

DESIGNING A SPECIALIZED AGRICULTURAL SYSTEM

O. EREMI, F. MARIAN, A. OKROS, Casiana MIHUȚ, V. M. DRAGOSLAV
*University of Agricultural Sciences and Veterinary Medicine "King Michel I of Romania" of
Banat from Timisoara 119, Aradului Avenue, Timișoara 30064, Romania*
Corresponding author: adalbertokros@yahoo.com

Abstract: Agriculture is one of the main engines pushing a society towards change, having influences both in the economic and social environments. Agriculture, in turn, is influenced by various factors that come out of human control, such as natural and technical factors. Some of the main natural factors are the relief and the type of soil, while technical factors are represented by mechanization, irrigation, chemistry, and so on. Agriculture also has a significant impact in the social sphere. The process of social division finds its foundations in agriculture. This is easily observable by the emergence and development of new branches of material production derived from agriculture or based on the provision of food by agriculture. The paper presents the implementation of a specialized agricultural system. The subject addressed is the establishment of a fruit plantation and the presentation of economic and technological features. (ARDELEAN 1979, BORCEAN 1996) The area allocated to this project is 4 ha. This area is divided into 3 areas where 3 different types of trees are planted. The varieties planted are apple (Jonathan, Florina, and Golden delicious), pear (Daciana, Aromată de Bistrița, and Untoasă bosc) and plum (Centenar, Stanley, and Tuleu gras). The areas will be the same for the plots where apple trees and plum trees are planted (1.1 ha) and plum trees are allocated an area of 1.8 ha. Before starting the planting process, work is needed to prepare the land, namely, cleaning the soil of plant residues, applying a product to improve the fertility of the land, and levelling it. The size of the pits in which the trees are inserted have a stand-alone size for all plots of 60x60x60 cm. (COSTE 1986, IANOȘ 1997) A tree plantation requires year-round care. In the spring and in the summer, when temperatures rise, trees get watered in case of drought, foliar fertilizers and treatments against diseases and pests are applied, shoots starting in unwanted areas are cleaned and, last but not least, the shoots are lead and the grass in the tree area is cleaned. When autumn comes, work is carried out to remove the dry branches and, if necessary, the resting process is hastened by removing the leaves. This plan focuses mainly on the costs of implementing fruit tree cultivation. The total investment amounts to 330,119 lei. But, as time goes on, the costs become lower and lower, and the need to invest will be much lower in order to maintain the tree plantation within normal operating parameters. (IOAN 2005)

Keywords: agriculture, tree growing, investment, cultivation technologies

INTRODUCTION

Since ancient times, agriculture has been one of man's main pursuits. This remains a vital area of human activity nowadays. The perpetual development and change of agriculture are influenced by natural, technical, and socio-economic factors. (LAȚO 2008, MANEA 2013). Of the natural factors, climate plays an essential role: it conditions the spread and structure of agricultural crops by the regime of temperature, moisture, and light. Relief also influences the distribution of crops by altitude, exposure of slopes, and tilt of the slopes. Soil type contributes through its main feature, fertility, plus water retention, and drainage capacity. An important role in increasing production is that of technical factors through mechanization, irrigation, chemistry, while socio-economic ones, through the capacity and readiness of the workforce and through the entire economic context in which this branch of the economy develops. (MANEA 2015, MANEA 2016). Agriculture can be seen both as a science and as an art, with great economic and social significance. It is a primary branch for material production. Agriculture is also at the heart of the process of social division of labour, through the emergence and development of new branches of material production derived from agriculture or based on the provision of food by agriculture. Agriculture, therefore, continues to remain at the economic basis of the development of modern,

contemporary states, regardless of the state in which it is located. Like any economic activity, the purpose of agricultural activity is to meet human needs and the general progress of the country. (NIȚĂ 2014, NIȚĂ 2015). This paper contains a system in which the establishment of a classical tree plantation is found. Fruit culture is a branch of agricultural sciences, one of the main sectors of horticultural production. (NIȚĂ 2012, PUȘCĂ 2002)

MATERIAL AND METHODS

For the elaboration of the present paper, the data retrieved is taken from different sources of specialty literature and public institutions.

The cultivation system is a classic one. Fruit trees being planted at distances of 3/4 m. The total number of cultivated trees is 3,117 pieces.

Before the actual planting, ugly steps will be taken: deforestation, soil salification, leveling, parcelling and picketing.

Before the actual planting, ugly steps will be taken: deforestation, soil salification, leveling, parcelling and picketing.

After preparing the pits, planting trees are prepared, where the roots will be shaped, after which they will be slime and planted.

The varieties of fruit trees chosen for cultivation are:

Apple: - Jonathan

- Florina

- Golden delicious

Pear: - Daciana

- Aromată de Bistrița

- Untoasă bosc

Plum: - Centenar

- Stanley

- Tuleu gras

RESULTS AND DISCUSSION

The area of land used for this fruit tree plantation is 4 ha. The land is divided into 3 plots, where the 3 varieties of fruit trees are planted: apple, pear, and plum. In order to plant the trees, it is necessary to observe the following steps to take. (HETEA 2017)

The steps are as follows:

- Preparing the land;
- Land plotting;
- Planting;
- Maintaining the plantation in the early years.

Preparing the land:

- Cleaning the land of vegetable debris;
- Applying well-decomposed manure (50 t/ha) from a farm near the locality;
- Levelling the land followed by working the land.

Table 1.

Costs of preparing the land	
Works	Price for works (1 ha)
Workmanship	1.000 lei
Machinery	4.000 lei
Material (manuer)	3.500 lei
Material transportation	1.500 lei
Total: (4 ha)	40. 000 lei

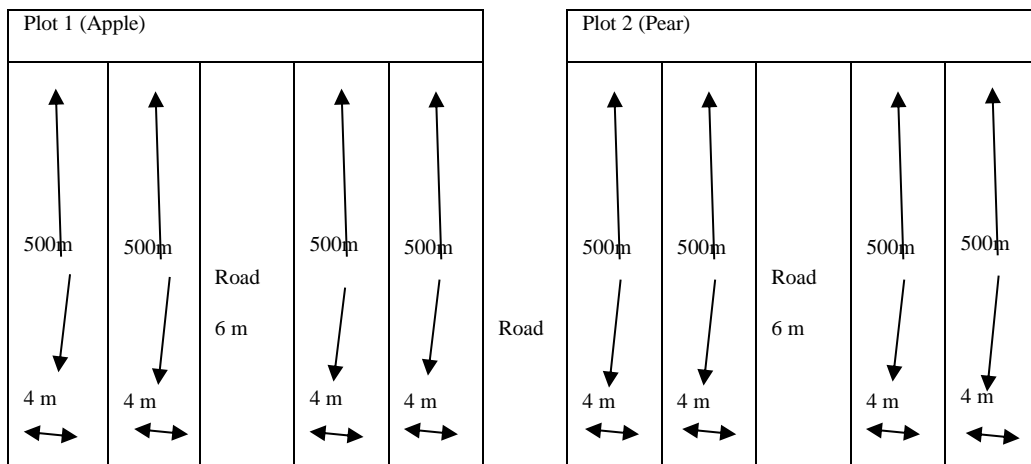
Plotting the land:

The orchard will contain the following species:

- Apple (1.1 ha);
- Pear (1.1 ha);
- Plum (1.8 ha);

The species of fruit trees will be divided into three plots:

- Plot 1: 11,000 m² (22 m X 500 m):
 - will include apple trees;
 - will be 500 m long;
 - will be 22 m wide;
 - will have a distance between the rows of 4 m;
 - will have a distance between the fruit trees of 3 m,
 - will have roads 6 m long;
 - will have 6 rows of trees with a total of 166 trees;
- Parcel 2: 11,000 m² (22 m X 500 m):
 - will include pear trees;
 - will be 500 m long;
 - will be 22 m wide;
 - will have a distance between the rows of 4 m;
 - will have a distance between the fruit trees of 3 m,
 - will have roads 6 m long;
 - will have 6 rows of trees with a total of 166 trees;
- Parcel 3: 18,000 m² (36 m X 500 m):
 - will include pear trees;
 - will be 500 m long;
 - will be 36 m wide;
 - will have a distance between the rows of 4 m;
 - will have a distance between the fruit trees of 4 m,
 - will have roads 6 m long;
 - will have 9 rows of trees with a total of 125 trees.



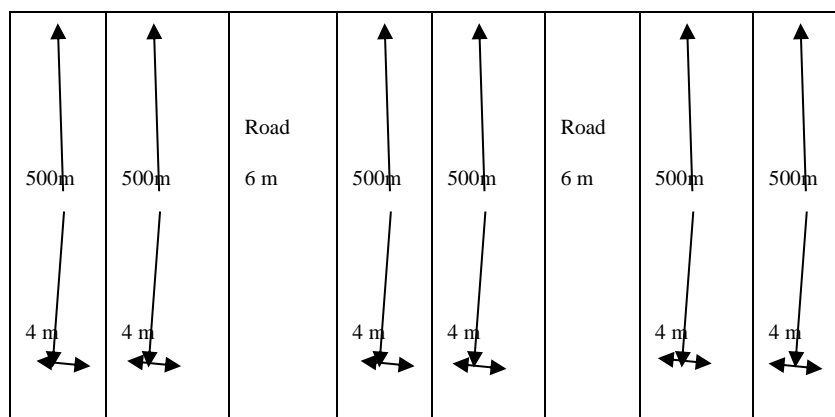


Fig. 1. Plot diagram

Table 2.

Costs related to land picketing and planting preparation

Works	Price (1 ha)
Workmanship	1.500 lei
Materials	3.000 lei
Material transportation	1.300 lei
Total: (4ha)	23.200 lei

Planting:

Varieties of fruit trees:

1. Apple: - Jonathan
- Florina
- Golden delicious
2. Pear: - Daciana
- Aromată de Bistrița
- Untoasă bosc
3. Plum: - Centenar
- Stanley
- Tuleu gras

Pits are prepared 2 weeks before planting, they will be 60x60x60 cm. The roots are cut and smouldered before being placed in the pits. The trees are watered after planting. (IENCIU 2017)

Table 3.

Seedling and planting material costs

Works	Price (1ha)
Rented Equipment	700 lei
Workmanship	2.500 lei
Transport	800 lei
Total: (4ha)	16.000 lei
Trees (3.117 trees x 7 lei/tree)	21.819 lei
	37.819 lei

Maintenance works:

In spring, after planting, the following is to be taken into account:

- Watering trees in case of drought;
- Applying foliar fertilizers and treatments against diseases and pests;
- Removing shoots that start in unwanted areas;
- Leading the shoots;

- Cleaning the grass in the tree area.
- When autumn comes, the following is to be done:
- Removing diseased, dry branches;
 - If necessary, speeding up the resting process by removing the leaves.
- The following year:
- Making crown formation cuts;
 - Applying treatments;
 - Applying herbicides around the trees;
 - Watering the trees in case of drought.

Tabel 4.

Maintenance costs year I and II

Maintenance work year 1 and 2	Price for works (4ha)
Workmanship (cuts, herbicide, treatments)	180.000 lei
Machinery	30.000 lei
Materials (substances, scissors etc)	10.000 lei
Material transportation	9.000 lei
Total: (4ha)	229.000 lei

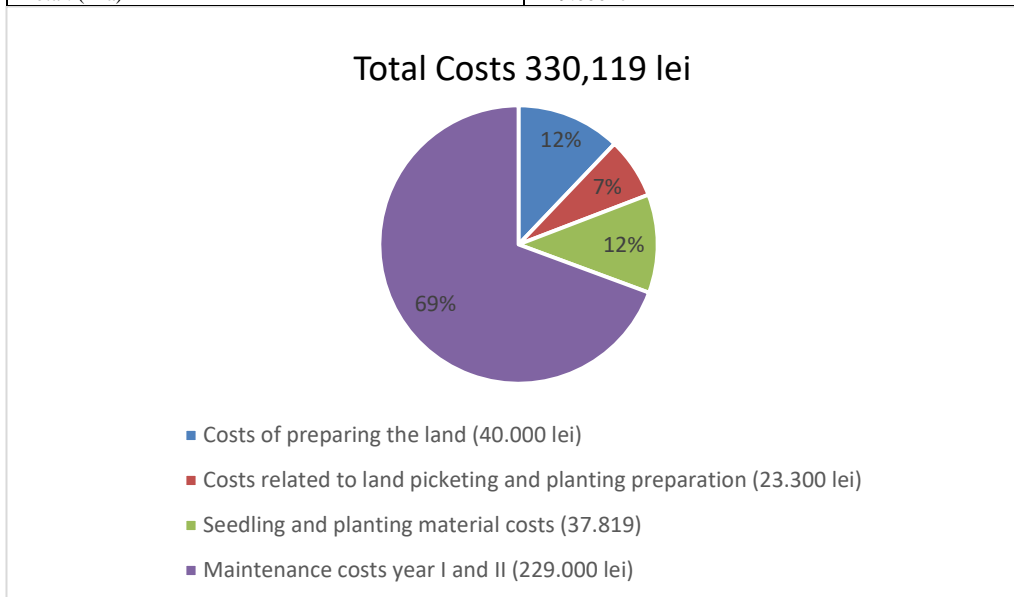


Fig. 2. Total investment for the implementation of tree cultivation

CONCLUSIONS

1. Large pear and plum trees have been chosen because they are not so susceptible to disease and pests and are more resistant to marketing;
2. The highest costs when preparing the land (40,000 lei), followed by planting work (37,829 lei) and picketing the land.
3. Total expenditure on plantation establishment reached 101,019 lei.
4. After liquidation of expenditure, it is desired to establish a product processing area, to open shops with products obtained for marketing and even to set up another smaller plantation with other fruit trees.

5. Even if, in the first years, the tree plantation will not produce, the expenses will be liquidated 2 years after the plantation fructifies.
6. Products obtained in the early years will be sold at supermarkets.

BIBLIOGRAPHY

- ARDELEAN V., ZĂVOIANU I., 1979- Județele patriei – Județul Timiș, Ed. Academiei RSR, București.
- BORCEAN I., TABĂRĂ V., DAVID G., BORCEAN EUGENIA, ȚĂRĂU D., BORCEAN A., 1996 -Zonarea, cultivarea și protecția plantelor de câmp în Banat, Ed. Mirton, Timișoara.
- COSTE I., 1986-Ecologie agricolă, curs IAT (LITO), Timișoara
- HETEA D., ARDELEAN A., IENCIU A., MANEA D. N., 2017-Determining water consumption in sunflower crops with indirect methods in the timisoara area, Reserch Journal Of Agricultural Science, Timisoara.
- IANOȘ G., PUȘCA I., GOIAN M., 1997- Solurile Banatului II – Condiții naturale și fertilitate, Ed. Mirton, Timișoara.
- IENCIU A. A., SMULEAC L. I., MIRCOV V. D., CIOLAC V., MANEA D. N., 2017-Monitoring hidro-climatic hazards in the western part of the Timiș county, Romania, Analele Universității din Oradea, Fascicula Protecția Mediului, Vol. XXIX, anul 22, Oradea.
- IOAN O., 2005-Tehnologii agricole performate,ed. Ceres.
- LAȚO A., NEACȘU A., CRISTA F., LAȚO KAREL IAROSLAV, RADULOV I., 2013-Chemical properties and soils fertility in the timis county wetlands journal of environmental protection and ecology Volume: 14 Issue: 4 Pages: 1551-1558.
- MANEA D., PEȚ I., IENCIU A., ȘTEF R., 2015-Control of Horse Thistle *Cirsium arvense* L.Scop, in Winter Wheat Crop Research Journal of Agricultural Science, ISSN 2066-1843, vol 47 (1), 2015 CABI <http://www.rjas.ro/volumes 82-89>.
- MANEA D.N., IENCIU A., PEȚ I., ȘTEF R., CĂRĂBET A., 2013-Research on the influence of weed control on the soybean yield. Annals of the University of Oradea, Fascicula Environmental Protection, 2013, vol.XXI, ISSN 1224-6255.
- NIȚĂ S., NIȚĂ L. D., MIHUȚ C., KOCIS E., PANAITESCU L., LUNGU M., 2014-The agricultural system of the Armeniș township, Caraș-Severin county. Review on Agriculture and rural development. Scientific Journal of the University of Szeged, Faculty of Agriculture, No. 1 Vol 3, pp. 344-349.
- NIȚĂ S., NIȚĂ L., PANAITESCU L., 2015- Research regarding the introduction of sorghum crops in the Almăj Depression. Analele Universității Din Oradea Fascicula: Protecția Mediului, vol XXI anul 19, editura Universității din Oradea.
- NIȚĂ S., NIȚĂ L., PANAITESCU L., 2015-Preliminary studies on the production capacity of triticale (*Triticosecale Wittmack*) grains under the influence of fertilization and varieties. Journal of Horticulture, Forestry and Biotechnology Volume 19(4), pp. 5- 8, www.journal-hfb.usab-tm.ro.
- NIȚĂ S., OKROS A., 2012- Sisteme de agricultură, Eurobit.
- PUSCA I., 2002 - Câmpia Banatului, Fundația Națională „Satul românesc”, București.