" means injury to the berry caused by exposure to the sun, including "sulphur burn," usually occurring as a sunken and discolored or dried area on the exposed surface.

§51.901 Damage.
"Damage" means any specific defect described in this section; or an equally objectionable variation of any one of these defects, or any other defect, or any combination of defects which materially detracts from the appearance, or the edible or marketing quality of the individual berry, the appearance of the bunch as a whole, or the marketing quality of the stems.

(a) The following shall be considered as damage to the individual berry:
(1) Scarring such as that caused by thrips, mildew, rubs, and similar injuries when materially detracting from the appearance of the berry;
(2) Discoloration when any light brown, tan, or darker discoloration of the skin materially detracts from the appearance of the berry: Provided, That "sunkissed" berries of the white Malaga variety which show discoloration of amber or light brown color shall not be considered as damaged. "Buckskin" berries of the Tokay variety, and similar injury to other varieties, shall be considered as damaged by discoloration;
(3) Heat when the flesh of the berry is affected;
(4) Almeria Spot when any spot is distinctly sunken or dark in color;
(5) Mildew when active powdery mildew is present;
(6) Freezing when the berry is frozen or when the flesh of the berry is affected by freezing;
(7) Insect injury when penetrating the skin of the berry or when there is noticeable insect infestation on the bunch; when mealybug residue or aphis honeydew are present in noticeable amounts; or when leafhopper residue materially detracts from the appearance of the individual berry or of the bunch.

(b) The following shall be considered as damage to stems:
(1) Active powdery mildew or any other disease when present on the stems to the extent that it detracts from the appearance of the bunch or when scars caused by mildew or other disease constrict or weaken any part of the main or lateral stems; and,
(2) Freezing when the stems are frozen or the capstems are swollen or dried, or when the main or lateral stems are water-soaked and limp, or dried, as a result of freezing.

§51.902 Fairly well filled.
"Fairly well filled" means that the berries are reasonably closely spaced on main and lateral stems and that the bunch is not very loose or stringy.

§51.903 Excessively tight.
"Excessively tight" means that the berries are so wedged together that the bunch is extremely compact for the variety and resulting distorted berries materially detract from the appearance of the bunch.

§51.904 Shot berries.

"Shot berries" means very small berries resulting from insufficient pollination, usually seedless in those varieties which normally develop seeds.

§51.905 Dried berries.
"Dried berries" means berries which are dry and shriveled to the extent that practically no moisture is present.

§51.906 Well developed and strong.
"Well developed and strong" means that the main and lateral stems are firm, fibrous, and pliable; not distinctly immature or spindly or threadlike at time of packing.

§51.907 Diameter.
"Diameter" means the greatest dimension of the berry taken at right angles to a line running from the stem to the blossom end.

§51.908 Serious damage.
"Serious damage" means any defect or any combination of defects which seriously detracts from the appearance, or the edible or marketing quality of the grapes and includes berries which are split, crushed, wet, affected by decay or waterberry, or affected by heat or freezing. Grapes which show healed cracks at the blossom and shall not be considered as seriously damaged.

§51.909 Materially shriveled at capstem.
"Materially shriveled at capstem" means that the skin of the berry is definitely wrinkled adjacent to the capstem and the surface is materially sunken.

§51.910 Straggly.
"Straggly" means that the berries are so widely spaced on main and lateral stems that the bunch is distinctly open or very stemmy or stringy in structure.

§51.911 Container.
"Container" as used in these standards shall, for the purposes of determining maturity and other factors of grade of grapes in packages containing 5 pounds or less, mean the master container in which the individual packages are packed for shipment.

§51.912 Export. 13
When designated as Export, grapes shall be packed with any of the customary protective materials such as cushions, liners, or wraps, or properly packed in sawdust or granulated cork. The so-called "semi-sawdust packs" which are cushioned and/or covered with sawdust are not approved as protective packaging for export.

§51.913 Clusters.
"Clusters" as used in these standards in reference to the U.S. No. 1 Institutional grade only shall be defined as two or more berries sharing a common point of attachment.
Metric Conversion Table

§51.914 Metric conversion table.
Inches Millimeters (mm)
3/16 equals 4.8
8/16 equals 12.7

9/16 equals 14.3
10/16 equals 15.9
11/16 equals 17.5
12/16 equals 19.1
13/16 equals 20.6
14/16 equals 22.2
15/16 equals 23.8
1 equals 25.4

Pounds Grams
1/4 equals 113.4
1/2 equals 226.8
3/4 equals 340.2
1 equals 453.6
2 equals 907.2
3 equals 1,360.8
4 equals 1,814.4
5 equals 2,268.0
10 equals 4,536.0Varieties listed, when tested by refractometer, are mature when meeting or exceeding the specified soluble solids. All varieties, regardless of refractometer reading, are mature at 18 to 1 or higher titration ratio.

All varieties, when tested by temperature compensated hand refractometer, are mature when meeting or exceeding the specified soluble solids percentage. The Thompson Seedless at 15 percent or more soluble solids and Perlette or Sugraone at 14 percent or more soluble solids and all other varieties regardless of refractometer reading are mature, provided that the juice contains a minimum of 20 parts soluble solids to every part acid in the juice as determined by titration. Thompson Seedless below 15 percent soluble solids, and Perlette or Sugraone below 14 percent soluble solids may not be titrated. They are immature with out further testing. The California Agricultural Code should be consulted for official sampling guidelines and titration procedures. All varieties, when tested by refractometer, are mature when meeting or exceeding the specified soluble solids.

Table Grape Maturity Chart
Percent
Soluble
Solids
Arizona Agricultural Code
California Agricultural Code U.S. Standards for Origins
Outside California & Arizona

17.5 All white varieties of Muscat and White Malaga grown Muscat NW of San Gorgonio Pass
17.0 Thompson Seedless grown NW of San Gorgonio Pass
16.5 All varieties not listed elsewhere in this column
16.0 Thompson Seedless Flame Seedless
15.5 Beauty Seedless grown SE of San Gorgonio Pass. Cardinal, Emperor, Perlette, Berenda Red, Cardinal, Imperial Cardinal, Richards Ribier, Olivette, Blanche, Black, and Robin grown NW of San Gorgonio Pass Rish Baba, Red Malaga, and

Blackrose, Isabella Regia, Bleu Grau, Khalili, Burger, Perlette, California Concord, Persian 23, Concord, Pierce Isabella, Dattier de Beyrouth, Queen, Delight, Red Malaga, Dizmar, Ribier, Drodelabi, Servian Blue, Emperor, Sugraone, Fresno Beauty similar varieties.
15.0 Perlette, Beauty Seedless
14.5 Cardinal, Robin, Berenda Red, Imperial Cardinal, and Richards Black grown SE of San Gorgonio Pass; and Lady finger, Rish Baba, Khandahar, Olivette Blanche
14.0 Exotic Exotic

ANNEX III: Table Grape Varieties

INTRODUCTION OF NEW VARIETIES

Kosovo currently lacks late harvesting varieties. It is recommended that growers plant new, late harvesting varieties. The late varieties that are being recommended in this report are: Red Globe and Crimson.

Red Globe

- Light red color
- Breed by the USDA
- Seeded
- Large and heavy bunches
- Large harvest
- Late harvest variety
- Holds up well in cold storage
- No royalty fees
- Well known worldwide

Crimson Seedless

- Red color
- Breed by the USDA
- No royalty fees
- Good eating quality
- Sweet
- Late harvest variety
- Lasts for up to 3 months in cold storage

It is recommended that these varieties be imported from a well-known nursery to guarantee the varieties authenticity and quality. The local grower can get a good return on his investment. Today, "no royalty" varieties are generally not requested by growers. All the breeders can demand royalties on their varieties, and even more so they demand IP protection. Therefore, it will take a few more years until growers in Kosovo will be able to properly import protected varieties. At this point it is too early to discuss this but it is recommended that Kosovo start beginning the process of registering as a member of the UPOV (http://www.upov.int).

Annex IV: Kosovo Table Grapes

	Black grapes with unripe, reddish & green sour berries.
	Boxes harvested in the sun. 35° with no protection against the sun.
	Boxes in the sun.

	Common market on the side of the road. Grapes exposed to the sun for 10 hours. By the evening the grapes have lost their appeal.
	Esca disease. Spreads easily from soil application. Not removed.
	General look of well maintained table grape vineyard.
	Grapes harvested to wooden box with no padding.

	Grapes in bulk
	Mixed box.
	No production and no fertility due to over shading.
	Rotted bunches due to crowded canes, leaves and shoots. Bad pruning.

	Victoria grapes with all the small berries. Not modern packing.
	Victoria