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Study of the current situation of pepper production in Kosovo

(Evaluation of the current situation and recommendations
for more productive pepper production and marketing)

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Implemented by



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Summary

Peppers are one of the main vegetables planted in Kosovo regarding production area and economic importance. The dominant type of pepper production is open field cultivation. Pepper cultivation in protected environments is much less common compared to other crops such as tomatoes, cucumbers, and lettuce. Usually when peppers are grown indoors, low tunnels are used for cultivation and the production goes for family consumption (only small quantities reach the market).

The main pepper production is localized in the region close to the Drini i Bardhë river. Pepper production is expanding to other regions as well, but it is not accompanied by an increase in yields.

Tomato is the crop that represents the highest percentage in vegetable imports, and peppers are the second highest imports.

There is a real possibility for substituting pepper imports (for certain periods of the year). Most of the pepper imports occur during months of May, June, and July. By applying modern methods in open field pepper cultivation and by expanding the areas of indoor pepper production, it is possible to substitute imports during this period of the year. Also, the pepper crop has a good potential for export, especially in the period of August-September.

The level of agro-technical measures to be applied to pepper production, starting with seed choice and ending with the harvest, is very extensive. It is necessary that farmers pay greater attention to care-taking activities. For that purpose they need more technical support (professional publications, demonstrations of new techniques in pepper cultivation, etc).

The harvest is one of the activities which heavily burden the cost of production. The whole harvesting process from start to finish (delivery to the market) is done manually, without any equipment. In many cases, the classification and packaging of peppers are not compliant with the standards of countries with more advanced agriculture. The classification of fruit is almost never done before the production goes to the market. The transport of peppers to the market is done in sacks, which causes the fruit to be damaged and to rot faster. There is also not enough coordination between farmers in groups or associations. Collection centres with appropriate conditions do not exist. The farmers do not have sufficient knowledge of post-harvest storage techniques for peppers.

It is necessary post-harvest performance is improved by applying appropriate techniques right from planting to the consumer.

Another important and necessary element is the urgent improvement of the market infrastructure, because in its present condition, it is far from fulfilling the necessary standards. In general, farmers need to better expose (market) their products.

The proper application of agro-technical measures (good agricultural practices), combined with the economic aspect of production, would be undoubtedly the best way to improve productivity in pepper production. The agro-technical measures could include: the utilization of qualitative seeds for planting (hybrid seeds), qualitative preparation of seedlings, proper nutrition to the plants (including basal fertilization and nutrition with high-solubility fertilizers through irrigation systems), as well as the proper application of preventive plant protection. It is also imperative that production is better adapted to market demand.

Peppers are one of the crops most commonly used in industrial processing. In general, the market possibilities for the processing industry could be a good incentive for increasing pepper production. However, present processing capacities are still too small to be able to absorb the majority of the pepper production in Kosovo. The establishment of linkages between

pepper producers and processors should be supported in order to create a long-term collaboration between them.

The cost of production is high due to the low level of mechanization. An improvement in production (increased yields and earliness on the market) could have a great impact in increasing profitability in pepper production.

Sales of pepper production are almost totally made on the internal market. There are rare cases of vegetable exports.

Indoor pepper cultivation is not developed or widespread. The market analysis and the general greenhouse sector in Kosovo show that indoor pepper production is a non-utilized potential by farmers.

1. Background of pepper production in Kosovo

1.1 History

There is no accurate data as to when peppers were first cultivated in Kosovo. However, it is supposed that it was first brought to the region by the Turks in the 17th century. Since then the crop has continuously expanded its area of cultivation. To begin with, peppers were used only as a supplementary food. Later on, as society and nutrition developed, peppers became more important for the diet.

After World War II, pepper cultivation started to become more widespread in Kosovo, but the most important area expansion of pepper production occurred in the 1960s and 70s when irrigation systems were built. Since then peppers have almost always been the main vegetable crop cultivated in Kosovo.

The 70s were the starting point when pepper production became a very profitable activity for many farmers in Kosovo, especially those in the Dukagjini Valley. The market was relatively wide (ex-Yugoslavia), and Kosovo farmers were able to sell their products in that region. In the end of the 70s and during the 80s, Kosovo farmers were significant suppliers to the pepper market, supplying the territory on the seaside of ex-Yugoslavia in particular.

Due to the collapse of Yugoslavia and the creation of new states with new borders, the exchange of goods became more and more difficult. The sale of the vegetables from Kosovo farmers to these new countries became totally impossible. Meanwhile, the markets of these countries were taken over by their own local producers and by producers from other countries. This situation created many difficulties for Kosovo farmers with many consequences that continue today.

Recently, the area of pepper production has expanded and has reached a maximum area of 4,449 ha last year. The consumption of peppers in the local population's diet has also increased. It should be noted that peppers are a very popular food for local consumers.

1.2. Relative importance of peppers for Agriculture

Imports

Considering the total imports of vegetable crops, peppers rank second after tomatoes in terms of percentage of imports. 7,872 tonnes of peppers were imported in 2006 with a declared value of €2,798,624. Turkey and Macedonia represent 93% of total imports by weight.

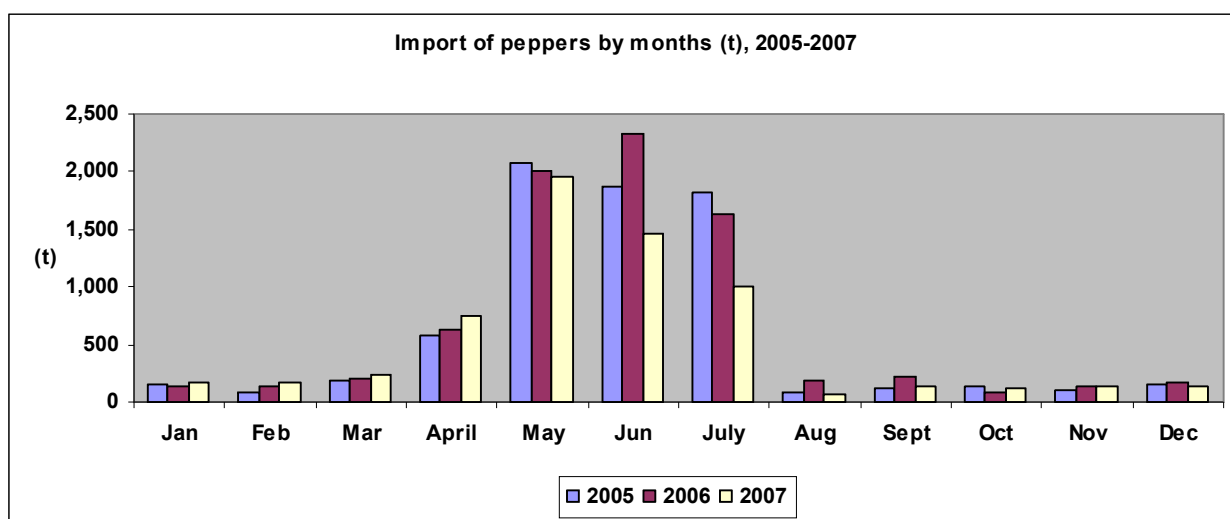
Table 1 Imports of peppers to Kosovo by country

Country	Quantity (t)	Value (€)
Turkey	3,479	1,330,802
Macedonia	2,436	515,847
Greece	217	71,441
Albania	45	8,425
Jordan	36	13,745
Other	117	51,528

Source: UNMIK Customs service 2007, cit. Intercooperation

Pepper imports decreased by 19.6% compared to last year. Monthly pepper imports are presented by the graph below:

Graph 1 Imports of peppers by month and year (2005-2007)



Source: UNMIK Customs service 2007

According to the same source (Intercooperation – referring to Customs service data), imports in 2006 increased by 7% compared to 2005. While in 2007 (compared to 2006), there was a considerable decrease in imports (19.6%).

Various reasons have influenced the present pepper import situation. In 2007, there was a notable decrease in imports compared to the preceding year, and there also occurred a significant increase in exports (by 226% compared to the preceding year). This happened because of the situation of pepper production in regional countries, the quantities produced, the market stability etc.

Exports

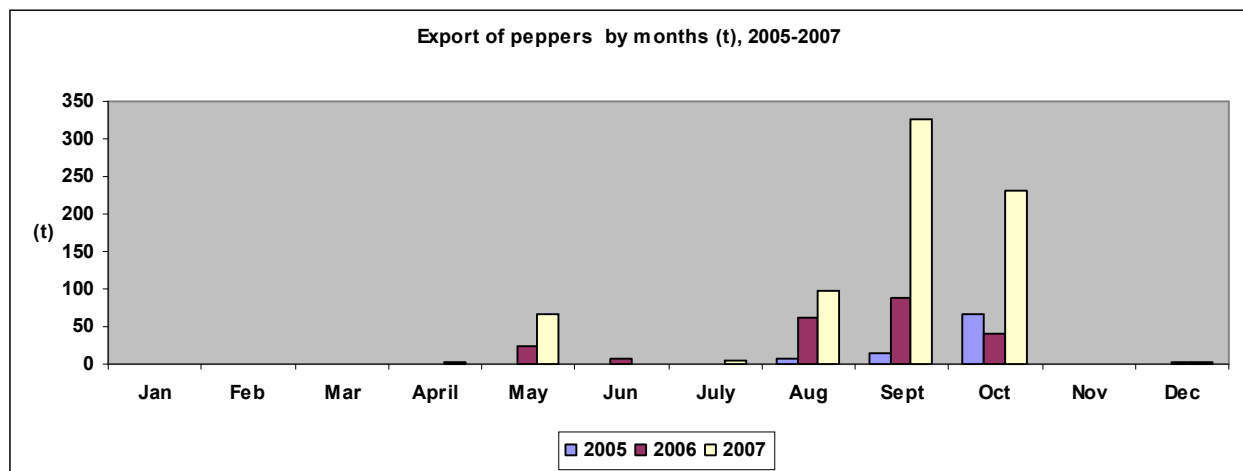
In 2007, 733 tonnes of peppers were exported with a declared value of €125,675. Montenegro and Serbia are the main importing countries with respectively 47% and 24% of pepper imports.

Table 2 Exports of peppers from Kosovo by country

Country	Quantity (t)	Value (€)
Montenegro	355	55,863
Serbia	173	33,292
Germany	70	16,630
Bosnia	42	7,253
Macedonia	36	6,101
Albania	32	4,409
Bulgaria	19	1,512
Mexico	5	615

Source: UNMIK Customs service 2006

Graph 2 Exports of peppers by month and year (t) 2005-2007



Source: UNMIK Customs service 2007

Export of peppers increased by 226 % compared to the previous year (2006).

Table 3 Exports of peppers from Kosovo in 2006-07

	<u>2006</u>	<u>2007</u>	
	Quantity (t)	Quantity (t)	Change %
Peppers	225	733	226

The areas cultivated with peppers expanded, but the expansion was not accompanied with an increase in yield. The low yields are a result of using traditional cultivation technology, low quality pepper seed varieties, and low quality seedlings.

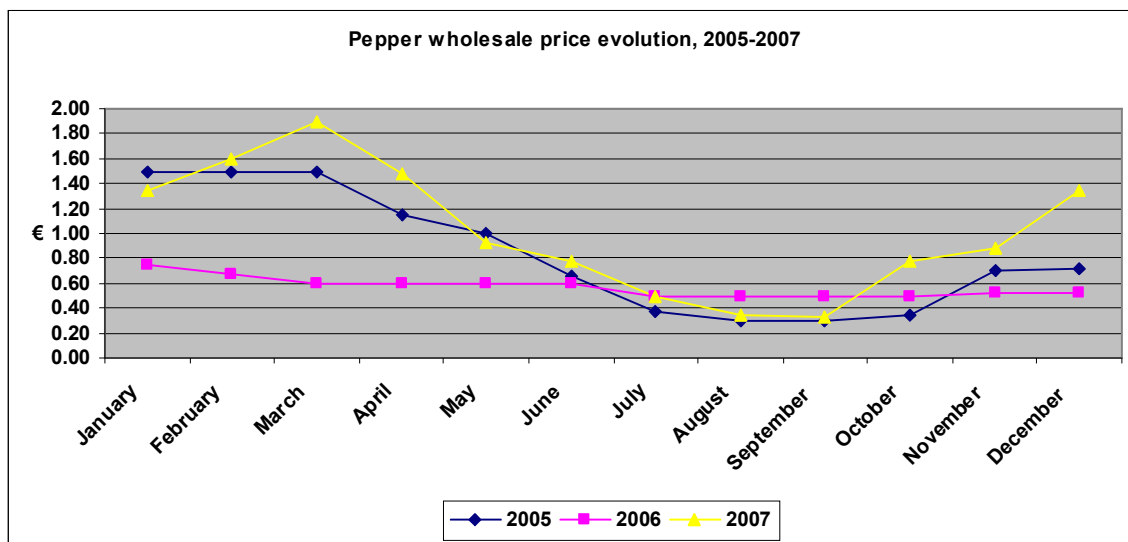
By analyzing the import data represented in graph 1, it is evident that the absolute majority of pepper imports occur during months of May, June, and July. Pepper import substitution can be significantly improved through measures based on the recommendations of this report and by considering the excellent tradition in pepper cultivation as well as favourable agro-ecological conditions.

The case of exports is more delicate and requires stronger intervention in order to improve a number of deficiencies, especially in the post-harvest phase. Keeping in mind the relatively high quantities and the diversity of peppers produced in Kosovo as well as the statistical data for exports in the recent years, it can be stated that there is a good possibility for pepper exports. Export of processed peppers is also a very good possibility.

1.3 Prices

Pepper prices oscillate depending on the time of year that they are present in the market. However, market prices show a good potential for pepper production in Kosovo. Usually pepper prices do not decrease below € 0.20 in August and September.

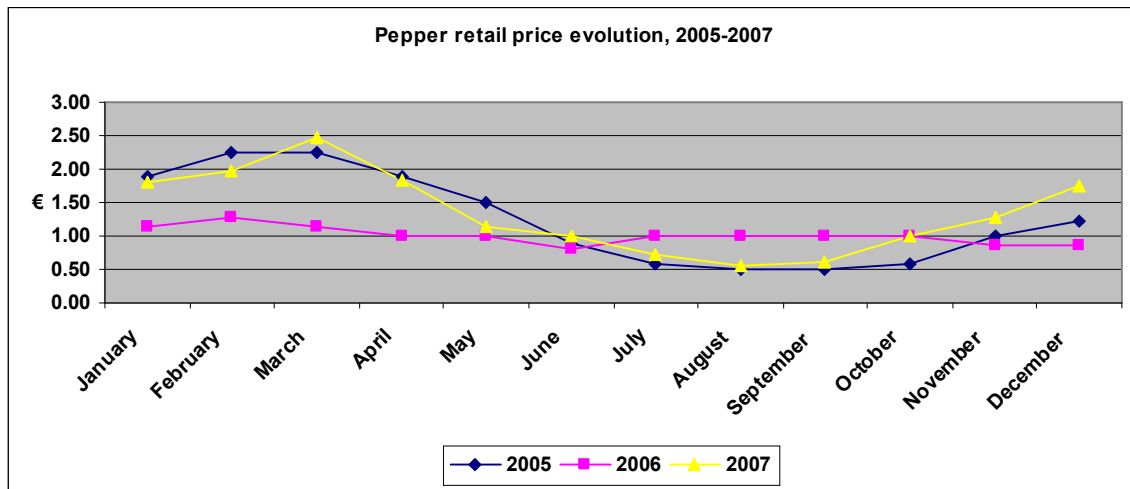
Graph 3 Evolution of wholesale prices 2005-2007



Source: Intercooperation

Based on the data from graphs 3 and 4, it can be noticed that prices at this time (August-September) are very favourable.

Graph 4 Evolution of retail prices 2005-2007



Source: Intercooperation

2. Description of the current situation

2.1 Distribution of pepper production throughout Kosovo

Pepper production is one of the main agricultural activities Kosovo-wide, while in some Dukagjini Valley regions (especially regions along Drini i Bardhe River), it represents the main economical activity. Peppers are one of the five most common vegetable crops grown in Kosovo.

In 2006, the total production area with vegetables was 14,500 ha, out of which 4,449 ha were cultivated with peppers, which represents 30.68% of the total area under vegetable production (source: MAFRD).

Not only are peppers the vegetable with the largest cultivation area, but they are also the most popular vegetable regarding population consumption as well as economic importance. Open field cultivation is the dominating pepper production practice. Indoor cultivation of peppers is also present in smaller areas in greenhouse structures (mainly in plastic-covered tunnels).

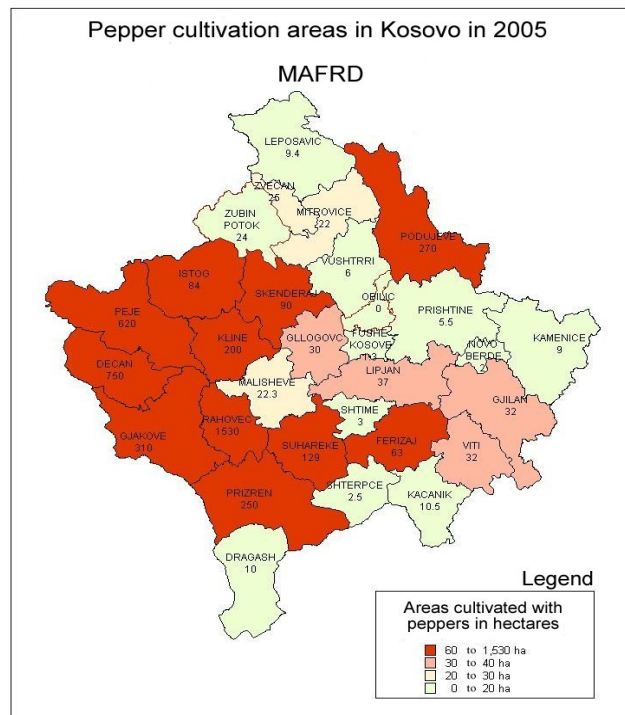


Figure 1 Areas cultivated with peppers according to municipalities (Source: MAFRD)

However indoor pepper cultivation is much less common compared to indoor cultivation of tomatoes, cucumbers, and lettuce. Generally, the type of protected structure environment used to cultivate peppers is low tunnel. When produced indoors, peppers are dedicated mainly for family consumption (with very few quantities produced for the market).

Although the main pepper producing activity is concentrated in the region along the Drini i Bardhe River (Anadrini, Lugu i Baranit, Decani, Peja, Klina, Prishtina, Anamorava), there are small areas cultivated with peppers in almost every region of Kosovo (given suitable climatic conditions).

2.2 Most common cultivation techniques, typical yields, seasonality

Traditional practices of pepper cultivation is the dominate way peppers are cultivated in Kosovo. The traditional cultivation methods involve more workers and labor and is characterised by a uniformity of pepper production over a long time. Above all, the agro-technical measures applied (starting from seed choice and ending with the harvest) are extensive and there is a lack of new technology in this production.

Typology of cultivars (including size of operation)

The structure of cultivar varieties used is part of the technology. The dominating varieties in pepper production in Kosovo are very old and not productive enough.

Somborka is a very old variety; for over three decades no authorised seed production (or manipulation) institution or company has chosen to produce or breed this kind of seed. Every year farmers in Kosovo take seed from regular production leading to an extreme degeneration of the variety, which now resembles the characteristics of a population rather than that of a selected variety. This variety of peppers is a bell (babure) type with a pointed tip. It is a hot pepper. At its technological ripeness¹ its colour is yellow, and at its botanical ripening, its colour is red.

Kurtovska Kapia In most cases, the seed of this variety is divided from regular production by Kosovo farmers. This variety is a “longum” type, and the crop at botanical ripeness is red. It is usually used for processing (in the processing industry or at family level).

Duga Bella is a variety of the “longum” type of pepper used for fresh consumption. It is usually harvested at its technological ripening stage. The seed of this variety is usually imported from Serbia. The first harvest of this variety occurs in the second half of July. This variety is also cultivated in protected environments.

Shorok Shari is a bell (babure) type variety with three tips. It is used for fresh consumption and for processing. This variety is also imported from Serbia.

¹ Technological ripening is the time when the pepper crop reaches the size at which it can be used as food, while the botanical ripening is achieved when the pepper crop reaches its total physiological ripening and usually its colour turns to red.

Choice of seed

The selection of seeds by the farmers is diverse. In some cases (in production regions such as Anadrini and Lugu i Baranit), 30 to 40% of the seeds are produced by the farmers². This happens especially with the Somborka and K.Kapia varieties. To start with, producers select the best and healthiest fruits, and then they remove the seeds and dry them in the sun. Later, the seeds are stored somewhere on the farm without any specific storage criteria. Seeds produced this way undergo no control or pre-planting treatments. Undoubtedly, all these mentioned deficiencies significantly influence the pepper yields and ripening time of the final crop.

Farmers give different reasons why they produce (or buy) this kind of seed. Some say that it offers them a higher security³, others state that it is not possible for them to buy commercial seeds as they are very expensive, and still others mention that the local market demand is higher for this kind of self-produced seed.

In general, farmers believe that the quality of pepper seeds from commercial companies (present on the market) do not correspond to the original quality parameters of the varieties they produce themselves.

The utilization of such (traditional) seeds influences the difficulties in production (presence of disease, different degradation processes, lack of growth), which naturally have an effect of decreasing the yields, as well as a lower quality of fruit.

The rest of the varieties (mainly field ones) are Duga Bella, Shorok Shari, S. Uho. Other varieties⁴ are cultivated to a lesser extent, generally in small plots for family needs. The Duga Bella variety is cultivated for fresh consumption, while the other varieties are produced not only for fresh consumption, but also for processing (such as family processing or industry processing– refer to the section on processing).

Commercial pepper producers in Kosovo cultivate an average area of 1-2 ha⁵.

Indoor pepper production is dominated by the above-mentioned pepper varieties as well. Indoor pepper production is still far from using quality seeds even though there is a tendency to increase the utilization of hybrid seeds.

Seedling production

Seedling production for field cultivation (in the Anadrini region where most of the pepper production takes place) is usually done in warm soil beds. The preparation of the beds is done using different methods on the ground surface or underground. At the bottom, a layer (25-50 cm) of fresh organic fertilizer is formed, which serves as the source of warmth. Another layer, with a thickness of 10-15 cm, contains soil (which in some cases is partly mixed with a decomposed fertilizer) and is laid on top of the bottom layer. The seeds are placed on the prepared surface. Then they are covered with different materials. In the Anadrini region, many producers use the remains of grapes used for processing to cover the seeds. In other cases (in other regions), the seeds are

² Evaluation of the report's author

³ According to the farmers it often occurs that the quality of the seeds they buy in an agricultural pharmacy does not correspond to the accompanying seed quality certificate

⁴ This year with "Mercy Corps" support, 7 ha were planted with chili /feferon peppers (of long spiral shape and not hot) for processing industry needs in different regions of Kosovo.

⁵ Author's statement based on general experience and meetings with farmers of the Anadrini region.

covered with a mixture of soil and decomposed fertilizer (in a ratio of 1:2). The material used to cover the seeds is generally the only difference in seedling production between the Anadrini region and other regions. Other activities in seedling production, starting with the choice of seeds and ending with planting the seedlings in the open field, are almost the same throughout the regions.

This type of seedling production utilizes 1-1.2 kg of seed / ha.

The beds are covered with a plastic film in a semi-arc structure. In such conditions, the seeds usually germinate within an average of 20-25 days (depending on outside temperatures). Considering the knowledge that in normal conditions, pepper seeds germinate within 10-14 days, we notice a delay of 7-10 days for germination; such a delay is very meaningful for pepper production. Care-taking activities during seedling production involve protection from low temperatures (in some cases double plastic film covers are used), ventilation, watering, and pest protection.

The hardening of the seedlings is the preparation of seedlings for transfer to the open field; it involves more frequent aeration, the gradual removal of the plastic covering of the tunnels where seedlings are produced (in order for the seedlings to get used to natural environmental temperatures), and watering at lower water quantities. In the majority of cases, the hardening of seedlings is not done properly by producers. As a result, a delay is caused in the adaptation of the new seedlings after transplantation in the field. It is obvious that among the reasons for the delay in fruit harvests in pepper production are the mentioned delays in seed germination (caused by germination conditions) and in seedling adaptation after transplant.

There is no need for big investments in order to correct these “defects” in seedling production. The key to correcting these “defects” are better and more professional care-taking practices in seedling production.

Transplanting seedlings

Field transplantation of seedlings is done when they have 4-6 leaves. It usually occurs in the second half of May⁶. Farmers transplant seedlings bare-rooted in the ground of open fields, while most indoor farmers transplant seedlings by transferring the seedlings together with their substrate to the cultivation plot. In cases when the transplantation is done with bare-rooted seedlings, it is more difficult and time-consuming for the seedlings to adapt to their new environment. Transplanting bare-rooted seedlings causes a delay in the harvest time of the final crop.

Transplanting seedlings is done in different distances. In the Anadrini region, the seedlings are usually spaced at 50 x 20 cm. In the other regions (such as Lugu i Baranit, Pristina vicinity and Anamorava) the distances are even smaller around 30-40 x 20 cm.

Transplanting seedlings is done manually. From an agro-technical viewpoint this method is not appropriate, and it influences in the increase in the cost of production of pepper cultivation. In order to transplant seedlings for a surface of 1 hectare, an average of 20 work days are needed (for more details see production costs in Annex 1). During the preparation of the report and field visits, no cases of seedling transplantation using machines were observed on any farm. This method of seedling transplantation is known by farmers (in the past, machines for transplanting tobacco were used by farmers). Buying a transplanting machine (to be used once per year) is not considered cost-effective by the majority of commercial pepper farmers cultivating areas of 1-2 ha. The

⁶ From conversations with farmers groups of Celinë and Rogovë villages.

solution to this problem could be farmer organization to collectively purchase the machine, so that the whole group would be able to utilize it at a low cost. Unfortunately, even farmer organizations are very deficient (see section on Marketing).

Land preparation

In the majority of the production regions, land preparation for seedling transplantation is usually done in the autumn with deep ploughing but in some cases this ploughing is done in spring. The autumn deep ploughing (25-35 cm) is done in order for the water to accumulate and the soil to become friable during the winter. Land preparation in the spring is done through disking, ploughing, or harrowing depending on the needs identified by the farmers.

Peppers are transplanted to the field in the beginning of May; at this time, weeds are present almost everywhere. Therefore, farmers apply harrowing as a measure to make the land friable and to eliminate weeds.

Fertilization

In the production regions where organic fertilizer is used, the distribution occurs before deep ploughing. In regions where pepper production is widespread, only 30-40% of farmers use organic fertilizer⁷. The main reason why farmers in these regions do not use organic fertilizer is that their families usually only own a few animals. Most farm families own 1-2 heads of animal stock, which is too little to fulfil the needs for organic fertilizer in pepper cultivation. In cases when farmers do use organic fertilizer they usually buy quantities from other regions.

Distribution of NPK fertilizer is usually done during the land surface preparation. Normally farmers use varying quantities of chemical fertilizer, with an average of 600-800 kg NPK (15:15:15). In recent years, some farmers have started using other (more appropriate) combinations of NPK fertilizer (such as 8:16:24). One in four farmers is oriented towards using more appropriate combinations of complex content fertilizers⁸.

The amount of fertilizers that farmers use is based on their own free judgement. The majority of farmers have never taken samples of their soil for analysis. In the few cases when soil analyses were made, the initiative has come from different projects or Municipality Councils (Agriculture directorates). This approach in fertilizer use is not rational and can be inappropriate for proper plant nutrition. Defects and other symptoms of deficiency (or excess) of different nutritive elements often occur as a result of inappropriate fertilizer use.

Re-fertilization of the plants is usually done 2-3 times. The quantity of fertilizer used during re-fertilization is a matter of farmer's judgement. On average around 750 kg/ha of Nitrogen fertilizer⁹ or 250 kg/ha Urea¹⁰ is used (according to the data from the workshop with farmers and input suppliers). The distribution of fertilizers is done manually. Usually the distribution is done before watering or before weeding (hoeing between rows). In some rare cases foliar nutrition is applied.

⁷ Author's evaluation based on data collected from the field.

⁸ According to information from farmers and the main agriculture input suppliers

⁹ Nitrogen fertilizer 27% N

¹⁰ Urea 46% N

Irrigation

Irrigation of pepper plants is done based on farmers' own judgements. In regions with irrigation systems, farmers irrigate more often. In the Anadrini region rain-like irrigation is the most widely spread form of irrigation used, while in other regions (Pristina vicinity, a part of the vicinity of Peja, Decan, and Anamorava) irrigation is done by channelling surface water to cultivated plots. There are very few cases of drip irrigation used in open field pepper cultivation. In general, irrigation is not an impeding factor in regions where pepper production is widespread. However, quantities of water used for irrigation of peppers in the regions covered by the Radoniqi water supply system (where there are no water use limitations) are often high. As a result of excess of irrigation, there is a higher incidence of different plant diseases (especially fusarium and phytophthora). In many cases, irrigation takes place without any defined criteria; often farmers irrigate during high midday temperatures. The use of cold water to irrigate the plants during high midday temperatures causes problems in the intensity of plant growth. It is imperative that farmers apply drip irrigation (if possible), considering the many advantages of this method compared to the two above mentioned methods.

In some cases irrigation is done using water pumps (powered by diesel or electricity). Both of the power alternatives used by pumps considerably increases the cost of production¹¹. A small number of farmers (especially in some regions of Lugu i Baranit, Istog, and Klina) use streaming water from different canals to irrigate. This alternative of irrigation is cheaper than the other two, and mainly it only includes labour costs. However, this kind of irrigation could have problems during high temperature periods (in the summer) when the canals dry out.

Weeding – weed management

Weeding is a regular activity applied in pepper production. Usually 2-4 hoeings between rows are practiced. Depending on the producer, hoeing is done by hand or by using machines but needs rows to be wide enough to allow for access. This activity takes place until the area in between rows is wide enough to allow for weeding. This process is very beneficial, not only because it helps make the soil friable, but also reduces the need of herbicides.

In recent years, farmers are paying more attention to protection against weeds. Based on the field-collected data, it is estimated that about half of the pepper producers in the region around Drini i Bardhe river use herbicides. The main herbicides used are: Stomp, Trefgal and Guardian.

Crop rotation

In the majority of cases, crop rotation is not done properly. It was observed from conversations with farmers that they are aware of the consequences of cultivating peppers as a mono-culture without crop rotation. A number of factors limit farmers in applying proper crop rotation methods. The most important factors are:

- Limited area surface of their plots of land

¹¹ Irrigation by water pumps costs around 300 Euros per season

- Irrigation possibilities
- The higher relative profitability of pepper crops as compared to other vegetable crops.

In cases when crop rotation is applied by farmers, different vegetable crops (tomatoes, cucumbers, watermelon, cabbage etc.) are rotated. Considering the similar demands for nutrients that these vegetable crops have and the likeliness of being affected by similar pests and diseases, this kind of crop rotation does not essentially differ from mono-culture cultivation.

Leaving aside the limitation of crop rotation, pepper cultivation for multiple years in the same area has many consequences. The main consequences are the partial utilization of the soil's nutrient matter and the difficulty in protection against diseases, pests, and weeds. In some areas it is very difficult to cultivate peppers (especially because of the presence of different diseases and pests) due to long-term pepper cultivation in the same area. In this condition, it is necessary that farmers apply strict crop rotation practices, considering they have restricted possibilities in decreasing the negative effects of mono-culture cultivation.

Plant protection from diseases, pests, and weeds

Protection from diseases, pests, and weeds is done without prior planning. Preventive protection measures take place in very few cases.

The main diseases which are present in pepper cultivation in Kosovo are blight, fusariosis, the green wilt, and the bacterial spot (*Phytophthora capsici*, *Fusarium* sp., *Verticillium albo-atrum* and *Xanthomonas campestris*). In order to protect pepper plants from these diseases the following fungicides are generally used: Ridomil, Dithane, and Galben¹².

The most important pests that are present on pepper plants in Kosovo are click beetles and aphids / leaf lice (*Elateridae* and *Aphididae*). The damage that these pests cause the pepper plants is manifested in a decrease in yield and quality of fruit. However, the negative influence of pests is lower than that of disease.

Yield

Official MAFRD (Kosovo's Ministry of Agriculture) data states that the average pepper yield in Kosovo is 22.53 tons/ha. According to the opinion of the author of this study, yields in pepper production in the most important production regions may be close to the officially declared value, but the Kosovo-wide average yield is much lower than that value. This statement can be argued with the following reasons:

- The average yield for pepper production in other countries in the region or other countries with more advanced pepper production is lower than the MAFRD declared value
- the average yield for countries with advanced agriculture is around 25 t/ha, while countries around Kosovo have yields of 10 t/ha

¹² From visited farmers (see farmers' names in the annex) and input suppliers

- The weak cultivation technology described in this report (starting from choice of seeds to harvesting) does not guarantee such a high yield.
- Besides producing regions, peppers are also cultivated on a smaller scale in all of the other regions where there are suitable conditions. Cultivation in these regions is done in small areas and with very low production technology. All of these factors greatly influence the decrease of Kosovo-wide average yields.
- Based on this data, it can be concluded that the real pepper yields per hectare are at least 40-50 % lower than the declared value in the MAFRD report¹³.

Indoor production of peppers

Indoor pepper cultivation is very rare. The market analysis, as well as the general greenhouse situation in Kosovo, show that indoor pepper production is an unused possibility by our farmers.

Based on field investigations when farmers cultivate peppers in greenhouses, they do it in small areas in order to meet family needs. A total of 2-3 hectares of peppers produced in greenhouses are dedicated for the market¹⁴. Referring to the preliminary report of the Greenhouse Inventory (Intercooperation, 2008), there is a small number of greenhouse producers that cultivate peppers indoors. This fact shows that there is a need to intervene as soon as possible to encourage greenhouse cultivation of peppers (among the other vegetables cultivated indoors) in Kosovo.

2.3 Harvesting, packaging, and transporting peppers

Harvesting starts at different times of the year depending on the location. In some parts of the Dukagjini Valley, the first harvest usually takes place between July 15th and 20th. In varieties with an elongated shape, such as the Duga Bella, harvesting is done 5-7 times. In late varieties such as Somborka and K. Kapia harvesting takes place an average of 2-4 times. The harvested crop is placed in the trailer of a tractor and is transported to the farmyard; peppers then go into sacks of different sizes (and different textures). No real classification¹⁵ of the fruit occurs before peppers go into sacks. Then the pepper-filled sacks reach the market in different ways.

In general, harvesting is an activity that heavily influences the cost of production. According to the majority of pepper producers, harvesting requires about 4 full-time workers during the two and a half months of the pepper harvesting period. Even though harvesting is considered an “easy” activity in pepper production and all the family members are involved in it, it still represents a heavy burden for the cost of pepper production¹⁶.

The whole harvesting process from start to finish (delivery to the market) is done manually, without any assisting equipment.

The post-harvest problems and difficulties of pepper production can be generally summarized as follows:

¹³ Evaluation of the author of the study

¹⁴ Statement of the author of the study

¹⁵ Except for the cases when damaged fruits are removed

¹⁶ For more details see cost of production in the Annex

- The high influence of harvesting activities on the cost of production
- Lack of know-how on harvesting times and methods
- Lack of harvesting mechanization (or supporting equipment)
- Lack of product classification before distribution to the market
- Inappropriate packaging standards
- Transport done in sacks (this results in a damaged product which rots faster)
- Lack of farmer organizations and appropriate collection centres
- Lack of know-how regarding post-harvest vegetable storage techniques
- Market infrastructure in most cases does not provide optimal conditions for vegetable sales
- Lack of product quality control by different inspection services
- The insufficient commercial production development

2.4 Marketing

Weak marketing and insufficient development of commercial production represent specific problems in pepper (and other vegetable) production. In regions where production is oriented for the market, the crop is sold in various ways. In most cases, traders go to villages to buy wholesale quantities of peppers, which they then sell retail to populated urban centres. In some infrequent cases, producers deliver their products directly to the urban markets.

In many cases, the classification and packaging of vegetables is not compliant with the quality standards of peppers from countries with an advanced agriculture.

2.5 Marketing channels

Vegetables produced in Kosovo are sold almost entirely on the local market. Exports of vegetables to other countries occur in rare cases. The sale of products is individual; there is no efficient system to organize sales.

Another weak element is the extremely poor infrastructure of markets (especially local ones), which do not provide the minimal conditions for the sale of peppers (and other vegetables).

Farmers use three marketing channels:

- direct marketing,
- retail marketing, and
- wholesale

The main characteristics of selling through these channels are described below.

Direct marketing channel

This channel of marketing implies that farmers sell products directly to the final consumer. It is carried out in different forms. Some farmers sell their products in the village market or in other cases, they sell along the main roads close to their plots of land where peppers are cultivated. Passers-by or wholesale buyers can find (or purchase) the products being sold in the mentioned locations.

Many farmers use their own transportation to deliver their products to different markets within Kosovo.

Sometimes farmers send some peppers directly for processing (look at the section on processing).

Retail channel

Marketing in this way implies a supply to restaurants, supermarkets, and small retail shops. This channel requires less of the individual grower's time but more post-harvest care in order to ensure product quality and uniformity. Some supermarkets and retail shops require attractive packaging - but for restaurants, the priority is quality and uniformity of product. This channel is frequently used by small and medium producers. However, this channel is less common for the total pepper sales and it is not an attractive form of marketing for the bigger producers.

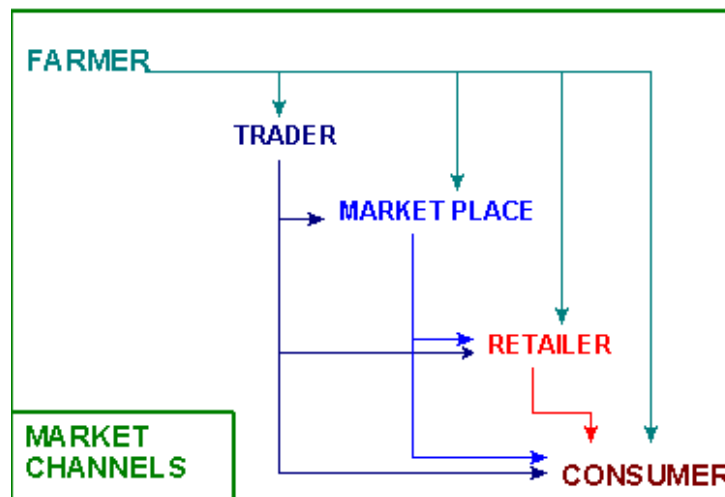
The retail channel could be a good choice for the small and medium producers (considering all specified conditions that are necessary for this form of sale are fulfilled - as mentioned above).

Wholesale channel

During the high production season, more than half of the total pepper production is sold through wholesale traders. Producers expose their products in the village centres or elsewhere where wholesale buyers come to buy the products in order to sell them retail to more populated urban areas.

Farmers sometimes sell their products through wholesale markets, where their products are bought by wholesale traders.

Figure 2 Marketing channels



Source: H.P. Beukema et. Al. Marketing Canls

The above scheme (Potato Explorer) corresponds to the marketing channels for peppers in Kosovo.

2.6 Cost of production

On a per hectare basis, the cost of production for the present production system is **€5,081**. The value of land rent would be an additional 600 Euros. Considering an average pepper sale price of 0.25 Euros/kg the net profit per hectare would be €1,019 /ha not including land rent, or € 419 /ha should we deduct land rent (see Annex 1). If we consider that the farmer is not renting the land and that 90% of farm labour is done by family members, the total income for the farmer family would be € 3,165 /ha.

Table 4 Economic calculations in traditional pepper production¹⁷

	Considerations	Yield (tons)	Price (Euro/kg)	Revenue (Euro)	Fixed costs (Euro)	Variable costs (Euro)	Family Labour (Euro)	Income from land, capital (Euro)	Income from land, capital, and family labour
Peppers	(1 ha) 90% family labour	22.5	0.25	5,500	600	4,481	2,146	419	2,565

2.7 Processing industry, capacities, and trends.

In Kosovo, peppers are one of the vegetable crops commonly used for conservation. Until recently, the majority of families in Kosovo would conserve peppers for consumption needs. Now, as a result of general lifestyle changes, consumption habits have changed as well. Nowadays, fewer people conserve peppers for their dietary needs. Unfortunately, farmers have not yet understood this tendency and have not managed to adapt to the new market demands for peppers.

The pepper processing industry in Kosovo has a long tradition. The “Progres” vegetable processing factory in Prizren is the biggest and most successful in Kosovo. This factory processes around 2000 tonnes of peppers. In general, processing is done with the following varieties of red peppers: Kapia (1500 tonnes), Baburet (350 tonnes), Somborka (150 tonnes), and chili (feferon) peppers (around 100 tonnes¹⁸).

All the processed quantities mentioned above are supplied by local producers, except for the chili peppers, which are imported from FYR of Macedonia (at a price of 0.30-0.40 Euros).

During months of August and September at the peak of pepper production, it is not possible for the processing company to absorb all the pepper quantities coming from the field, even though processing capacities are high. On the other hand, there is lack of local chili pepper production, which could be a good opportunity for farmers who are interested in specializing in this type of production.

¹⁷ We met no farmers who used planting machines to transplant seedlings. The utilization of such a machine through service providers would cost around 80-100 Euros, which is about 150% cheaper than the traditional method.

¹⁸ Data collected this year directly from “Progres” company management

Besides “Progres”, there is a tendency for more processors to get involved in pepper (and other vegetable) processing. In the Krusha e Madhe village, the womens’ association, “Farmer Women”, with Swiss “Caritas” support, has started traditional pepper processing activities (a product with a high market demand). The women package processed peppers in jars of 2.5 kg. This association plans to conserve 10 tonnes of processed pepper products. The pepper quantities used by this association for processing are mostly their own products.

Traditional processing of peppers is a good choice for these producers even though small quantities are processed. Also, women involvement in this sector is very positive.

Another processing initiative is the “Etlinger” company, which, in collaboration with Mercy Corps, has organized the production of spiral chili peppers in 7 hectares, and all the production from this area is collected by the company. Future plans of this company involve the conservation of 1000 tonnes of processed pepper products (using chili peppers, Kapia peppers, and tomato-shaped peppers).

According to the above mentioned processors, there is a market for their products; therefore, utilization of peppers in the processing industry is a good orientation for the general pepper production industry in Kosovo.

2.8 Input suppliers

In general, the agricultural input market is relatively well-organized. The prices of inputs are bit higher than in other regional countries. The Ministry of Agriculture intervened with some assistance in the fiscal policy for agro-inputs, but at the same time, a price increase occurred in fertilizer (almost doubling of prices), diesel, etc. This has affected farmers, who are finding it difficult to have a supply of qualitative agro-inputs.

It can be deduced from field-collected data that input suppliers have not been very active in promoting their products (except for one case, the supplier “Jonathan” in Gjakova utilized a number of parcels in 2006, together with the “Anadrini” association). In contrast, many input supplying companies in other countries of the region have achieved leading positions in their respective markets by promoting their hybrids or new cultivation techniques (examples: Albania and Serbia). The main agro-input suppliers should be much more involved in the future development of the sector.

2.9 The involvement of different NGOs, farmers’ organisations, and other institutions in pepper production.

After the conflict in Kosovo in 1999, numerous projects have been involved in supporting the vegetable sector. All of these projects have involved pepper production in their activities. Swiss Intercooperation has been the longest project in the vegetable sector; other projects that have directly or indirectly been involved in pepper production are USAID projects, “Anadrini”, some EAR projects, etc. The main problem with the activities of these projects has been the lack of continuity, and as a result most of the progress achieved has stopped at the termination of the projects.

Different farmers’ associations have been formed during this period with assistance from different projects implemented by different NGO-s. One of the components of most of the active projects in the vegetable sector has been the

establishment of farmers' associations. However, the activities of the associations established ended with the termination of the projects.

However, there are a few exceptions to what was just mentioned and they are the farmers' associations "Anadrini", "Pëdrini", "Farmer women" in Krusha e Madhe, and "Mamusha". Nevertheless, these associations are not able to play an active role in the sector because of organizational and functioning difficulties. Small associations or informal groups of farmers have been formed in some regions.

Better farmers' organizations are an important precondition in strengthening the farmers' positions. The key to doing this is capacity building of associations (especially direction boards), in order to have a better organization and management. In order to build association capacities, specific programs should be initiated.

3. Best Agricultural Practices

Currently other vegetable crops (excluding peppers) show some progress regarding cultivation practices (at least compared to pepper cultivation). Based on what is discussed in this report, it is obvious that traditional methods dominate pepper cultivation in Kosovo. The application of good agricultural practices in pepper production requires the application of modern agro-technical measures. The proper application of these measures would be the best way to increase the productivity of these plants. These measures should be:

Choosing quality seeds (hybrids) to plant Choosing hybrid seeds, of the F1 generation, means more security for producers. In the demonstration by the Anadrini association (2005), the hybrids (Istra F1, Madona F1, Biskra F1, Arlequin F1, Piquito F1, dhe C.L.X.P 1574- F1) gave very good results. The yields achieved were approximately 40 t/ha and the crop harvest happened a week earlier. This fact shows that even the improvement of variety structure could have an important impact. Nowadays different companies offer a wide range of varieties that could fulfil the demands of any consumer.

Proper preparation of seedlings, by using appropriate substrate in modules (without using the bare-rooted transplantation method) According to the evaluation of the author of this study, the weak quality of pepper seedlings is the most important factor which influences the harvesting delays. A qualitative seedling production means planting seedlings in modules, by using appropriate substrate (specific for pepper seedlings). Other important issues in producing qualitative pepper seedlings involve appropriate temperature, lighting, humidity, and nutrition specific to the needs of the seedlings. It is very important that seedlings be transplanted together with the soil (not bare-rooted, which is the common practice).

Proper land preparation before seedling transplant Good land preparation is an important precondition in successful pepper production. The land should be prepared in such a manner as to create an optimal condition for the water-air ratio. The land should be ploughed immediately after the removal of the previously cultivated crop. If the time of the ploughing does not coincide with the deep autumn ploughing, then there needs to be another ploughing in the autumn. In the spring, if it is noticed that the land is denser, a

shallow ploughing is recommended, followed by supplementary land preparation (harrowing, disking etc.)

Crop rotation is also very important and should be given attention. The cultivation of the same crop in consecutive years increases the risk of diseases and pests, and influences the improper utilization of nutritive elements.

Ideally, the number of plants per hectare is lower than the traditional cultivation method. Usually, this number is about 4-6 plants/m².

Utilisation of black mulch The utilization of black mulch covering the surface within rows has many advantages. The effects of using such technique are:

- elimination of weed development
- retention of water (reduction of the water demand by the plants and the rational utilization of water by the plants), and
- limitation of significant changes in soil temperature.

When there is the possibility of high temperatures, the top side of the plastic cover, used for mulching, is white, and the bottom side should be dark/black.

Utilisation of drip irrigation This irrigation method started to become widespread in the 1960s when plastic materials began to be used in the production of pipes (Moti Chen,2003).

This irrigation method is especially appropriate for intensive agricultural crops. Drip irrigation represents the most appropriate method of plant irrigation, and is one of the regular practices in modern pepper production (as well as for most other vegetables). Drip irrigation, together with mulching, satisfies the water demands of the plants, utilizing only 30-50% of the water volume that is typically used with rain-type irrigation. The producer can exactly control the dosage of water and fertilizer that is given to the plants through drip irrigation. As a result, there is a higher chance of achieving better quality and higher production yields. Through utilizing drip irrigation, there is a lower possibility that the land becomes dense and reduces the chance of land erosion or depletion of nutrients.

Proper nutrition of plants (including basal fertilization and nutrition with high-solubility fertilizers through the irrigation system) Each specific variety of pepper has a unique demand for nutritive elements, and the dosage and the intensity of assimilation are determined through experiments. Pepper plants usually grow well with certain levels of nutrients, which are specific for each phase of development. The manipulation of nutrient levels is essential in achieving high yields of good quality. Peppers require considerable amounts of macro and micro elements. The demands for nitrogen and potassium are especially high for pepper plants, while the demands for phosphorus are low. Even though the requirements of plants for Nitrogen are high, an excess in the dosage of Nitrogen could cause plants to grow excessively with very little early production. In periods of high humidity, high Nitrogen doses delay the ripening of pepper fruits and increase the likeliness of plant disease.

In link with best agriculture practices, the utilization of high solubility fertilizers in plant nutrition is a regular practice. The soluble fertilizers are distributed to the plants through the drip irrigation system, which allow for appropriate plant nutrition and fulfil their requirements, depending on the development phase. However, the application of this

nutrition method requires a deeper knowledge of plant physiology and soil properties. It is very important that a distinction is made between problems caused by pathogens and problems caused by the lack or excess of specific nutritive elements for plants.

The respective amounts of the main nutritive elements expressed in kg per ton of pepper production are presented in the following graph:

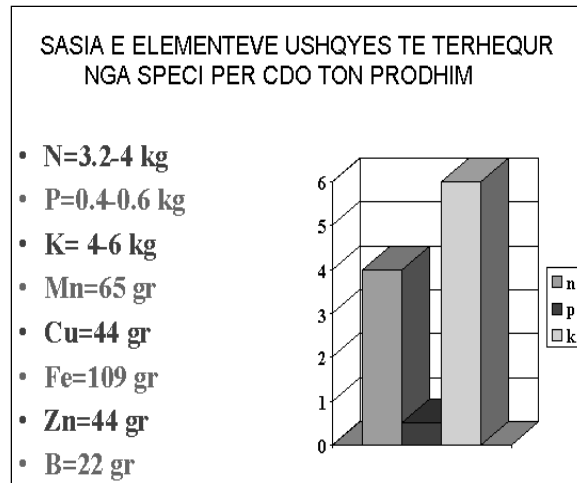


Figure 3 Nutritive element requirements per ton of peppers produced (source: Moti Chen, 2003)

Application of proper prevention/protection methods Accurate protection of pepper plants from diseases and weeds is the basis of a successful production. Preventive protection, implying the optimal application of agro-technical practices (the right crop rotation, good land preparation, mulching), is very important. Integrated biological and chemical plant protection is also applied in pepper production. However, chemical measures in plant protection are still the most widely used.

Some of these chemicals are used as preventive measures. The advantage in using these chemicals is that they almost totally wipe out the insects, pathogens, and weeds. However, in recent years, the cost of chemicals is very high, which has oriented producers towards integrated plant protection. Integrated plant protection is the basis for a healthy production and is focused on the timely and correct application of all agro technical measures, with an appropriate choice of variety, as well as a minimum of chemicals used.

Adaptation to market demands Based on the data of the demand and prices of peppers at different time periods during the year, it is observed that there are many possibilities for local producers. The presence of peppers on June 20th in the market is possible (especially in the Anadrini region) and it would be very profitable for pepper producers in Kosovo.

By applying the above-mentioned measures in pepper production, farmers could double the MAFRD declared average yield (23 t/ha). During a visit to a farmer with an area of 0.40 hectares in the Malesi e vogel village of Rahovec, it was noticed that achieving such yield was evidently feasible if the above mentioned measures were followed.

Another measure to be added to the above list should be covering the rows of plants to protect them from low temperatures in the early stages after transplant in the field. The application of this measure would influence earlier ripening of fruit by 15-20 days and increase yields.

Improvements caused by best agricultural practice methods are very positive compared to their impact on the cost of production (compared to traditional cultivation methods). By the application of modern cultivation methods, small areas would be able to produce good yields, and the product could be ready for the market much earlier. This year the above mentioned farmer has started harvesting in the last week of June as compared to traditional farmers harvesting between July 15th to 20th. The difference in earliness is economically significant for the farmer.

Why farmers have not adopted BAP and what they need to learn about BAP In general the measures to improve pepper cultivation are very rarely applied. A number of projects in agriculture have attempted to promote these good practices. However, they have not managed to spread these practices to other farmers. The reasons for this are summarized below:

- Very small plots were used for demonstration parcels where project work was concentrated (with “Anadrini” association participation only in one location with a small area)
- No promotion of good practices in pepper production has been organized (i.e. open days etc.)
- Other farmers have not been properly and sufficiently informed, and they have created an opinion that this method would be very costly
- The projects’ work has not been continued and was not organized with a wide number of farmers.

These activities would help build farmer capacities in order for them to be able to apply these new techniques. Moreover there is a need to organize demonstration plots as well as field days. These activities should be widespread and continue for at least two to three years.

The approach to this problem must include technical (trainings, demo plots) and economic measures:

- Utilization of hybrid seeds
- Improved preparation (hardening) of seedlings for transplantation
- Utilization of mulch (black mulch or other material) to cover the soil in between rows and cover the plants with plastic at the beginning of the season (especially at night) until there is no more risk of low temperatures
- Drip irrigation and application of soluble nutrition in water
- Plant crown arrangement (pruning)
- Better packaging of products
- Better market approach
- Possibility of certifying the production, especially if export is intended.

None of these measures are applied by actual pepper producers (in the best cases, they are applied rarely and little).

The utilization of these measures by farmers would achieve three very important objectives for the agricultural production in Kosovo:

- Earliness in harvesting (by 15-20 days)
- Doubling the present yields
- Increasing in the income of the farmer

3.1 Cost of Production (gross margins for BAP)

If we could include family labour in the income (considering most work is done by family members), and if we consider that the farmer is not renting the land, then the total income would be 7115 Euros/ha. The total income (including family labour) from using advanced agricultural methods is almost three times the traditional agricultural method (see cost of production in the annex 1). In the case of pepper production, if considered from a business viewpoint, then labour costs should be calculated, and the net income would be 3501 Euros/ha.

Table 5 Economic calculations in best agriculture practices of pepper production

	<i>Considerations</i>	Yield (tons)	Price (Euro/kg)	Revenue (Euro)	Fixed costs (Euro)	Variable costs (Euro)	Family Labour (Euro)	Income from land, capital (Euro)	Income from land, capital, and family labour
Peppers	<i>(1 ha) 90% family labour</i>	45	0.30	13,500	600	9,806	3,501	3,014	6,515

Production according to this method requires a relatively high initial investment for our farmers. However, it is evident that farmers do not know enough about the advantages of this method. Therefore, this method of production should be highly promoted. A complex approach including technical and economic aspects is needed in order to achieve this objective.

3.2 Identification of individuals (& locations) carrying out BAP in whole or in part

The work regarding BAP could be organized in different pepper producing regions. A group of farmers involved in the association “Agrobiznesi” have already started to apply this method, and are interested in expanding this kind of production. This year they have applied new techniques in a location between Gjakova and Rahovec. In this region, it is possible to continue establishing BAP. Furthermore, the region of Lugu i Baranit and the vicinity of Pristina are appropriate locations to start promoting these practices.

4. Market demand

There is a real possibility of import substitution for peppers during certain periods of the year. On the other hand, this crop can have considerable export potential. By analyzing the import data represented in figure 1, it is evident that the majority of pepper imports occur during months of May, June, and July. Based on field data and general experience, import substitution for peppers is possible in the above mentioned period of the year through the application of modern cultivation methods for field peppers and the expansion of pepper cultivation under protected environments.

It is possible to significantly impact pepper import substitution based on the recommendations of this report and considering the favourable agro-ecological conditions as well as the excellent tradition in pepper cultivation.

The case of exports is more delicate and requires stronger intervention in order to improve a number of deficiencies, especially in the post-harvest phase. Keeping in mind the relatively high quantities and the diversity of peppers produced in Kosovo, as well as the statistical data for exports in recent years, it can be stated that there is a good possibility for pepper exports. Export of processed peppers is also a very good possibility.

5. Comparison of “common” agricultural practices with BAP

5.1. SWOT (Strengths, Weaknesses, Opportunities and Threats)

Strengths:

- Very favourable agro-ecological conditions
- A long pepper cultivation tradition
- The existing market demand for peppers or pepper related products
- Private approach in farm management
- The possibility of cultivating in protected environments
- The non-utilized potential in pepper production
- Cheap labour

Weaknesses:

- The domination of traditional production
- High credit interest rates
- Low yields which result in high production costs
- Low investment capacity from producers
- Old-fashioned marketing system of farmer associations (regarding export)
- Underdeveloped extension services compared to sector needs
- Lack of an internationally recognized certification system for export
- Lack of institutional support to the sector
- Insufficient development of the processing industry

Opportunities:

- The high internal demand, especially during the early and late season
- The possibility of contributing to job creation for family members (especially women)
- New cultivation methods could be swiftly adapted because the old system is already devaluated
- The possibility of substituting imports and exporting
- The development of the processing industry

Threats:

- Lack of financing
- Insufficient grace period for production development
- Lack of institutional support
- Migration of population from villages to urban areas
- Lack of extension service development

5.2 Comparison of gross margins

The cost of production in the advanced production method is somewhat higher compared to the traditional method. On a per hectare basis, the cost of production for the present traditional production system is **€ 5,081**. The value of rented land would be an additional 600 Euros. Considering an average pepper sale price of 0.25 Euros/kg, the net profit per hectare would be €1,019 /ha, not including rent, or € 419 /ha should we deduct the rent. If we consider that the farmer is not renting the land and that 90% of farm labour is done by family members, the total income for the farmer's family would be € 3,165 /ha.

However, if incomes of the two methods are compared, the net income of the advanced method of cultivation is much higher. If we include family labour in the income (considering most work is done by family members), and if we consider that the farmer is not renting the land, then the total income would be **€ 7115 /ha**. The total income (including family labour) from the advanced method is almost three times the traditional method. Furthermore, farmers would have higher yields and economical benefits by cultivating even half of the area that they presently cultivate. Looking at pepper production from a business viewpoint, then labour costs should be considered, and therefore, the net income would be € 3501 /ha.

Table 6 Comparison of costs of production (traditional method as compared to best agricultural practices)

Cultivation method	Production cost (€)	Income from engagement of family labour. (90% of the total labour cost) (€)	Net Profit	Income per family ¹⁹ (€)
Traditional	5,081	2,146	1.019	3.165
BAP	9,806	3,501	3.114	7.115

5.3 Reasons why farmers do not adopt BAP

There are different reasons that affect the adoption of BAP in pepper production by farmers. The two main ones are:

1. Lack of knowledge
2. Economic reasons

It is evident that farmers do not have appropriate knowledge in the implementation of BAP. It is therefore necessary that farmers learn about the benefits of this pepper production method. This could be achieved through the methodology already mentioned in this report.

The application of BAP needs investment especially in the initial phase. This is one of the reasons why farmers hesitate to apply these practices. However, it is very important that farmers become aware that the net profit could be increased by applying BAP (look at section 5.2). Furthermore, the application of these practices would allow farmers to rationally use land, because the same yield could be achieved in much smaller areas, allowing them to apply a better crop rotation.

¹⁹ Land rent is not included

6. Recommendations

- The development of pepper production should be one of the most important orientations in Kosovo's vegetable sector.
- Promotion of modern techniques (best agricultural practices) in pepper cultivation should start with different activities. Through the application of modern techniques (utilization of qualitative seedlings, hybrid seeds of high production potential, drip irrigation, high solubility fertilizers, preventive protection from diseases and pests) in pepper cultivation, it would be possible to harvest the crop at least 2-3 weeks earlier. Based on the data presented in graphs 3 and 4, it is noticed that prices at this time are very favourable which would increase the profitability of this plant.
- It is very necessary that the range of varieties is improved; through the introduction of new hybrids with high production potential.
- In order for farmers to be able to practically apply the modern cultivation techniques, there is a need for farmer capacity building. In order to achieve this, there is a need for further technical support (through different professional publications and demonstration plots of new techniques in pepper cultivation).
- It is necessary that farmers improve post-harvest techniques and marketing of their pepper production, as well as a better research of the market. Farmers should generally improve post-harvest techniques which are considered to be a very weak link in the long chain from planting the crop to the consumer. The first thing to be done is sorting (classification) of the crop prior to presentation in the market. Other elements are the improving the packaging in compliance with the demand of the consumer, labelling the product, and the general improvement of quality of production.
- Another important (very necessary) element is the (urgent) need for improving the market infrastructure because the present market conditions are far from fulfilling the necessary standards. In general, farmers must expose (market) their products better.
- There is a real possibility of import substitution for peppers during certain periods of the year. Also, this crop can be considered to have very good export potential. It is evident that the majority of pepper imports occur during months of May, June, and July. Based on field data and general experience, import substitution for peppers is possible during the above mentioned period of the year through the application of modern cultivation methods for field peppers and the expansion of pepper cultivation under protected environments.
- The linkages between farmers and the processing industry should improve, keeping in mind the importance of pepper production in the processing industry
- There is a need to develop production in different types of indoor environments (including temporary tunnels)
- The first region where there is a need to focus efforts for the promotion of best agriculture practices is the triangle Gjakova-Rahovec-Prizren. The most important reason for this recommendation is that more than half of the area planted with peppers in Kosovo is located in this region with suitable agro

ecological conditions. The group of farmers organized in the “Agrobiznesi” association could be an appropriate choice to undertake this activity. Another appropriate region for best practice production could be Lugu i Baranit (and eventually some villages in the Pristina vicinity), where a considerable area of peppers are cultivated.

The cost of production is high; there is a low level of utilization of mechanization in pepper production, which is one of the reasons for this high cost. As a result, it is necessary that further mechanisation of pepper production is achieved.

Annex 1 Costs of production for peppers using two different cultivation practices

Traditional pepper production				
Area 1 hectare				
	<i>Quant. (kg)</i>	<i>Price €/kg</i>	<i>Total</i>	
Revenue	22000	0.25	5500	
	<i>Unit</i>	<i>Price</i>	<i>Quantity</i>	<i>Total €</i>
<i>Inputs</i>				
Pepper Seedlings	piece	0.01	77400	774
Organic fertilizer				250
NPK fertilizer				288
Soluble fertilizer				0
Fungicides				30
Insecticides				15
Black mulch				0
Agrofleece				0
			Total	1357
<i>Labour</i>				
Irrigating				100
Transplanting				264
Pesticide application				20
Care-taking, pruning etc.				0
Harvesting	Work days	10	200	2000
			Total	2384
<i>Mechanisation</i>				
Ploughing				60
Disking				70
Tilling				30
			Total	160
<i>Packaging and marketing</i>				
Packaging				330
Transport (including inputs)				250
			Total	580
<i>Fixed costs</i>				
Rent				600
Depreciation				0
			Total	600
Total cost of production				
				5081
Net profit				
				419
Income with family labour (90% of labour costs)				
				2564.6

Best practices pepper production				
Area 1 hectare				
	<i>Quant. (kg)</i>	<i>Price €/kg</i>	<i>Total</i>	
Revenue	45000	0.3	13500	
	<i>Unit</i>	<i>Price</i>	<i>Quantity</i>	<i>Total €</i>
<i>Inputs</i>				
Pepper Seedlings	piece	0.05	45000	2250
Organic fertilizer				250
NPK fertilizer				276
Soluble fertilizer				1500
Fungicides				50
Insecticides				30
Black mulch				250
Agrofleece				250
			Total	4856
<i>Labour</i>				
Irrigating				200
Transplanting				250
Pesticide application				40
Care-taking, pruning etc.	Work days	10	160	1600
Harvesting	work days	10	180	1800
			Total	3890
<i>Mechanisation</i>				
Ploughing				60
Disking				70
Tilling				30
			Total	160
<i>Packaging and marketing</i>				
Packaging				650
Transport (including inputs)				250
			Total	900
<i>Fixed costs</i>				
Rent				600
Depreciation	per year	5 years	400	80
			Total	680
Total cost of production				
				10486
Net profit				
				3014
Income with family labour (90% of labour costs)				
				6515

Annex 2

Horticultural Promotion in Kosovo Terms of Reference

Subject:	Study of existing situation on growing pepper in Kosovo
Purpose:	Evaluation of the current situation and proposals for more productive pepper production and marketing
Month:	June 2008
Duration:	15 days

Introduction

Vegetable production in Kosovo is one of the most important branches of agricultural production in general, whereas in some areas of Dukagjini representing the main economic activity.

The pepper production in Kosovo is one of the five major vegetable crops grown in the country. The total surface of vegetables in 2006 was 14,500 ha, of which 4,449 ha was peppers or 30.68% of the total area under vegetables (MAFRD source).

The area with peppers has expanded but this expansion has not conducted higher yields. The lower yields are a result of using traditional technology, local cultivars of peppers, and low quality of seedlings produced.

The consultant should analyze the existing situation of growing peppers in Kosovo and have recommendations for improving growing technology to increase yield and quality of peppers.

Scope of work

- Pepper production in Kosovo, surface with peppers, and production capacity
- Identify the suitable areas for growing peppers
- Growing techniques (open field and protected area)
- Seedling production (to evaluate the current situation)
- Soil cultivation
- Cultivars
- Input suppliers
- Fertilisation (type of fertilisation and using fertilisation during the production period)
- Crop rotation
- Pests and diseases management
- Irrigation
- Post harvest activity of pepper production
- Processing industry, capacity, and trends
- Market analysis (import - export and marketing channels)
- Analysing the involvement of different NGOs and other institutions in pepper production.
- Farmers organisations within the sector
- Production costs (gross margin analysis)

Methodology

The consultant will:

- Work under the direction of Ismet Babaj (IB) – Project Officer of HPK
- familiarize him/herself with the written material on the subject made available by the Project and from other sources
- consult the existing data from MAFRD and another sources about the area of pepper area, yield
- Interview key informants using interview schedules
- The study will clearly distinguish data, information, and comments for pepper production processing and marketing

Expected outputs

- A report in English, not more than 30 pp plus annexes.
- A presentation of the findings to GBDG for pepper production in Kosovo.

Estimated time frame

- 2 days data collection
- 6 days field visit to stakeholders
- 2 days analyzing the data
- 1 day workshop
- 3 days report writing
- 1 day de-briefing

Structure of Report

Summary

1. Background to pepper cultivation in Kosovo
 - 1.1 History,
 - 1.2 Relative importance of pepper within Agriculture
 - 1.3 Import substitution potential
 - 1.4 Export potential
 - 1.5 Prices
2. Description of current situation
 - 2.1 Distribution of cultivation throughout Kosovo
 - 2.2 Most common cultivation techniques, typical yields, seasonality
 - Typology of cultivators (including size of operation)
 - 2.3 Harvesting, packaging and transport
 - 2.4 Marketing channels
 - 2.5 Gross margin analysis
 - 2.6 Processing industry – capacity and trends
 - 2.7 Input supply
 - 2.8 NGOs and Associations
3. Best Agricultural Practices
 - 3.1 Describe BAP and yield potential
 - 3.2 Gross margin analysis
 - 3.3 Identification of individuals (& locations) carrying out BAP in whole or in part.
4. Market demand

- 4.1 Identify present market demand and comment how this could be met by producers
- 4.2 Identify future/potential demand/alternative markets.
- 5. Comparison of 'common' with BAP
 - SWOT analysis
 - Compare gross margins
 - Reasons why farmers do not adopt BAP
- 6. Proposals for more productive pepper production and marketing