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Crop and Product Costing II

Research report

Draft

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Research report

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All opinions expressed are those of the authors and have not been endorsed by donor.

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1 INTRODUCTION

The IESB Institute based on the Request for Proposal for The Promoting Private Sector Employment (PPSE) program in Kosovo has prepared this research report. The Promoting Private Sector Employment (PPSE) is a project in Kosovo financed by the Swiss Agency for Development and Cooperation (SDC), and implemented by a consortium of Swisscontact, Riinvest Institute and PEM Consult. The goal of the project is to attain large- scale sustainable impact on employment for young women and men through improved competitiveness of the private sector. The project uses the Market System Development (MSD), formerly known as Making Markets Work for the Poor (M4P) approach, using practical sector analysis which includes: sector problems, underlying causes, related services and its weaknesses, actors, and interventions proposed.

The program is concentrated in two sectors, namely tourism and food processing, including the fruits & vegetables subsector and the non-wood forest products sub sector. The program outcomes are: 1) competitiveness of the sectors; 2) private sector development governance; and 3) women's economic empowerment, whereas good governance with social inclusion and gender are transversal themes that will be mainstreamed through all the activities of the program. The project, focus is to assist small and medium size businesses operating in competitive and well-organized economic sectors, more specifically in the area of vegetable production especially for pepper and tomatoes.

The draft report presents the results of field interviews and secondary data conducted during the period consisting of December 2016-Janaury 2017. The underlying theme of the report is crop and product costing aimed at estimating employment opportunities for this sector. The analysis in the report draws on relevant information based on personal interviews and secondary financial data, on both, producer and processors of vegetables in Kosovo. The analysis includes all dimensions of crop and product costing, including labour, vegetable cost share in total cost, share of labour cost as well as data regarding profitability.

The reminder of this report consists of following sections. Section discusses research design, sample section, and methodology used to analyse data. Section 3 provides an overview of current situation of the vegetable production in Kosovo. Section 4 discusses the state of production of pepper for processing purposes while Section 5 analyses a cost of production. Section 6 and 7 describes and analysis the production of tomatoes. Section 8 presents findings on cabbage production. Section 9 covers collection centres. Section 10 presents share of labour in production of pepper and tomatoes for processing. Section 11 carrot production and Section 12 onion

Production. Section 13 discusses production of Cucumber. Section 14 estimates cost of tomatoes' sauce production. Section 15 cost of ajvar production (modern technology) while on Section 16 cost of ajvar production (traditional technology). Section 17 presents cost of pepper processing (Philippos Food Kosova). Section 18 provides cost of pickled pepper processing (Fitimi Drenas. Section 19 presents summary table: employment and income projections. Finally Section 20 provides some conclusions and recommendations.

2 METHODOLOGY

This research report contains findings personal interviews with producers and processors of pepper and tomatoes carried out in December 2016 – January 2017. This research report is based on quantitative and qualitative analysis of the data collected from producers and processors.

The first phase of research consisted on literature review on crop and product costing based on previous studies for pepper, tomatoes, onions, garlics, carrots and gherkins production in Kosovo and elsewhere. It followed the workshop with PPSE team to discuss aims, issues, and research study methodology. This workshop helped consulting team to clarifying the methodological approaches used in this study such sample selection and especially cost template questionnaire.

The study used purposive sampling of producers and processors in cooperation with PPSE staff to serve the needs of project. After initial in depth preliminary research and meetings with stakeholders of the fruits and vegetables processing sub-sector, PPSE has chosen it as one of the sectors with major potential for employment creation and income increase for actors along the value chain. On this base intervention have been defined to support the sector. One of the first interventions piloted is related to the introduction of non-GMO industrial varieties of tomatoes and peppers in order to substitute imported raw materials with locally produced ones and ensure processing capacities of food processors are utilized adequately. During 2016 the intervention was scaled-up in the Northern region of Kosovo. In this specific region, there were introduced four new varieties of vegetables, namely onions, garlics, carrots and gherkins.

Thus, based on the PPSE Project aims this crop costing assessment, is focused on the analysis the case in the Northern Region. It is looking to figure out what added value these four new crops bring to the farmers compare with the crops that they were previously doing, namely pepper, onion and potato. In terms of production of selected vegetables we have used list of AKTIVA collection centre based in Babimoc (Municipality of Vushtrri), while for purposes of evaluating companies in area of vegetable processing we have focused on Podujeva (Philippos Food Kosova), Fitimi in Drenas, and Abi Prizren. In addition we have updated the cost templates from the previous PPSE Crops costing assignment. The regions and companies we have presented from PPSE 1 crop costing assessment regions of vegetable production such as Anadrini region (triangle between municipalities Rahovec, Gjakovë, Prizren), and Anamorava region (Mogilla). For the purposes of data collection for the tomatoes and other specific crops specialized regions well known for the production of tomatoes was selected (Agrocelina). In addition, processors were selected from different regions (Prizren and Prishtina). In order to maximize variation in data collected analysed production cost of processors in

different levels such as small scale family owned, association of processors (e.g. Women Association in Krusha) and processors with larger industrial capacities (Abi Elif).

In this study, we used comparative analysis based on best agricultural practice for pepper[1], meaning that farmer has applied professionally new agricultural techniques of cultivation (starting from hybrid seed, qualitative seedling, adequate use of fertilisers, irrigation, pesticides, etc.). This data has been used with aim to analyse growth potential of this sector to generate income for farmers. In addition, all working days has been converted to full time employees. In order to create yearly figures we used an estimation based on 240 working days in a year equivalent to one full time employee. Part time employee is calculated at rate of 50% of full time employees.

The interviews were conducted face - to face with the key people in each enterprise, mainly owner/managers or financial managers. The consulting team prepared a cost questionnaire template for both producers and processors. The questionnaire contains several sections covering all costs regarding their cost structure including data on labour by gender, cost of raw material (pepper or/and tomatoes), other direct and indirect cost. The collected data were in expressed in quantity and expressed in Euro currency. The questionnaire has been prepared in excel sheet for easer communication, calculation and revision of data. The interviews did encompasses additional information provided by interviewees regarding their perspective on the business opportunities and occasionally on plans for expansion, enhancing the overall findings

The first phase of the field survey consisted of visiting these farmers/companies and delivering the questionnaire with explanations to avoid is of misunderstanding or excluding certain cost items. After receiving the completed questionnaires consulting team has reviewed the information and in all cases asked interviewees to send additional information and clarify existing data. In addition to producers and processors, consultants in this study collected and analysed data from various institutions (association of producers and processors, municipalities, MAFRD, etc.).

3 CURRENT SITUATION OF VEGETABLE PRODUCTION

Vegetable production is one of the main agriculture sectors Kosovo-wide, while in some Dukagjini Valley regions (especially regions along Drini i Bardhe River) it represents the main economic activity. Open field cultivation is the dominating vegetable production practice.

The production of vegetables in Kosovo is primarily concentrated in land near the rivers, with suitable conditions for irrigation. In Kosovo, generally operate mixed type farms, covering production of different varieties. Very rarely there are farms specialized for production of vegetables. In the triangle Rahovec – Gjakovë – Prizren, there are cases where specialized farms for production of vegetables. In this region, livestock funds is very poor, and for this reason, usage of manure is very low.

[1] Skender Kaçiu, 2008, Study of the current situation of pepper production in Kosovo, INTERCOOPERATION, Prishtine

In Kosovo, the there is a small number of vegetables crops and cultivars. The dominant crops produced in Kosovo are pepper, tomatoes, onion, cabbage, and watermelon. These five types of crops cover more than 60% of areas with vegetables in Kosovo. There are some tendencies to improve the assortment through the introduction of new hybrids for main crops produced in Kosovo. In this regard, some positive trends are noticed in production of tomatoes, cucumber, and cabbage, while with regard to pepper production these improvements are only minor. These changes in production of vegetables are linked with the consumption tradition, because some cultivars like Somborka and K. Kapia are most preferred in consumption (especially for pickles or processed)

Open field vegetable are concentrated in the Anadrine valley; a triangle between Rahovec, Gjakovë and Pizren. More than 3.000 ha of peppers is grown there (out of the total 5000 ha). Production of pepper for longer periods in the same land area created difficulties in crop production management The problem is that farmers see no alternative crop. More than half of the area is under pepper and farmers use the same land for 2 – 3 years consecutively c. With only 1-2 cows per farm, there is not enough manure.

The vegetable processing industry in Kosovo has a long tradition. This tradition is mostly related to the "Progress" vegetable processing industry located Prizren. Despite this fact, in Kosovo, there is no specialized production for the processing. Production of pepper, tomatoes, cabbage, and other types of vegetables that cannot be sold for fresh consumption are sold for processing purposes of the industry.

All the processed quantities mentioned above are supplied by the 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 peppers production, which could be a good opportunity for the farmers who are interested to specialize in this type of production.

Besides "Progress" there is a tendency for more processors to get involved in pepper (and other vegetables) processing. In the Krusha e Madhe village the women association "Farmer Women" with the 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 tons of processed pepper products. The peppers quantities used by this association for processing are mostly their own product.

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

According to the above-mentioned processors, there is a market for their products; therefore, utilization of peppers in the processing industry is one of the right orientations for the general pepper production developments in Kosovo. The key issue remains the linkages between producers and processors in the value chain. Due to the lack of these business linkages, collection centres play

an important role in linking with producers with processors. In this regard, a collocation centre "AGROCELINA" is main contributor.

4 PRODUCTION OF PEPPER FOR PROCESSING

There is no distinction in production of pepper for processing industry and fresh consumption purposes. The structure of varieties used is part of the technology. The dominating varieties in pepper production in Kosovo are very old and not satisfactorily productive. Somborka, K. Kapia and D. Bella. There is no hybrid found for wider production. Moreover, very frequently producers of these type of peppers use seed from generated from their regular production, especially for Soborka and K. Kapia. In the Anamorava region, instead of K. Kapia farmers use cultivar Amanda. Interviews with farmers in village Mogilla, show that in this region K. Kapia cannot be vegetate. Seeds produced in this way undergo no control or pre-planting treatment. Undoubtedly, all these mentioned deficiencies significantly influence on the pepper yields and time of ripening of the final crop.

The utilization of such (traditional) seed influences the likeliness of many difficulties in production (presence of diseases, different degradation processes, lack of growth) which naturally has an effect in the decrease of the yields as well as in a lower quality of the fruits. The traditional way of producing seedling results in low quality. Almost, none of the interviewed farmers (during our fieldwork) uses production of seedling in modules. In addition, the transplanting of seedlings is done with bear rooted seedlings. There is no need for a big investment in order to correct these "defects" in seedling production. The key to correct these "defects" is a better and more professional care-taking practice in seedling production. There are different methods of transplanting of seedlings in open field. In the Anadrini region majority of land is based on manual transplanting, and rarely with using machinery for seedling transplanting. The opposite holds for Anamorava region. In order to increase yield it is necessary to promote modern technology of seedling production. In Kosovo there are no specialised greenhouses for production of seedlings, there is a need for intervention support for development of nurseries. This has a vital not just for production of vegetables for processing industry, but also for vegetable produced for fresh consumption market.

In the majority of the producing regions, land preparation for seedlings transplant is usually done in autumn with a 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 whole winter. Land preparation in the spring is done through disking, ploughing or harrowing depending on the need 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.

In regions where pepper production is widespread, only 30-40% of farmers use organic fertilizer. The main reason why farmers in these regions do not use organic fertilizer is that their families usually own a small farm animals stock. 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 in other regions.

The amount of fertilizers that farmers use is based on their own free judgement. The absolute majority of the farmers have never taken samples of their soil for analysis.
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 because of the inappropriate fertilizer use.

Irrigation of the pepper plants is done based on farmers' own judgement. In regions with irrigation systems (Anadrini), farmers irrigate more often. The difference in irrigation cost is very high. While in regions with established irrigation system (Anadrini), irrigation cost is around 120 Euro/ha, in the Anamorava region (in Mogilla) is approximately six times higher (See Table for cost of production). There are very few cases of drip irrigation use in open field pepper cultivation.

Weeding is a regular activity applied in pepper production. Usually 2-4 hoeing between rows are practiced. Depending on the producer, hoeing is done by hand or by using machines. 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 in making the soil friable, but also because most farmers do not use herbicides or black mulch between the rows.
Protection from diseases, pests and weeds is done without prior planning. Preventive protection measures take place in very few cases.

Based on the collected data from the field, we did not identify commercial producers of pepper for milling purposes. Almost, none of farmers does not keep written evidence of production and other farm –related cost. For this reason, there is a no exact data of yield. Therefore, their calculations are bases on quantity sold and based on this quantity they calculate approximate yield per hectare. Yield rates vary depending on region, growing conditions and technology, and the general care of production.

Harvesting starts at different times of the year depending on the location. Cultivars used for processing (K. Kapia and Amanda) usually harvest 2-3 times. In general harvesting is an activity that influences heavily on the cost of production. According to the majority of the pepper producers, harvesting requires about four full-time workers during the two and a half months of pepper harvesting period. Even though harvesting is considered an "easy" activity in pepper production and all the farm family members are involved in it, still it represents a heavy burden for the pepper cost of production.

5 COST OF PRODUCTION

In this section, we discuss cost of production for two varieties of pepper; both of them produced using traditional technology. Differences in terms of cost of production are not very significant, except in regions where cots of irrigation and rent are high it makes some differences in terms of cost of production. However, in terms of different cultivars used, there are no notable differences. Pepper production in the way the PPSE wants to support farmers (with hybrid seeds and best agricultural practices) will lead to higher profitability, income and employment (see Annex 3 for comparative data for production of pepper in two regions)

The total cost of production for the present production system (in first case –Mogilla) is € 6,967.60[2] The value of land rent would be an additional 300 Euros. Considering an average pepper sale price of 0.30[3] Euros/kg the net profit per hectare would be € 533 /ha not including land rent. If we consider that the farmer is not renting the land and that 70 % of farm labour is done by family members, the total income for the farmer family would be €2,170.00/ha, or with his land €2,702.34 /ha. The average yearly rent per ha costs 300 Euros.

The comparatively higher irrigation cost in Anamorave has a significant impact on the profitability of production of pepper (around 700 Euros) as compared to Anadrini region (120 Euros). Similarly, the paid labour force (excluding unpaid family members) is very high (30%) compared to Anadrini Region where majority of works is done my unpaid family members. This is because the larger family size of Anadrini Region compared to Anamorava where family size is smaller.

Table 1: Traditional pepper production, K. Kapia, Mogilla

	Area 1 hectare				
		Unit	**Quantity**	**Price (€)**	**Total (€)**
1	**Revenue**	kg	25,000	0.30	**7,500.00**
	Costs				
	Inputs (including packaging e.g. nets or bottles)				3,367.66
	Labour	Day	240	12.92	3,100.00
	Machinery (costs of fuel considering that bigger farmers that target processors have tractors and attachments)				500.00
2	**Total cost of production**				**6,967.66**
3	**Net profit *(1-2)***				**532.34**
4	**Income with family labour (70% of labour costs)**				**2,170.00**
	Total income *(3 + 4)*				**2,702.34**

[2] Without rent

[3] In contrast to Anadrini region, the producers of the Anamorave region have longer production tradition of this type of pepper. Average yield is higher and this enables to sell at higher prices because they are able to avoid the hyper-production days for this cultivar.

In a per hectare basis, the cost of production for the present production system (in second case – Anadrini, Table 2) is **€** 5,262.00. 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 € 838 /ha not including land rent, or € 238 /ha should we deduct land 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 family would be € 1,800.40 /ha, or with his land 2,400.40 €/ha

Table 2: Traditional pepper production, K. Kapia, Anadrini

	Area 1 hectare				
		Unit	**Quantity**	**Price (€)**	**Total (€)**
1	**Revenue**	kg	22,000	0.25	**5,500.00**
	Costs				
	Inputs (including packaging e.g. nets or bottles)				2,776.00
	Labour	Day	240	7.23	1,736.00
	Machinery (costs of fuel considering that bigger farmers that target processors have tractors and attachments)				750.00
2	**Total cost of production**				**5,262.00**
3	**Net profit *(1-2)***				**238.00**
4	**Income with family labour (90% of labour costs)**				**1,562.40**
	Total income *(3 + 4)*				**1,800.40**

6 PRODUCTION OF TOMATOES

Since decades ago, there is no production of tomatoes for industrial processing purposes. Although, there has initiatives to promote the production of this type of tomatoes but without success. It worth mentioning, that during the period of former Yugoslavia, Kosovo produced up to hundreds hectares with this cultivar, primarily for the purposes of vegetable processing industry in Prizren.

The protected areas (various types of greenhouses) compose a dominant form of producing tomatoes. Farmers producing tomatoes in this way, usually supply the processing industry with unsold quantities of tomatoes in the market. Under these circumstances, processors face obstacles in their supply chain, and the quality of the supply with tomatoes is inadequate for their processing standards.

In comparison to pepper production, the production of tomatoes production noted a significant progress using hybrid seedlings and other advanced production technology. Because of this, the average yield in are comparable higher. Concerning the period of production, harvest of tomatoes begins during the first week of June and lasts until end of September, depending on the growing

conditions. While the harvest for tomatoes produced in the open field begins in second week of June and lasts until end of September.

The period of the tomatoes production is limited from the climate conditions of the region as well as greenhouse technology. There are no major differences/variations in terms of the harvest period of tomatoes during the years, but the high production takes place during the July and August. This is because the harvest of tomatoes produces in the open field and in the protected areas concur. Similarly, to production of other vegetables in Kosovo, production of tomatoes depends on the imported inputs.

After harvesting, the tomatoes are delivered to the market within the short period. Finalization of the quantities in the market is reasonable because the farmers do not have well-organized system for collection and storage of large quantities of tomatoes. Packaging is mostly done in wooden boxes of 5-6 kg. Transportation of tomatoes to market or processing company is done with different types of trucks. Usually, trucks used for transportation of tomatoes do not possess equipment for controlling conditions of tomatoes transportation. Based on the farmers' estimations, distance from farm to longest market distance in Kosovo does not exceed more than 2 hours of drive. According to them, the distance does not have an effect in lowering quality of tomatoes.

There is lack of cooperation agreements between tomatoes producers and processors. The main reason for this are limited capacities of producers/farmers and fresh consumption of tomatoes. Quantity produced of tomatoes still does not satisfy the market need for fresh consumption, and therefore has an implication for supply of processing industry. Another indicator is a limited area of production per farm, resulting in lower levels of quantity left for processing industry

7 COST OF PRODUCTION FOR TOMATO

Because there are no commercial production of tomatoes for processing, the single source of data was Agrocelina that cooperates with producers of this type of tomatoes. Agrocelina's calculations indicates higher average yield. However, yield could be even higher if we take into account use of hybrid seedlings in large areas of production (the yield can arrive at 55 t/ha[4]).

The production of this type of tomatoes does not require large investments and especially does not require large number of labour. In this case, net profit is 1,322.00 Euro/ha and if we calculated that 90% of work is done by unpaid family labour supply, then the profit margin would be 2,555.00 Euro (Table 3)

[4] The authors' opinion here is based in their previous experience

***Table 3: Tomato for processing*[5]**

	Area 1 hectare				
		Unit	**Quantity**	**Price (€)**	**Total (€)**
1	**Revenue**	kg	55,000	0.08	**4,400.00**
	Costs				
	Inputs (including packaging e.g. nets or bottles)				1,498.00
	Labour	Day	240	7.23	1,370.00
	Machinery (costs of fuel considering that bigger farmers that target processors have tractors and attachments)				210.00
2	**Total cost of production**				**3,078.00**
3	**Net profit *(1-2)***				**1,322.00**
4	**Income with family labour (90% of labour costs)**				**1,233.00**
	Total income *(3 + 4)*				**2,555.00**

8 COST OF PRODUCTION FOR CABBAGE

For a long time ahead cabbage was cultivated as a second crop, especially after cereals (mostly grain). In such a case, harvesting took place at the end of October and continued until early winter. The absolute majority of the cabbage quantities were used for traditional processing (preparation of pickled cabbage for family needs) To a smaller extent this type of head cabbage home processing, continues to this day in many regions of Kosovo (in rural areas). With the improvement of living standards, eating habits and choice of food have changed. Therefore using cabbages in pickled form is not as common as in the past, while using fresh cabbage (in salads) is becoming more popular. The structures of cultivation and cabbage varieties used have changed as a response to the demand to consume more fresh cabbage.

The agro-technical measures applied in cabbage production starting with choice of seed and finishing with harvesting is still extensive. It is necessary that farmers pay greater attention to care-taking activities

Generally, cabbage and onion are the first vegetable crops to be transplanted to the field by Kosovo farmers, for early production, planting of seed usually take place in Mid-February. For medium and late production, planting of seed usually takes place during May - June.

[5] It is estimated that the farmer has its own mechanization and land, while the price of hybrid type of seedlings has not been calculated because farmers planned to use seedlings provided by processors. Based on this information, the overall profit is calculated (revenues based on 90% unpaid family labour) to be around 850 Euros lower.

Cabbage does not have an important usage in the processing industry. During this year, it is predicted that only 60 tonnes of cabbages are going to be used for industrial processing[6]. However, cabbages are widely used for family traditional processing (pickles) a one used for family needs only.

Cost of production of cabbage is influenced by the fact that the price of cabbage is very variable (depending on the year and on the period within the same year). The price of cabbages (according to the farmers) fell to about 0.07 Euro/kg. During the same period of the previous year, the price had been three times higher. The price fluctuation problem is a proof of the difficulties and risks that vegetable producers in Kosovo face.

Cost of production for the traditional cultivation is relatively high and the profit from one hectare is low. Sales price at 0.12 Euro/kg was used based on the data for the average cabbage price. There exist no big differences between the cost of production of early and late production of cabbage. However there is a difference in seedling production (which is more costly for the early production), anyhow the number of irrigations in the early production is lower.

Usually farmers do not keep data on productivity. Based on the data collected from farmers, In regions where there is more intense production of cabbage average productivity ranges between 30-40 t/ha. For earlier cultivars this productivity is lower, while for late cultivars productivity reaches 70 or more t/ha (although it is rare).

Table 4. Cost of cabbage production

	Area 1 hectare				
		Unit	**Quantity**	**Price (€)**	**Total (€)**
1	**Revenue**	kg	35,000	0.15	**5,250.00**
	Costs				
	Inputs (including packaging e.g. nets or bottles)				1,182.66
	Labour	Day	240	7.23	790.00
	Machinery (costs of fuel considering that bigger farmers that target processors have tractors and attachments)				300.00
2	**Total cost of production**				**2,272.66**
3	**Net profit *(1-2)***				**2,977.34**
4	**Income with family labour (90% of labour costs)**				**711.00**
	Total income *(3 + 4)*				**3,688.34**

9 COLLECTION CENTRES

In neighbouring countries, it is not very popular for processors to work with farmers through collection centres, because this increases cost of production of processors. However, in Anadrini case, the collection centre is functioning well because we have small average size of firms and for processors it is difficult and costly to make contracts with small farmers. The average cost of per kg

[6] ABI

of vegetable (excluding packaging) is around 0.02-0.05 Euros. The average employment engagement per 1 ton of vegetables is one full time employee. The average employment cost in collection centre is 13.6 Euros per day (300 Euros per month at rate of 22 days per month).

10 SHARE OF LABOUR IN PRODUCTION OF PEPPER AND TOMATOES FOR PROCESSING

The share of labour cost in total cost of production is very high in the vegetable production activities because of low level of mechanization. Low productivity of producers of pepper has a significant impact in lowering their profits. On the other hand, the use of modern techniques in growing these vegetable would double the yield and profit. It is important, that, processors encourage and influence producers to introduce new hybrids, modern technology, and better crop management practices.

All family members, including women participate in the fieldwork. Based on collected data, share of women in fieldwork varies. For example, in village Mogilla, share of women in production of pepper is 30%, predominantly working in the harvesting period. In the Anadrini region, share of women labour in production activities is around 50%. Their share in caring for seedlings is 40%, while on harvesting is 60%.

However, the employment generation for this sector is promising. Taking into account that profitable opportunities for this sector are not fully utilized (around 50%)[7] and considering the high motivation of women to take up employment opportunities, the further support of this sector would facilitate the employment of women in rural areas.

11 CARROT PRODUCTION

Although the cultivation of carrot in Kosovo is quite old, for a long time it is produced in small areas, in gardens around houses for family needs. Commercial carrot production, in larger areas has begun in greater proportions only in the last ten years. Not only the production, but also the use of carrot for feeding of the population was represented very little. It was mainly used in restaurants and in households was used only for conservation.

With the raise of standards and improvement of the structure of nutrition, carrots increasingly are becoming one of the highly required vegetable plants in our country. This increase in demand has also led to increasing interest of farmers to increase yields and carrot surfaces.

In addition to production for fresh consumption, carrot is becoming increasingly important also for the processing industry. "Rooty fruit" of carrot is used for food which can have different colour, shape and size depending on the cultivar and growing conditions. Otherwise, carrot is part of the

[7] Author's own estimations

most important kinds of vegetables. There are nutritional and healing properties. It is the richest source of Beta carotene, from which the body synthesizes vitamin A, which has multiple significance for the human body. It has fairly wide use in human nutrition, whether fresh or processed. Carrots can be stored for a long period. Carrots can be cultivated even in quite large height above sea level (2000 m), makes this vegetable very important and widespread. Table below presents the cost of production of 1 Ha of carrots.

Table 5. Cost of carrot production

Activities	Unit	Quantity	Price	Total (Euros)
Land preparation	1ha	1	250 €	250 €
Manure NATYRAL	kg	1,000	0.10 €	100 €
Fertilizer N:P:K	kg	500	0.25 €	125 €
Fertilizer KAN	kg	200	0.30 €	60 €
Irrigation (drip system)	m	10,000	0.08 €	800 €
Seeds	kg	4	125 €	500 €
Pesticide & Herbicide	Over a year	1	250 €	250 €
Irrigation	1ha	1	100 €	100 €
				2,185 €
Labour cost				
Planting	1ha	1	150 €	150 €
Harvest		20	15 €	300 €
Pocketing & Classification		30	15 €	450 €
Transport		1	80 €	80 €
Others (bags)		1	300 €	300 €
				1,280 €
Total				
Cost of production				3,465 €
Income	kg	35,000	0.25 €	8,750 €
Net income				5,285 €

In majority of cases, productivity ranges between 20-30 t/ha. Average productivity at country level is 50% lower. With more dedication of farmers, for cultivars for storage productivity can reach up to 50 or more t/ha.

12 Onion Production

Onion is among the oldest vegetable known to mankind. Its use in human nutrition has a fairly distant past. It has been also cultivated by the ancient peoples (Greeks, Egyptians) who despite the use of onion for food used it quite a lot as a medical plant. Onions are quite durable product and is is cultivated worldwide and used for food in various forms.

There is fairly broad use in human nutrition as in various countries of the world as well as to us. Onions are used in various forms whether fresh or different soup and dishes. There are rare dishes without participation of onions in our country. In addition onion it is quite important by the fact that it as a culture emerges early in the spring, when assortment of nutrition of vegetables is quite poor.

In Kosovo, production of onions is done exclusively through bulbs. The cultivation of direct sowing of seeds in the field is little known, whereas the cultivation of onion through the seedling is almost not known at all. In the future it should be directed production of sewing more in the second mode (cultivation of direct sowing of seeds in the field) which has several advantages compared to other modes which is very good indicator in Kosovo's conditions.

This method in practice (is easier and safer) but is not quite economical. The advantages of this method of production of onion are based on the fact that the plant in the early stages has nutrient reserve available in sufficient quantities (which are the bulbs), so unfavourable agro-climatic conditions have little impact on plants.

Qualitative production of bulbs in the first year is one of the main preconditions for the production of onion through bulbs. In the production of vegetables in Kosovo productivity of bulbs is less common which is conditioned by the tradition of production and agro-ecological conditions. This type of production is known only in the district of Prizren.

Onion cultivation through direct sowing of seeds is a widespread cultivation of onions in many countries of the world. This method of cultivation of onion is very economical and has several advantages compared with the cultivation of onion through bulbs. The cultivation of onion through this method achieves very high yields 30-50 [t / a]. In Kosovo, this type of onion production is not known very well because of traditional method of production of onion as well as because onion in Kosovo has been cultivated without irrigation.

In addition to these factors, we should mention the fact that this way of cultivation requires quality preparation of the soil and more intense care compared to the other method (cultivation through bulbs) this production can be successful only in soils with good structure and prepared in very good order, they need to be flat, with a high content of nutrient and organic matter and clean of weeds (suitable for irrigation).

Table 6. Cost of onion production

Cost of production for onion (1 ha)				
Activities	**Activities**	Unit	Quantity	Price
Land preparation	1ha	1	180 €	180 €

Manure	kg	1,000	0.10 €	100 €
Fertilizer N:P:K	kg	1,200	0.35 €	420 €
Fertilizer KAN	kg	100	0.30 €	30 €
Onion sets	kg	600	1 €	600 €
Pesticide & Herbicide	During the year	1	200 €	200 €
Irrigation	1ha	1	100 €	100 €
				1,630 €
Labour				
Planting	1ha	1	150 €	150 €
Harvest		10	15 €	150 €
Pocketing & Classification		30	15 €	450 €
Transport		1	80 €	80 €
Others		1	300 €	300 €
Total cost				1,130 €
Summary				
Total production cost				2,760 €
Total Income	kg	25,000	0.25 €	6,250 €
NET income				3,490 €

Average productivity ranges from 15-30 t/ha, but with application of more modern technology and scientific achievements and with deeper understanding of the characteristics of this culture the productivity can reach 40 t/ha.

13 PRODUCTION OF CUCUMBER

Cucumber may be produced very successfully in open fields. Recently, there is evidence of production of cucumber with modern methods by using nets. Analysis conducted by AGRO project (USAID funded) for cost of production suggested the advantages of this method in comparison with traditional methods of production. This type of production is very useful and appropriate for processing industry because it has lower cost of production and van be very effective in open field during the July-September.

Table 7. Cost of cucumber production

Cost of production (1ha) Cucumber				
Activities	Unit	Quantity	Price	Unit
Land preparation	1ha	1	250 €	250 €
Manure NATYRAL	kg	1,000	0.10 €	100 €
Fertilizer N:P:K	kg	500	0.25 €	125 €

Fertilizer KRISTALOR	kg	200	1.20 €	240 €
Drip system irrigation	m	10,000	0.08 €	800 €
Plastic folio (black)	cope	6	110.00 €	660 €
Seeds	cope	50,000	0.015 €	750 €
Pesticide & Herbicide	During the year	1	250 €	250 €
Irrigation	1ha	1	100 €	100 €
				3,275 €
Labour cost				
Planting	1ha	1	180 €	180 €
Harvesting		100	15 €	1,500 €
Packaging & classifications		30	15 €	450 €
Transportation		1	100 €	100 €
Other (bags)		1	500 €	500 €
				2,730 €
Summary				
Total production cost				6,005 €
Total Income	kg	40,000	0.30 €	12,000 €
Net Income				5995€

The productivity for this cultivar depends on hybrid and growing conditions. As mentioned earlier, for this culture too there is lack of data because the farmers do not keep updated accounts. Based on farmers' data, it can be estimated that majority of them achieve an average productivity of 25-35 t/ha. However, if they apply modern technologies for cultivation (including nets) they can achieve productivity of 50-60 ton/ha.

14 COST OF TOMATOES' SAUCE PRODUCTION

Tomato ketchup is flavoured products processed from sorted, washed, and fresh wholesome tomatoes and hot fruits. Although tomatoes are one of the most widely grown vegetable in Kosovo, their production for industrial purposes remains limited as discussed in previous sections. Several intensive and interlinked operations in the production process of tomato sauce including include washing, crushing, concentrating, homogenizing, flavouring, bottling and/or canning, packing and dispatching.

The share of total cost tomatoes in the total cost for production of tomatoes sauce is 48%, reinforcing the argument that the development of processing industry will have tremendous impact on producers and farmers. In marginal terms, a unit change increase in production of tomatoes sauces will lead to ½-unit increase of production of tomatoes. However, the major concerns of processors remain the limited supply side capacities of producers. Moving, from traditional cultivars to industrial type cultivars would enable famers to increase their sales.

In terms of employment, the share of labour cost in total production cost of tomatoes sauce is relatively small (around 9%). However, the potential of export for this product noted encouraging trends, indicating that despite the low share of labour the potential for increase in volume of production can have an impact on employment generation. In particular, these employment opportunities will be more likely for women than for man. Data show that the share of women in total number of employees in this production is 53% (both full time and part time). From all three seasonal part time employees all of them were women.

Table 8 Cost of tomatoes sauce production (ABI)

Qty for processing (7,000 kg pepper)	Quantity	Euros/unit	Total (Euros)	Labour involved			
Materials				Full time		Part time	
				F	M	F	M
Tomatoes (kg)	7,000.00	0.10	700.00				
Salt	15.00	0.15	2.25				
Preservatives	1.00	5.00	5.00				
Sugar							
Gas/coal	2.00	60.00	120.00				
Electricity	750.00	0.17	127.50				
Packing	1,000.00	0.26	260.00				
Labour (Days)							
Cleaning and drying	5.00	7.00	35.00		2	3	
Baking							
Cleaning the skin							
Milling	3.00	7.00	21.00		3		
Cooking	2.00	7.00	14.00		2		
Filling the jars	6.00	7.00	42.00	6			
Storing	4.00	7.00	28.00		4		
Other work							
Indirect cost							
Machines	10.00	1.00	10.00				
Receiving							
Packing	8.00	7.00	56.00	6	2		
Engineering							
Insurance							
Utilities	1.00	5.00	5.00				
Other (Depreciation)	1.00	10.00	10.00				
Total Cost of production			1,435.75	12	13	3	0
Total Quantity produced (pack)			1,000.00				
Cost per unit (pack)			1.44				

15 COST OF AJVAR PRODUCTION (MODERN TECHNOLOGY)

The production of ajvar involves sequence of different production operations such cleaning and drying, baking, removing the skin, milling, cooking, filling the jars and storing.

The share of total cost of peppers in the total cost for production of ajvar is 27.4 %, while share of labour cost in total cost is 22 percent (Table 9). In marginal terms, a unit change increase in production of ajvar will lead to almost 27.4 percent increase of production of peppers. However, the major concerns of processors remain the limited supply of producers to satisfy the needs of processors.

In terms of employment, women's share in total full time employment is around 54 percent, and 100 percent in total part time employment, respectively. These findings suggest important employment opportunities, especially for women. To illustrate, if production of ajvar doubles, then, the expected increase of employment is 22 percent. Within the 22 percent, increase of labour female participation would be more than half.

The ajvar production has potential for market growth, including export, therefore is promising in generating employment.

Table 9: Cost of ajvar production (ABI)

Quantity for processing (1000 Jars)	**Quantity**	**Euro/unit**	**Total (Euros)**	**Labour involved**			
Materials				**Full time**		**Part time**	
				F	**M**	**F**	**M**
Peppers (kg) purchased	1,500.00	0.18	270.00				
Oil	20.00	1.10	22.00				
Salt	15.00	0.15	2.25				
Sugar							
Gas/coal	2.00	60.00	120.00				
Electricity	750.00	0.17	127.50				
Jars	1,000.00	0.13	130.00				
Labour (Days)							
Cleaning and drying	10.00	7.00	70.00	5		5	
Baking							

Cleaning the skin	3.00	7.00	21.00		3		
Milling	3.00	7.00	21.00		3		
Cooking	3.00	7.00	21.00		3		
Filling the jars	6.00	7.00	42.00	6			
Storing	4.00	7.00	28.00		4		
Other work	3.00	7.00	21.00	2	1		
Indirect cost							
Machines	10.00	2.00	20.00				
Receiving							
Packing	8.00	7.00	56.00	6	2		
Engineering							
Insurance							
Utilities	1.00	5.00	5.00				
Other (Depreciation)	1.00	10.00	10.00				
Total cost of production			986.75	19	16	5	
Total production (Jars)			1,000.00				
Unit cost of production			0.99				

16 COST OF AJVAR PRODUCTION (TRADITIONAL TECHNOLOGY)

Traditional technology of production of ajvar involves more labour than production based on modern technology. Traditional technology has been based on long tradition of women in Kosovo. The selected company sells its products during various fair-trades and other food events, which were organized by MAFRD, ABK and Economic Chamber, etc. They sell their products also to various individual consumers in surroundings of the Krusha e Madhe and to major trade centres like ALBI, Ben AF, Maxi, Interex, Nertili, Liridon, etc. They usually have predetermined singed contract with trade centres for supply with ajvar.

Table 10 presents cost structure of production of ajvar using traditional technology: pepper (raw material) 39%, labour 21.50, and other 39.05. Compared to modern technology production of ajvar we can noticed that there are differences in terms of engagement. Almost 100 percent of labour (both full and part time) is women (only one male employee) suggesting that this technology of production is fully based on women labour. A total number of employed is four full time females and one male we well as 15 seasonal part time workers. Having considered the product penetrated successfully into the market, it has potential for future growth. A unit cost of production of ajvar is 3.07 Euros, which is very high compared to modern technology production unit cost (around 1 Euros). The profit margin for production of ajvar is more than 30 percent.

Table 10: Cost of ajvar production, traditional technology (Grate e Krushes)

Qty for processing (90,000 kg)	Quantity	Total (Euros)	Labour involved			
Materials			Full time		Part time	
			F	M	F	M
Peppers (kg) purchased	90,000.00	27,000.00				
Oil	6,500.00	7,150.00				
Salt	750.00	300.00				
Sugar	750.00	375.00				
Gas/coal						
Electricity		950.00				
Containers/Jars/PACKING		6,250.00				
Labelling		1,562.50				
Wood for boiling	80.00	4,000.00				
Labour (Days)			4	1	15	
Cleaning and drying						
Baking		2,450.00				
Cleaning the skin		2,150.00				
Milling		850.00				
Cooking		3,545.00				
Filling the jars		960.00				
Storing		1,240.00				
Other work		3,600.00				
Indirect cost						
Machines						
Receiving						
Packing		2,350.00				
Engineering		1,800.00				
Insurance						
Utilities		420.00				
Water supply		90.00				
Depreciation		450.00				
Other		1,650.00				
Total cost of production		69,142.50	4	1	15	
Total production		22,500.00				
Unit cost of production 1 Kg		3.07				

Quantity produced	Quantity (kg)	Jar 720 gr	Price per Jar	Total revenue
Hot baked ajvar	11,250.00	15,625.00	3.30	51,562.50

Mild baked ajvar	11,250.00	15,625.00	3.30	51,562.50
Total revenues	22,500.00	31,250.00		103,125.00
Cost of product sold				69,142.50
Profit before tax				33,982.50

This company with same equipment and labour inputs produces the pickles with yogurt. However, the profit margin for pickled peppers in yogurt (21percent) is lower than producing ajvar (30 percent).

Table 11: Cost of production of pickles with yogurt, traditional technology (Grate e Krushes)

Materials	**Quantity**	**Total (Euros)**	**Labour involved**			
			Full time		**Part time**	
			F	**M**	**F**	**M**
Peppers (kg) purchased	80,000.00	24,000.00				
Oil						
Salt	950.00	380.00				
Sugar						
Milk	20,000.00	8,000.00				
Gas/coal						
Electricity		750.00				
Containers/Jars/PACKING	21,053.00	14,737.10				
Labelling	21,053.00	1,684.24				
Labour (Days)			4	1	20	
Cleaning and drying		2,540.00				
Baking						
Cleaning the skin		3,500.00				
Milling						
Cooking						
Filling the jars		1,650.00				
Storing		1,240.00				
Other work		3,650.00				
Indirect cost						
Machines						
Receiving						
Packing		2,560.00				
Engineering		1,800.00				
Insurance						
Utilities		420.00				
Water supply		90.00				

Depreciation		450.00				
Other		1,650.00				
Total cost of production		69,101.34	4	1	20	
Total production		40,000.00				
Unit cost of production (2.7 kg)		1.73				

Quantity produced	Quantity (kg)	Jars 2,7 Kg	Price per Jar	Total revenue
Babura with yogurt	20,000.00	10,526.00	4.00	42,104.00
Somborka with yogurt	20,000.00	10,526.00	4.00	42,104.00
Total	40,000.00	21,052.00		84,208.00
Cost of product sold				69,101.34
Profit before tax				15,106.66

17 COST OF PEPPER PROCESSING (PHILIPPOS FOOD KOSOVA)

Table below presents cost structure of pepper processing using modern technology. In processing peppers we have quite good engagement of female labour. A total number of employed is 91 full time females 74 male we well as 36 seasonal female and 14 male part time workers. Having considered the product penetrated successfully into the market, it has potential for future growth. A unit cost of production of ajvar is 1.27 Euros,

Table 12. Cost of pepper processing

			Labour			
1000 Kg pepper						
			Full time		**Part time**	
Materials	**Total cost**	**Quantity**	**Female**	**Male**	**Female**	**Male**
Oil	0					
Salt	3.18 €	1000	32	15	18	7
Preservative	0.06 €	1000	2	3	18	7
Sugar	12.50 €	1000	2	3		
Gas/coal	0	1000				
Electricity	5 €	1000				
Containers/Jars/PACKING	126.88 €	1000				

	5 €	1000				
Labour (Days)						
Cleaning and drying	42.39 €	1000	32	15		
Baking	80 €	1000				
Cleaning the skin						
Milling						
Cooking	200 €	1000	10	2		
Filling the jars	400 €	1000	8	4		
Storing	50 €	1000				
Other work						
Packaging/covering	25 €	1000		2		
Labelling	25 €	1000		2		
Pallets	22 €	1000		3		
Indirect cost						
Machinery	50 €	1000	5	10		
Stock	20 €	1000		5		
Packaging	50 €	1000		4		
Engineering	100 €	1000		2		
Insurance	20 €	1000		4		
Utilities	20 €	1000				
Depreciation	20 €	1000				
Total cost of production	1,277.01 €	1000	91	74	36	14
Total production						
Unit cost of production	1.27					

18 COST OF PICKLED PEPPER PROCESSING (FITIMI DRENAS)

Table below presents cost structure of pepper processing pickled using modern technology. In processing pickled peppers we have also quite high engagement of female labour. A total number of employed is 7 full time females 3 male we well as 30 seasonal female and 0 male part time workers. Profit per unit cost of production of ajvar is 0.20-0.30 Euros.

Table 13. Cost of production of pickled peppers (industrial processing)

				Labour involved			
				Full time		Part time	
		Total cost	**Qty**	**F**	**M**	**F**	**M**

1.	**Revenues**			**7**	**3**	**30**	**-**
	Materials						
	Peppers (kg)	0.40-0.55€	1kg				
	Oil	--					
	Salt	160€	Pallets				
	Sugar	160€	Pallets				
	Milk	-					
	Gas/coal	1,000-1,500€	1,000-1,500l				
	Electricity	80€	Per month				
	Containers/Jars/PACKING	11,500€	50,4000				
	Labelling	0.015€	Piece				
	(other) Vinegar	4000€	10,000l				
	(other)_____						
	Cleaning and drying	200€	All products				
	Baking	-	-				
	Cleaning the skin	-	-				
	Milling	-	-				
	Cooking	-	-				
	Filling the jars	-	-				
	Storing	130,000	The whole object				
	Other work:						
	Indirect cost						
	Machines						
	Receiving						
	Packing						
	Engineering						
	Insurance	100€	Per person				
	Utilities	-	-				
	Water supply	-	-				
	Depreciation						
	Other						
2	**Total cost of production**						
3	**Net profit (1-2)**	**0.20-0.30€**	Product				

19 SUMMARY TABLE: EMPLOYMENT AND INCOME PROJECTIONS

The data for best agricultural practices production for pepper and cabbage are based on earlier studies (Kaçiu, 2008 and 2009) with very small modifications in certain parameters, while for tomatoes production are based on Agro Celina report on cost of production for processing tomatoes.

It should be noted that the estimation are based on data provided by companies. For the purposes if impact of PSEE evaluation, the traditional technology of processing should be used cautiously because it overestimates the employment opportunities, because the most part of processing takes part in the industrial sector with modern technology which is less intensive labour activity. All working days as been adjusted to provide information for full time employment. In order to create yearly figures we used an estimation based on 240 working days in a year. Part time employees also has been adjusted into working days to calculate full time employment per year.

20 CONCLUSIONS AND RECOMMENDATIONS

This section reports main conclusions and draws some recommendations as follows:

- In Kosovo, there is no specialised production of vegetables for processing industry. Production of pepper, tomatoes, cabbage and other vegetables which cannot be sold for fresh consumption is sold for processing purposes (for those vegetables attractive to processing industry
- Traditional processing of pepper may be a good choice for these producers even in small quantities. Although with limited production capacities, women involvement in this sector is very positive.
- A major problem in this area remains weak linkages between producers and processors in the value chain. In response to this value chain gap, collection centres play a significant role in connecting producers and processors.
- Crop management of producers is not adequate, majority of them not having appropriate data on the cost of production and other expenses. Usually, their estimation of sales is based on sold quantities.
- Paid labour force in Anamorava region (excluding unpaid family labour) is very high (around 30 percent) compared to Anadrini region because of family size differences in respective regions.

- Findings suggest that there are different engagement rates of female and male in vegetable production activities. For example, in Mogilla female labour participation in production activities is around 30 percent and are primarily engaged in harvesting activities. In Anadrini region, female participation is around 50 percent. Female participation share is 40 percent in caring for seedlings and 60 percent in harvesting.

- The employment generation for crop production is promising. Taking into account that profitable opportunities for this sector are not fully utilized (around 50%) and considering the high motivation of women to take up employment opportunities, the further support of this sector would facilitate the employment of women in rural areas.

- There is a need to support and develop commercial production of both pepper and tomatoes to fulfil the needs of the market in terms of quality and quantity. This will unleash the potential for vegetable processing industry. We suggest working with farmers with higher potential people to help them develop commercial pepper production and demonstrate the benefits of it in order to promote this type of production.

- The share of total cost tomatoes and peppers in the total cost for production of tomatoes sauce and ajvar is 48%, and 27 percent respectively. This suggests that the development of processing industry will have tremendous impact on generating aggregate demand for producers and farmers.

- The share of employment cost on total cost of production for tomato sauce is 9 percent while for ajvar is 22 percent. Within this range, the female labour participation is very high (around 50%).

- The major concern of processors remains the limited supply side capacities of producers. Moving, from traditional cultivars to industrial type cultivars would enable famers to increase their sales and therefore, encouraging increase of production capacities of farmers. In this regard, the processing companies have shown readiness to finance the seedlings of pepper and tomatoes production. The support of seedling may have a positive impact in encouraging the producers to move towards the production of commercial vegetables, and hence creating employment opportunities.

- Research findings suggest that an average income from crop production is average of 4,097.14 Euros, while average employee is 1.86 full time employee. In the processing sector the employment generation per i/ha of crops used for processing is 1.56 full time of employees. Female participation in labour in production is around 50 percent while in production more than 50 percent.

- Cucumber production, carrots and onion is far better in terms of both, employment and income generation.

ANNEX 1: REFERENCES

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ANNEX 3: COMPARATIVE DATA FOR PRODUCTION OF PEPPER IN TWO REGIONS (TABLE 1 & 2)

	Area 1 hectare	Mogilla				Anadrini			
		Unit	**Quantity**	**Price (€)**	**Total (€)**	**Unit**	**Quantity**	**Price (€)**	**Total (€)**
1	**Revenue**	kg	25,000	0.30	**7,500.00**	kg	22,000	0.25	**5,500.00**
	Costs								
	Inputs (including packaging e.g. nets or bottles)				3,367.66				2,776.00
	Labour	Day	240	12.92	3,100.00	Day	240	7.23	1,736.00
	Machinery (costs of fuel considering that bigger farmers that target processors have tractors and attachments)				500.00				750.00
2	**Total cost of production**				**6,967.66**				**5,262.00**
3	**Net profit *(1-2)***				**532.34**				**238.00**
4	**Income with family labour (70% /90% of labour costs)***				**2,170.00**				**1,562.40**
	Total income *(3 + 4)*				**2,702.34**				**1,800.40**

*****70% Mogilla; 90% Anadrin*