

STUDIES REGARDING THE OPTIMIZATION FOR CROP PLANT FARMS IN BRĂILA FIELD

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One of the micro, the most important bridge to the agricultural potential, is the Plain of Braila.

This microzone is located in the north-eastern Romanian Plain, with the neighbors to the west, north and east geographical formations nature plain and the Danube south. The climate is temperate continental with hot and dry summers and cold winters.

The average annual temperature is 10.4 ° C and average rainfall - 447 mm recorded a deficit of water is 258 mm, which determines the need of irrigation.

To optimize the structure of crops has made a case study of the field holding a Braila, SC Agro-Group Import-Export SRL Braila. Optimization was done using linear-programming.

He developed an economic-mathematical model for one of the two bodies namely body Siliștea society, with an area of 400 hectares. Profit maximization objective function followed.

After solving the resulting model a new structure different from the existing structure.

Corn grain holds 37.5% of the surface, with 10% more than the old structure. Most area for maize seed is 32.5%. It also increased the area planted with winter barley seed, from 2.5% to 20%, at the expense of consumption. If winter wheat area for consumption decreased by 50%, increasing slightly the area of wheat seed. In the rape seed crops. In the culture of rape and sunflower seed, they were maintained at a constant level of 12.5%.

Level economic indicators of the two structures, we show that if optimized structure, both the income and gross profits are higher than the existing version. Total income is higher by 219.14 thousand lei, and profit by 134.79 thousand lei, if optimized version. In addition, areas of different sizes allow you to create a rotation crop favorable from the technological point of view.

Keywords: *optimization, culture structure, Brăila Plain, economic efficiency, programming.*

MATERIAL AND METHOD

To conduct the study it was taken as a case study within a firm specializing in field crops in Plain Braila, respectively SC Agro-Group Import-Export SRL Braila. The farm is representative of the area studied.

Following the optimization process there has resulted a new structure significantly different from the existing structure.

Table 1

Optimized structure of crops – Siliștea body

Nr. crt.	Specification	Existing structure*		Optimized structure	
		ha	%	ha	%
1.	Winter rape	80	20,0	-	-
2.	Winter rape seed lot	10	2,5	50	12,5
3.	Winter barley	50	12,5	-	-
4.	Barley Autumn	30	7,5	20	5,0
5.	Winter barley seed lot	10	2,5	80	20,0
6.	Autumn wheat	40	10,0	20	5,0
7.	Autumn wheat seed lot	20	5,0	30	7,5
8.	Sun flower	50	12,5	50	12,5
9.	Grain maize for consumption	40	10,0	20	5,0
10.	Grain maize hybridization group	70	17,5	130	32,5
	Total	400	100,0	400	100,0

*Average years 2007-2008

First it is found that grain maize occupies 37.5% of the surface, with 10% more than the old structure. Within this structure, the weight has a grain maize - batch of hybridization, with 32.5% of the entire area.

Among other cultures, it is noted that increased the area planted with winter barley seed, from 2.5% to 20% at the expense of autumn two-rowed barley and winter barley for consumption. Also, the rape, keep growing at a rate of 12.5%, only the intended seed.

Autumn wheat consumption has reduced the area by 50%, slightly increasing the area under seed. Sunflower crop was maintained at the same level - 12.5%, which led and technology reasons.

Shown in *tables 4 and 5* the size of the economic indicators in the two structural variants: V_0 - the existing version and V_1 - optimized version with climate and soil characteristics.

Crop was used for structure optimization linear programming method which allowed the development of economic-mathematical optimization model, with the variable areas of favorability main field crops in the area. Objective function of maximizing the gross profit achieved.

Table 2

Total economic indicators – V_0 existing variant

Nr. crt.	Culture	Area ha	Total revenue thousands lei	Total expenditure thousands lei	Total gross profit thousands lei
1.	Winter rape	80*	250,8	193,22	57,66
2.	Winter rape seed lot	10	46,80	33,64	13,16
3.	Autumn two rowed barley	50	176,70	135,90	40,80
4.	Autumn barley	30	93,00	75,81	17,19
5.	Winter barley seed lot	10	35,10	25,71	9,39
6.	Winter wheat	40	139,20	117,62	21,58
7.	Winter wheat seed lot	20	81,20	57,90	23,30
8.	Sunflower	50	180,00	129,42	50,58
9.	Grain maize for consumption	40	188,00	121,93	66,07
10.	Grain maize hybridization group	70	430,08	240,30	189,78
	Total	400	1620,96	1131,45	489,51

*Average years 2007-2008

Table 3

Total economic indicators – V₁– optimized variant

Nr. crt.	Culture	Area ha	Total revenue thousands lei	Total expenditure thousands lei	Total gross profit thousands lei
1.	Winter rape seed lot	50	234,0	168,2	65,8
2.	Autumn barley	20	62,0	50,5	12,5
3.	Winter barley seed lot	80	280,0	205,7	74,3
4.	Winter wheat	20	69,6	58,8	10,8
5.	Winter wheat seed lot	30	121,8	86,9	34,9
6.	Sunflower	50	180,0	129,4	50,6
7.	Grain maize for consumption	20	94,0	70,0	24,0
8.	Grain maize hybridization group	130	798,7	446,3	352,4
	Total	400	1840,1	1215,8	624,3

RESULTS AND DISCUSSIONS

Company Agro-Group Import-Export SRL Braila was founded in its current form in 2003 specializing in field crops. It is a unit of the field Braila. The company is located in the northern Plains of Braila, with characteristics of steppe zone with a temperate continental climate with hot and dry summers and cold winters, struck by strong winds. The average annual temperature is 10.4 °C and average precipitation are 447 mm. The existence of high evapotranspiration, water deficit causes a 258 mm, requiring the application of irrigation. The soil is the typical mold, well supplied with phosphorus and potassium and nitrogen moderate.

Siliștea body, having an area of 405 hectares, has weight in society (80%).

Structure cultivated is shown in *tab. 4*.

Table 4

Culture structure at Farm no. 7 –Siliștea body

Nr. crt.	Specification	Years			
		2007		2008	
		ha	%	ha	%
1.	Winter rape	87,0	18,0	80,0	19,7
2.	Winter rape seed lot	-	-	21,0	5,2
3.	Autumn two rowed barley	103,0	25,4	-	-
4.	Autumn barley	-	-	60,0	14,8
5.	Winter barley seed lot	10,0	2,5	10,0	2,5
6.	Winter wheat	55,0	13,6	30,0	7,4
7.	Winter wheat seed lot	-	-	25,0	6,2
8.	Sunflower	35,0	13,6	53,0	13,9
9.	Grain maize for consumption	31,0	7,6	51,0	12,6
10.	Grain maize hybridization group	64,0	15,8	75,0	18,5
	Total	405,0	100,0	405,0	100,0

Analyzing the data for the period 2007-2008 follows a diffuse structure, with a total of six species, mostly cultivated for room, for consumption and seed. Corn

grain occupies an average area that is on average 27.3%, of which 17.2% is owned by maize for consumption. Cereals straw (wheat and barley occupy 36.2%, of which only 5.6% were destination seeds). Among other crops, sunflower held 13.9%, and rape, on average, about 18%, of which very little seed.

Average yields have been relatively high, consistent with the favorability factors existing in the unit (*tab. 5*).

Table 5

The achievement of the average production plan (2008)

Nr. crt.	Culture	Year 2008		Degree of plan accomplishment - %
		Plan	Accomplished	
		Kg/ha	Kg/ha	
1.	Winter rape	2700	2825	104,6
2.	Winter rape seed lot	1500	1760	117,3
3.	Winter barley	6000	6200	103,3
4.	Winter barley seed lot	5000	5350	107,0
5.	Autumn wheat	5500	5900	107,2
6.	Autumn wheat seed lot	5500	5820	105,8
7.	Sunflower	2800	3060	109,3
8.	Grain maize for consumption	8000	9360	117,0
9.	Grain maize hybridization group	4500	4800	106,7
10.	Beans seed batch	2000	2000	100,0
11.	Lucerne foe hay	15000	15000	100,0
12.	Alfalfa seed lot	500	720	144,0

These productions have exceeded the planned level in all crops in 2008.

Comparing the economic indices of the two structures indicates that variant optimized for both the income and gross profits are higher than the existing version.

Thus, the optimized version, total income is higher by 219.14 thousand lei, and total profit is 134.79 thousand lei more than in the existing version.

If we take into consideration that the size of areas of different cultures allow the creation of favorable turns in terms of technology, we find the opportunity to structure optimization process crops.

CONCLUSIONS

1. One of the most important micro view of Romania's agricultural heritage is Braila Plain. Climatic conditions, especially soil, allow high production of main crops, and the presence of water sources can ensure the stability of these productions.

2. Structure cultures showed some weaknesses caused by temporary factors, neasigurând stability and proper rotation. Soon cultures is a necessity for economic efficiency.

3. The case study that was done, using mathematical models, structure optimization of crops on a farm representative of plain Braila, showed the effectiveness of this process. Increase the value represented by the size of the

additional gross income (219.14 thousand lei). And total profit (134.379 million lei), demonstrates the usefulness of this process.

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