

## THE IMPACT OF SILKWORM FARMING ON THE RURAL ENVIRONMENT

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*Abstract: Due to the favourable pedoclimatic conditions in our country, there is potential to develop a business with silkworms, but there are very few producers. This activity can be an important economic activity through which very good incomes can be obtained. The main purpose of this paper is to present the business plan of a company dealing with the sale of cocoons and the economic impact that the establishment of such a company would have in Cefa commune, Bihor county.*

*Key words: silk, sale, sericulture, antique, Bihor county*

### INTRODUCTION

Sericulture has a long, large and interesting history. For centuries, the West had little information about silk and those who produced it.

Silk was used to make various ornaments and other fabrics. Silk stopped being just an industrial material, in time it became an absolute value. According to the French specialist Dr. Eng. Paul Rochas natural silk existed before the appearance of man. Silkworm cocoons were discovered in 1927 near the Yellow River in northern China, dating back to 2600-2300.

The mulberry tree, originally from Asia, was brought to Europe at the same time as silkworms. The culture of mulberry plantations and their expansion determine the development of sericulture. It is estimated that natural silk represents approximately 0.15% - 0.17% of the total textile fibers used worldwide. Requirements increase every year by at least 5%, because it cannot be substituted from the composition of many articles [1].

In Romania, thanks to extremely favourable pedoclimatic conditions, sericulture developed extremely quickly. It spread in the Romanian lands in the 17th and 18th centuries, at first in Banat and then in Transylvania from the West [2].

In our country, the existence of a silk industry has been remembered since 1818. The state began to support this branch in 1845. Over 650,000 white mulberry saplings were distributed and planted in Moldova. In Muntenia in 1842, the number of existing silkworms at that time was about 1000,000 and the publications of the time presented information about the multiplication of silkworms, respectively the growth of silkworms. In Romania, the results obtained were particularly good regarding the growth of silkworms. Thus, Romanian silk was able to enjoy great success at the universal exhibition in London in 1851, but also in Paris in 1855 [3].

Until 1990 we were a country with a tradition of silk production. In the following period until 2004, no one showed interest in this sector. After the end of the First World War, the Sericulture Station was established in Orșova for the production of silkworm pots, and the Băneasa Sericulture Station became the central sericulture resort belonging to the Ministry of Agriculture with the objective of procuring and selling silkworm pots.

The low production after 1945 is explained by the outbreak of the Second World War, which significantly disrupted sericulture as well. Since 1958, production has increased continuously, being more than double in 1989, compared to that of 1958. For 1990, production was 67,000 tons, so an insignificant increase compared to 1989. Although it can be appreciated that the development of sericulture took place later in the Romanian countries compared to other countries, however the use of natural silk on the territory of Romania is particularly old.

To support silkworm farmers. The Ministry of Agriculture proposed granting a subsidy of 400,000 lei/box of 10 grams of silkworm eggs to agricultural producers who deliver at least 20 kilograms of raw cocoons for each 10 gram box.

Through the advance payment campaign, for the year 2022 a coupled support will be granted in the livestock sector for the category of silkworms of 180.0000 lei. This is a help to start a farming business during this period.

### MATERIALS AND METHODS

As a result of the market research we have gathered information about the growth of silkworms. We followed the situation of crops on the territory of Romania, as well as the impact of the growth of silkworms on the rural environment. Analysing the data, we made a forecast for a new mulberry culture in view of a business plan for a period of 5 years, in the town of Cefa, Oradea.

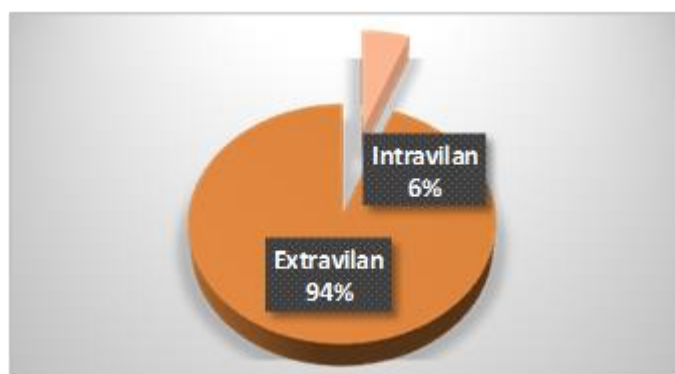
We collected, analysed and estimated data making a prediction for a new crop of white mulberry and growing silkworms to be distributed in cocoon form. I developed a business plan for a period of 5 years, in the town of Cefa, Oradea.

### RESEARCH RESULTS

Over the years, the Cefa commune has always been on an upward trend, everyone's efforts being directed towards the development of the living conditions offered to the inhabitants of the commune.

The village of Cefa is located in the southwest of Bihor county, between the municipalities of Oradea and Salonta, at a distance of 9 km from the Romanian-Hungarian border, being included in the Bihor-Hajdu Bihar development euroregion and also part of the Cefa Natural Park, the reserve meant to protect did not name the wetland with flora and fauna, respectively local traditions [18].

The town has an area of 7181.97 ha, of this area 410 ha being intra-village and 6771.97 of the land being extra-village [19].



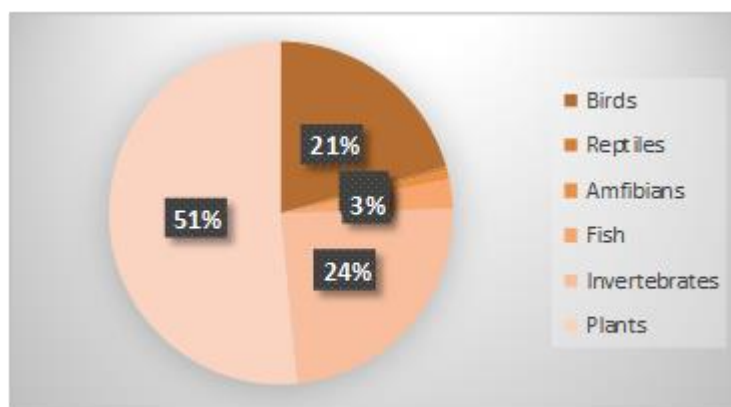
**Figure 1. The situation of land surfaces in Cefa**

The population is 2355 inhabitants and a number of households 805, number of kindergartens 3, number of schools 2.

The climate is less excessively continental than inside the Carpathian arc. Average monthly temperature values are between 20-21.5 degrees Celsius in July, -1.5 and -2 degrees Celsius in January [6].

The specific activities of the area are fish farming and agriculture, also the Cefa Natural Park is a protected area of national interest that corresponds to the V category - IUCN. It is located in the western part of the country on the territory of Bihor county.

More than 600 animal species live in the Cefa Natural Park (more than 40 mammals, more than 260 birds, 4 reptiles, 11 amphibians, more than 35 fish, more than 300 invertebrates) and more than 600 plant species [7].



**Figure 2. Species of Plants and animals**

In the current conditions of improvement and permanent diversification, a strong competition has appeared on the service market given the quality of products, respectively services. Therefore, the Cefa area must adapt its product to the European level, paying special attention to the clientele.

We also analysed the economic life in the town of Cefa, and the main occupations of the inhabitants are agriculture, fish farming and forestry. There are approximately 15 companies in the town, with different activities, respectively a large number of shops with a wide range of products.

In this context, I established a company, namely S.C. Crisalida Magica SRL, whose purpose is the realization of a white mulberry culture in order to raise silkworms, on an area of 2 ha in the outskirts of the town of Cefa in Bihor county.

The initial investment was the land worth 18,070 from the owner's own sources, as well as 20,000 ron.

Of this land area, 0.4 ha is the space intended for raising 200 g of silkworms, and the rest for planting white silkworms.

The plantation of white nozzles takes place in a plain area classified with medium potential for this type of plantation. Mulberry is a big consumer of water and that is why a water collection system was improvised that will only work in cases of drought. From the total area of 2 ha, we estimate that 1.6 ha will represent the area for the cultivation of nozzles. The planting of nozzles was started in 2018, and in 2023 the production of growing *Bombyx mori* silkworms is to be implemented[8].

In Romania, there are extremely few silkworm breeders, the biological material mostly coming from China. In 2017, there were only 3 companies with this activity, and in the first two months they exported goods worth over 7 million euros. In Romania, only the locals from Stoenеști, Vâlcea still grow silkworms and they also make borangic. Rearing of silkworms is an economic activity through which substantial income can be obtained and which can be practiced even by people who cannot perform hard labour [9].

The extraurban land located in the town of Cefa, due to the climate of the area, is suitable for the cultivation of white roses [10].

The room for rearing silkworms should be well ventilated and have windows facing north-east to provide adequate light.

In the annex necessary for the growth of the larvae, we will mount a shelf made of frames, shelves, beds, pallets in the form of 0.8 m wide grills, overlapping at a height of

0.4 m. On the shelves are placed sheets of thick paper with dimensions of 0.7x 1.20 m, 3 sheets each for 3 g of eggs. For receiving and sorting the larvae, perforated paper is used, with holes of different sizes, according to the age of the larvae (worms).

The eggs are incubated, in the box in which they were packed, or on a sheet of paper with folded edges [11].

Considering the fact that raising silkworms does not involve very high costs, we purchased the minimum necessary equipment:

- A modular container with all the equipment needed to grow silkworms
- Small utensils needed for rearing worms, cleaning nozzles, collecting leaves, storing insecticides
- Building for storage and office [12].

In order to be able to carry out our activity, we need staff. In addition to the specialist, accountant and horticulturist engineer, we will hire 6 sericulturists for a fixed period of three months in May-August, according to Table no. 1.

**Table 1.**

**Employed Staff**

Number of people	Occupation	Net salary (Ron)
6	Silk growers (in shifts 3 months a year)	2,520
1	Horticultural engineer (2 days per month)	600
1	Accountant (providing services)	600

*Source: company registers*

Regarding the annual expenses with utilities, they are presented in Table no. 2.

**Table 2.**

**Cost of utilities for maintenance**

Utilities/annually	Price (Ron)
Electricity	300
Water	500
Sanitation	150
Total	950

*Source: company registers*

We have presented below the annual income estimate (for a period of 5 years from the investment's commissioning) as well as the expenditure estimate (for a period of 5 years from the investment's commissioning): expenditure on raw materials, personnel, depreciation, fuel, electricity, thermal energy, water, gas, tax on land / buildings / vehicles, services (accounting, telephone, transport, courier).

As we can see in the table in the first year we have the most expenses due to the purchase of the container and the necessary raw material and the expenses with staff and utilities. The income we estimate is from the sale of cocoons, ripe mulberries, as well as the annual subsidies received from Apia.

The main company that supplies worms and silkworm donuts in Romania is SC SERICAROM S.A. – Bucharest, which is our supplier of larvae [13]. To begin with, we will purchase 10 boxes of 10 g worm larvae costing 240 lei. For 2 ha of mulberries, we can purchase 200 g of larvae for the price of 500 lei. The cost of maintaining the mulberry plantation reaches up to 7000 lei if it does not require irrigation.

Table 3.

## Estimated financial situation over a period of 5 years

	Naming of the indicators	First year 2023	Second year 2024	Third year 2025	Fourth year 2026	Fifth year 2027
1.	Buildings, land, landscaping	18070	0	0	18000	0
3.	Raw material costs	900	900	900	1200	900
4.	Staff costs	3720	3720	3720	3720	3720
5.	Space maintenance expenses	950	950	950	950	950
7.	Other expenses	500	500	500	500	500
8.	<b>Total expenses</b>	<b>24140</b>	<b>6070</b>	<b>6070</b>	<b>24370</b>	<b>6070</b>
9.	Own sources	20.000	0	0	20000	0
10.	Subsidies per hectare of land	780	780	780	1460	1460
11.	Income from the sale of cocoons	4000	4000	4000	4000	4000
12.	Earned income from the recovered mulberry fruits	2500	2500	2500	2500	2500
13.	<b>Total expenses</b>	<b>27280</b>	<b>7280</b>	<b>7280</b>	<b>27960</b>	<b>7960</b>
14.	<b>PROFIT</b>	<b>3140</b>	<b>1210</b>	<b>1210</b>	<b>3590</b>	<b>1890</b>

Source: company registers

The production cycle lasts between 30-40 days, after about a month and a half resulting in 20 kg of cocoons that we can sell for a minimum of 20 lei/kilogram.

In the fourth year of the situation, we proposed reinvesting the profit by buying a 1-hectare plot of land in the neighbourhood.

In terms of market analysis and marketing strategy, we have identified the target market in the western area of our country. Facing the demand and supply in the market of cocoons, the target market is the big producers in the country or the export. In Italy, Japan, China, the selling price varying according to the quality of the cocoons. Currently there is no competition in this market due to the small number of companies that have the same product.

We usually set the selling price according to the production cost, to which we add an additional 20 percent, and we take into account the fact that the company that supplies us with eggs buys our entire production.

For the Cefa commune, this profitable business is beneficial due to the fact that it provides jobs in the area and the reinvested profit increases the value of the land in the area.

### CONCLUSIONS

Based on the research of the documentary material composed primarily of the primary legislation in the field, we found that the taxation of units in the hospitality industry was based on other taxation criteria than income or wealth. Compared to other economic operators, whose earnings are taxed according to the amount of income and/or profits, the HoReCa sector was imposed, in order to determine the tax due, criteria such as: the seasonality of the business, the rank of the locality where it operates, the useful area of the location. GEO No. 16/2022 amending and supplementing the Fiscal Code eliminates this type of taxation of these companies and leaves them free to choose between:

- Income taxation with 1%, or
- Taxation of profits at 16%.

Regardless of the form of taxation that these economic operators choose to adopt, the legislator created the prerequisites for respecting the principles of fiscal equity, as they

were formulated as maxims by Adam Smith, in the book *Wealth of Nations*; the absolute and relative tax burden of each taxpayer to be established according to his contributory power, which is dependent on the amount of income and taxable assets, as well as the personal situation of the taxable subject.

Observing not only the percentage rate that is different between the taxation of profits and incomes, but also through detailed analyses, we can state that the turnover tax tends to become more advantageous for the hospitality industry sector as well, in terms of the amount of tax owed, but also in terms of flexibility, ease and way of managing it. Of course, apart from the cases in which these types of economic operators obtain accounting and fiscal losses, in which case in the variant of taxation of profits, the fiscal pressure borne by them would become 0.

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