Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development
Vol. 13, Issue 3, 2013
PRINT ISSN 2284-7995, E-ISSN 2285-3952

ESTIMATION OF EXPENSES, INCOME AND PROFIT IN MULBERRY TREE GROWING

Agatha POPESCU[1], Alexandra MATEI[2]

[1]University of Agricultural Sciences and Veterinary Medicine of Bucharest, 59 Marasti, District 1, Bucharest, 011464, Romania, Phone: +40213182564, Fax:+40213182888, Email:agatha_popescu@yahoo.com
[2]Sericarom Joint Venture Commercial Company, 69 Bucharest-Ploiesti Road, Bucharest, 013685, Phone: +40212309220, Fax:+40212309229, Email: monicamatei47@yahoo.com

Corresponding author: agatha_popescu@yahoo.com

Abstract

The paper aimed to comparatively analyze the economic efficiency for two experimental variants in Mulberry tree growing as follows: V1 – Mulberry planatation 0.5 ha + Layer maker 0.5 ha; V2 – Mulberry plantation 0.5 ha + Seed Field 0.2 ha + Layer maker 0.1 ha + Sowing Field 0.2 ha. The V2 variant assured Euro 51,915.49 profit, while V1 just Euro 3,675.41 profit. Therefore, the most profitable variant is V2. This means that production diversification in mulberry tree growing could have positive effects leading to an increased profitability. The hierarchy of the variants was made based on profit that the sericiculturist could get in the first 8 years of activity when mulberry plantation will reach the maximum production.

Key words**:** *costs, income, mulberry tree growing, production diversification, profit*

INTRODUCTION

Mulberry tree is a perennial plant, mainly spread in the plain and hilly areas of Asia, Europe and America. In Romania, the decline of silk worm rearing after 1990 did not stimulate the establishment of new plantations and the existing ones remained in the communities property or were given back to the old owners (Matei A, 2000, Baiski D., 2009). Mulberry tree is used in sericiculture, medicine, food and wood industry, as it could be processed in many useful products (Tanase D., 2009)**.** Its leaves are juicy and rich in nutrients suitable for silk worm feeding *(*Jayab M.M.*et al.*, 1962)**.**They are rich in a high value protein (15-35 %), minerals (2.42-4.71 % Ca, 0.23-0.97% P), energy 1.130-2.240 kcal/kg (Saddul *et al*., 2004). The protein could be compared with soy bean protein. The high digestibility of the mulberry leaves recommend them to be used in feeding various animal species replacing partially oil plants such as: in cattle feeding (Datta R.K. *et al.*,2012), in sheep feeding (Liu J.X. *et al.*,2012), in goats feeding (Miller D. *et al.* 2000), in chicken feeding (Al-kirshi R.A. *et al.* 2009)**,** in laying hens feeding (Olteanu M., *et al.*, 2010), in fish feeding (Mondal K. *et al.*, 2012). Mulberry leaves are rich in tannin, aspartic acid, folic acid, argininE, minerals, a reason to be used in medicine for treating various diseases. White and black fruits are rich in sugar, C vitamin, betacaroten, tannin and minerals. They are tasty and juicy fruits being consumed as such or processed in jam, cakes, alcoholic drinks and vinegar. Mulberry tree is used for fixing sandy soils and its wood is processed in furniture, musical instruments, wheels, paper.

Mulberry tree growing imposes various expenses which could be covered by income is production is diversified. In this context, the paper aimed to estimate costs, income and profit in mulberry tree growing under a diversified production in order to offer alternatives to farmers for increasing profitability if cocoon market is not operating.

MATERIALS AND METHODS

The research started from a model of family sericicultural farm of 1 ha agricultural land, of

which 50 % mulberry plantation and 50 % nursery and 150 square meters for silk worm rearing. Two experimental variants were organized within SC Sericarom SA as follows: V1 – Mulberry planatation 0.5 ha + Layer maker 0.5 ha; V2 – Mulberry plantation 0.5 ha + Seed Field 0.2 ha + Layer maker 0.1 ha + Sowing Field 0.2 ha. Based on the technological sheets for each variant, the following costs were estimated: tillage, setting up the plantation and its maintenance, as well as by cost item: materials, labor, thirds, depreciation, energy, water, direct and indirect costs, total costs. Income resulted based on production and market price for each product. Financial results were estimated for the first 8 years of activity, because it was considered that in the 8th year, mulberry plantation will reach the highest performance. All the calculations were made in Euro.

RESULTS AND DISCUSSIONS

For V1 variant, expenses with soil tillage are similar for microplantation and layer maker. The costs for setting up and maintenance of layer maker are higher than in case of microplanatation (Table 1).

Cost structure for V1 variant consists of: 55.61 % matarials, 32.50 % labor, 3.07 % thirds, 2.62 % energy and water (Table 2).

In case of V1, cost structure included: materials 55.61 %, labor 32.50%, thirds 3.07 %, depreciation 0.51 %, energy and water 2.62 %. Direct costs represented 94.33 % of total costs.

Table 1.Costs V1-Microplantation 0.5 ha + Layer maker 0.5 ha (Euro

Specification	Costs with soil tillage	Costs for setting up plantation	Costs for plantation maintenance in the 1st year	TOTAL costs
Microplantation 0.5 ha	857	3,999	433	5,289
Layer maker 0.5 ha	857	4,101	3,272	8,230
Total Costs V1	1,714	8,100	3,705	13,519

Source:Own calculations.

The implementation of V2 variant requires Euro 1,684 for soil tillage, Euro 8,234 for setting up the microplanatation, seed field, layer maker, sowing field and Euro 1,345 Euro for maintenance. About 50 % of total costs of Euro 11,263 belong to microplantation for leaves (Table 2).

Table 2.Costs V2-Microplantation 0.5 ha+ Seed field 0.2 ha + Layer maker 0.1 ha + Sowing field 0.2 ha (Euro)

Specification	Costs with soil tillage	Costs with microplantation setting up	Costs with microplantation maintenance in the 1st year	TOTAL costs
Microplantation 0.5 ha	857	3,999	433	5,289
Seed field 0.2 ha	329	1,061	250	1,690
Layer maker 0.1 ha	169	843	662	1,674
Sowing field 0.2 ha	329	2,331	0	2,660
Total Costs V2	1,684	8,234	1,345	11,263

Source:Own calculations.

Costs structure for V2 variant consists of 60.04 % materials, 27.72 % labour, 3.21 % thirds, 1.05 % energy and water.

The comparative analysis of the costs related to V1 and V2 has shown that V2 is by Euro 2,256 less costing.

In the microplantation 0.5 ha, mulberry leaves are obtained starting from the 2nd year 1.1 tons, then in the 3rd year 3.85 tons, in the 4th year 5 tons, in the 5th year 5 tons, of which 3.65 tons for silk worm feeding and 1.35 tons for sale to Plafar. The amount of leaves sold to Plafar exceeds the need for silk worm rearing, contributing to higher income.

In the micro-plantation 0.5 ha, investment cost is Euro 4,856 of which Euro 857 for soil tillage and Euro 3,999 Euro for plantation establishment and maintenance cost accounts for Euro 433.

Table 3.Financial results in microplantation 0.5 ha

Year	Income (Euro)	Costs (Euro)	Financial results (Euro)
I Soil Tillage + Setting up	0	857 + 3,999= 4,856	-4,856
II Maintenance	0	433	-433
III	146.30	433	-286.70
IV	521.05	433	+88.05
V	575.90	433	+142.90
VI	575.90	433	+142.90
VII	691.08	433	+258.08
VIII	864.18	433	+431.18
IX	864.18	433	+431.18
X	864.18	433	+431.18
XI	864.18	433	+431.18
XII	864.18	433	+431.18
XIII	864.18	433	+431.18
XIV	864.18	433	+431.18
XV	864.18	433	+431.18
XVI	864.18	433	+431.18
XVII	864.18	433	+431.18
XVIII	864.18	433	+431.18
XIX	864.18	433	+431.18
TOTAL	12,880.39	12,650	+230.39

Own calculations. Note: Inflation rate was not taken into account.

Taking into account that in the 1st and 2nd years there is no income, and starting from the 3rd year, the production of leaves will reach 2.2 t/ha up to 15 t/ha in the 8th year, and then it remains constant, the mulberry plantation will become profitable after 9 years, when income will reach Euro 12,880.39, exceeding costs of Euro 12,650, and leading to Euro 230.39/0.5 ha or Euro 460.78/ha profit, under 1.82 % profit rate (Table 3).

Layers production of 5,000 pieces/0.5 ha (10,000 pieces/ha) will be obtained in the 2nd year. Sale price is Euro 1.03 /layer. Production will remain constant in the coming years and income will account for Euro 5,150/year.

In case of layer maker 0.5 ha, investments costs will account for Euro 4,958 of which Euro 857 tillage and Euro 4,101 setting up, and maintenance Euro 3,272. Starting from the 2nd year, a number of 5,000 layers are obtained from 0.5 ha, whcih could be sold at Euro 1.03/piece resulting Euro 5,150 income/year (Table 4).

Table 4.Financial results in Layer maker 0.5 ha

Year	Income (Euro)	Costs (Euro)	Financial results (Euro)
I Tillage and Establishment	0	857 + 4,101 = 4,958	-4,958
II Maintenance	5,150	3,272	+1,878
III	5,150	3,272	+1,878
IV	5,150	3,272	+1,878
TOTAL	15,450	9,816	+676
Profit rate (%)	-	-	6.88

Investment and maintenance cost in layer maker are covered in the 4th year, when the sericiculturist will get Euro 676 profit under 6.88 % profit rate. Beginning from the 2nd year, income will be Euro 5,150 covering maintenance cost Euro 3,272 and leading to Euro 1,878 profit and 57.39 % profit rate.

For V1, investment cost of Euro 9,814 per 1 ha, of which 0.5 plantation for leaves and 0.5 ha layer maker are covered in the first 8 years,

assuring Euro 3,675.41 profit and 44.88 %profit rate (Table 5).
In the established plantation, Mulberry seed will be obtained in the 4th year, 6 kg/0.2 ha, which estimated at Euro 267/kg market price, means Euro 1,600 income. Seed production increase by 1 kg every year, reaching maximum 10 kg in the 8th year and then it remains constant. Therefore, after the 8th year, income coming from seed are constant and equal to Euro 2,670/0.2 ha or Euro 13,350/ha.

Table 5. Financial results per 1 ha, V1=Mulberry tree plantation 0.5 ha and Layer maker 0.5 ha (Euro)

Year	Plantation 0.5 ha	Layer maker 0.5 ha	Total V1
I	-4,856	-4,958	-9,814
II	-433	+1,878	+1,445
III	-286.70	+1,878	+1,591.30
IV	+88.05	+1,878	+1,966.05
V	+142.90	+1,878	+2,020.90
VI	+142.90	+1,878	+2,020.90
VII	+258.08	+1,878	+2,136.08
VIII	+431.18	+1,878	+2,309.18
TOTAL	-4,512.59	+8,188	+3,675.41

Source:Own calculations.

In seed field 0.2 ha, in the first 3 years there is no profit. Only in the 4th year when 6 kg seeds are obtained from 0.2 ha, a profit of Euro 1,350/0,2 ha and a profit rate of 540 % could be assured. Maximum profit rate is 966.80 % in the 8th year, when seed production will be 10 kg/0.2 ha. In the next years, profit rate will remain constant (Table 6).

Table 6.Financial results in Seed Field 0.2 ha

Year	Income (Euro)	Costs (Euro)	Financial results (Euro)
I Tillage + Setting up	0	329+ 1,061 = 1,390	-1,390
II Maintenance	0	250	-250
III	0	250	-250
IV	1,600	250	+1,350
V	1,867	250	+1,617
VI	2,133	250	+1,883
VII	2,400	250	+2,150
VIII	2,667	250	+2,417

Source: Own calculations.

In layer maker 0.1 ha, production will be obtained in the 2nd year and will remain constant for 1,000 kg leaves in the coming years and income will account for Euro 1,030/year.
In the 4th year, all the costs of Euro 2,993 are covered by Euro 3,090 income and Euro 97profit/0.1 ha and 3.53 % profit rate will result during the 4 years. Taking into account only income and maintenance costs, the annual profit is Euro 368/0.1 ha starting frpm the 2nd year and profit rate will account for 56,06 % (Table 7).

Table 7.Financial results in layer maker 0.1 ha

	Income (Euro)	Costs (Euro)	Financial results (Euro)
I Tillage + Setting up	0	164 + 843 = 1,007	-1,007
II Maintenance	1,030	662	+368
III	1,030	662	+368
IV	1,030	662	+368
TOTAL	3,090	2,993	+97

Source: Own calculations.

From sowing field 0.2 ha, a number of 33,200 saplings/0.2 ha (166,000 plants/ha) will be obtained, of which in autumn about 40 %, that is 13,280 saplings could be sold and the remaining of 60 %, that is 19,920 saplings will be grown and sold in the 2nd year.
In autumn, land is tilled and in the next year it is sew, so that in the 2nd year about 33,200 saplings could be obtained of which 40 % are sold in the 2nd year and the remaining of 60 % will be grown and sold in the 3rd year.
This cycle is repeated every two years, income increasing from Euro 6,906 in the 1st year to Euro 10,358 in the 2nd year, if all the other items remain constant.

Table 8.Financial results Sowing field 0.2 ha

	Income (Euro)	Costs (Euro)	Financial results(Euro)
I Tillage + Setting up	6,861	329 + 2,331 = 2,660	+4,201
II Tillage + Setting up	10,292	2,660	+7,632
III Tillage + Setting up	6,861	2,660	+4,201
IV Tillage + Setting up	10,292	2,660	+7,632

Source: Own calculations.

Therefore, in Sowing field 0.2 ha, profit is achieved every year. In the 1st year, profit will account for Euro 4,201/0.2 ha, and profit rate for 157,94 %, in the 2nd year, profit will account for Euro 7,632/0.2 ha, and profit rate will reach 286.92 % (Table 9).

Table 9.Financial results for V2 Total (Euro)

Year	Mulberry plantation 0.5 ha	Seed field 0.2 ha	Layer maker 0.1 ha	Sowing field 0.2 ha	Total
I	-4,856	-1,390	-1,007	+4,201	-3,052
II	-433	-250	+368	+7,632	+7,317
III	-286.70	-250	+368	+4,201	+4,032.30
IV	+88.05	+1,350	+368	+7,632	+9,438.05
V	+142.90	+1,617	+368	+4,201	+6,328.90
VI	+142.90	+1,883	+368	+7,632	+10,025.90
VII	+258.08	+2,150	+368	+4,201	+6,977.08
VIII	+431.18	+7.250,19	+1.113,70	+22.896,12	+10,848.26
TOTAL	-4,512.51	+7,527	+1,569	+47,332	+51,915.49

Source: Own calculations

Table 10.Comparison between financial results by experimental variant (Euro)

Year	V1	V2	V2-V1
I	-9,814	-3,052	+6,762
II	+1,445.00	+7,317	+5,872
III	+1,591.30	+4,032.30	+2,441
IV	+1,966.05	+9,438.05	+7,472
V	+2,020.90	+6,328.90	+4,308
VI	+2,020.90	+10,025.90	+8,005
VII	+2,136.08	+6,977.08	+4,841
VIII	+2,309.18	+10,848.26	+8.539.08
TOTAL	+3,675.41	+51,915.49	+48,240.08

Source: Own calculations

In case of V2 variant, in the 1st year, it will be a loss of Euro 3,052/ha, but starting from the 8th year it will be otained Euro 10,848. This will be possible because the loss coming from production of leaves in microplantation will be covered by profit in seed field 0,2 ha starting from the 3rd year, by the profit got in layer maker 0.1 ha starting from the 2nd year and profit achieved in sowing field 0.2 ha starting from the 1st year (Table 10).

CONCLUSIONS

Taking into consideration the minimum total costs, the order of the variants is V2 and V1. Based on cumulated financial results during 8 years of activity, the order of the variants is also V2 and V1. The V2 variant assures Euro 51,915.49 profit, while V1 just Euro 3,675.41 profit. Therefore, the most profitable variant is V2. This means that production diversification in mulberry tree growing has had positive effects leading to an increased profitability.

The hierarchy of the variants was made based on profit that the sericiculturist could get in the first 8 years of activity when mulberry plantation will reach the maximum production.

ACKNOWLEDGMENTS

This paper was supported by CEEX 40/10.10.2005,"SERI" Management of family sericicultural reproduction farm under integrated production, 2005-2010. All the support given by the funding institution Ministry of Research and Development and the sericicultural SERICAROM Joint Venture Commercial Company are gratefully acknowledge.

REFERENCES

[1]Al-kirshi R.A., Alimon A.R., Zulkifli I., Zahari M.W., Sazili A,Q,, 2009, The Chemical Composition and Nutritive Value of Mulberry Leaf as a Protein Source in Poultry Diets, The 1st International Seminar on Animal Industry, Faculty of Animal Science, Bogor Agricultural University, p..98

[2]Baiski D., 2009, Candva infloritoare, sericicultura romaneasca se afla in agonie, www.dusanbaiski.eu, 28,dec,2009

[3]Datta R.K., Sarkar A., Rama Mohan Rao P., Singhvi N.R.,2012, Utilization of mulberry as animal fodder in India, www.fao.org

[4]Jayab M.M., Kehar N.D., 1962, a Study on the nutritive value of Mulberry tree leaves, India J.Dairy Sci., 15(1):21-27, www.fao.org

[5]Liu J.X., Yao J., Yan B.J., Shi Z.Q., Wang X.Q., 2012, Mulberry leaf supplement for sheep fed ammoniated rice straw.China, www.fao.org

[6]Matei, Alexandra, 2004, Cresterea viermilor de matase, Ed.Alex-Leti Press

[7]Miller D., McDonald D., Asiedu F., 2012, The Effect of Mulberry Leaf Meal on the Growth Performance of Weaner Goats in Jamaica

[8]Mondal K, Kaviraj A., Mukhopadhyar P.K., 2012, Effects of partial replacement of fishmeal in the diet by mulberry leaf meal on growth performance and digestive enzyme activities of Indian minor carp Labeo bata, International Journal of Aquatic Science, Vol.3(1), 2012:72-83

[9]Olteanu M., Panaite T., Curescu G., Criste R.D., 2010, Effect of dietary Mulberry Leaves on Nutrient Digestibility and Layer Performance, XIIIth European Poultry Conference, Tours, France, 23-27 august 2010

[10]Tanase D., 2009, Monography-Mulberry tree growing in Romania.Moricultura-a source of new commercial products. Eastfalia Press House, Bucharest.

[11]Project CEEX 40/10.10.2005,"SERI" Management of family sericicultural reproduction farm under integrated production, 2005-2010