Calculation System used in Technical and Economic Substantiation of Production Costs and Estimation of Capitalization Prices for Crops. Case Studies: Vegetables Crops in Field and in Protected Spaces from Romania

Rozi Liliana Berevoianu, Research Institute for Agricultural Economics and Rural Development, Bucharest, Romania, E-mail:berevoianu.rozi@iceadr.ro
Diana Maria Necula, Research Institute for Agricultural Economics and Rural Development, Bucharest, Romania, E-mail:necula.diana@iceadr.ro
Raluca Necula, The Bucharest University of Economic Studies; University of Agronomical Sciences and Veterinary Medicine from Bucharest, Bucharest, Romania, e-mail:raluca@yahoo.com

Abstract

This paper presents a practical approach of the use of a methodological system for estimating the production costs and indicative prices from the manufacturer, as well as the yield degree for the main vegetables products from Romania.. For this purpose it will be used an informational system for production technologies analysis and calculation, of the revenues and expenditures budget, as well as for specific technique and economic indicators of vegetables production. Through its complexity, the calculation system constitutes an informational guide that allows users the access to data and information on the estimates relating to the assessments of the vegetables products demand and target price from the manufacturer, in order to increase the inputs allocation and achieving high and efficient productions. Also, the content and methods of making the informational guide is based on achieving results in developing and strengthening public policies on integrated support management support schemes for farmers, promoting and forecasting the trends on the vegetable market sector in terms of absorbing potential volume of demand and supply, developing consultancy solutions and fostering knowledge transfer and innovation in agriculture.

Keywords: production costs, prices, profitability, calculation system

Introduction

The vegetable products market in Romania is characterized by joint action of producers and consumers, and the lack of any offer can create difficulties in stabilizing the market creating periodic and annual price fluctuations.

Each vegetable product is obtained under an appropriate production technology. From a technical point of view the production technology records a series of timely operations sequenced in a logical order, and from an economical point, the technology is the sum of costs for each technical operation. The implementation of the production technology results are obtaining vegetable products which, economically, are characterized by a certain value recorded in the price of the product. We can deduce that profit maximization can be achieved by minimizing production costs per unit, by maximizing the selling price of the product, or both.

Production costs and prices of vegetable products are fully interdependent, their analysis being carried out coherent and systematic. Due to the influence of inflation, private agricultural structures, largely unconsolidated and noncompetitive, pricing for vegetable products calculated based solely on the free market can cause imbalances between supply and demand.

If the price of the obtained product, as a result of the variation of the demand and supply, falls below production costs, they can not be recovered. In such cases, the main measure to counteract the negative effects of the market lies in careful planning of vegetable production, thereby avoiding a situation where the market price of a product could fall below production costs.

Establishing the optimal price for vegetable products and the organization and efficient functioning of agricultural markets requires creating and implementing a computer system that, along with a system for providing statistical data, can meet the requirements of market economy. In this context it is mandatory to achieve the following objectives: estimating production costs and the prices of agricultural products; creating an informational guide on estimated prices and the appreciation of the production potential of main agricultural products.

Material and Methods

To achieve the case studies the main vegetable crops in Romania were selected, in order to highlight the utility of the computing system designed for technical and economic substantiation of production costs and price estimate of recovery of vegetable products.

From the methodological point of view technical and economic substantiation of production technology and production costs are achieved, average prices for capitalization and the degree of profitability for the main vegetable crops in Romania. From a technical standpoint, it starts with the technological preparation of each crops selected, differentiated by the allocation of factors of production, and by what is yielded per unit area, appropriate to the economical conditions for the selected farming system.

The computer system is made out of the following modules/components (Figure 1):

1. UI
2. Administrative module
3. Calculation module
4. Reporting module
5. Import/export data module

The application is based on a computing platform consisting of:

a) Operating system
b) Database
c) Server Application

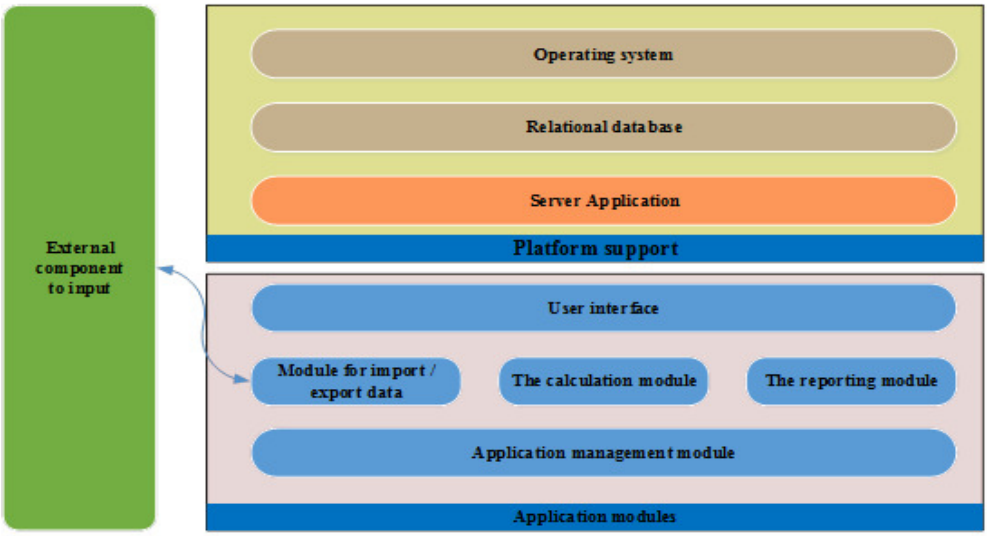

Figure 1. Scheme computing system software modules

The system architecture has considered the possibility of using the computer system simultaneously by internal and external users (Figure 2).

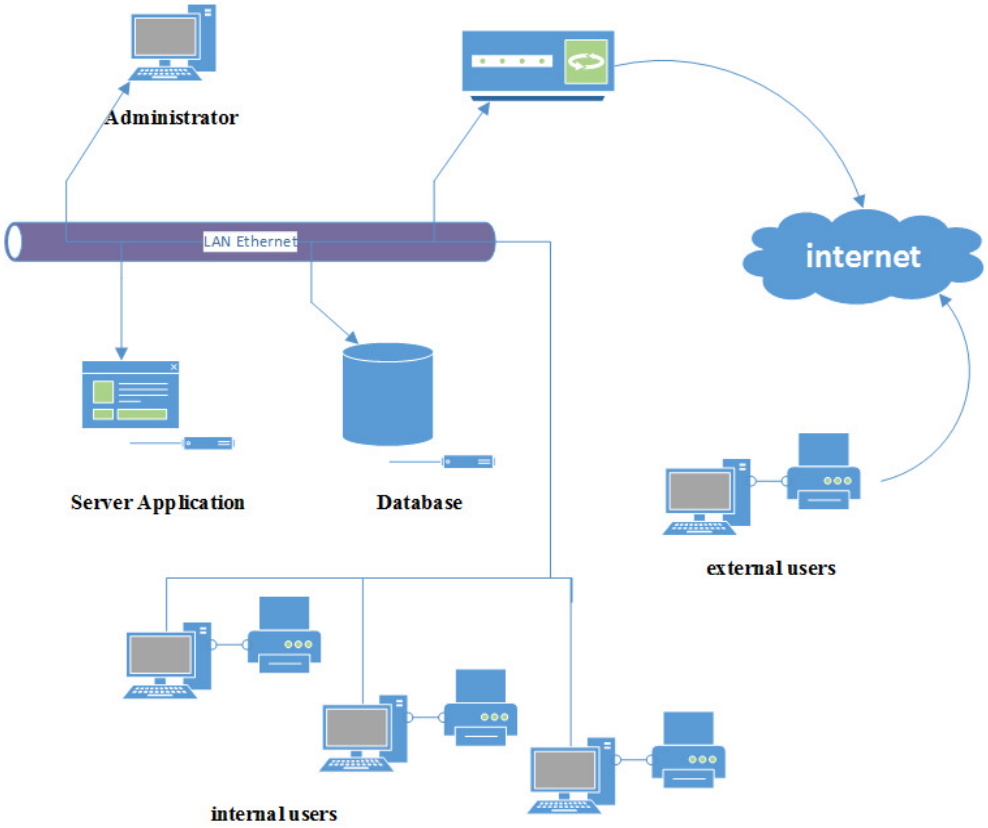

Figure 2. System architecture computing

Results and Discussions

I. Presentation of the database as part of the computer system.
The computing system uses a relational database managed through a proper system of programs. The database is organized so as to ensure the possibility of chaining in processing registrations and to eliminate duplication of information. However, the database is the common source of data for all subsystems of applications in the computing system.

In the computer system, the database consists of a collection of tables classified accordingly by the use and purpose for which they were created. Thus, the database includes:

- tables or permanent basis (constant), which contain information that is frequently consulted in the process of automatic processing;
- Tables variables that store quantitative data are updated frequently;
- auxiliary tables, which are establishment by a set of intermediate results required in processing.

The organization of these types of tables is a primordial requirement in the data processing system of calculation. We note that the information is recorded in coded form tables once they are used repeatedly to different treatments, systematically resorting to this unique source. The most important operations which is performed upon tables are query and maintenance (adding new records, updating records and deleting records). As a solution for encoding information is the most appropriate

automated processing numerical coding as the codes are unique, they can have long-term stability and flexibility in coding.

In the computer system, for an easy identification of the information required for processing, there were made encoding for mechanical works, manual works, seeds and seedlings, materials, and delivery prices, fungicides, herbicides, etc. Thus, the computer system has the following lists:

- lists with the names of cultures, of the production levels and allocation of agrotechnical production factors include: technology codes, codes for cultures used to establish the unit price of culture, the name of the technology, codes and quantities for primary and secondary production of crops, codes for phytosanitary actions and numbers for culture variation.
- The nomenclature of mechanical works includes: group works norm production, consumption norm, mechanized hours, payment rates.
- classification of manual work includes: manual labor group, band work, workload, man-days / unit of measure, payment rates.
- Lists of seeds, seedlings and various materials contain: codes that identifies the material, the material's name, unit of measure, unit price of material used, the identification code of the type of material.
- The classification of pesticides includes: identification code of the pesticide, the name of the material used, the concentrations of active substance, unit of measure, unit price of the pesticide.
- The nomenclature of phytosanitary actions includes: phytosanitary action code (this code groups several substances used in plant protection proceedings), code of the substance used, the amount of substance.
- mock crops include: code layout associated to the list of crops, job type (mechanical / manual), code of the paper, the volume of the work, materials and equipment and the volume associated with the current job, the calendar year in which the work is carried out, month in which the work is carried out.

II. Substantiation methodology of development of system models used in the calculation system:

A. The layouts for product technology

Production technology for vegetable crops includes enumeration, the sequence and description of operations, agrophytotechnical methods and procedures, type and nature of materials, machines and devices that are used determining using climatic factors and/or biological characteristics of plants, to obtain maximum production unit/surface, with minimal costs per unit of product.

The layout technology system includes the technological files for vegetable crops, which include technological links in chronological and logical sequences, materials and labor consumption, values of the consumption. All these technological elements are divided in months, quarters and annualy for the unfinished production. The technological sheet is drawn up for the area of 1 hectare per crop and it includes:

- the name of culture, the average system culture (field or area protected);
- the columns relating mechanical work contain: name of the work mechanical unit of measure, unit agriculture (tractor + car zone), the group works norm production, consumption norm, hours Motor-rates Payment work and mechanization costs;
- for manual labor we have data covering: manual labor name, unit of measure, group classification, ensemble work, workload, manual man-hours, payment price handiwork, manual work expenses;
- for various materials we have data regarding: the name of the material used, the unit of measurement, the amount of material used, the unit price of materials used, the total amount of various materials. By various materials we refer to inputs used to build production namely organic and chemical fertilizers, plant protection products to combat diseases and pests, herbicides, irrigation water etc.

The technological descriptions of the vegetables are required for programming, preparation and organization of production under economic conditions serving to determine the necessary means and manpower, as well as the direct costs of production required. Being an important source of

information for the preparation of annual production budget of income and expenditure sheet allows tracking technological and systematic control over the economic activity of the agricultural unit.

B. The layouts for budget revenue and expenditure of the product

The layouts for the income and expenses of the product include income from primary production, secondary and allowances, intermediate consumption, production costs, price, manufacturer, profit. Drafting of revenue and expenditure statement is based on technology. The structure of revenue and expenditure shall include elements related to:

- Production value, which is based on the average production per hectare and the estimated price on the domestic market;
- Intermediate consumption used for the output of main expenditure groups include the following:
  - Variable expenses, which include costs of materials and supplies (seed and planting material expenses, organic fertilizers and chemicals, expense with products against pests and diseases, expenses with other materials) costs mechanization, the expenses with irrigation (water consumption applicable to the culture), supply expenses (expenditure incurred for procurement, storage and transport of materials and materials provided in the technological schedules) expenses, temporary labor (representing the employees for performing different activities), expenses with crop insurance (rates are set according to the crop's risks and quotations, depending on the frequency manifestations of risk factors).
  - Fixed expenses, which include costs of permanent labor and management (representing expenditure taxes, maintenance assets, third party services, various services, etc.), interest expense on loans (fixed as a percentage of tech expenditures the technological sheet prepared for each crop).
- Taxable income is obtained by the difference between primary and intermediate consumption for the production of primary production value.
- Net income is based on the reduction of taxable income taxes related value.
- The taxable income rate is a percentage of the taxable income reported for the main production costs.
- The percentage of net income is the percentahe to net income reported for the main production expenses
- The production cost is the ratio of expenditures for the main product and main production culture
- The predictable domestic market price is the price at wich the crop is to be sold refferenced with the year.

C. System models for technical and economic indicators

The layouts for the technical-economic analysis was designed to achieve economic efficiency of production technology and includes:

- Indicators of production with respect to average production and production value reported in 1 hectare
- Economic indicators, referring to the structure of production costs, unit cost of production and price recovery, labor productivity, the yield rate of return, breakeven rate risk of exploitation

For the analysis of investment projects at farm level / vegetable farms is achieved breakeven analysis or cost-volume. Thus one can appreciate the relationship between the volume of production, production costs and profit.

III. Diagram of operation of the computer system

From a functional perspective, the computing system comprises the following components:

1. Component maintenance data
   a. Data entry
   b. View existing information
2. User interface component
   a. Select actions
   b. Set parameters
3. Specialized computing components
   a. Computing technology
   b. Calculating budgets

c. Calculation of indicators

4. Reporting Component
   a. Internal reporting database content
   b. Reporting generated technology
   c. Budget reporting income / expenses
   d. Reporting indicators

Schematic diagram of the functional application can be described as follows (Figure 3):

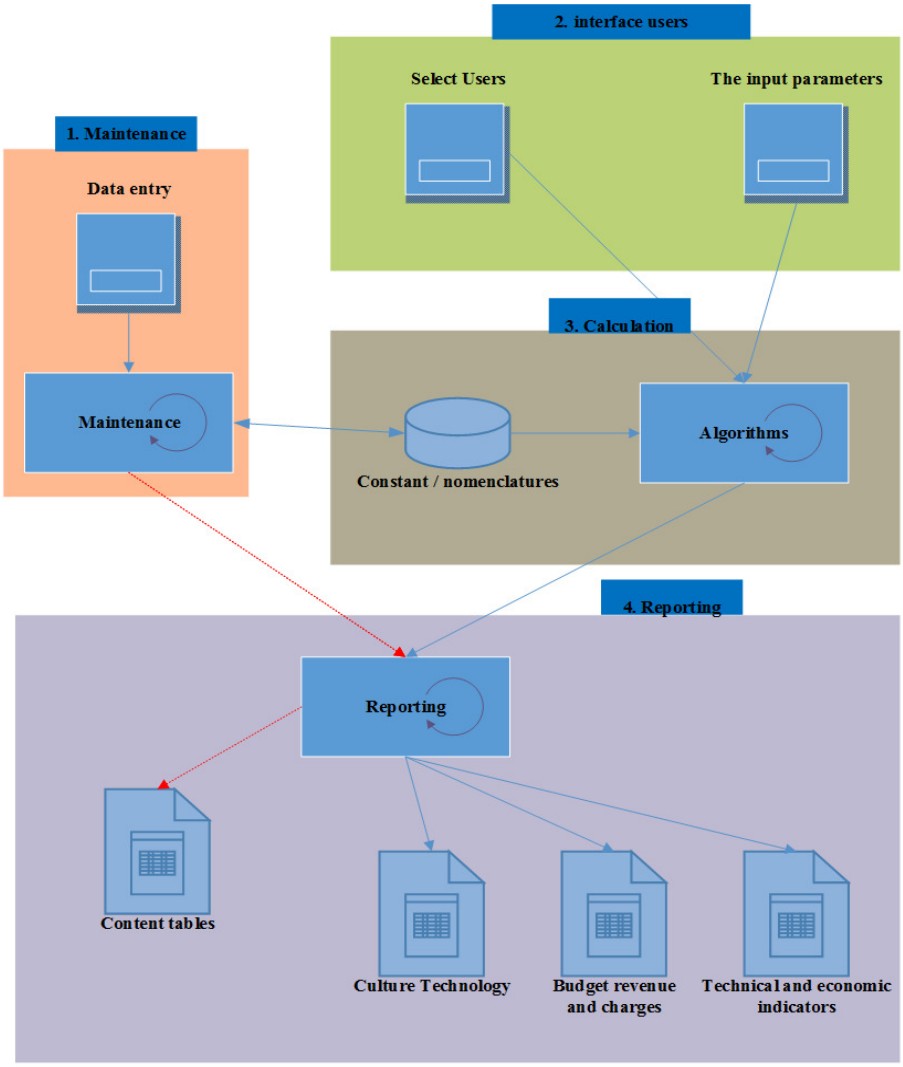

Figure 3. Scheme functional computer system

For the computing system to be effective, they considered some evaluation criteria, namely:

- compatibility database created with other computer systems;
- the possibility of including the computer system in a similar computer program;
- ratio of outcome or results achieved by implementing the computer system and all development costs to be as economically efficient;
- the design and implementation of the computer system took into account user requirements.

IV. Exemplifying the computer system for the main field and vegetable crops in protected areas.
For efficient use of the computing system we recommend the following:

- technological charts have to be developed by research experts from institutes with development profile;
- economic substantiation technologies for production and estimated production costs and domestic prices predictable crops under study, will consider technological input prices for the year in question. To calculate average tariffs on mechanization, will consult specialists from research institutes for agricultural mechanization development, production specialists;
- tariffs on irrigation works will be taken for 1000 cubic meters water prices set by legislation;
- Seed prices are taken from specialized units in the field;
- prices of fertilizers will be averaged using the companies that produce and charged them;
- prices for herbicides and pesticides used in crop technologies will be used from the distribution firms;
- tariffs and prices will be updated depending on market developments from the areas where the holding/vegetable farm is located.

The values of technological inputs mentioned above may influence production costs so predictable market prices will be established so that, each vegetable crop farmer to be able to cover their production costs and to ensure return appropriate to the culture system practiced.

The computing system is validated by the economic efficiency of production technology, measured by the ratio between incomes and expenses. Solution given hardware system is validated if the size of the benefit per hectare is optimal. Otherwise, we recommend reducing the costs per hectare, eliminating some optional technological works to compliance with the normative costs.

For example took into account two vegetable crops grown in the open and protected spaces 2015: peppers and tomatoes. For each vegetable crop, the informational system was used for analysis and calculation technologies of production, income and expenditure budgets and the specific technical and economic indicators. Based on the results of the analyzes were performed measurements of economic efficiency and profitability thresholds.

A. Pepper

A.1. Substantiation cost of production and predictable domestic market price for growing peppers (Table 1).

- Bell pepper cultivated field:
- The growth rate of revenues growth rate is higher by about 1.14% of the expenditure.
- Material expenses: a share of 64% of all resources consumed.
- The cost per unit of output - indicator reflecting the economic efficiency of expenditure items - 0.5 euro / kg.
- The average selling price per unit of output - factor with qualitative character in relation to time - 0.568 euro / kg. Culture has a return of 14.5% which is equivalent to an increase of the degree to which resources consumed brought profit.
- Gross rate of return of 14% shows a favorable situation that characterizes positive work culture bell pepper field.
- Labour productivity: 1 ton bell pepper field was obtained with a consumption of 58.3 hours for work (of which 1.3 hours / t / and mechanical works 57 hours / t / manual work).
- Safety index of the culture is 0.4%.

- Bell pepper cultivated in protected space (solar)
- The growth rate of revenues growth rate is higher by about 1.24% of the expenditure.
- Material expenses: a share of 66% of the resources consumed.
- The cost per unit of output - indicator reflecting the economic efficiency of expenditure items - 0.52 euro / kg.
- The average selling price per unit of output - factor with qualitative character in relation to time - 0.636 euro / kg. Culture has a return of 24.3% which is equivalent to an increase of the degree to which resources consumed brought profit.

- Gross rate of return of 24.3% shows a favorable situation that characterizes positive work culture in solar pepper.
- Labour productivity: 1 tonne of pepper in solar was obtained with the time consuming work of 65.2 hours (including 1 hour / t / mechanical work and 64.3 hours / t / manual work).
- Safety Culture Index is 0.6%.

Table 1: Financial ratios pepper

Nr crt	Indicators	UM	Culture values pepper	
			Culture in field	Culture in solar
1	Average production	t / ha	25.0	50.0
2	The production value per hectare	euro	14204.5	31818.2
3	Costs of production per hectare	euro	12404.5	25599.4
4	Variable expenses	euro	10196.3	20743.0
5	Raw materials	euro	8026.4	17115.2
6	Fixed expenses	euro	2208.2	4856.4
7	Permanent labor expenses	euro	1607.3	3622.6
8	Unit production cost	euro / kg	0.5	0.52
9	Price recovery	Euro / t	568.2	636.4
10	Labour productivity in physical expression	man-hours / t	58.3	65.2
11	Profit or loss per unit of production	EUR / ha	1800.1	6218.8
12	The rate of return	%	14.5	24.3
13	Margin on variable costs (CVM)	euro	4008.3	11075.2
14	Margin on variable costs	%	28.2	34.8
15	Breakeven in value units	euro	7825.4	13952.0
16	Profitability threshold in physical units	t	14.0	21.9
17	Operating risk rate	%	55.1	43.8
18	Safety Index		0.4	0.6

Source: Own calculations - Values are targeting indicators and may change depending on changes in output and input prices, seasonal conditions and characteristics vegetable farm.

A.2. Determining breakeven; simulations of possible scenarios for the cultivation of pepper

- Bell pepper cultivated field (Table 2):

- at an average of 25t/ha, breakeven is 7825 euro value in units and 13.8 t expressed in physical units. To an increase in turnover by 20% the result (amount of gross profit) increased by 44.5%. Price recovery for growing peppers in the field can vary from 0.45 euro / kg, while the turnover is reduced by 20% to 0.68 euro/kg, while the turnover increases 20%. The situation pepper culture in the field of culture for the year can be assessed in the study, compared to breakeven, as comfortable as actual turnover by 40% exceeds the critical point.

Table 2: Breakeven: simulations of possible scenarios for pepper field

	Fiscal value EUR / ha	Variable expenses EUR / ha	Margin on variable costs	Fixed expenses EUR / ha	Gross
Values	14.204	10.196	4,008	2,208	1,800
%	100	72	28	-	-
Breakeven	7825	5.617	2,208	2,208	0
Obtainable result in an increase in turnover by 20%	17.045	12.236	4.810	2,208	2602
The result obtainable from a decrease in turnover by 20%	11.364	8157	3207	2,208	998
Maintaining the initial result when turnover is reduced by 10%	13.422	9635	3.787	1,987	1,800

Source: Own calculations

▪ Bell pepper cultivated in protected space (solar) (Table 3):

- at an average of 50t / ha, breakeven is 13 952 euro in units and 21.9 t value expressed in physical units. To an increase in turnover by 20% the result (amount of gross profit) increased by 35.6%. The price recovery in the solar pepper crop can vary from 0.50 euro / kg, while the turnover is reduced by 20% to 0.76 euro / kg, while the turnover increases 20%. The situation pepper culture in the solar year in the study of culture can be appreciated in relation to breakeven, as comfortable as actual turnover by 60% exceeds the critical point.

Table 3: Breakeven: simulations of possible scenarios for solar pepper

	Fiscal value EUR / ha	Variable expenses EUR / ha	Margin on variable costs	Fixed expenses EUR / ha	Gross
Values	31.818	20.743	11.075	4856	6219
%	100	65	35		
Breakeven	13.952	9096	4856	4856	0
Obtainable result in an increase in turnover by 20%	38.182	24.892	13.290	4856	8434
The result obtainable from a decrease in turnover by 20%	25.455	16.594	8860	4856	4.004
Maintaining the initial result when turnover is reduced by 10%	30.423	19.833	10.590	4,371	6219

Source: Own calculations

B. Tomatoes

B.1. Substantiation cost of production and predictable domestic market price for the summer-autumn crop of tomatoes (Table 4).

▪ Autumn summer tomatoes grown in the open

- The growth rate of revenues growth rate is higher by about 1.20% of the expenditure.
- Material expenses: a share of 48.8% of the total resources consumed.
- The cost per unit of output - indicator reflecting the economic efficiency of expenditure items - 0.27 euro / kg.
- The average selling price per unit of output - factor with qualitative character in relation to time - 0.329 euro / kg. Culture has a return of 20.5% which is equivalent to an increase of the degree to which resources consumed brought profit.
- Gross rate of return of 20.5% shows a favorable situation positive activity that characterize the tomato crop in summer and autumn field.
- Labour productivity: 1 ton of tomatoes summer-autumn field was obtained with a consumption of 65.04 hours for work (of which 0.99 hours / t / mechanical works and 64.05 h / t / manual work).
- Safety index of the culture is 0.4%.

▪ Autumn summer tomatoes grown in protected space (solar)

- The growth rate of revenues growth rate is higher by about 1.26% of the expenditure.
- Material expenses: a share of 54.4% of the resources consumed.
- The cost per unit of output - indicator reflecting the economic efficiency of expenditure items - 0.33 euro / kg.
- The average selling price per unit of output - factor with qualitative character in relation to time - 0.420 euro / kg. Culture has a return of 26.6% which is equivalent to an increase of the degree to which resources consumed brought profit.
- Gross rate of return of 26.6%, showing a favorable situation that characterizes the positive work of the summer-autumn crop of tomatoes grown in solar.
- Labour productivity: 1 ton of tomatoes grown in summer-autumn sun was achieved with the time consuming work 72.18 hours (of which 0.62 h / t / mechanical works and 71.56 h / t / manual work) .
- Safety Culture Index is 0.5%.

Table 4: Financial ratios summer-autumn tomatoes

Nr crt	Indicators	UM	Summer-Autumn tomatoes values	
			Culture in field	Culture in solar
1	Average production	t / ha	40.0	90.0
2	The production value per hectare	euro	13181.8	37840.9
3	Costs of production per hectare	euro	10938.3	29891.2
4	Variable expenses	euro	7563.6	20402.6
5	Raw materials	euro	5.332.3	16285.4
6	Fixed expenses	euro	3374.7	9488.6
7	Permanent labor expenses	euro	2870.7	8126.8
8	Unit production cost	euro / kg	0.27	0.33
9	Price recovery	Euro / t	32.9	42.04
10	Labour productivity in physical expression	man-hours / t	65.0	72.18
11	Profit or loss per unit of production	EUR / ha	2243.5	7949.6
12	The rate of return	%	20.5	26.6
13	Margin on variable costs (CVM)	euro	5618.2	17438.3
14	Margin on variable costs	%	42.6	46.1
15	Breakeven in value units	euro	7917.9	20590.2
16	Profitability threshold in physical units	t	240.3	489.7
17	Operating risk rate	%	60.1	54.4
18	Safety Index		0.4	0.5

Source: Own calculations - Values are targeting indicators and may change depending on changes in output and input prices, seasonal conditions and characteristics vegetable farm.

B.2. Determining breakeven; simulations of possible scenarios for the tomatoes

- Autumn summer tomatoes grown in the open (Table 5)

- At an average of 40t / ha, breakeven is 7564 euro and value in units of 240 t expressed in physical units. To an increase in turnover by 20% the result (amount of gross profit) increased by 50%. The price recovery in the summer-autumn crop of tomatoes grown in the open may vary from 0.26 euro / kg, while the turnover is reduced by 20% to 0.38 euro / kg, while the figure business increase by 20%. The situation of the tomato crop grown in the open summer-autumn crop year can be assessed in the study, compared to breakeven, as comfortable as actual turnover by 40% exceeds the critical point.

Table 5: Breakeven: simulations of possible scenarios for the summer-autumn tomato field

	Fiscal value EUR / ha	Variable expenses EUR / ha	Margin on variable costs	Fixed expenses EUR / ha	Gross
Values	13.182	7564	5618	3,375	2,244
%	100	57	43		
Breakeven	7918	4543	3,375	3,375	0
Obtainable result in an increase in turnover by 20%	15.819	9076	6742	3,375	3.367
The result obtainable from a decrease in turnover by 20%	10.545	6051	4,495	3,375	1,120
Maintaining the initial result when turnover is reduced by 10%	12.390	7109	5281	3.037	2,244

Source: Own calculations

- Autumn summer tomatoes grown in protected space (solar) (Table 6)

- At an average production of 90 t/ha, breakeven is 20.590 euro in units and 489.7 t value expressed in physical units. To an increase in turnover by 20% the result (amount of gross profit) increased by 43.8%. The price recovery in the summer-autumn crop of tomatoes grown in solar can vary from 0.75

euro / kg, while the turnover is reduced by 20% to 1.11 euro / kg, while the turnover increases 20%. The situation of the tomato crop grown in solar summer-autumn crop year can be assessed in the study, compared to breakeven, as comfortable as actual turnover by 50% exceeds the critical point.

Table 6: Breakeven: simulations of possible scenarios for the summer-autumn solar tomato

	Fiscal value EUR / ha	variable expenses EUR / ha	Margin on variable costs	Fixed expenses EUR / ha	Gross
Values	37.841	20.403	17.438	9489	7,950
%	100	54	46		
Breakeven	20.590	11.102	9489	9489	0
Obtainable result in an increase in turnover by 20%	45.409	24.483	20.926	9489	11.437
The result obtainable from a decrease in turnover by 20%	30.272	16.322	13.951	9489	4.462
Maintaining the initial result when turnover is reduced by 10%	35.782	19.292	16.489	8,540	7,950

Source: Own calculations

Conclusions

On the presented study basis, we conclude that the calculation system can provide information to producers from the vegetable sector, since before the crops establishment, in conjunction with the estimates concerning the demand assessment for different destinations, with the indicative price which will be obtained from the manufacturer, as well as the ways for supporting and stimulating the obtained production capitalization in good condition in the agricultural year. Also, it can be achieved some operational objectives namely: a planned vegetables production and adjusted to the market demand type in terms of quantity at the farm level, of quality and traceability; improving technical and economic management of the vegetables production ; the prices stabilization at the producer and at the processor at a decent level; the promotion of the vegetables technologies that ensure the quality protection of water, soil and landscape, preserving and promoting biodiversity; the analysis of the main specific indicators of yield per unit area, so as to create the possibility that on the basis of some complex analysis can be identified the qualitative and quantitative losses at the farm level.

Acknowledgment

The calculation system is developed within the ADER program, contract No. 1311/2015: "Technical and economical substantiation of production costs and estimates regarding the capitalization prices for tomatoes in field and in protected spaces, cucumber in field and in protected spaces , cornichon, carrots, bell peppers, cabbage, cauliflower, flowers in field and in greenhouse, medicinal plants for conventional and organic agriculture", a project funded by the Ministry of Agriculture and Rural Development from Romania, project coordinator: Rozi Liliana Berevoianu.

References

Berevoianu, Rozi, Liliana., (2007) Research on the application of computer technology in crop monitoring and optimization technologies in crop production, University Publishing House, Bucharest

Berevoianu, Rozi, Liliana. Ivascu, Teodora., Isbăşescu, T., (2008) "Tehnical and Economic Indicators Correlation in Frame of Information System Designed to Agricultural Farms (SIFA)" Scientific papers - International Scientific Symposium Prospects of Agriculture and Rural Areas Development, ISSN 1844-5640, Publisher Do-Minor, Bucharest, 171-174

Thomas, Elena (coordinator)., Berevoianu, Rozi, Liliana. (2008) User SIFA, University Publishing House, Bucharest

Ursu, Ana. Nicolescu, M. Thomas, A. (2008), Handbook technical and economic and management - Crop. University Publishing House, Bucharest