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FRAME TECHNOLOGY FOR CHRYSANTHEMUMS IN THE CONVENTIONAL AND ORGANIC FARMING SYSTEM

Diana Maria NECULA, Rozi Liliana BEREVOIANU, Eduard Alexandru DUMITRU

Research Institute for the Economy of Agriculture and Rural Development, 61 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Phone:+4021.313.60.87, Fax:+ 021.313.60.96, Emails: necula.diana@iceadr.ro, berevoianu.rozi@iceadr.ro, dumitru.eduard@iceadr.ro

Corresponding author: dumitru.eduard@iceadr.ro

Abstract

Chrysanthemum occupies an important place in the top of the cultivated flowers, due to its decorative qualities, being one of the most beautiful autumn plants. The chrysanthemum culture is of particular importance due to the period when it appears on the market, September-December, when other flowers are not found or are in insufficient quantities. Economic importance of the culture of chrysanthemums resides in the fact that it can be an important source of income due to density appropriate for the culture, the level of investment gains and values that can be obtained per unit area values are much higher compared to other agricultural crops. The paper analyses the economic efficiency of cultivation of chrysanthemums in the system of conventional agriculture and organic farming - weather 2018/2019 using indicators of profitability (gross rates of return, breakeven, etc.), which can influence which can influence the decision making required for the future production cycle.

Key words**:** *economic efficiency, profitability threshold, chrysanthemum culture*

INTRODUCTION

Flowers, at present, have become commodities, unlike the events of our lives. Floriculture tries to keep pace with the development of the entire agriculture, thus increasing the number of cultivated species, modernizing the culture technologies and deepening the knowledge regarding the agrobiological particularities of the plants [1] [3].

Photo 1. Chrysanthemum - Chrysanthemum spp.
Source: http://www.finegardening.com

The last autumn flowers, chrysanthemums, are highly appreciated due to the variety of shapes and sizes of the inflorescence, the multitude of colours (red, pink, white, yellow), with a discreetly specific fragrance, are suitable for modern dwellings. Chrysanthemums have a flower similar to daisies, anemones or beaten flowers, as shampoos of different sizes, capable of withstanding frost (blooming until the end of November) [5] [6].

Cultivated and reproduced for centuries has a large number of species. Chrysanthemums, also called bush shrubs, daisies, autumn daisies, are a kind of flower (Chrysanthemum), native to Asia and northeast Europe. Chrysanthemum species are perennial, grassy plants that grow up to 50-150 cm high, with deeply curved leaves and large flowers of various colours. Chrysanthemums can be grown in gardens, solariums, greenhouses, gardens or for decorating green spaces.

MATERIALS AND METHODS

The frame technology for chrysanthemums in the conventional and organic farming system has been adapted to the resources and conditions existing at SCDL Buzau. In order to determine the economic efficiency of the culture, the main indicators were taken into account: costs, prices, profit and profit rate.

It has also started from conventional and environment-friendly production technology according to the scheme below:

A. Application of fertilizers

	Conventional system	Ecological system
Basic fertilization	Organic fertilizers: fertilizers: 60 - 80 t/ha degraded manure + 25 - 35 t/ha peat	
	-90 – 120 kg/ha phosphorus -150 – 170 kg/ha potassium	-ecological fertilizers can be used as starter fertilizers at the doses recommended by the technical research
Method of application	-It is run with the 40-45 cp tractor in aggregate with the fertilizer machine -Autumn under the main base: phosphorus, potassium, organic fertilizers, peat -In spring, in the preparation of the germinating bed: ecological fertilizers	

Source: [2] [4]

B. Soil works

	Conventional system	Ecological system
Works executed in autumn		
Discarding previous culture	-It aims to clean the land from the vegetal remains of the previous culture -It is run with 40 - 45 hp tractor	
Maintenance leveling	-It has the role of leveling the soil after performing the blocking work -It is carried out with a tractor of 40 - 45 hp in aggregate with the grader	
Deep soil mobilization (shrubs)	-it is done for the incorporation of organic fertilizers into the soil as well as for loosening and soil breaking -It is run with 40 - 45 hp tractor in plow and adjustable hitch	
Works executed in the spring		
Disinfection of soil and protected space	-aims to destroy pathogens from soil and protected space to create optimum conditions for plant growth and development -Use chemicals specific to disinfection -It is carried out with the 40-45 cp tractor in the aggregate with the machine to perform the treatments	is not done
Preparing the germinative bed	-It has the role of grinding, chopping and leveling the soil for planting -It is carried out with a tractor of 40 - 45 hp in aggregate with the combiner	
Open gullies	-It is run with a 40-45 cp tractor in aggregate with the open-gauge machine	
Soil modeling on rough terrain	-It is carried out in 100-100 cm wide furrows, separated by 40 cm trails -It is run with a tractor of 40 - 45 HP in aggregate with the modeling machine	

Source: [7] [8]

C. Setting up the culture

	Conventional system	Ecological system
The way of planting	-is executed manually in the spring	
Density of plants	-200.000-300.000 cuttings/ha depending on the plant's management system (1 or more floral stems)	
Planting distance	-15cm/10-12 cm -20 cm/18 cm -22cm/18cm	
Depth of planting	-just to cover the cuttings with earth	

Source: [9] [10]

D. Maintenance of culture

	Conventional system	Ecological system
Watering	-dripping is recommended, ensuring that the plant's water needs are constantly maintained -Watering is done before planting -After planting it is recommended not to irrigate for a period of about 6-7 days to favor the rooting of the cuttings	
Maintaining atmospheric humidity	-It is carried out in order to ensure an atmospheric humidity of about 80-85% during vegetative growth and about 70% from the time of the appearance of floral buds -It is executed with fine spraying	
Additional fertilization	-in order to ensure the necessary nutrients of plants at all times	
	-The products recommended by the technical research are used	-Use recommended organic products
pinching	-It is done for the ramification of the plant and for the delay of the flowering -runs 2 weeks after planting and consists of removing the vegetative tip of the stem or shoots above 5 to 6 leaves -it can be repeated 1-2 times depending on the degree of branching desired or the time chosen for flowering	
Removal of unnecessary shoots	-Apart from 2-4 shoots to be led as floral stems, remove all other shoots formed after the pinching -Run when the shoots are about 10 cm long	
Pinching	-removing side shoots from the leaves (cops) to obtain unrivaled flora strains -runs throughout the growing season, when the children are 5-6 cm long	
Elimination of drags	-It is always made to compete for growing floral stems -Run when dragons are 5-6 cm long	
Embellish	-Perform to obtain the type of standard flower or twig -It is repeatedly executed, depending on the particularities of the growth of each variety	
Trellising	-is made to obtain straight, superior floral stems -It is executed by installing or building into crops of nets for plant support	
Combating diseases and pests	-it is executed manually with devices specific to application of plant protection treatments in protected areas	
	-is carried out by preventive and curative application of phytosanitary treatments with the recommended products	-is carried out by the preventive application of plant protection products with environmentally friendly products

Source: [2] [7]

E. Harvesting

	Conventional system	Ecological system
Standard chrysanthemum	Harvesting takes place in the maximum or near-complete opening phase;	
Chrysanthemum twig	Harvesting occurs when 5-6 inflorescences are open	
output	It varies depending on the plant management system	

Source: [8] [10]

RESULTS AND DISCUSSIONS

The revenue and expenditure budget for the protected area crystals crop - conventional system, has been calculated for an estimated

production of 960.000 pieces (cut flowers)/hectares.

Table 1. The main predicted indicators for conventional chrysanthemum cultivation between 2018 and 2019 (protected area, average potential) with an estimated production of 960,000 cut flowers / hectare

No. crt	Indicators	U.M	Value	
			lei	Euro (4,6 lei/euro)
1	A VALUE OF PRODUCTION, of which:	lei	1,168,330.4	253,984.9
2	B (+).SUBSIDIES	lei	542.8	118
3	C (=) GROSS PRODUCT	lei	1,168,873.2	254,102.9
4	D (-) TOTAL EXPENSES	lei	898,715.7	195,373.0
5	I. VARIABLE CHARGES	lei	271,866.7	59,101.5
6	II. FIXED EXPENSES	lei	626,849.0	136,271.5
7	E (=) TAXABLE INCOME	lei	269,614.7	58,611.9
8	E.1(-) Taxes	lei	26,961.5	5,861.2
9	F (=)NET INCOME + subsidies	lei	243,196.0	52,868.7
10	F.1 (=)NET INCOME	lei	242,653.2	52,750.7
11	G. RATED INCOME TAX	%	30	6.5
12	H. RATE INCOME NET + subsidies	%	27.1	5.9
13	H.1 RATE INCOME NET	%	27	5.9
14	COST OF PRODUCTION	Units. Cut flowers	0.9	0.2
15	PREVIOUS INTEREST PRICE MARKET	Units. Cut flowers	1.2	0.3

Source: processing ICEADR calculations.

For the crop of chrysanthemums grown in conventional protected area, at an estimated average production of 960,000 pieces of cut flowers/ha, a production value of 1,168,330.4 lei/ha corresponds, which by adding the subsidy of 542.8 lei/ha, determines the realization of a gross product of 1,168,873.2 lei/ha (Table 1).

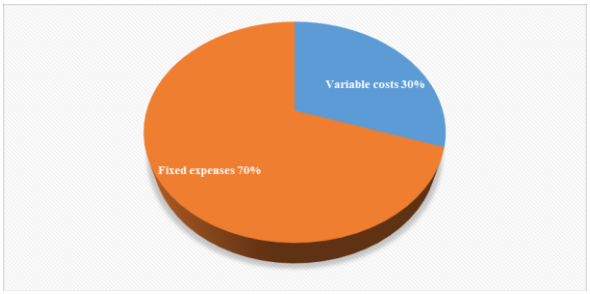

Fig. 1. Distribution of total agrotechnical costs for chrysanthemum culture (cut flowers) in conventional protected space
Source: processing ICEADR calculations.

Of the total expenditure, the variable costs 30%, and the value inputs with materials and materials account for 78% of the variable costs. With a weight of 70% of total expenditures, fixed expenses are formed in 95% of the permanent labor force consumption value (Fig. 1.) (Fig. 2.).

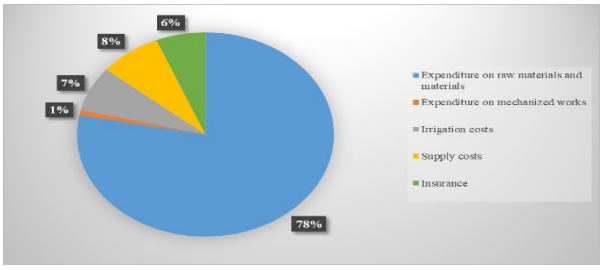

Fig. 2. Distribution of variable costs for chrysanthemum culture (cut flowers) in conventional protected space
Source: processing ICEADR calculations.

By lowering the total expenditures from the realized revenues, the taxable income is 269,614.7 lei/ha, and finally a net income of 242,653.2 lei/ha and a net income of 27% (Fig. 3).

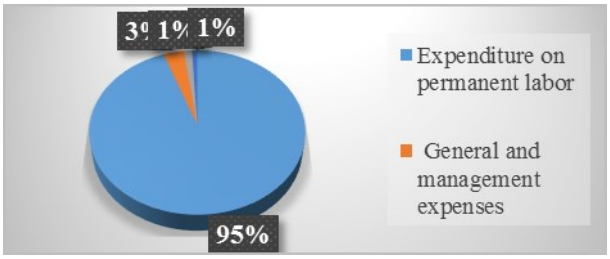

Fig. 3. Distribution of Fixed Costs for Chrysanthemum Culture (cut flowers) in conventional protected space
Source: processing ICEADR calculations.

The production cost of 0,94 lei/thread resulting from the ratio of total expenditures to the estimated average production represents the representative synthetic indicator of the economic efficiency level for the chrysanthemum culture in protected space - conventional system (Table 1).
In order to ensure profitability for the chrysanthemum culture, the foreseeable domestic market price of 1.22 lei/ thread was calculated by multiplying the production cost by a coefficient of 1.30 (Table 1).
The income and expenditure budget for the protected chrysanthemum culture - an ecological system, has been calculated for an

estimated production of 960,000 pieces (cut flowers)/hectares (Table 1).

Table 2. The main predicted indicators for ecological chrysanthemum cultivation between 2018 and 2019 (protected area, average potential), with an estimated production of 720,000 cut flowers per hectare

No. crt	Indicators	U.M	Value	
			lei	Euro (4,6 lei/euro)
1	A VALUE OF PRODUCTION, of which:	lei	1,211,762.4	263,426.6
2	B (+).SUBSIDIES	lei	2,152.8	468
3	C (=) GROSS PRODUCT	lei	1,213,915.2	263,894.6
4	D (-) TOTAL EXPENSES	lei	865,544.6	188,161.9
5	I. VARIABLE CHARGES	lei	277,013.0	60,220.2
6	II. FIXED EXPENSES	lei	588,531.6	127,941.7
7	E (=) TAXABLE INCOME	lei	346,217.8	75,264.7
8	E.1(-) Taxes	lei	34,621.8	7,526.5
9	F (=)NET INCOME + subsidies	lei	313,748.8	68,206.3
10	F.1 (=)NET INCOME	lei	311,596.0	67,738.3
11	G. RATED INCOME TAX	%	40	8.7
12	H. RATE INCOME NET + subsidies	%	36.2	7.9
13	H.1 RATE INCOME NET	%	36	7.8
14	COST OF PRODUCTION	Units. Cut flowers	1.2	0.3
15	PREVIOUS INTEREST PRICE MARKET	Units. Cut flowers	1.7	0.4

Source: processing ICEADR calculations.

In the case of cultivated chrysanthemums in ecologically protected space, for an estimated average production of 720,000 pieces of cut flowers/ha corresponds to a production value of 1,211,762.4 lei/ha, and by adding the subsidy of 2,152. 8 lei / ha, it is determined the realization of a gross product of 1,213,915.2 lei/ha (Table 2).

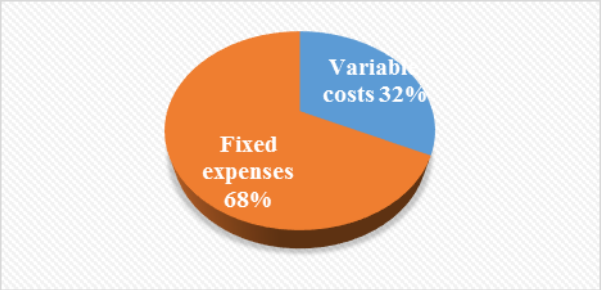

Fig. 4. Distribution of total agrotechnical expenses for chrysanthemum culture (cut flowers) in ecologically protected space
Source: processing ICEADR calculations.

Of the total expenditures, the variable costs 32%, and the value inputs with materials and materials represent 77% of the variable expenses. With a share of 68% of total expenditures, fixed expenses are formed in 94% of the permanent labor force consumption value (Fig. 4) (Fig. 5).

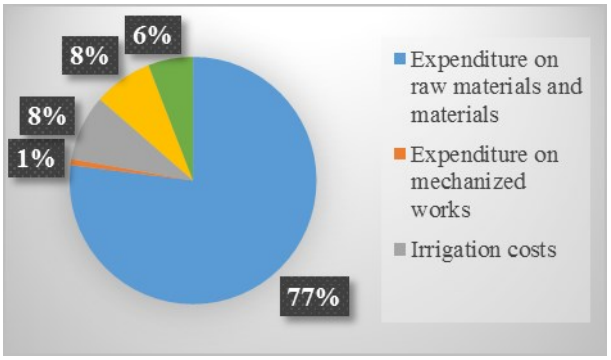

Fig.5. Distribution of variable costs for chrysanthemum culture (cut flowers) in ecologically protected space
Source: processing ICEADR calculations.

By lowering the total expenses from the realized revenues, the taxable income is 346,217.8 lei/ha, and finally a net income of 311,596 lei/ha and a net income of 36%.

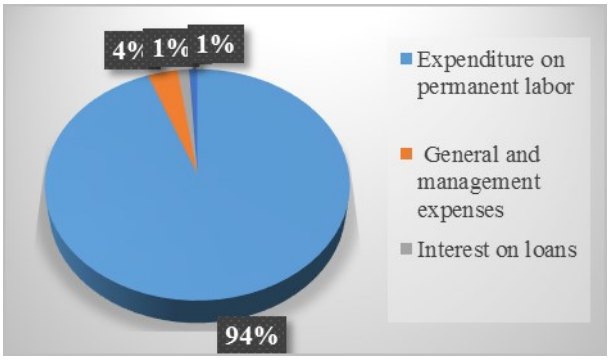

Fig. 6. Distribution of Fixed Costs for Chrysanthemum Culture (Cut Flowers) in Ecological Protected Area
Source: processing ICEADR calculations.

Synthetic indicator representative of the level of economic efficiency at which the chrysanthemum culture is obtained in a protected environment - ecological system, the production cost of 1.20 lei/thread results from the ratio of total expenditures to the estimated average production (Fig. 5).
In order to ensure profitability for the chrysanthemum culture, the foreseeable domestic market price of 1.68 lei/thread was calculated by multiplying the production cost by a coefficient of 1.4 (Table 2).

Table 3. Analysis of economic indicators of synthesis for chrysanthemum culture in conventional and ecologically protected areas - prognoses 2018/2019

No. crt.	Economic indicators of synthesis	U.M.	Conv.	Ecol.	Deviations	
					UM	%
1	Average production at ha	1,000 cut flowers/ha	960.0	720.0	-240.0	75.0
2	Production value at ha	lei/ha	1,168,330.4	1,211,762.4	43,432.0	103.7
3	Production costs per hectare	lei/ha	898,715.7	865,544.6	-33,171.1	96.3
4	Variable costs	lei	271,866.7	277,013.0	5,146.3	101.9
5	Raw materials and materials	lei	212,180.7	213,283.8	1,103.1	100.5
6	Expenditure on permanent labor	lei	591,982.0	554,666.6	-37,315.4	93.7
7	Fixed costs	lei	626,849.0	588,531.6	-38,317.4	93.9
8	Unit production cost	lei/cut flowers	0.9	1.2	0.3	128.4
9	Cost of capitalization	lei/ cut flowers	1.2	1.7	0.5	138.3
10	Productivity of work in physical expression	man-hours / ton	37.7	47.4	9.7	125.7
11	Profit or loss per unit of production	lei/ha	269,614.7	346,217.8	76,603.1	128.4
12	Profit sau pierdere pe unitatea de produs	lei/1000 cut flowers	280.8	480.9	200.0	171.2
13	Rate of return	%	30.0	40.0	10.0	133.3
14	The threshold of return in units of value	lei	816,950.8	762,942.9	-54,007.9	93.4
15	Revenue threshold in physical units	cut flowers/ha	671,276.5	453,322.3	-217,954.2	67.5
16	Risk of exploitation risk	%	69.9	63.0	-7.0	90.0
17	Security Index (Is)		0.3	0.4	0.1	123.2

Source: processing ICEADR calculations.

The data of the table above presents an analysis of the synthetic economic indicators for the cultivation of field chrysanthemums for the two systems: conventional and ecological. From this analysis it follows that (Table 3):

• The production of chrysanthemums, cut flowers, is smaller in the organic system by 25% compared to the conventional system, but the value of organic production exceeds by 3.7% the conventional one.

• the value of the production obtained exceeds the expenses incurred by 30% in the conventional system and by 40% in the ecological system.

• Variable expenditures represent 30% and 32% respectively, the difference being covered by fixed costs. Consumed resources, materials and materials are 0.52% higher than the conventional one.

• Representative synthetic indicator in the estimation of the economic efficiency of the expenses per product, the unit production cost is 0.9 lei/thread in the conventional system and 1.2 lei/thread in ecological system, mainly because of lower production by 25%.

•The average price of recovery is 1.2 lei/thread in the conventional system and 41.7% higher in the ecological system. Regarding the productivity of work, the realization of 1,000 conventional chrysanthemum threads requires 37 hours consumption, of which 0.1 hours for mechanical works and 37.9 hours for manual works, and in the ecological system a consumption of 47.4 hours, of which 0,1 hours for mechanical works and 47.3 hours for manual works.

• The rate of risk exploitation is a synthetic indicator that assesses the possible risk of achieving the expected output. For the chrysanthemum culture, in protected space, the indicator is 69,9% in the conventional system and 63% in the ecological system.

CONCLUSIONS

The culture of this plant is an economically advantageous activity due to the period when it appears on the market, September-December, when other flowers are not found or are in insufficient quantities.

Considering that for the production of a chrysanthemum in a conventional system, the unit production cost amounts to 0.9 lei, and in the case of chrysanthemum grown in ecological system is 1.2 lei, we can notice its profitability in terms of profit 0.3 lei/thread (chrysanthemum cultivated in conventional system) and 0.5 lei/thread (chrysanthemum cultivated in ecological system).

Also, the profitability threshold is the physical or value level of the production where the value of the output obtained fully covers the costs incurred, namely the level at which the culture starts to be profitable. Thus, we mention that in the conventional chrysanthemum culture the profitability is shown starting with the average production of 671.3 thousand yarns/ha corresponding to the value of 816,950.8 lei, and in ecological system this threshold is lower by 32.5% in physical units and 6.6% in units of value.

At the same time, the security index refers to the security margin that is ensured by the culture, which is 0.3 in the conventional system and 0.4 in the ecological system,

increasing it in the same way as the security index.

Note that both chrysanthemums grown in conventional and organic farming systems can be a profitable activity for florists.

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