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STUDY ON THE ARRANGEMENT OF AN ENERGY WILLOW EXPLOITATION IN THE LOCALITY OF VETIŞ (SATU MARE COUNTY)

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ABSTRACT. The technical project for a 30 ha energy willow exploitation arrangement is presented, which will provide approximately 5000 tons of timber in 10 years of operation and which partly covers the shortage of firewood in the area. The project value amounts to 4.401.042 lei, 80 % of which is covered by Community funds (the Interreg Program) along with a short-term bank loan. The return on investment is 9 % per year, plus the bonus granted for green energy production and 30 jobs.

Keywords: forestry, environmental investments, green energy

INTRODUCTION

Recent difficulties in accessing energy resources stimulated a series of attempts to harness new renewable biological resources for energetic purposes, at least in terms of local interest (Hendea and Ardelean, 2004; Desaingnes and Point, 1993; Krutilla, 1985).

For example, vegetable oil is being used as an energy resource due to its enviromentally friendly nature. This is the case for rape crops, and lately setting up a forest exploitation of rapid growing woody plants, like the energy willow (Salix rigida) for producing pellets which are used in domestic and industrial heating installations (Lenti and Ardelean, 2012).

In this study we aim at analyzing the best conditions for setting up an energy willow exploitation which would operate in economic conditions.

MATERIALS AND METHODS

The research material was the energy willow, whose growth was monitored in pedoclimatic conditions specific to the exploitation operation.

Research methods refer to:

- Ensuring the growth of willow and studying the influence of soil conditions on its growth;
- The organization of the forestry (wicker), so it provides the largest possible timber quantity and
- The economic analysis of the investment in terms of need and opportunity, feasibility, investment efficiency and financing.

The research took into account the considerations expressed by Ardelean D.I. (2009 and 2011).

RESULTS AND DICUSSIONS

The technical project in discussion consisted of establishing a 30 ha wicker (energy willow) plantation by a local agricultural association from Vetiş (Satu Mare County), situated in a plain area without forests or access to natural gas. This study analyzes the evolution of this forest exploitation over the course of 10 years.

The exploitation was established by an agricultural association in order to increase their income and especially to offer solid fuel (pellets) to the local institutions and population, and the opportunity for achieving the investments is due to the fact that there is a generous financing offer when it comes to the production of green energy.

The plantation will be situated on a swampy terrain near the Someş river and will consist of establishing a wicker production cycle of 10 years.

The work for establishing the wicker plantation consists of: site preparation, potting the Salix rigida cuttings (170.000 cuttings/ha, with a distance of 60 cm x 10 cm), willow crop maintenance and harvesting canes.

The most important characteristics of this investment are: financially modest, rapid growth biological material, work done mechanically with own equipment, organic fertilizer (manure), available skilled workforce, large cane production. It should be noted that processing the canes into pellets is the subject of another EU-funded project.

The amount of material needed for the investment totalling 1.527.270 lei, according to table no. 1.

Table no. 1. Materials needed for the establishment the wicker plantation at Vetiş (30 ha)

Materials	UM	Qty./ ha	Total quantity	Unit price (lei)	Value (lei)
Sprinklers	pcs.	0,9	27	20.700	558.900
Manure	ton	10	300	48,500	14.550
Water	mc.	4000	120.000	0,03	3.600
Herbicide	kg	4	1200	100	120.000
Fuel, spare parts	-	-	-	-	28.620
Wicker cuttings	thousands pcs.	167	5.010	160	801.600
Total	-	-	-	-	***1.527.270***

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Own equipment needed for the work specified in the technical estimate for exploitation establishment are shown in Table no. 2 and are owned by the agricultural association.

Table no. 2. The equipment used to carry out the work set out in the technical estimate on the wicker exploitation in Vetiş

Specification	# pcs.	Work performed	Observations
Vacuums	9	Irrigation	Own
Tractors with trailers	6	Transport Manure and Wicker cuttings	Own
Distributor	3	Distribution of manure	Own
Tractor with plow and harrow	12	Plowing, harrowing, loosen soil	Own
Spraying machine	3	Herbicide	Own

Transport expenses for setting up the exploitation amounts to 593.825 lei, according to Table no. 3.

Table no. 3. Transport costs for achieving the Vetiş wicker plantation

Specification	UM	Quantity	Km	t/km (lei)	Total value (lei)
Manure transport	To	300	45	2,15	29.025
Cuttings transport	To	60	1200	2,15	154.800
Workers transport	-	-	-	-	410.000
Total	-	-	-	-	***593.825***

Labor costs required to set up the exploitation and maintaining it amounts to 1.763.310 lei, to which is added the social contributions of 491.577 lei, calculated by taking into account the time and production rules for forestry work, contained in table no. 4 and no. 5.

Table no. 4. Labor costs for setting up a 30ha wicker plantation and harvesting over a 10 year period at Vetiş

Nr. crt.	Specification	UM	Quantity (ha)	Unit price/ ha	Total value
1.	Site preparation	ha	30	56	1.680
2.	Cuttings	ha	30	2.953	88.590
3.	Crop maintenance	ha	300	298	89,400
4.	Wicker harvesting	ha	300	5.279	1.583.700
TOTAL costs					**1.763.370**

Table no. 5. Social contributions for the work required to set up and exploit a 30ha wicker plantation on a 10 year cycle, at Vetiş (in lei)

TOTAL labor cost		**1.763.370**
1.	CAS (20,8 %)	366.781
2.	CASS (5,2 %)	91.695
3.	Unemployment (0,5 %)	8.816
4.	Accident fund (0,27 %)	4.761
5.	Guarantee fund (0,25 %)	4.515
6.	Medical leave fund (0,85 %)	14.988
Total contributions		**491.577**

Therefore, the total expenditure of labor for this project amounts to 2,254,947.

Based on the data mentioned above, the total expediture to achieve the 30ha wicker exploitation at Vetiş could be calculated, according to table no. 6, which amounts to 4.401.042 lei. This includes the expenses required for full operation over a period of 10 years.

Table no. 6. Total expenses for setting up the 30ha wicker exploitation at Vetiş

Nr. crt.	Specification	Value (lei)
1.	Materials	1.527.270
2.	Transport	593.825
3.	Direct labor	1.763.370
4.	Social contributions	491.577
5.	Design work	25.000
TOTAL expenses		***4.401.042***

The investment funding structure is shown in table no. 7, consisting of own funds – 19.81 %; European funds – 39.69 % and short term bank loan – 40.50 % to avoid paying a high interest.

Table no. 7. Investment funding structure "Establishing a wicker plantation and running it over a 10 years period at the Agricultural Association"

Source of funding	The financing /lei	Share of total investment project financing (%)
Own resources (including insurance source for VAT for the entire project and cofinancing Structural Funds, 2 %)	871.846,42	19,81
Structural Fund (Interreg)	1.746.773,57	39,69
Bank loan for a period	1.782.422,01	40,50

Studia Universitatis "Vasile Goldiş", Seria Ştiinţele Vieţii
Vol. 23, issue 4, 2013, pp. 435-437

of 5 years with 8 % interest		
TOTAL (including VAT)	***4.401.042***	***100***

The return on investment achieved is 9 % (gross profit – 390.000 lei over a 10 years period). It can be amplified even more by processing willow into pellets and selling them as such, but by also gaining subsidies for green energy production. The project also carries a social dimension, offering workplaces for at least 30 people.

The duration of the investment is 10 years, with 1 year for establishment and 9 years for exploitation.

The physical capacity achieved by the investment is 30 ha of wicker, with a total production of 4950 tons of canes over a 10 years period, according to regulations.

CONCLUSIONS

Implementing the investment for setting up the wicker exploitation at Vetiş has the purpose of providing enough timber for heating installations, in an area lacking forests.

Establishing an exploitation is easier due to the fact that the Vetiş agricultural association has its own equipment and workforce.

The total value of the project amounts to 4.401.042 lei and the financing is about 80% covered from community funds and a short-term bank loan.

The return on investment is 9 %, which is increased by the bonus granted for producing green energy.

The investment carries a social dimension as well: providing heating resources and a work place for at least 30 people.

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