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20 November 2014

Online at <https://mpra.ub.uni-muenchen.de/61780/>  
MPRA Paper No. 61780, posted 03 Feb 2015 06:28 UTC

# COMPUTER SYSTEM FOR FARMS (SITEFA) - AN OPPORTUNITY FOR PERFORMANT AGRICULTURAL MANAGEMENT

ELENA COFAS<sup>1</sup>

**Abstract:** *Any modern agricultural unit, regardless of profile, size, ownership and socio-economic space in which they operate, requires a management style based on flexibility, dynamism and foresight, which is inconceivable without a complex, operative and quality information, to underpin decision making. Therefore, any farmer needs objective, relevant, reliable, timely, useful, concerning: market demand, new products and technologies, the position of competitors, suppliers and customers, their performance, etc., so that their analysis to directly influence and as the competitiveness of the farm in a particular market or market segment. Based on the theme of the "Determination of economic indicators of crop production technologies and animal applied in order to increase environmental performance (costs, productivity, profitability, gross margin)" from the Sector Plan ADER 2020 was developed computer system SITEFA- a product developed and designed program-technical-economic analysis of the performances of farm economic and efficient use of production factors in classical operating conditions.*

**Keywords:** *agriculture, computer system, farm, management, analysis*

## INTRODUCTION

SITEFA is a software developed and produced for technical and economic analysis of the performances of farm economic and efficient use of production factors in classic operating conditions.

The main structural elements of the informatic system SITEFA are:

- technical basis or hardware system, which consists of all technical means for collecting, transmitting, storing and processing data, the central site computer returns electronically.
- Software system, which includes all programs built for operation of the product, according to the functions and objectives that have been preset (profitability analysis and efficient use of factors of production).
- scientific and methodological basis, which consists of mathematical models of economic processes and phenomena, methodologies, methods and techniques for achieving information systems.
- information base, which include data undergoing processing, information flows, systems and nomenclatures codes.

## MATERIAL AND METHODS

From a technical standpoint, SITEFA is an application built on a platform Microsoft Excel using Visual Basic tool because it allows to describe control structures, procedures and user functions. Visual Basic is part of Microsoft's Visual Studio package and, as well as other languages 'visual' Microsoft is focused on component interface of the program is easily possible to create Windows-standard interfaces (windows, buttons, lists etc.), without having to be written source code for this.

Visual Basic as a library of visual components (lists, calendars, menus etc.) whose components (graphics and functional) are already implemented, with the possible introduction and use of its components or realized within other applications. On the basis of information system design SITEFA stayed both elementary functions and special functions (called macros, involving macro-commands and macro-functions), the latter being in the utility of the application Microsoft Excel Visual Basic.

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## RESULTS AND DISCUSSIONS

From a functional perspective, the computer system SITEFA has the following functions:

- Generating technology/technology and estimate of revenue and expenditure for each of the types of crops recognized by the system based on the input data.
- Determination economic indicators of crop production technologies.
- Maintenance of all subsystems (lists and tables) used to obtain the results generated by the computer system.
- Function to create/update: the system is equipped with a special feature for creating and updating its constants (maintenance); This function can perform the following:
  - updating /changing information contained in system nomenclatures and tables;
  - adding new records (mechanical works, manual work, materials and equipment, crop types, etc.);
  - deletion of certain information from databases;
  - looking/checking the desired information;
  - nomenclatures listing or other useful information from the system.
- Search functions, location, calculating, extracting information from the database and preparing for listing will be the most important component of the system that will be incorporated algorithms calculation procedure.

### *Description of information flow*

In terms of construction, a computer system includes input into the system (inputs), constant system (information taken from lists and tables) and system output data (outputs or reports).

a. *The input data* is any information entered by the user of the system, according to the objective pursued, for example:

- type of culture,
- production area (plains, hills, mountains) /production system (irrigated, non-irrigated)
- used agricultural surface
- rates mechanical works,
- manual work rates,
- materials and materials prices,
- selling price main production,
- selling price secondary production,
- the subsidy per hectare,
- the proportion of different types of expenses (supplies, labor, with insurance, and general management, with the interest rate)
- values for other expenses (reduction in value on buildings and utilities, taxes and fees)
- opening balance etc.

b. *The constants* are classifications system, internal tables and tables linking the program; system uses the following tables:

- table culture
- table with manual work
- table with mechanical works
- making materials and materials
- making the necessary annual (monthly rations of forage types)
- action table for each crop plant
- table with pesticides (fungicides, herbicides).

These constants can be updated through maintenance (maintenance) nomenclatures and tables used.

c. *The output* are there ports that are generated after charging system input and constants defined, based on algorithms specific to each module design; examples:





	A	B	C	D	E
4	<b>Calculatii pe hectar</b>				
5					
6					
7	Cod: D.01			Sistem: Neirigat	
8	Zona geografica:	Campie		Productia principala (kg)	
9	Potential:	Mediu		Productia secundara (kg)	
10	INDICATORI	U.M	VALOARE		
11			fara arenda	cu arenda in cheltuieli	cu arenda din venit
12	A. VALOAREA PRODUCTIEI	lei	5748	5748	5748
13	A <sub>1</sub> Din care productia principala	lei	5460	5460	5460
14	B (+) SUBVENTII	lei	771,5	771,5	771,5
15	C (=) PRODUS BRUT	lei	6519,5	6519,5	6519,5
16	D (-) CHELTUIELI TOTALE	lei	4223,5	4743,5	4223,5
17	D <sub>1</sub> Din care pentru productia principala	lei	3935,5	4455,5	3935,5
18	I. CHELTUIELI VARIABLE	lei	3701,1	3701,1	3701,1
19	1 Cheltuieli cu materii prime si materiale	lei	1849,92	1849,92	1849,92
20	- Sămânță și material săditor	lei	675	675	675
21	- Ingrasaminte chimice	lei	555	555	555
22	- Pesticide	lei	565,9	565,9	565,9
23	- Alte materiale	lei	54	54	54
24	2 Cheltuieli cu lucrari mecanizate	lei	1703,9	1703,9	1703,9
25	3 Cheltuieli cu irigatii	lei	x	x	x
26	4 Cheltuieli de aprovizionare	lei	55,5	55,5	55,5
27	5 Cheltuieli cu forta de munca temporara*	lei	x	x	x
28	6 Asigurari	lei	91,8	91,8	91,8
29	II. CHELTUIELI FIXE	lei	522,4	1042,4	522,4
30	- Cheltuieli cu forta de munca permanenta	lei	62,0	62,0	62,0
31	- Cheltuieli generale si de management	lei	73,4	73,4	73,4
32	- Dobanzi la credite	lei	217,0	217,0	217,0
33	- Arenda**	lei	x	520	x
34	-Amortisment pentru cladiri si utilitati	lei	170	170	170
35	E. (=) VENIT IMPOZABIL	lei	1524,5	1004,5	1524,5
36	(-) Impozite si taxe	lei	243,9	160,7	243,9
37	(-) Arenda**	lei	x	x	520
38	F. (=) VENIT NET+subventii	lei	2052,1	1615,3	1532,1
39	G. RATA VENIT IMPOZABIL (%)	%	38,7	22,5	38,7
40	H. RATA VENIT NET+subventii (%)	%	52,1	36,3	38,9
41					
42	COST DE PRODUCTIE	lei/to	937,0	1060,8	937,0
43	PRET PIATA INTERNA PREVIZIBIL	lei/to	1300	1300	1300
44					
45	* Aceste cheltuieli se regasesc la exploatatile de dimensiuni mijlocii, mari si foarte mari.				
46	** Pana la 600 kg/ha la pretul pietei (400 kg/ha grau X 1,3 lei/kg = 520 lei)				

Fig. 3. Spreadsheet „Budget for revenue and expenditure”

The spreadsheet "Standard gross margin" (Figure 4) enables calculation of standard gross margin (expressed in RON and EUR).

For the calculation of standard gross margin were considered direct costs or expenses standardized variables specific crop production such as:

- Seed and planting stock (purchased or produced on the farm)
- Chemical fertilizers,
- The purchase or manure from their own farms,
- Crop protection products,
- Crop insurance
- Water for irrigation,
- Heating,
- Specific marketing costs (cleaning, packaging)
- Other specific costs proportionate.

The specific costs are not included in labor costs, mechanization, buildings with fuels and lubricants, car repairs, depreciation and expenses made by third units. These expenses are highlighted specific cultures of their size unit activity in each culture.

	A	B	C	D	E	F
1	<b>MARJA BRUTA STANDARD-UNITARA</b>					
2	<b>GRAU - Cod. D.01</b>					
3	<b>Zona geografica: Campie; Sistem neirigat; Potential Mediu</b>					
4	<b>Rezultate estimate pentru recolta 2013/2014</b>					
5	<b>CALCULATII PE HECTAR</b>					
6						
7	Productia: <b>Grau boabe (4200 kg) in sol cernoziomic</b>					
8						
9				1 EURO = 4,5383		
10	<b>GRAU neirigat</b>		Kg/ha	Pret livrare -lei/kg-	Lei	Euro
11	Productia medie		4200,0	1,30	5460,0	1203,1
12	Productia secundara		1440,0	0,20	288,0	63,46
13	<b>Produs brut mii lei</b>		<b>pe ha</b>	<b>pe t</b>	<b>euro/ha</b>	<b>euro/t</b>
14			<b>6519,5</b>	<b>1552,3</b>	<b>1436,6</b>	<b>342,0</b>
15	Subventii acordate lei		771,5	0,184	170,0	0,040
16	Cheltuieli variabile lei		1941,7	0,462	427,8	0,102
17	<b>Marja bruta mii lei</b>		<b>4577,8</b>	<b>1090,0</b>	<b>1008,7</b>	<b>240,2</b>
18	<b>Pondere marja bruta in produs br</b>		<b>70,22%</b>			
19						
20						
21						
22	Variatia Marjei Brute in functie de diferite		Media	M.B.S	M.B.S	1 UDE=1200 E
23			kg/ha	lei	euro	
24	Productie medie	mare	5040	5669,8	1249,3	1,041
25	Productie medie	medie	4200	4577,8	1008,7	0,841
26	Productie medie	mica	3360	3485,8	768,1	0,640
27						
28						
29	<b>Cheltuieli variabile</b>		Cantitatea Kg, l	Pret unitar	Total lei	Euro
30	Igrasaminte cu N, kg sa/ha		135	3	405,00	89,2
31	Ingrasaminte. P <sub>2</sub> O <sub>5</sub> Kg sa/ha		60	2,5	150,0	33,1
32	Samanta Kg/ha		250	2,7	675,0	148,7
33	Insecto-fungicid Tonic Plus 2,5 l/to		0,625	183,6	183,6	40,5
34	Erbicid - Bucril universal l/ha		1	90,7	90,7	20,0
35	Fungicid - Evolus l/ha		1	200,9	200,9	44,3
36	Insecticid - Pynex 25 CS l/ha		1	90,72	90,7	20,0
37	Apa irigatii mii m <sup>3</sup>		x	x	x	x
38	Sfoara Kg/ha		2	27	54,0	11,9
39	Asigurari		1	91,8	91,8	20,2
40	<b>Total cheltuieli variabile</b>		<b>x</b>	<b>x</b>	<b>1941,7</b>	<b>427,8</b>
41						
42						
43	<b>Aportul de ore munca/ha si t</b>					
44	Total:		22,1 ore/ha - 6,3 ore/t			
45	din care:		ore/lucrari mecanice 10.1 ore/ha - 2.9 ore/t			
46						

Fig. 4. Spreadsheet „Standard gross margin”

In the spreadsheet "technical-economic indicators" (Figure 5) are calculated a number of financial indicators:

- Unit cost of production,
- Price recovery,
- Labor costs 1000 lei production value,
- Expenditure on materials lei 1000 production value,
- Profit,
- Rate of return etc.

INDICATORI ECONOMICI DE SINTEZA					
GRAU - Cod. D.01					
Zona geografica: Campie; Sistem neirigat; Potential Mediu					
Rezultate estimate pentru recolta 2013/2014					
	INDICATORI	U.M	VALOARE	4,5383	
1	2	3	4	5	
6	1	Producția medie la ha	to/ha	4,2	x
7	2	Valoarea prod. la ha	lei/ha	5748	1266,6
8	3	Valoarea prod. principale la ha	lei/ha	5460	1203,1
9	4	Cheltuieli de prod la ha	lei/ha	4223,5	930,6
10	5	Cheltuieli pentru productia principala	lei/ha	3935,5	867,2
11	6	Cheltuieli variabile	lei	3701,1	815,5
12	7	Materii prime si materiale	lei	1849,9	407,6
13	8	Cheltuieli cu forta de munca permanenta	lei	62,0	13,7
14	9	Cheltuieli fixe	lei	522,4	115,1
15	10	Costul de prod. unitar	lei/kg	0,937	0,2
16	11	Pretul de valorificare	lei/to	1300,0	286,5
17	12	Consum de timp de muncă	ore-om/ha	22,0	x
18	13	Consum de timp de muncă	Z.O/ha	2,8	x
19	14	Remunerarea la ha pt forta de munca	lei/ZO	22,5	5,0
20	15	Productivitatea muncii în expresie fizică	ore-om/tonă	6,3	x
21	16	Productivitatea muncii în expresie valorică	lei/oră-om	247,6	54,6
22	17	Cheltuieli cu forta de munca la 1000 lei prod. val	lei	11,4	2,5
23	18	Cheltuieli cu materialele la 1000 de lei prod valori	lei	338,8	74,7
24	19	Cheltuieli la 1000 de lei prod principală	lei	720,8	158,8
25	20	Profit sau pierdere pe unitatea de producție	lei/ha	1524,5	335,9
26	21	Profit sau pierdere pe unitatea de produs	lei/to	363,0	80,0
27	22	Rata rentabilității	%	38,7	x
28	23	Marja asupra cheltuielilor variabile (MCV)	lei	2046,9	451,0
29	24	Marja asupra cheltuielilor variabile %	%	35,6	x
30	25	Pragul de rentabilitate in unitati valorice	lei	1467	323,2
31	26	Pragul de rentabilitate in unitati fizice	to	1,13	x
32	27	Rata riscului de exploatare	%	26,9	x
33	28	Indicele de securitate (Is)		0,731	x
34	29	Pozitia absoluta fata de PR	lei	3993,0	879,9
35	30	Pozitia realtiva fata de PR		2,722	x

Fig. 5. Spreadsheet „Technical and economic indicators”

Profitability analysis is important not only for assessing performance in economic unity, but also for choosing the most effective measures on the financing of economic growth, as achieved breakeven junction between industrial and financial strategy.

In the spreadsheet "Breakeven" (Figure 6) are some possible scenarios: increased production by 20%, decreased production value by 20% and 10% decrease in fixed costs.

Analysis of profitability forecasting gross product based on break-even scientifically possible to establish physical volume output is obtained and delivered cost-effective and also indicates the physical volume of output produced and sold (including the structure and its average selling price the recipients subunits, period and quality) in order to achieve a competitive level of gross profitability of domestic and foreign product coming period.

ANALIZA PRAGULUI DE RENTABILITATE							
Simulari de scenarii posibile							
Grau neirigat							
Explicatii	Valori	%	Pragul de rentabilitate RE=0	Rez obtenabil la o crestere a val prod cu 20%	Rez obtenabil la o scadere a val prod cu 20%	Mentinerea rezultatului initial cand CF se reduc cu 10%	
6	Cifra de afaceri (CA)	5748	100	1467	6898	4598	5601,3
7	Cheltuieli variabile (CV)	3701	64,4	945	4441	2961	3606,7
8	Marja asupra cheltuielilor variabile (MCV)	2047	35,6	522	2456	1637	1994,6
9	Cheltuieli fixe (CF)	522		522	522	522	470,1
10	Rezultatul brut	1524,5		0	1934	1115	1524,5

Fig. 6. Spreadsheet „profitability threshold”

Also, breakeven analysis serves in making financial diagnosis, ie economic risk analysis of the farm.



## CONCLUSIONS

Analysis of manufacturing activity is based on specific economic and physical indicators which along with accounting packages allow the farmer more analytical records of expenditure and revenue and provide management information needed to plan the best allocation of resources (eg staffing, operational mobility and the amount of resources required) to choose one of several possible or to conduct a study on the impact of the use of certain resources or to compare the results with those planned.

Among the indisputable advantages of this analysis mention:

- allows for production levels that no longer loss or programmed to produce a level of profit;
- highlights correlations between production development revenue and costs, grouped into variable costs and fixed costs;
- allows for utilization of production capacities in terms of obtaining a particular profit program and its growth paths;
- allow the development of hypotheses and simulations on the profits of the company;
- allows optimal sizing decisions on production capacity and make investments for the development and modernization of each company.

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