DESIGNING A SPECIALIZED AGRICULTURAL SYSTEM

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Abstract: *Setting up a specialized agricultural system represents a large investment, which can bring long term profitability. In order for it to become economically profitable, we need to take into account the following: based on a complete set of economical-social soil analyses and studies, to select, process, organize and prepare the land, insuring a well-rounded plantation, maintenance works during the first also insuring the development of the vines and their fruition potential. The rational exploitation of fruit-bearing plantations, by establishing fruit loads in correlation with the soil potential and crop technology, will insure large, relatively constant productions, which will help recoup the investment in a relatively short period of time.*

Key words*: agricultural system, labour, equipment*

INTRODUCTION

Several works are carried out in order to create a vineyard plantation. Firstly, there is the land selection, where one must look for a proper slope as well as a good sun orientation. Once the area is selected, we start carrying out the works necessary for creating a vineyard plantation as follows.[1]

Works necessary for creating a vineyard plantation:

- soil preparation works;
- vineyard plantation creation works;
- vineyard maintenance works for the 1st, 2nd and 3rd year;
- vineyard support system setup.

MATERIALS AND METODS

On the basis of the studies carried out and the purpose of the plantation, the technical and economic documentation of setting up and maintenance of the plantation shall be drawn up until the fruit, the documentation to be approved by the authorized bodies.

The documentation includes: organization and arrangement of the land, preparation of the land for planting, establishment of planting distances, selection of varieties, planting and maintenance of plantation until entry into the fruit

RESEARCH RESULTS

1. Soil preparation works

1.1. Labour:

- loading, unloading chemical fertilisers, loading, unloading manure in the field, chopping chemical fertilisers, manipulating MIC - 2 works, clearing the undergrowth, manual trenching 5%, manipulating the balance plough

1.2. Equipment: Works with tractors and agricultural machines:

- administering chemical fertilisers, manure, 60 tons, trenching the soil at a 60 cm depth, sanitizing the soil, scarifying with 3 aeration, ploughing and harrowing organs before plantation, ploughing, harrowing and levelling (3 times)

1.3. Substances and materials:

- superphosphate, potassic salt, semifermented manure, sinoratox.

1.4. Substance and material transport:

- chemical fertilisers + sinoratox, manure.

1.5. Total direct expenses:

Expenses for 1 ha:

Labour expenses	Expenses with mechanical works	Substance and material expenses	Transport expenses	Total direct expenses RON
1,425.50	3,093.00	4,925.00	1,350.00	10,793.50

2. Vineyard creation works for density of 3,788 vines/ha with 2.20 m planting distance between rows and 1.20 m between plants in a row.

2.1. Labour:

- plotting and alley outlining, land lay-out, digging holes for planting 40x40x60, manufacturing and sharpening of pegs, cutting and checking the vines' quality, preliminary manure fertilising of the vine roots before planting, transporting vines to the plantation site, planting the vines, complete work, watering vines - 10 litre water/vine, large shovel after plantation.

2.2. Equipment: working with tractors and agricultural machines:

- mechanical ploughing after planting

2.3. Materials:

- pegs, vines + reserve of 3%, garden mould, 5 kg/vine.

2.4.Material transport:

- vines from grafted varieties, garden mould and pegs.

2.5. Total direct expenses:

Expenses for 1 ha:

Labour expenses	Expenses with mechanical	Substance and material expenses	Transport expenses	Total direct expenses RON
1,915.30	204.00	14,942.90	618.80	17,681.00

3. For vineyard maintenance works during the 1st year, with a density of 3,788 vines/ha

3.1. Labour:

- crust breaking and hill rebuilding, hoeing with shovel after mechanical hoeing, weeding and binding shoots, cutting of the vine shoots twice, preparing solution 500 1/ha x 5, hand sprinkling x 5, hill: autumn vines.

3.2. Equipment: Working with tractors and agricultural machines:

- mechanical hoeing (6 times), mechanical ploughing in autumn.

3.3. Substances and materials:

- binding material 2 kg/1,000 vines, fungicide + insecticide + growth stimulators.

3.4. Substance and material transport:

- fungicide +insecticide + growth stimulators

3.5. Total direct expenses:

Expenses for 1 ha.

Labour expenses	Expenses with mechanical works	Substance and material expenses	Transport expenses	Total direct expenses RON
1.654,75	538,50	908,75	3,80	3.105,80

4. For vineyard maintenance works during the 2nd year, with a density of 3,788 vines/ha.

4.1. Labour:

- hill undoing in spring, dry cutting + root fertilising with manure, loading, unloading complex fertilisers, shovelling the vineyard, shovel hoeing after PCV, hole digging for 5% holes, cutting + preliminary manure root fertilisation, planting the vines in the holes, manufacturing pegs, distributing and hammering of pegs, trellising the stem on the peg with 3 bonds, weeding and binding of shoots x 3, vine shoot cutting II, preparing sprinkling solution (600 1 / ha) x 6 treatments, manipulating MPSP 6 treatments, autumn vine hill.

4.2. Equipment: Working with tractors and agricultural machines. [2]

- Spring furrow + complex fertilisation, mechanical hoeing x 5, sprinkling with MPSP 300, autumn ploughing.

4.3. Substances and materials:

- Vines for the holes, binding material (4.2 kg/1,000 vines), complex fertilisers (300 kg/ha), pegs, fungicide + insecticide + growth stimulators + foliar fertilisers.

4.4. Substance and material transport:

- vines + insecto-fungicide + complex fertilisers

4.5.Total direct expenses:

Expenses for 1 ha:

Labour expenses	Expenses with mechanical works	Substance and material expenses	Transport expenses	Total direct expenses RON
2,441.25	1,152.00	5,855.59	36.00	9,484.84

5. For vineyard maintenance works during the 3rd year, with a density of 3,788 vines/ha.

5.1. Labour:

- hill undoing in spring, vine and vine shoot cutting, marginal cord cutting, loading, unloading manure, loading, unloading chemical fertilisers, shovelling the vineyard, hoeing after PCV, hole digging for 5% holes, cutting + preliminary manure root fertilisation, planting the vines in the holes, trellising stems, weeding and binding of shoots x 3, vine shoot cutting II, preparing sprinkling solution (600 1 / ha) x 6 treatments, manipulating MPSP 6 treatments, autumn vine hill.

5.2. Equipment: Working with tractors and agricultural machines:

- Spring furrow + complex fertilisation, mechanical hoeing x 5, sprinkling with MPSP 300, autumn ploughing.

5.3. Substances and materials

- semifermented manure, vines for the holes, binding material (4,2 kg/1.000 vines), chemical fertilisers (300 kg/ha), fungicide + insecticide + growth stimulators + foliar fertilisers.

5.4. Substance and material transport

- semifermented manure, vines + insecto-fungicide + complex fertilisers.

5.5. Total direct expenses:

Expenses for 1 ha:

Labour expenses	Expenses with mechanical works	Substance and material expenses	Transport expenses	Total direct expenses RON
2,211.50	1,152.00	3,067.59	436.00	6,867.09

6. Setting up the vineyard support system of trellises at a 2.2 m distance between rows and 8.0 m in a row

6.1. Labour:

- land lay-out
- trellis distribution
- setting up front trellises
- anchoring front trellises
- setting up middle trellises
- setting up wire

6.2. Equipment: Working with tractors and agricultural machines

6.3. Substances and materials

- front trellises, middle trellises, galvanised wire 2.2 mm, galvanised wire 2.8 mm, anchor clasp set, Stabilo anchors, Medium gripple - simple row -2 pieces per row, Medium gripple - double row-4 pieces per row, Medium gripple - double row - 4 pieces per row.

6.4. Substance and material transport:

- trellises, anchors, wire, gripple

6.5. Total direct expenses:

Expenses for 1 ha:

Labour expenses	**Expenses with mechanical works**	**Substance and material expenses**	**Transport expenses**	**Total direct expenses RON**
642.25	0.00	21,063.70	2,100.0	23,805.95

7. DISEASE AND PEST CONTROL PROGRAM, growth stimulators and foliar fertilisers applied at the same time with phytosanitary treatments amounting to the sum of 4,505 RON (1st year), 5,332 RON (2nd year), 5,331 RON (3rd year). [3]

8. Costs and general estimate

Main material centralizer

Material and work category they are used for	**U.M.**	**Price/UM, RON**	**Requirement**	**for 1 ha**
			Quantity	**Value, RON**
1	2	3	4	5
land preparation	-	-	-	4,925.00
Superphosphate	kg	1.30	800.00	1,040.00
potassic salt	kg	1.10	600.00	660.00
semifermented manure	t	50.00	60.00	3,000.00
Sinoratox	kg	7.50	30.00	225.00
plantation creation		-	-	14,942.90
Pegs	piece	0.40	3,788.00	1,515.20
vines + 3%	piece	3.15	3,902.00	12,291.30
garden mould	t	60.00	18.94	1136.40
maintenance 1st year	-	-	-	908.75
binding material	kg	1.00	7.58	7.58
fungicide + insecticide + growth stimulator				901.17
maintenance 2nd year	-	-	-	5,855.59
vines for the holes	piece	3.15	189.00	595.35
binding material	kg	1.00	15.91	15.91
complex fertilisers	kg	1.30	300.00	390.00
Pegs	piece	1.00	3,788.00	3,788.00

fungicide+ insecticide + growth stimulator + foliar fertilisers				1,066.33
maintenance 3rd year	-	-		3,067.59
semifermented manure	t	50.00	20.00	1,000.00
vines for the holes	piece	3.15	189.00	595.35
binding material	kg	1.00	15.91	15.91
chemical fertilisers	kg	1.30	300.00	390.00
fungicide + insecticide + growth stimulator + foliar fertilisers				1,066.33
Total crop material				29,699.83
support system	-	-	-	21,063.70
front trellises	piece	17.00	90.00	1,530.00
middle trellises	piece	16.00	720.00	11,520.00
galvanised wire 2.2 mm	kg	6.50	560.00	3,640.00
galvanised wire 2.8 mm	kg	6.30	227.00	1,430.10
anchor clasp set	piece	10.50	90.00	945.00
stabilo anchors	piece	10.40	90.00	936.00
medium gripple simple row - 2 piece/row	piece	2.30	90.00	207.00
medium gripple double row - 4 piece/row	piece	2.30	186.00	427.80
medium gripple double row - 4 piece/row	piece	2.30	186.00	427.80
General total for 1ha	-	-	-	50,763.53

8.2. General estimate

Specification	U.M.	for: 1 ha
Chapter 1 – Direct investment expenses		
- land preparation	RON	10,793.50
- plantation creation	RON	17,681.00
- maintenance works for the 1st year	RON	3,105.80
- maintenance works for the 2nd year	RON	9,484.84
- maintenance works for the 3rd year	RON	6,867.09
Total chapter 1	RON	47,932.23
Chapter 2 – Support system	RON	23,805.95
Total Direct investment expenses	RON	71,738.18
Chapter 3 – Additional expenses for:		
- material acquisition (10% x 50.798,11)	RON	5,076.35
-diverse and unforeseeable (5% x 67.950,18)	RON	3,586.91
Total chapter 3	RON	8,663.26
General total	RON	80,401.44

9. Production value and vineyard efficiency calculation

9.1. Production-merchandise value (VPM)

Specification	**U.M.**	**for:** **1 ha**
Projected physical production	kg	12,000.00
Exploitable production, of which:	kg	12,000.00
a) extra and 1st quality	kg	10,000.00
- price per kg	RON/kg	1.50
Production value, extra and 1st quality	RON	15,000.00
b) 2nd quality	kg	2,000.00
- price per kg	RON/kg	1.25
Production value, 2nd quality	RON	2,500.00
Total production-merchandise value	RON	17,500.00

9.2. Global production value (VPG)

Specification	U.M.	Value for: 1 ha
- projected capacity	ha	1.00
- total investment value	RON	80,40144
- normed exploitation duration	years	45.00
- annual amortization rate	RON	1,787.00
- annual production expenses	RON	8,900.51
- grape production	ton	12.00
- environment cost per grape ton	RON	89063
- total global production value	RON	10,687.51

9.3. Annual production expenses

Are made up of:

- annual technological expenses (afore measurement estimate no. 5, increased with 20%);

= 8,240.51 RON (for 1 ha);

- production harvesting expenses (NTM 92/2.541):

= 12 t x 2.2 ZO/t x 25 RON = 660 RON

Total annual production expenses for 1 ha = 8,900.51 RON

9.4. Economic efficiency of the vineyard plantation

Indicator	U.M.	for 1 ha
Total investment value	**RON**	**80,401.44**
Normal exploitation duration	**Years**	**45.00**
Annual amortization rate	**RON**	**1,787.00**
Annual production cost value	**RON**	**8,900.51**
Global production value (VPG)	**RON**	**10,687.51**
Production-merchandise value (VPM)	**RON**	**17,500.00**
Annual profit	**RON**	**6,812.49**
Investment recovery duration	**years**	**11-12**

CONCLUSIONS

The vineyard crop is profitable because:

- ✓ it is favoured by plants with southern exposure;
- ✓ it is very profitable;
- ✓ various EU funds can be accessed for the creation of a vineyard plantation;

There are also some drawbacks:

- ✓ it requires a high manual and mechanical labour volume;
- ✓ it takes approximately 3 years to fruition from plantation, that is why one must allot a budget for maintenance expenses;
- ✓ Expenses for setting up a hectare of vineyard amount to approximately 80,000 lei;
- ✓ Maintenance expenses for one year a hectare of vineyard amount to 10,000 lei;
- ✓ The profit obtained in the 3rd year from plantation is of 7,000 lei per hectare;
- ✓ The investment amortization period is of 10 – 11 years;

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