TagItSmart
Smart tags driven service platform for enabling ecosystems of connected objects

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Open Call Deliverable Report for

HoneyTag – Brand protection and Quality Improvement for Montenegrin Honey

– Feasibility and Affordability Study –

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Project objective

The general objective of the HoneyTag pilot project is to validate the feasibility of the TIS solutions and Smart Tags use for brand protection, quality control and reducing forging in honey production, as well as to test TIS capabilities to change based on environmental conditions (such as temperature and potentially UV rays) to avoid fake or misplaced honey products, by enabling contextual scanning.

The following specific objectives are to be achieved:

- To analyse honey production and supply chain in order to properly identify and organize pilot facilities among honey producers in the municipalities of Pluzine, Savnik and Zabljak;
- To test and validate TIS configuration, implement and execute a pilot system for brand protection, quality control and reducing forging in honey production in targeted municipalities;
- To prepare feasibility analysis regarding the potential of TIS solutions usage for brand protection and reducing forging in honey production (reviewing both costs and benefits) in Montenegro, including the affordability study;
- To promote and widely disseminate the results of the pilot implementation, providing an opportunity to registered honey producers from other regions to explore the benefits of TIS technologies and tools in order to use them in the future, primarily through the Union of beekeeping associations of Montenegro (SPOCG) as a national umbrella organization;
- To provide relevant feedback and share “lessons learned” to the TIS project about pilot performance and propose improvements (if any).

This Affordability study has the specific project objective to analyse the potential of TIS solutions usage for brand protection and reducing forging in honey production (reviewing both costs and benefits) in Montenegro.

The key objective of the Affordability Study is to *”evaluate beekeepers readiness to accept increased costs”.*

Methodology

Starting from the key objective of this study, the methodology for analysing the affordability of implementing the Honey Tag project has been defined. Implementation of HoneyTag project includes purchasing of labels for individual honey producers – these labels are placed on each package/jar of honey. The producers have to purchase and calculate purchasing costs in calculation of production costs and calculation of the profit rate.

The specific objective of this Affordability study is to investigate if implementation of Honey Tag project is affordable to honey producers in the area of Durmitor (municipalities of Žabljak, Plužine and Šavnik).

This methodology includes the following:

1) The study analysis is related only to honey producers in area of Durmitor (municipalities of Žabljak, Plužine and Šavnik). The calculation of number of producers is made based on the data provided by SPOCG and includes only those producers who paid the annual membership fee (officially registered beekeepers). Our approach is based on the estimation that the producers who pay the membership fee are a representative group that will participate in the project and be ready to use labels.
2) Using data obtained from SPOCG, we analysed the estimated revenues and costs per unit of production (hive). Following this approach, we estimated revenues from the sale of honey per unit (hive) and per producer.
3) The next step in the methodology is the analysis of the label price. This part of the methodology includes the procedure of procurement of the label – this implies that labels are purchased through SPOCG, and not through individual producers. Also, it starts from the fact that labels are produced in Montenegro and delivered to Danilovgrad, and then distributed to individual honey producers.
4) At the end of the study, we made the analyses of production costs per hive with included label costs and estimation of costs with the conclusion about affordability and implementation of the project.

Review of Revenues

The initial data in the analysis of revenues made from the honey production is the SPOCG data on the number of members by municipalities, who paid the membership fee in 2017. The following table shows the number of members in the municipalities of Šavnik, Žabljak and Plužine that paid the membership fee for 2017, and the table also shows the recorded number of hives of these manufacturers

Table 1: Review of producers who paid SPOCG membership fee in 2017 and number of hives

Municipality	Number of producers	Number of hives
Šavnik	23	962
Žabljak	17	185
Plužine	37	1.065
Total:	77	2.212

Further analysis starts from the assumption that 60% of the hives are stationary and 40% are planted. The stationary hives capacity is 8-14 kg of honey per hive (on average 11 kg), and the capacity of planted hives is 14-20 kg per hive (on average 17 kg). The selling price per kg

of honey ranges from 10 to 15 EUR, and for the purposes of this study the estimated price is 10 EUR per kg. The following table shows the volume of production and income for the total number of hives from the areas of Šavnik, Žabljak and Plužine that were taken for analysis.

Table 2: Production capacity and revenues per hive

Type of hive	% in production	Capacity per hive	Average capacity	Price per kg	Total revenue/hive (in EUR)
Stationary	60%	8-14 kg/hive	11 kg/hive	10 EUR	110,00 EUR
Planted	40%	14-20kg/hive	17 kg/hive	10 EUR	170,00 EUR

The revenue calculation for the total number of 2.212 hives is presented in the Table 3.

Table 3: Revenue calculation for 2.212 hives

Type of hive	% in production	Number of hives	Average capacity	Price per kg	Total revenue/hive (in EUR)
Stationary	60%	1.327	11 kg/hive	10 EUR	145.970
Planted	40%	885	17 kg/hive	10 EUR	150.450
Total		2.212			296.420

Review of Production Costs

According to SPOCG records, the structure of the cost of honey production is:

- Fixed costs, and
- Variable costs.

The review of expenses for honey production, based on the type of hives, are presented in the following tables:

Table 4: Fixed and variable costs for honey production – for stationery hives

	Fixed costs	EUR	Variable costs	EUR
Stationery hives				
	Wax	6.00	Replacement of hives	8.10
	Health protection	2.50	Additional workforce	2.00
	Queen bee	5.00		
	Bees feeding	13.00		
	Packaging	5.39		
	Fuel	2.00		
	Total	33.89		10.10
	Other expenses	1.00		
	Total expenses: 44,99 EUR			

Table 5: Fixed and variable costs for honey production – for planted hives

	Fixed costs	EUR	Variable costs	EUR
Planted hives				
	Wax	6.00	Migration of bees	15.00
	Health protection	2.50	Replacement of hive parts	8.10
	Queen bee	5.00	Additional workforce	3.00
	Bees feeding	13.00		
	Packaging	8.33		
	Fuel	6.00		
	Total	40.83		26.10
	Other expenses	1.00		
	Total expenses: 67.93 EUR			

Based on the data on the income per hive and the total production costs (depending on whether it is a stationery or planted beekeeping), the total profit per hive in the case of stationery beekeeping is 65.01 EUR, and the profit per hive in the case of planted hives is 102.07 EUR.

Label costs

Introduction of smart label-based packaging includes labels for each package/jar of honey. This analysis implies that honey sale is packed in 1 kg jar packages.

The cost analysis of the labels includes the following assumptions:

- Label production is organized locally in Montenegro,
- Procurement of labels is performed by SPOCG, and then distributed to individual beekeeping organizations and beekeepers in Durmitor region,
- The costs of producing the labels are shown in the table below and do not include other costs (transportation, taxes, management fees).

The following table shows the structure of the cost of producing labels, and based on the input from the partner organizations in the project.

Table 6: Review of label production costs

Label cost	Amount (EUR)
General work costs	0.2
Printing consumables	0.1
Paper costs	0.1
Thermochronic ink consumption	0.003
Photocromic ink consumption	0.005
Inkjet printing	0.01
Distribution and other expenses	0.2
Total:	0.618 EUR/label

Having in mind the number and structure of hives in the area of Durmitor, the total label costs are 6.8 EUR per stationery hives and 10.5 EUR per planted hives.

Conclusion about the Costs of production

Honey production, calculated on the basis of estimated production costs and realized revenues, generates 65.01 EUR of profits in stationery hives and 102,07 EUR for planted hives. The realized profit rate is 59.10% and 60.04% respectively.

When the cost of the labels is included in the calculation, then the costs of the production of stationary hives are 51.8 EUR per hive and 78.4 EUR per hive in the case of planted hives.

The increase in production costs is 15.1% and 15.5% respectively, as shown in Table 7.

Table 7: Increase of production costs with included label costs

Production costs calculation	Stationery hives	Planted hives
Production costs	44.99 EUR	67.93 EUR
Label costs	6.8 EUR	10.5 EUR
Total costs	51.8 EUR	78.4 EUR
% of cost increase	15.11%	15.47%

In the case of project implementation, there is a decline in profits due to the costs of purchasing labels, as shown in Table 8.

Table 8: Decrease in profit with included label costs

Profit calculation	Stationery hives	Planted hives
Revenues	110.00 EUR	170.00 EUR
Costs without labels	44.99 EUR	67.93 EUR
Profit	65.01 EUR	102.07 EUR
Profit rate	59.10%	60.04%
Costs with labels	51.8 EUR	78.4 EUR
Profit	58.21 EUR	91.56 EUR
Profit rate	52.92%	53.86%
% of profit decrease	10.46%	10.29%

The conclusion is that the implementation of the project leads to a rise in production costs of 15% and a 10% profit decline. Bearing in mind the amount for which the cost of label production affects the increase in total production costs, it can be concluded that the implementation of the project is acceptable from the point of view of the cost of production of honey.

Conclusion about the Project implementation

During the preparation of this study, SPOCG and their members who expressed the willingness to participate in the project stated that the acceptable price of the label for 1 kg of honey was 0,10 EUR. The price of the label in this study is significantly higher and amounts to EUR 0.6 per kg.

However, it should be noted that the estimated price of the label was obtained in consultations with partner organizations and their assessments from other projects, and that it is expected that the price of label production will increase after their production is organized locally in Montenegro. The main reason for this is that label manufacturers will have to acquire the necessary technology and materials and harmonize the organization of production with the requirements of label production.

In the calculation of the price of labels per unit are included distribution and other costs (see Table 6) – these costs should also include backstopping activities related to maintenance of the information system and Honey Tag application, update of the Web site and other expenses that should be organized by the SPOCG. These costs are currently higher per unit because they only apply to producers from the Durmitor region, and they can be significantly lower per unit when other manufacturers join the project.

Therefore, the conclusion that the implementation of this pilot project should be supported by the Ministry of Agriculture through financial support to the pilot project participants in the procurement of labels. This support will allow manufacturers to continue producing honey using the Smart tag application without the risk of affecting their production. This support should be time-limited, and its goal is to help manufacturers apply new technology. If this pilot project, supported by the Ministry of Agriculture, proves to be successful which includes education of both beekeepers and final consumers as well as promotion of smarttags, there is no doubt that all other producers from Montenegro will be interested in its implementation.