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KOSOVO NEW OPPORTUNITIES FOR AGRICULTURE PROGRAM

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 by the Program to focus on in Kosovo is table grapes. There is strong local demand for table grapes and imports of table grapes are supplying 3000 tons per year. Kosovo has many quality grape vineyards, but a majority of the vineyards have grown table grapes by utilizing wine vineyard cultivation techniques.

In August 2012, the Program obtained the services of a grape growing expert, Mr. Shachar Karneil to provide a road map for the next steps in the development of table grape production and post harvest needs. He identified 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. He proposed a system-wide change to grow table grapes by utilizing table grape production techniques instead of wine grape production techniques. This would result in higher yields of better quality grape bunches at a lower 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 could be expected to increase.

PURPOSE OF ASSIGNMENT

The purpose of this assignment was to contribute to the development of diversified and increased agricultural production through the introduction of new trellising technologies and winter pruning. A second assignment, in the summer of 2012, will introduce thinning techniques such as leaf thinning, bunch thinning and berry thinning. These new table grape growing practices will be introduced by assisting growers to use a new modified "T" trellising system and by improving the cultural practices and production techniques meant specifically for table grapes. With these new practices, yields and quality of table grapes will increase in Kosovo and offset costly table grape imports.

The objectives were to:

1. Convert the current vertical trellising system in Kosovo over to a new, improved horizontal system using a modified "T" trellising conversion method.

2. Provide two days of training for the trainers to include Rahovec Grape Institute in winter pruning of table grape vines for the conversion of the new trellising system.

3. Conduct a one-day symposium in Rahovec on table grape growing and introduce new cultural practices including the new modified "T" trellising system recommended by Mr. Karniel, winter cane and spur pruning, and leaf, bunch and berry thinning, harvest and post-harvest handling and packaging, table grape diseases, IPM, sprayer calibration for table grapes. Further, provide the presentation and talking points to speak at the symposium as key note speaker on all of the above.

EXECUTIVE SUMMARY

The assignment aimed at improving cultivation techniques, in particular trellis systems and winter pruning, adopted for table grape in Kosovo, in order to enhance fruit yield and quality standards and overcome the need to import table grape from abroad (30% of Kosovo's table grape consumption).

The report focuses on the implementation into table grape vineyard management of training and trellis systems, innovative pruning techniques and sustainable cultural practices, based on up-dated scientific and technical information, for increasing marketable yield and fruit quality, preventing plant diseases and environmental stresses (eg. drought, frost).

As highlighted in previous reports (see USAID Mr Karniel's report), in spite of the high potential, due to climatic and historical reasons the development of the table grape sector in Kosovo is considerably impaired by several agronomic constrains, in part due to the lack of distinction between table and wine grape cultivation.

During the visit, much useful information has been gained through field activities and daily interviews and discussions with the experts of the USAID Program and the Viticulture and Wine Institute, trainers and grape growers.

Almost a unique training system, the double guyot is being adopted for training both wine and table grape with planting distances (2.5 m x 0.9 m is the most widespread one, corresponding to 4444 vines per hectare) often not properly chosen according to soil fertility of the different sites. Scarce attention is being devoted to the need of differentiating training systems and pruning techniques according to the different table grape varieties and environmental conditions. Vine canopy is not correctly managed during the vegetative season. Shoot trimming is performed by growers whereas leaf removal, shoot, bunch and berry thinning are practices rarely adopted. Therefore canopy is characterized by high shoot and leaf density leading to high incidence and severity of fungal diseases (particularly powdery mildew, mildew, botrytis). Moreover such microclimatic conditions cause poor effectiveness of spray applications on bunches and prejudice color development in red varieties, since the formation of compounds responsible for skin color is under light control.

As a consequence of the above described agronomic management, real fertility is scarce (around 0.5 bunches per shoot) and marketable fruit yield (number of healthy bunches at harvest) is extremely low (10-11 t/ha) and estimated to only 70% of the total potential fruit yield. The remaining 30 % of production does not reach the market mainly because of rot bunches.

In existing vineyards, the recovery of this high proportion of fruit production is a must of the USAID program and should be achieved by the implementation of the new trellis systems (e.g. Double T system) capable of improving plant sanitary status, enabling bunches to receive more light and air circulation, and adequate cultural practices, plant protection programs and effective sprayers/dusters respecting the specific EU legislation (Laws 127/2009 and 128/2009). The purchase of low cost dusters for applying sulfur (effective against powdery mildew), have been suggested.

The attainment of these goals would allow by itself to overcome the current need of importing table grape in Kosovo.

Concurrently, further significant improvement of marketable fruit yield and bunch quality can be achieved by the conversion of existing double-guyot to different training systems (e.g. single guyot, spur-pruned cordon for varieties with good fertility of basal buds) and the adoption of innovative pruning techniques, specifically proposed by the author for grape varieties with low fertility of basal buds or varieties excessively vigorous for the existing planting distances.

For some varieties (Cardinal, Hamburg Muscat, Ribier) it is worthwhile to assess the possibility to establish a permanent cordon (two or more years old wood) covered of spurs.

The risks and adverse effects of spring frost should be managed by delaying pruning time as in other viticulture areas.

The proposed agronomic changes focused on vine structure and canopy management are uncomplicated and economically sustainable and should be transferred into practice starting from the current year (2012), within an integrated approach involving fertilization and soil management (postponing and reducing soil tillage practices) in order to control plant vigor, decrease plant susceptibility to water stress during summer period, pests and diseases, minimize the use of external inputs (pesticides, herbicides, fertilizers). Monitoring of plant diseases and pests, plant nutritional and water status by simple methods is recommended.

By these approaches table grape produced in Kosovo would start to be also appreciated for the attention devoted to growers and consumers health and environment preservation, according to the guidelines of integrated plant management programs. In addition, such sustainable agronomic management would create the basis for the future implementation of the organic cultivation method in some vineyards. The innovations proposed for existing table grape vineyards, almost exclusively characterized by the cultivation of seeded varieties, would permit to enhance the marketable yield by an additional 20-30 % after two years.

In new (future) plantations, special care must be devoted to adapt plantation distances to rootstock/variety combination and site potentialities. Training systems specific for table grape as Y system, should be implemented along with irrigation systems in order to support the higher yield levels and economic investments. The option of introducing nets against hail and plastic covers for protecting bunches and delaying harvest should be also considered. It is recommended to choose rootstocks resistant to drought stress and assess the possibility of introducing in Kosovo, along with seedless varieties, also some attractive red-colored seeded varieties (Benitaka and others, currently widespread in Brazil) derived after mutation from cv Italia (Muscat Italia), traditional variety widely cultivated and appreciated in Kosovo and Europe.

The analysis of agronomic and market conditions and production costs in the main producing countries, indicate that the table grape sector certainly represent an attractive economical opportunity for Kosovo, with good perspectives for future export.

Nevertheless table grape cultivation requires specific physiological knowledge and technical management. High priority should be now given at improving fundamental agronomical aspects starting at pruning time and continuing during the vegetative season, at plant and soil level, particularly preventing effectively the risk of diseases, otherwise most of the efforts, achievements and aims of the program would be suddenly cancelled before harvest time. In the meanwhile, post-harvest management techniques will be introduced to table grape growers by specific demonstrations and guided visits. The special willingness and great enthusiasm of Kosovar growers to implement technological innovations will facilitate and speed up the modernization process of the national table grape sector.

TRAINING AND FIELD ACTIVITIES TO ACHIEVE PURPOSES

Training lessons (Figure 1) and field activities (Figure 2) in the table grape vineyards of the Rahovec area have been performed, during three consecutive days (February 12-15), with the trainers attending the course, Sulejman Bala, Nesim Morina, Qamil Cena, of the Wine Institute Mike Kimes, USAID Chief Technical Officer, Maxhun Shehaj, USAID Fruit Production Specialist. During classes the fundamental and technical basis of winter pruning and table grape management were presented and discussed with course attendants. Summer pruning and thinning practices were introduced.

In spite of the abundant snow, a good overview on structure and management of table grape vineyards in the area of Rahovec was gained through field visits. Vines are trained at double guyot (Figures 3-5).The most widespread planting distances are 2.5 m x 0.9 m (corresponding to 4444 vines per hectar). The distance between plants appears to narrow for vines cultivated in fertile soils. Too narrow distances stimulate shoots proliferation, limiting fruit yield and quality. This condition is exacerbated by the improper insertion of canes on the vine. The length of canes determine yield. Canes are often inserted far from the trunk and consequently their length is too short. Field visits clearly evidenced the need of improving the management of double guyot-trained vines and indicate the possibility to convert vines to the single guyot system. Such conversion would also permit the adoption of a single permanent for specific varieties and the future introduction of small mechanical pruners.

It was shown to the trainers how to implement the new Double T trellis system (Figure 6) consisting in 30 cm long two metallic horizontal arms inserted at 40 cm and 80 cm from the wire (Figure 7). Each metallic arm, manufactured in Kosovo, costs 2 euro. Considering the additional wires required for the Double T system as compared to the traditional system currently used, the cost of the additional material required for converting 1 hectare of vineyard is about 3400 euros. However cheaper solutions are commercially available; cheap woody arms can also be used.

On March 16, within the Table Grape Symposium, a field demonstration on training, trellis systems and pruning techniques took place with the participation of several table grape growers. Within the symposium the main issues of table grape growing were presented to the audience. Innovations concerning trellis/training system, pruning techniques and sustainable management practices (IPM) were discussed. The electronic material employed for the oral presentations were provided for translation and dissemination.

TASK FINDINGS AND RECOMMENDATIONS

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

Task 1: Convert the current vertical trellising system in Kosovo over to a new, improved horizontal system using a modified "T" trellising conversion method.

Task 2: Provide two days of training for the trainers to include Rahovec Grape Institute in winter pruning of table grape vines for the conversion of the new trellising system.

Task 3: Conduct a one-day symposium in Rahovec on table grape growing and introduce new cultural practices including the new modified "T" trellising system recommended by Mr. Karniel, winter cane and spur pruning, and leaf, bunch and berry thinning, harvest and post-harvest handling and packaging, table grape diseases, IPM, sprayer calibration for table grapes. Further, provide the presentation and talking points to speak at the symposium as key note speaker on all of the above, (see draft agenda attachment).

Findings and recommendations for each task are below reported.

Task 1: The implementation of the Double T system, capable of improving plant sanitary status, enabling bunches to receive more light and air circulation and improving buds fertility, should enhance marketable yield and fruit quality. The cost for the implementation of Double T system in the vineyard, currently estimated in more than 3000 euros per hectare, can be significantly decreased by cheaper technological alternatives. By improving trellis systems, cultural practices during the vegetative season (eg. leaf removal) and plant protection programs, introducing effective sprayers/dusters respecting the specific EU legislation (Laws 127/2009 and 128/2009), the current need of importing table grapes can be overcome in two years. Some low cost dusters for applying sulfur, effective against powdery mildew, a main concern for table grape cultivation in Kosovo, have been suggested (see annex II).

Nevertheless, table grape vineyards require essential interventions concerning training systems, it means the way vines are trained. Currently the double guyot system, is mainly adopted for training vines with planting distances (2.5 m x 0.9 m is the most widespread one, corresponding to 4444 vines per hectar) often not properly chosen according to soil fertility of the different sites. Scarce attention is being devoted to the need of differentiating training systems and pruning techniques according to the different table grape varieties and environmental conditions.

Significant improvement of marketable fruit yield and bunch quality can be achieved by the conversion of existing double-guyot to different training systems (e.g. single guyot, spur-pruned cordon for varieties with good fertility of basal buds) and the adoption of innovative pruning techniques, specifically proposed by the author for grape varieties with low fertility of basal buds or varieties excessively vigorous for the existing planting distances. Cultivars Italia and Afuz Ali (Regina), for example could be trained by a single cane system resembling the simple guyot system but with two essential key innovations: 1) long cane of a vine overlapping the contiguous vine and 2) removal of the first basal buds by pruning).

In mature already established vineyards, with vigorous vines displaying a limited number of nodes along the cane, there is the real risk of low yield. In this case, two interlaced canes could be maintained at pruning in order to ensure the production of enough bunches. Successively, bunch thinning will be performed, if necessary. Increased yield should control shoot vigor and assure better canes (with short internodes) for the following year.

For some varieties (Cardinal, Hamburg Muscat, Ribier) it is worthwhile to assess the possibility to establish a permanent cordon (two or more years old wood) covered of spurs. In order to create a well-trained permanent cordon, in spring 2012 vines should be properly pruned by maintaining long canes (cane of one plant should overlap the trunk of the next vine) and de-budding their basal buds. The current year cane (2012) will become a permanent cordon in the following year (2013). Also in the case the establishment of a permanent cordon, it is crucial to start with a cane, well covered with nodes, i.e. with short internodes.

Although the present conditions of most of table grape Kosovar vineyards (plants, but also posts and supporting wires require direct fixing) are not satisfactory, grapevine is a flexible species and vines currently trained at double-guyot can be rapidly converted to different training systems (simple guyot, permanent cordons and even Y) by choosing the most appropriate techniques at pruning time.

In areas with risks of spring frost it is recommended to delay pruning in order to postpone budburst, thereby reduce possible frost damages on current and following year production. Pruning delay would also permit to adjust the number of buds maintained on plant according to the percentage of frost-injured buds (assessed by simple specific observations).

Task 2: During the training sessions it was possible to appreciate the skills of Kosovar table grape growers, some of them are highly qualified. Together with the experts of the USAID Program and of the Viticulture and Wine Institute, trainers attending the course proposed innovations showing a marked capacity of developing autonomously cheap and practical technical solutions for improving cultivation techniques. Moreover trainers and growers shared with enthusiasm the proposal, based on physiological considerations discussed during classes, of training young vines directly with the single guyot system. A not previously scheduled field demonstration was appositely performed in a private vineyard (Figures 8-10). This behavior denotes an unusual attitude of Kosovar growers towards technological innovation in agriculture. Practical and technical knowledge should be further sustained and encouraged within the Program by additional training during the vegetative season and establishment of small on-field demonstrations aimed to quantify the improvement of projected innovations on bunches and overall vineyard conditions.

Task 3: During the one-day symposium the proposed changes for table grape growing were presented and discussed. Apparently growers are not completely aware of the crucial importance of improving trellis and training systems, pruning techniques and cultural practices for successful cultivation and also for decreasing plant susceptibility to environmental stresses like frost and drought. They often tend to underestimate the need of efficient plant protection whereas overestimate the role of irrigation practice. The

correct agronomic management would greatly facilitate post-harvest handling and packaging, aspects that need to be further deepened by planned visits within the Program. Initial planning meetings and collaboration with key stakeholders (farmers, manufacturers, traders, delegates of the Agricultural Minister, NGO, agricultural organizations) were established.

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE ACTIVITY

The agronomic techniques currently adopted for table grape in Kosovo require urgent modernization. The implementation of the Double T system will enhance marketable yield and fruit quality. However cheap, economically affordable technological solutions should be adopted. The current need of importing table grape will be overcome in two years by properly improving trellis systems, cultural practices, plant protection programs and effective sprayers/dusters.

Nevertheless, table grape vineyards needs essential interventions concerning training systems (the way vines are trained). Currently scarce attention is being devoted to the need of differentiating training systems and pruning techniques according to the different table grape varieties and environmental conditions. Significant improvement of marketable fruit yield and bunch quality can be achieved by the conversion of existing double-guyot to different training systems (e.g. single guyot, spur-pruned cordon for varieties with good fertility of basal buds) and the adoption of innovative pruning techniques, specifically proposed by the author for grape varieties with low fertility of basal buds or varieties excessively vigorous for the existing planting distances. The conversion to different training systems can be rapidly performed, does not imply additional expenses, consents a tangible contraction of costs production. In areas with risks of spring frost, it is recommended to delay pruning time for reducing possible frost damages.

The proposed agronomic changes focused on vine structure and canopy management should be transferred into practice starting from the current year, within an integrated approach involving fertilization and soil management (postponing and reducing soil tillage practices) (Figure 11) in order to control plant vigor, decrease plant susceptibility to water stress during summer period, pests and diseases, minimize the use of external inputs (pesticides, herbicides, fertilizers). Monitoring of plant diseases and pests, plant nutritional and water status by simple methods is recommended. The innovations proposed for existing table grape vineyards, almost exclusively characterized by the cultivation of seeded varieties, would permit to enhance the marketable yield by an additional 20-30 % after two years. Additionally, this approach will disclose the future prospect of adopting the organic method in table grape cultivation, an option that the USAID Program and the Minister of Agriculture should consider for augmenting the competitiveness of the table grape produced in Kosovo on the European market.

In young, recently established table grape vineyards (1 or 2 years old) the choice of training system and pruning technique should be performed according to the variety (fertility of basal buds, plant vigor, etc.).

In new (future) plantations, special care must be devoted to adapt plantation distances to rootstock/variety combination and site potentialities. Training systems specific for table grape as Y system, offering several advantages in terms of light interception, fruit yield, quality and sanity, spray effectiveness, risks of frost damages, should be implemented along with irrigation systems in order to support the higher yield levels and economic investments. The option of introducing nets against hail and plastic covers for protecting

bunches and delaying harvest should be also considered. It is recommended to choose rootstocks resistant to drought stress and asses the possibility of introducing in Kosovo, along with seedless varieties, also some attractive red-colored seeded varieties (Benitaka and others, currently widespread in Brazil) derived after mutation from cv Italia (Muscat Italia), traditional variety widely cultivated and appreciated in Kosovo and Europe.

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ACKNOWLEDGEMENTS

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ANNEXES

ANNEX I:
Pictures showing Training and on Field Demonstration Activities, Training and Trellis Systems, Innovative Pruning Techniques proposed for Table Grape varieties cultivated in Kosovo.

ANNEX II:
List of some firms producing dusters

ANNEX I:
Pictures showing Training and Field Demonstration Activities, Vine Training and Trellis Systems, Innovative Pruning Techniques proposed by the author for Table Grape varieties cultivated in Kosovo

Fig. 1. Training activities,
Rahovec, February 2012

Fig. 2. Field demonstration activities,
Rahovec, February 2012

Fig. 3. Row of double guyot-trained table grape vines,
Rahovec, February 2012

Fig. 4. Double guyot-trained table grape vine, before pruning,
Rahovec, February 2012

Fig. 5. Double guoyt-trained table grape vine, after pruning,
Rahovec, February 2012

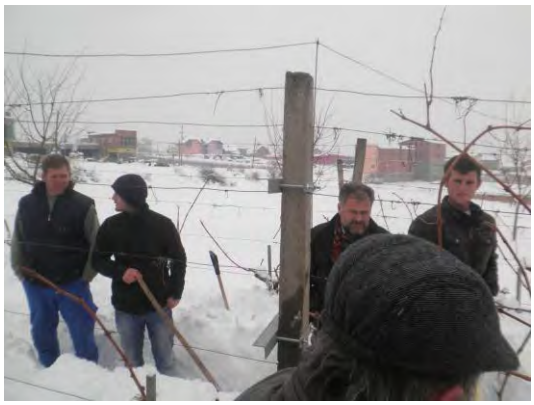

Fig. 6. Field demonstration on the implementation of double T system,
Rahovec, February 2012

Fig. 7. Detail of the horizontal metallic arms of the double T system,
Rahovec, February 2012

Fig. 8. Young vine before winter pruning.
Rahovec, February 2012

Fig. 9. Cane of a young vine after cutting.
Rahovec, February 2012

Fig. 10. Cane bending for starting the single guyot training system on a young vine.
Rahovec, February 2012

Fig. 11. Lawn cut and soil tillage should be postponed after budburst in many table grape Kosovar vineyards.
Picture taken in Faenza, Italy, April 2010

ANNEX II: List of some firms producing dusters

CIMA ⇒ www.cima.it

DAL DEGAN ⇒ www.daldegan.it

GAMBERINI ⇒ www.impolveratori.it

GENESINI ⇒ www.genesini.it

IDEAL ⇒ www.idealitalia.it

MB ⇒ www.mbbergonzi.it

PROJET ⇒ http://projet.portalservices.it/it/

UNIGREEN ⇒ www.unigreen-spa.com

VMA ⇒ www.vmaatomizzatori.it