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Ministry of Agriculture, Forestry and Rural Developement

ECONOMIC CATALOGUE FOR AGRICULTURAL PRODUCTS 2017

December, 2017

Economic Catalogue for Agricultural Products 2017

Ministry of Agriculture, Forestry and Rural Development

December, 2017

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Introduction

The second edition of the Economic Catalogue for Agricultural Products 2017 is designed and prepared by the Department of Economic Analyses and Agricultural Statistics, which is responsible for processing, analysing and publishing data on the profitability of agricultural crops. This catalogue contains data on the cost of production of agricultural products, such as: wheat, corn (with irrigation and without irrigation), silage corn (with irrigation and without irrigation), apples, strawberries, grapes, peppers, onions, cucumbers (in traditional greenhouse and standard greenhouse) and tomatoes (in traditional greenhouse and standard greenhouse).

This catalogue provides an overview of costs for the cultivation of a given crop, and based on this, farmers and other stakeholders can create an idea on what would the profit be for cultivating an agricultural crop, even when price or base yields changes. The catalogue also presents the profitability price and also other indicators from which business performance can be analysed and areas where improvements are needed can be identified. The data used to analyse the production cost were taken directly from individual farmers, as well as from meetings with farmers' groups and for certain items were obtained the opinions from experts. The used prices were obtained from various sources, such as: Kosovo Agency of Statistics, Market Information System and in certain cases other farmers and field experts were also contacted for verification. It is worth noting that all used prices are prices in the farm. As far as machinery is concerned, in cases when we have fuel costs, the machinery is owned by the owner, while in other cases when the work is performed by someone else, then that is considered as a service. The source of data for other economic and structural indicators presented in this publication is the Kosovo Agency of Statistics and the Agency for Agriculture Development.

The main purpose of this catalogue is to provide concrete examples that will assist farmers in planning and managing their agricultural activities.

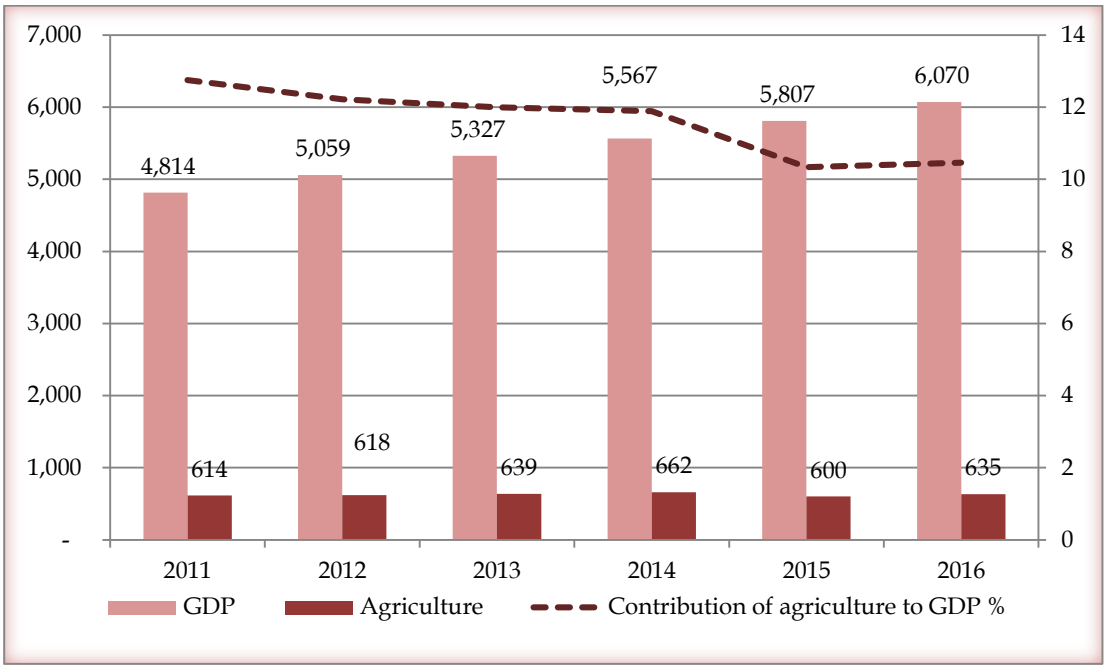
Dr. Sc. Ekrem Gjokaj

Director of Department of Economic Analysis and Agricultural Statistics

1 General information

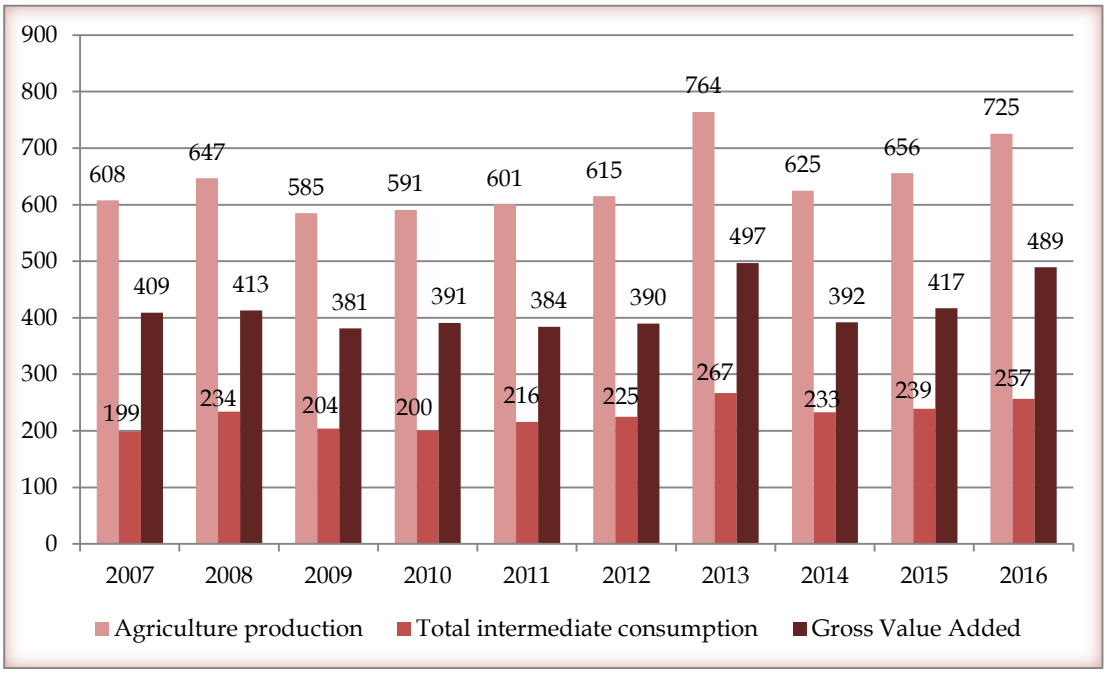
1.1 Key indicators for agriculture sector

Figure 1: Contribution of agriculture to gross domestic production in mil. €, 2011-2016



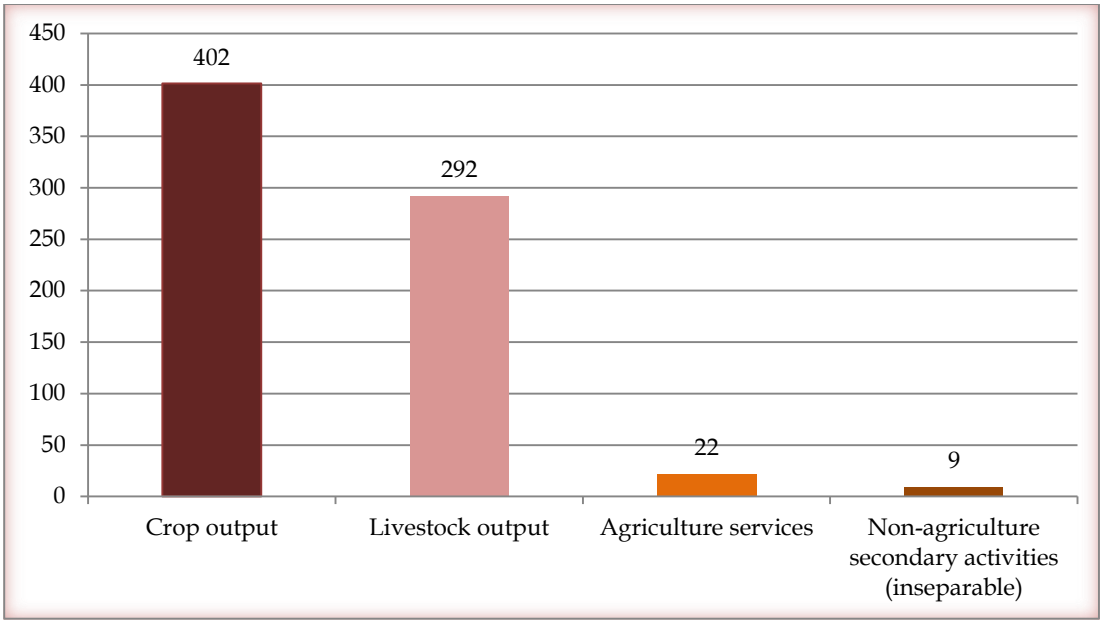
Source: KAS, processing by the DEAAS – MAFRD

Figure 2: Intermediate consumption, agricultural output and gross value added in mil. €, 2007-2016



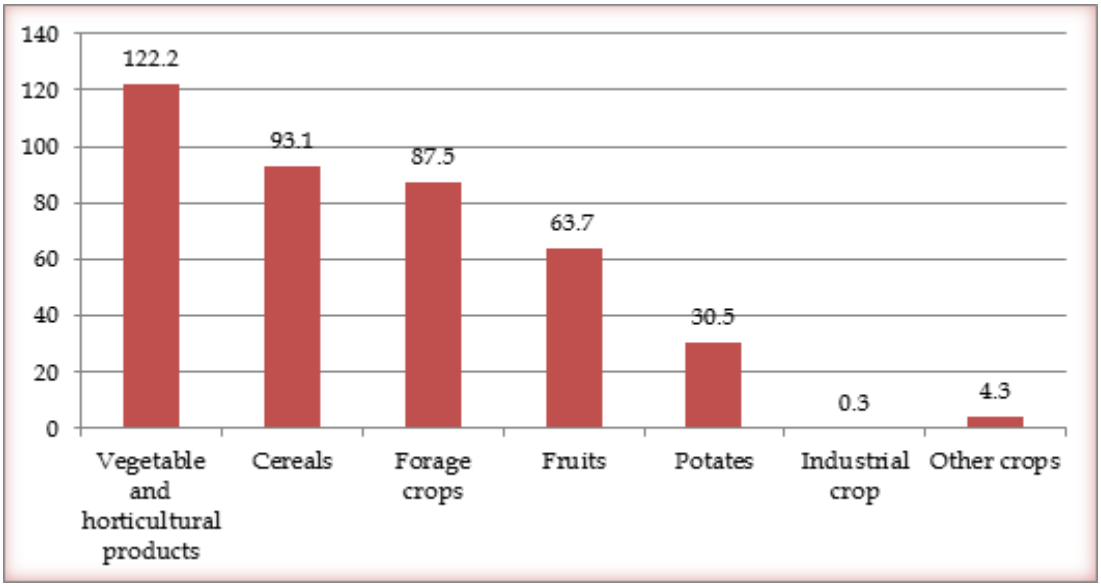
Source: KAS, Economic Accounts for Agriculture 2016, processed by DEAAS - MAFRD

Figure 3: Total output of the agricultural industry in mil. €, 2016



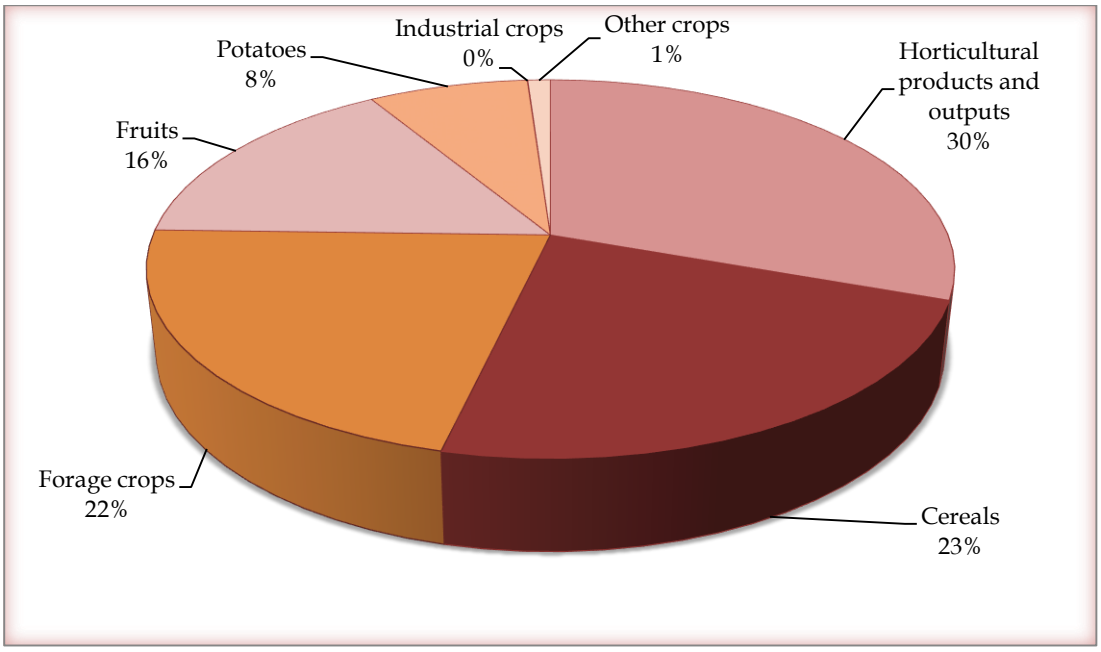
Source: KAS, Economic Accounts for Agriculture 2016, processed by DEAAS - MAFRD

Figure 4: Crop output according to categories in mil. €, 2016



Source: KAS, Economic Accounts for Agriculture 2016, processed by DEAAS – MAFRD

Figure 5: Contribution of crops according to categories, 2016



Source: KAS, Economic Accounts for Agriculture 2016, processed by DEAAS - MAFRD

Table 1: Annual price index of agricultural inputs 2010 - 2016 (2010 = 100)

	2010	2011	2012	2013	2014	2015	2016	Difference 2016/2015 in %
Goods and Services currently consumed in agriculture (Input 1)	100	112.9	119.7	122.4	120.8	118.4	115.6	-2.4
Seeds and Planting Material	100	112.7	109.4	107.1	115.3	158.6	139.9	-11.8
Energy; Lubricants	100	114.7	123.4	118.9	115.7	102.2	95.4	-6.6
Fertilizers and soil improvers	100	126.0	142.4	146.1	139.2	131.2	127.6	-2.8
Plant protection products and pesticides	100	98.5	99.6	129.7	159.4	113.6	113.1	-0.4
Veterinary expenses	100	107.0	106.8	109.3	104.6	102.6	100.2	-2.3
Animal feed material	100	122.3	137.5	143.4	130.8	114.4	126.1	10.2
Maintenance of materials	100	100.0	100.4	100.7	100.4	99.0	99.2	0.2
Maintenance of buildings	100	100.7	101.6	100.3	100.4	99.7	98.0	-1.7
Other goods and services	100	101.5	103.9	108.5	110.3	112.6	113.5	0.8
Goods and services contributing to agricultural investments (Input 2)	100	101.3	101.5	103.0	104.6	110.1	115.8	5.2
Tractors	100	101.3	101.3	104.1	107.1	118.5	132.2	11.6
Other	100	101.3	101.7	102.0	102.6	103.2	102.2	-0.9

Source: KAS (Input Price Index and Prices in Agriculture), processed by DEAAS – MAFRD

1.2 Agricultural production and direct payments

1.2.1 Cereals

Table 2: Area and crops production, 2010-2016

Crop	2010	2011	2012	2013	2014	2015	2016	Difference 2016/2015 in %
Area				ha				
Crops	119,871	121,095	137,215	141,912	131,949	134,886	134,571	0
Wheat	78,420	79,928	102,918	101,846	90,728	89,942	89,122	-1
Corn	35,424	35,209	31,181	36,122	35,038	41,492	41,524	0
Barley	1,177	844	568	1,363	1,487	1,141	1,196	5
Rye	571	607	253	235	588	396	415	5
Oat	4,279	4,508	2,294	2,346	3,940	1,790	2,156	20
Other grain crops	-	-	-	-	168	125	157	26
Production				t				
Crops	430,524	435,034	438,792	540,136	463,581	443,584	562,899	27
Wheat	294,540	300,203	345,027	391,727	331,296	304,443	365,651	20
Corn	120,461	119,693	86,304	136,633	116,209	131,486	186,592	42
Barley	3,642	2,608	1,808	4,415	4,716	3,061	3,669	20
Rye	1,371	1,457	740	571	1,521	809	991	23
Oat	10,510	11,072	4,913	6,790	9,840	3,415	5,428	59
Other grain crops						371	568	53

Source: KAS – Agricultural Household Survey ('12, '13, '15, '16); KAS – Expert's assessments within EAA '10-'11; Census of Agriculture ('14)

Table 3: Direct payments for cereals, 2012-2016

		2012	2013	2014	2015	2016	Difference 2016/2015 in %
Wheat	Number of applicants	9,604	11,758	11,871	11,032	11,864	8
	Number of beneficiaries	8,841	10,686	10,579	10,298	11,602	13
	Number of hectares paid	37,951	46,594	44,442	42,780	50,180	17
	Payment per ha	100	125	125	150	150	0
	Total amount paid	3,795,094	5,824,268	5,555,218	6,417,047	7,526,999	17
Wheat seed	Number of applicants	10	27	16	17	25	47
	Number of beneficiaries	10	27	16	11	25	127
	Number of hectares paid	250	850	511	344	803	133
	Total amount paid	25,020	63,720	107,391	86,063	196,678	129
Corn	Number of applicants	2,346	3,858	6,134	8,278	7,985	-4
	Number of beneficiaries	2,209	3,626	5,413	7,574	7,763	2
	Number of hectares paid	5,755	9,430	12,687	18,236	19,140	5
	Payment per ha	100	100	100	150	150	0
	Total amount paid	575,459	943,028	1,268,719	2,735,462	2,870,969	5

Source: Agency for Agricultural Development (AAD), processed by DEAAS – MAFRD

1.2.2 Vegetables

Table 4: Area and vegetable production, 2010-2016

Crop	2010	2011	2012	2013	2014	2015	2016	Difference 2016/2015 in %
Area		**ha**						
Vegetables	16,356	16,196	14,557	16,356	15,854	14,656	17,395	19
Potatoes	3,760	3,746	3,198	2,777	3,695	3,353	3,795	13
Tomatoes	935	967	1,271	950	558	791	866	10
Peppers	2,914	2,993	3,153	3,686	2,553	3,090	3,363	9
Cucumbers	343	359	255	340	193	317	259	-18
Mellon	1,141	1,240	847	827	781	781	1,127	44
Cabbage	836	842	568	851	556	594	807	36
Onion	1,043	1,074	881	1,060	1,041	1,079	1,228	14
Beans	3,609	3,260	2,954	3,648	3,959	2,945	3,317	13
Other vegetables	1,775	1,715	1,430	2,217	2,520	1,706	2,631	54
Production			**t**					**%**
Vegetables	338,989	345,565	163,146	235,326	221,330	246,096	335,467	36
Potatoes	87,354	87,036	33,407	50,847	64,027	70,678	98,583	39
Tomatoes	60,318	62,358	13,693	17,291	17,386	24,333	27,215	12
Peppers	93,924	96,322	50,744	72,928	57,921	55,469	68,849	24
Cucumbers	12,902	13,502	5,239	8,975	5,428	17,365	10,428	-40
Mellon	25,743	27,975	17,080	17,641	16,669	17,404	29,997	72
Cabbage	22,988	23,154	13,975	21,924	14,426	16,694	25,957	55
Onion	13,257	13,655	8,601	15,308	12,812	13,795	19,814	44
Beans	5,575	5,033	3,723	5,892	5,831	9,018	10,267	14
Other vegetables	16,928	16,530	16,684	24,520	26,831	21,339	44,357	108

Source: KAS - Agricultural Household Survey ('12, '13, '15, '16); KAS – Expert's assessments within EAA '10-'11; Census of Agriculture ('14);

Table 5: Direct payments for vegetables in open field, 2014-2015

		2014	2015	2016	Difference 2016/2015 in %
Vegetables in open field	Number of applicants	1,870	4,717	5,304	12
	Number of beneficiaries	1,548	4,268	5,188	22
	Number of hectares paid	3,422	5,216	6,605	27
	Payments per ha	300	300	300	0
	Total amount paid	1,026,735	1,564,692	1,981,617	27

Source: Agency for Agricultural Development (AAD), processed by DEAAS – MAFRD

1.2.3 Orchards and Vineyards

Table 6: Area and fruit production, 2010-2016

Crop	2010	2011	2012	2013	2014	2015	2016	Difference 2016/2015 in %
Area				**ha**				%
Fruits	*6,578*	*6,733*	*7,082*	*8,342*	*6,921*	*7,998*	*8,785*	10
Apple	1,661	1,790	1,725	2,024	1,973	1,972	2,076	5
Pear	352	354	326	561	210	367	416	13
Plum	1,063	1,063	1,404	1,843	699	1,518	1,518	0
Strawberry	49	45	52	148	201	203	175	-14
Raspberry	1	0	0	23	141	324	797	146
Vine grape	2,504	2,510	2,517	2,408	2,420	2,321	2,348	1
Table grape	636	648	702	751	781	747	769	3
Other fruits	312	323	355	584	496	546	686	26
Production				**t**				%
Fruits	52,419	41,429	59,633	76,702	45,873	70,096	78,502	12
Apple	12,545	13,523	8,120	16,786	13,519	18,352	27,485	50
Pear	2,495	2,510	1,562	4,259	1,363	3,189	3,966	24
Plum	6,957	6,957	17,514	24,433	7,525	17,543	12,722	-27
Strawberry	294	270	275	465	965	1,498	1,328	-11
Raspberry	2	1	1	105	529	1,748	6,250	258
Vine grape	22,536	12,048	22,656	20,473	15,101	18,426	16,800	-9
Table grape	6,042	4,536	7,026	7,137	4,869	6,996	6,866	-2
Other fruits	1,548	1,584	2,479	3,044	2,003	2,344	3,085	32

Source: KAS - Agricultural Household Survey ('12, '13, '15, '16); KAS – Expert's assessments within EAA '10-'11; Census of Agriculture ('14); MAFRD – Department of Winery and Vineyards

Table 7: Direct payments for existing orchards and vineyards, 2013-2016

		2013	2014	2015	2016	Difference 2016/2015 in %
Vineyards	Number of applicants	2,579	2,995	2,914	2,980	2
	Number of beneficiaries	2,556	2,995	2,806	2,881	3
	Number of hectares paid	2,791	2,435	2,456	2,473	1
	Payment per ha	500/200	1000/300	1000/300	1000/400	
	Total amount paid	1,124,516	2,290,783	2,046,167	2,117,978	4
Existing orchards	Number of applicants	-	-	1,796	2,908	62
	Number of beneficiaries	-	-	1,578	2,794	77
	Number of hectares paid	-	-	1,731	2,780	61
	Payment per ha	-	-	400	400	
	Total amount paid	-	-	692,256	1,112,032	61

Source: Agency for Agricultural Development (AAD), processed by DEAAS - MAFRD

2 Gross margin and net income

Given the fact that market competition is growing more and more, farmers need to plan and manage their business in order to know all the necessary indicators in terms of their business development.

A sustainable business of every sector, including the agricultural sector, should be based on reference calculations. The use of some reference calculations would help Kosovo producers to assess their position in relation to other producers, but also to see their cost of production in relation to the prices of the same products in the market, in order to make necessary changes so their products can be competitive in the market.

Gross margin enables profitability comparison of different crops that have common characteristics, such as: use of the same quality land and the same cultivation technology. It is an indicator that shows the cost of production used for decision making in the management of the farm. Farmers by taking into consideration gross margin can see on which points they can make changes in order to increase their profitability.

Definition of gross margin is quite simple; it represents the difference between revenues and variable costs. Given that calculation of gross margins does not take into consideration the fixed costs, it cannot be considered as profit, thus, to know the real profitability of agricultural production it is necessary to calculate the net profit.

Net profit gives a clear picture of the revenues that remain to a farmer from agricultural activity, as all costs are calculated, whether those variable, directly linked to the production level, or those fixed, that do not depend on the level of production.

The difference in using gross margin and net profit lies in the fact that in some cases a higher gross margin does not mean that the agricultural production is more profitable compared with other production, this is due to the fact that if for the cultivation of that production is needed more workforce and investment value is very high, despite of a high gross margin, the farmer will generate less net income compared to any agricultural product that has low gross margin, but which has much lower fixed expenditures.

The use of gross margin is very important but it should always be used along with the analysis of other financial indicators.

2.1 Wheat

2.1.1 Gross margin and net income per ha

Table 8: Wheat production cost

1. Calculation of cereals production cost 2017 1.1 Wheat Area 1 ha				
	Unit	**Quantity**	**Price per unit**	**Value in €**
INCOMES				
Wheat	kg/ha	4,500.00	0.18	810.00
Straw	sheaves/ha	120.00	0.60	72.00
Total income				**882.00**
VARIABLE COSTS				
Inputs				
Seeds	kg/ha	300.00	0.30	90.00
NPK	kg/ha	350.00	0.40	140.00
NAG	kg/ha	350.00	0.32	112.00
Herbicides 1	l/ha	2.00	5.00	10.00
Herbicides 2	ml/ha	150.00	0.08	12.00
Bags	pieces	90.00	0.13	11.70
Total input				**375.70**
Machinery expenditures				
Ploughing	l/diesel	20.00	1.02	20.40
Seed preparation	l/diesel	10.00	1.02	10.20
Planting	l/diesel	8.00	1.02	8.16
Fertilization	l/diesel	8.00	1.02	8.16
Spraying	l/diesel	8.00	1.02	8.16
Harvesting	service	1.00	100.00	100.00
Transport to the stable	l/diesel	8.00	1.02	8.16
Maintenance	flat rate	-	-	75.00
Total machinery expenditures		-	-	**238.24**
Total variable costs				**613.94**
GROSS MARGIN				**316.06**
WORKFORCE				
Harrowing	p/d	1.00	15.00	15.00
Planting	p/d	0.50	15.00	7.50
Fertilization	p/d	0.75	15.00	11.25
Spraying	p/d	0.50	15.00	7.50
Transport to the warehouse	p/d	0.50	15.00	7.50
Total workforce expenditures				**48.75**
GROSS MARGIN BEFORE DEPRECIATION				**219.31**
Depreciation				111.06
NET INCOMES				**108.25**
Subsidies	€/ha			150.00
NET INCOMES + Subsidies				**258.25**

Source: MAFRD-DEAAS

Table 9: The impact of price and yield change in gross margin (wheat)

GROSS MARGIN			-20%	-10%	Scenario with basic yield	10%	20%
			3,600	4,050	4,500	4,950	5,400
			96	108	120	132	144
-20%	Wheat	0.14	-49.46	21.10	91.66	162.22	232.78
	Straw	0.48					
-10%	Wheat	0.16	21.10	100.48	179.86	259.24	338.62
	Straw	0.54					
Scenario with basic price	Wheat	0.18	91.66	179.86	**268.06**	356.26	444.46
	Straw	0.60					
10%	Wheat	0.20	162.22	256.24	356.26	453.28	550.30
	Straw	0.66					
20%	Wheat	0.22	232.78	338.62	444.46	550.30	656.14
	Straw	0.72					

Source: MAFRD-DEAAS

Table 10: The impact of price and yield change in net income (wheat)

NET INCOMES			-20%	-10%	Scenario with basic yield	10%	20%
			3,600	4,050	4,500	4,950	5,400
			96	108	120	132	144
-20%	Wheat	0.14	- 209.27	- 138.71	- 68.15	2.41	72.97
	Straw	0.48					
-10%	Wheat	0.16	-138.71	-59.33	20.05	99.43	178.81
	Straw	0.54					
Scenario with basic price	Wheat	0.18	-68.15	20.05	**108.25**	196.45	284.65
	Straw	0.60					
10%	Wheat	0.20	51.16	148.18	245.20	342.22	439.24
	Straw	0.66					
20%	Wheat	0.22	72.97	178.81	284.65	390.49	496.33
	Straw	0.72					

Source: MAFRD-DEAAS

2.2 Grain corn

2.2.1 Gross margin and net income per ha, grain corn with irrigation

Table 11: Grain corn production cost with application of irrigation

1. Calculation of cereals production cost 2017 1.2.a Grain corn with irrigation Area 1 ha				
	Unit	**Quantity**	**Price per unit**	**Value in €**
INCOMES				
Grain corn	kg/ha	7,500.00	0.23	1,725.00
Total income				**1,725.00**
VARIABLE COSTS				
Inputs				
Seeds	bags	0.82	31.50	25.83
NPK	kg/ha	325.00	0.40	130.00
Urea	kg/ha	100.00	0.48	48.00
NAG	kg/ha	200.00	0.32	64.00
Herbicides	l/ha	1.00	21.00	21.00
Irrigation	flat rate			100.00
Total input				**388.83**
Machinery expenditures				
Ploughing	l/diesel	20.00	1.02	20.40
Seed preparation	l/diesel	10.00	1.02	10.20
Planting	l/diesel	8.00	1.02	8.16
Fertilization	l/diesel	8.00	1.02	8.16
Spraying	l/diesel	8.00	1.02	8.16
Irrigation	l/diesel	48.00	1.02	48.96
Harvesting	service	1.00	130.00	130.00
Transport to the stable	l/diesel	8.00	1.02	8.16
Maintenance				43.45
Total machinery expenditures				**285.65**
Total variable costs				**674.48**
GROSS MARGIN				**1,050.52**
WORKFORCE				
Harrowing	p/d	1.00	15.00	15.00
Planting	p/d	0.50	15.00	7.50
Fertilization	p/d	0.50	15.00	7.50
Spraying	p/d	0.50	15.00	7.50
Irrigation	p/d	12.00	15.00	180.00
Transport to the stable	p/d	0.50	15.00	7.50
Desiccation	p/d	1.00	15.00	15.00
Total workforce expenditures				**240.00**
GROSS MARGIN BEFORE DEPRECIATION				**810.52**
Depreciation				106.19
NET INCOMES				**704.33**
Subsidies	€/ha			150.00
NET INCOMES + Subsidies				**854.33**

Source: MAFRD-DEAAS

Table 12: The impact of price and yield change in gross margin (grain corn with irrigation)

GROSS MARGIN		-20%	-10%	Scenario with basic yield	10%	20%
		6,000	6,750	7,500	8,250	9,000
-20%	0.18	429.52	567.52	705.52	843.52	981.52
-10%	0.21	567.52	722.77	878.02	1,033.27	1,188.52
Scenario with basic price	0.23	705.52	878.02	**1,050.52**	1,223.02	1,395.52
10%	0.25	843.52	1,033.27	1,223.02	1,412.77	1,602.52
20%	0.28	981.52	1,188.52	1,395.52	1,602.52	1,809.52

Source: MAFRD-DEAAS

Table 13: The impact of price and yield change in net income (grain corn with irrigation)

NET INCOMES		-20%	-10%	Scenario with basic yield	10%	20%
		6,000	6,750	7,500	8,250	9,000
-20%	0.18	83.33	221.33	359.33	497.33	785.33
-10%	0.21	221.33	376.58	531.83	687.08	842.33
Scenario with basic price	0.23	359.33	531.83	**704.33**	876.83	1,049.33
10%	0.25	497.33	687.08	876.83	1,066.58	1,256.33
20%	0.28	635.33	842.33	1,049.33	1,256.33	1,463.33

Source: MAFRD-DEAAS

2.2.2 Gross margin and net income per ha, grain corn without irrigation

Table 14: Grain corn production cost without application of irrigation

1. Calculation of cereals production cost 2017 1.2.b Grain corn without irrigation Area 1 ha				
	Unit	**Quantity**	**Price per unit**	**Value in €**
INCOMES				
Grain corn	kg/ha	4,500.00	0.23	1,035.00
Total income				**1,035.00**
VARIABLE COSTS				
Inputs				
Seeds	bags	0.82	31.50	25.83
NPK	kg/ha	325.00	0.40	130.00
Urea	kg/ha	100.00	0.48	48.00
NAG	kg/ha	200.00	0.32	64.00
Herbicides	l/ha	1.00	21.00	21.00
Irrigation	flat rate			
Total input				**388.83**
Machinery expenditures				
Ploughing	l/diesel	20.00	1.02	20.40
Seed preparation	l/diesel	10.00	1.02	10.20
Planting	l/diesel	8.00	1.02	8.16
Fertilization	l/diesel	8.00	1.02	8.16
Spraying	l/diesel	8.00	1.02	8.16
Irrigation	l/diesel			
Harvesting	service	1.00	130.00	130.00
Transport to the stable	l/diesel	8.00	1.02	8.16
Maintenance				18.45
Total machinery expenditures				**211.69**
Total variable costs				**500.52**
GROSS MARGIN				**534.48**
WORKFORCE				
Harrowing	p/d	1.00	15.00	15.00
Planting	p/d	0.50	15.00	7.50
Fertilization	p/d	0.50	15.00	7.50
Spraying	p/d	0.50	15.00	7.50
Transport to the stable	p/d	0.50	15.00	7.50
Desiccation	p/d	1.00	15.00	15.00
Total workforce expenditures		**4.00**		**60.00**
GROSS MARGIN BEFORE DEPRECIATION				**474.48**
Depreciation				98.19
NET INCOMES				**376.29**
Subsidies	€/ha			150.00
NET INCOMES + Subsidies				**526.29**

Source: MAFRD-DEAAS

Table 15: The impact of price and yield change in gross margin (grain corn without irrigation)

GROSS MARGIN		-20%	-10%	Scenario with basic yield	10%	20%
		3,600	4,050	4,500	4,950	5,400
-20%	0.18	161.88	244.68	327.48	410.28	493.08
-10%	0.21	244.68	337.83	430.98	524.13	617.28
Scenario with basic price	0.23	327.48	430.98	**534.48**	637.98	741.48
10%	0.25	410.28	524.13	637.98	751.83	865.68
20%	0.28	493.08	617.28	741.48	865.68	989.88

Source: MAFRD-DEAAS

Table 16: The impact of price and yield change in net income (grain corn without irrigation)

NET INCOMES		-20%	-10%	Scenario with basic yield	10%	20%
		3,600	4,050	4,500	4,950	5,400
-20%	0.18	3.69	86.49	169.29	252.09	334.89
-10%	0.21	86.49	179.64	272.79	365.94	459.09
Scenario with basic price	0.23	169.29	272.79	**376.29**	479.79	583.29
10%	0.25	252.09	365.94	479.79	593.64	707.49
20%	0.28	334.89	459.09	583.29	707.49	831.69

Source: MAFRD-DEAAS

2.3 Corn silage

2.3.1 Gross margin and net income per ha, corn silage with irrigation

Table 17: Corn silage production cost with application of irrigation

1. Calculation of cereals production cost 2017 1.2.c Corn silage with irrigation Area 1 ha				
	Unit	**Quantity**	**Price per unit**	**Value in €**
INCOMES				
Corn silage	kg/ha	45,000.00	0.05	2,250.00
Total income				**2,250.00**
VARIABLE COSTS				
Inputs				
Seeds	bags	2.50	31.50	78.75
NPK	kg/ha	325.00	0.40	130.00
Urea	kg/ha	100.00	0.48	48.00
NAG	kg/ha	200.00	0.32	64.00
Herbicides	l/ha	1.50	21.00	31.50
Plastic foil	flat rate			20.00
Irrigation	flat rate			100.00
Total input				**472.25**
Machinery expenditures				
Ploughing	l/diesel	20.00	1.02	20.40
Seed preparation	l/diesel	10.00	1.02	10.20
Planting	l/diesel	8.00	1.02	8.16
Fertilization	l/diesel	8.00	1.02	8.16
Spraying	l/diesel	8.00	1.02	8.16
Irrigation	l/diesel	48.00	1.02	48.96
Harvesting	service	1.00	120.00	120.00
Transport to the stable	service	1.00	40.00	40.00
Maintenance	flat rate			42.12
Total machinery expenditures				**306.16**
Total variable costs				**778.41**
GROSS MARGIN				**1,471.59**
WORKFORCE				
Harrowing	p/d	0.50	15.00	7.50
Planting	p/d	0.25	15.00	3.75
Fertilization	p/d	0.50	15.00	7.50
Spraying	p/d	0.25	15.00	3.75
Irrigation	p/d	12.00	15.00	180.00
Desiccation	p/d	2.00	15.00	30.00
Total workforce expenditures				**232.50**
GROSS MARGIN BEFORE DEPRECIATION				**1,239.09**
Depreciation				151.19
NET INCOMES				**1,087.90**
Subsidies	€/ha			150.00
NET INCOMES + Subsidies				**1,237.90**

Source: MAFRD-DEAAS

Table 18: The impact of price and yield change in gross margin (corn silage with irrigation)

GROSS MARGIN		-20%	-10%	Scenario with basic yield	10%	20%
		36,000	40,500	45,000	49,500	54,000
-20%	0.04	661.59	841.59	1,021.59	1,201.59	1,381.59
-10%	0.05	841.59	1,044.09	1,246.59	1,449.09	1,651.59
Scenario with basic price	0.05	1,021.59	1,246.59	**1,471.59**	1,696.59	1,921.59
10%	0.06	1,201.59	1,449.09	1,696.59	1,944.09	2,191.59
20%	0.06	1,381.59	1,651.59	1,921.59	2,191.59	2,461.59

Source: MAFRD-DEAAS

Table 19: The impact of price and yield change in net income (corn silage with irrigation)

NET INCOMES		-20%	-10%	Scenario with basic yield	10%	20%
		36,000	40,500	45,000	49,500	54,000
-20%	0.04	277.90	457.90	637.90	817.90	997.90
-10%	0.05	457.90	660.40	862.90	1,065.40	1,267.90
Scenario with basic price	0.05	637.90	862.90	**1,087.90**	1,312.90	1,537.90
10%	0.06	817.90	1,065.40	1,312.90	1,560.40	1,807.90
20%	0.06	997.90	1,267.90	1,537.90	1,807.90	2,077.90

Source: MAFRD-DEAAS

2.3.2 Gross margin and net income per ha, corn silage without irrigation

Table 20: Corn silage production cost without application of irrigation

1. Calculation of cereals production cost 2017 1.2.d Corn silage without irrigation Area 1 ha				
	Unit	**Quantity**	**Price per unit**	**Value in €**
INCOMES				
Corn silage	kg/ha	35,000.00	0.05	1,750.00
Total income				**1,750.00**
VARIABLE COSTS				
Inputs				
Seeds	bags	2.50	31.50	78.75
NPK	kg/ha	325.00	0.40	130.00
Urea	kg/ha	100.00	0.48	48.00
NAG	kg/ha	200.00	0.32	64.00
Herbicides	l/ha	1.50	21.00	31.50
Plastic foil	flat rate			20.00
Total input				**372.25**
Machinery expenditures				
Ploughing	l/diesel	20.00	1.02	20.40
Seed preparation	l/diesel	10.00	1.02	10.20
Planting	l/diesel	8.00	1.02	8.16
Fertilization	l/diesel	8.00	1.02	8.16
Spraying	l/diesel	8.00	1.02	8.16
Harvesting	service	1.00	120.00	120.00
Transport to the stable	service	1.00	40.00	40.00
Maintenance	flat rate			17.45
Total machinery expenditures				**232.53**
Total variable costs				**604.78**
GROSS MARGIN				**1,145.22**
WORKFORCE				
Harrowing	p/d	0.50	15.00	7.50
Planting	p/d	0.25	15.00	3.75
Fertilization	p/d	0.50	15.00	7.50
Spraying	p/d	0.25	15.00	3.75
Desiccation	p/d	2.00	15.00	30.00
Total workforce expenditures				**52.50**
GROSS MARGIN BEFORE DEPRECIATION				**1,092.72**
Depreciation				**143.19**
NET INCOMES				**949.53**
Subsidies	€/ha			**150.00**
NET INCOMES + Subsidies				**1,099.53**

Source: MAFRD-DEAAS

Table 21: The impact of price and yield change in gross margin (corn silage without irrigation)

GROSS MARGIN		-20%	-10%	Scenario with basic yield	10%	20%
		28,000	31,500	35,000	38,500	42,000
-20%	0.04	515.22	655.22	795.22	935.22	1,075.22
-10%	0.05	655.22	812.72	970.22	1,127.72	1,285.22
Scenario with basic price	0.05	795.22	970.22	**1,145.22**	1,320.22	1,495.22
10%	0.06	935.22	1,127.72	1,320.22	1,512.72	1,705.22
20%	0.06	1,075.22	1,285.22	1,495.22	1,705.22	1,915.22

Source: MAFRD-DEAAS

Table 22: The impact of price and yield change in net income (corn silage without irrigation)

NET INCOMES		-20%	-10%	Scenario with basic yield	10%	20%
		28,000	31,500	35,000	38,500	42,000
-20%	0.04	319.53	459.53	599.53	739.53	879.53
-10%	0.05	459.53	617.03	774.53	932.03	1,089.53
Scenario with basic price	0.05	599.53	774.53	**949.53**	1,124.53	1,299.53
10%	0.06	739.53	932.03	1,124.53	1,317.03	1,509.53
20%	0.06	879.53	1,089.53	1,299.53	1,509.53	1,719.53

Source: MAFRD-DEAAS

2.4 Apple

2.4.1 Gross margin and net income per ha

Table 23: Apple production cost

2. Calculation of perennial crops production cost, 2017 2.1 Apple Area 1 ha				
	Unit	**Quantity**	**Price per unit**	**Value in €**
INCOMES				
Apple	kg/ha	16,000.00[1]	0.38	6,080.00
Total incomes				**6,080.00**
VARIABLE COSTS				
Inputs				
Organic fertilizer	t/ha	60.00	5.00	300.00
Mineral fertilizer	kg/ha	825.00	0.70	577.50
Pesticides	kg/ha	14.00	60.00	840.00
Other expenditures	flat rate			50.00
Total inputs				**1,767.50**
Machinery expenditures				
Cultivations	service	3.00	30.00	90.00
Spraying (6 times)	service	6.00	30.00	180.00
Other works	flat rate			100.00
Total machinery expenditures				**370.00**
Marketing expenditures				
Boxes	piece	800.00	0.40	320.00
Transport	service	6.00	50.00	300.00
Total marketing expenditures				**620.00**
Total variable expenditures				**2,757.50**
GROSS MARGIN				**3,322.50**
WORKFORCE				
Pruning	piece (plant trees)	1,600.00	1.00	1,600.00
Organic fertilizer	p/d	8.00	15.00	120.00
Fertilization	p/d	2.00	15.00	30.00
Irrigation	p/d	2.00	15.00	30.00
Spraying	p/d	14.00	15.00	210.00
Weed removal	p/d	6.00	15.00	90.00
Picking	p/d	32.00	15.00	480.00
Other works	p/d	2.00	15.00	30.00
Total workforce expenditures				**2,590.00**
GROSS MARGIN BEFORE DEPRECIATION				**732.50**
Depreciation				641.78
NET INCOME				**90.72**
Subsidies	€/ha			400.00
NET INCOME + Subsidies				**490.72**

[1] The yield of 16.000 kg/ha refers to 2017, as this document is published on an annual basis and reflects the state of all inputs for a given calendar year. The changes may vary from year to year depending on the circumstances. Reduction of the yield to 16,000 kg/ha compared to the previous year of 2016, which was 40,000 kg/ha, is a result of damage of about 60% of orchards from atmospheric conditions and, therefore, this has led to a decrease in profitability for apple crops.

Source: MAFRD-DEAAS

Table 24: The impact of price and yield change in gross margin (apple)

GROSS MARGIN		-20%	-10%	Scenario with basic yield	10%	20%
		12,800	14,400	16,000	17,600	19,200
-20%	0.30	1,197.70	1,620.12	2,106.50	2,560.90	2,915.30
-10%	0.34	1,684.10	2,167.32	2,714.50	3,229.70	3,644.90
Scenario with basic price	0.38	2,170.50	2,714.52	**3,322.50**	3,898.50	4,374.50
10%	0.42	2,656.90	3,261.72	3,930.50	4,567.30	5,104.10
20%	0.46	3,143.30	3,808.92	4,538.50	5,236.10	5,833.70

Source: MAFRD-DEAAS

Table 25: The impact of price and yield change in net income (apple)

NET INCOME		-20%	-10%	Scenario with basic yield	10%	20%
		12,800	14,400	16,000	17,600	19,200
-20%	0.30	-1938.08	-1611.64	-1125.28	-718.88	-412.48
-10%	0.34	-1451.68	-1064.44	-517.28	-50.08	317.12
Scenario with basic price	0.38	-965.28	-517.24	**90.72**	618.72	1,046.72
10%	0.42	-478.88	29.96	698.72	1,287.52	1,776.32
20%	0.46	7.52	577.16	1,306.72	1,956.32	2,505.92

Source: MAFRD-DEAAS

2.5 Strawberry

2.5.1 Gross margin and net income per 10 Ares

Table 26: Strawberry production cost

2. Calculation of perennial crops production cost, 2017 2.2 Strawberry in open field Area 10 Ares, average for three years				
	Unit	**Quantity**	**Price per unit**	**Value in €**
INCOMES				
Strawberry	kg	3,166.67	1.78	5,636.67
Total incomes				**5,636.67**
KOSTO VARIABILE				
Inputs				
Fungicides	ml	300.00	0.01	2.40
Insecticides	ml	400.00	0.03	12.00
Cristal fertilizers	bags	2.00	33.00	66.00
Fuel	l/diesel	11.67	1.02	11.90
Total inputs				**92.30**
Marketing expenses				
Primary packaging - crates	piece	703.70	0.38	267.41
Boxes - baskets 0.5 kg	piece	6,333.33	0.06	380.00
Transport	l/diesel	120.00	1.02	122.40
Total marketing expenditures				**769.81**
Total variable expenditures				**862.11**
GROSS MARGIN				**4,774.56**
WORKFORCE				
Cleaning of old leaves and pruning	p/d	1.33	15.00	20.00
Protection against diseases and pests	p/d	0.25	15.00	3.75
Mechanical elimination of weeds from strawberry holes	p/d	2.00	15.00	30.00
Drip irrigation	p/d	1.00	15.00	15.00
Picking	p/d	21.50	15.00	322.50
Transport	p/d	11.25	15.00	168.75
Total workforce expenditures				**560.00**
GROSS MARGIN BEFORE DEPRECIATION				**4,214.56**
Depreciation				442.37
NET INCOMES				**3,772.19**

Source: MAFRD-DEAAS

Table 27: The impact of price and yield change in gross margin (strawberry)

GROSS MARGIN		-20%	-10%	Scenario with basic yield	10%	20%
		2,533	2,850	3,167	3,483	3,800
-20%	1.42	2,874.84	3,261.03	3,647.23	4,033.42	4,419.61
-10%	1.60	3,325.77	3,768.33	4,210.89	4,653.45	5,096.01
Scenario with basic price	1.78	3,776.71	4,275.63	**4,774.56**	5,273.49	5,772.41
10%	1.96	4,227.64	4,782.93	5,338.23	5,893.52	6,448.81
20%	2.14	4,678.57	5,290.23	5,901.89	6,513.55	7,125.21

Source: MAFRD-DEAAS

Table 28: The impact of price and yield change in net income (strawberry)

NET INCOME		-20%	-10%	Scenario with basic yield	10%	20%
		2,533	2,850	3,167	3,483	3,800
-20%	1.42	1,936.97	2,290.91	2,644.86	2,998.80	3,352.74
-10%	1.60	2,387.91	2,798.21	3,208.52	3,618.83	4,029.14
Scenario with basic price	1.78	2,838.84	3,305.51	**3,772.19**	4,238.87	4,705.54
10%	1.96	3,289.77	3,812.81	4,335.86	4,858.90	5,381.94
20%	2.14	3,740.71	4,320.11	4,899.52	5,478.93	6,058.34

Source: MAFRD-DEAAS

2.6 Grape

2.6.1 Gross margin and net income per ha

Table 29: Table grape production cost

2. Calculation of perennial crops production cost, 2017 2.3 Table grape Area 1 ha				
	Unit	**Quantity**	**Price per unit**	**Value in €**
INCOMES				
Grape	kg	12,000.00	0.58	6,960.00
Total incomes				**6,960.00**
VARIABLE COSTS				
Inputs				
Strings	kg	6.50	6.15	39.98
NPK 5:20:30	kg	500.00	0.40	200.00
NAG	kg	200.00	0.32	64.00
Foliar fertilizer	kg	2.00	12.00	24.00
Preparations for protection	kg	25.30	21.00	531.30
Other expenditures	flat rate			20.00
Total inputs				**879.28**
Machinery expenditures				
Spring ploughing	service	1.00	110.00	110.00
Autumn ploughing	service	1.00	150.00	150.00
Cultivations (3 times)	service	3.00	80.00	240.00
Fertilization NPK	service	1.00	40.00	40.00
Supplemental fertilization NAG	service	1.00	30.00	30.00
Spraying (6 times)	service	6.00	25.00	150.00
Other works	service	15.00	60.00	900.00
Total machinery expenditures				**1,620.00**
Total variable expenditures				**2,499.28**
GROSS MARGIN				**4,460.73**
WORKFORCE				
Pruning	p/d	8.00	15.00	120.00
Cleaning of vines	p/d	3.00	15.00	45.00
System maintenance	p/d	1.00	15.00	15.00
Netting of vine	p/d	6.00	15.00	90.00
Ploughing and harrowing (2 times)	p/d	8.00	15.00	120.00
Weed removal (2times)	p/d	6.00	15.00	90.00
Re netting (2 times)	p/d	4.00	15.00	60.00
Spraying	p/d	1.00	15.00	15.00
Harvesting	p/d	26.00	15.00	390.00
Transport of grape	p/d	4.00	15.00	60.00
Total workforce expenditures				**1,005.00**
GROSS MARGIN BEFORE DEPRECIATION				**3,455.73**
Depreciation				630.42
NET INCOMES				**2,825.30**

Subsidies (option 1)	€/ha	1,000.00
Subsidies (option 2)	€/ha	300.00
NET INCOMES + Subsidies (option 1)		**3,825.30**
NET INCOMES + Subsidies (option 2)		**3,125.30**

Source: MAFRD-DEAAS

Table 30: The impact of price and yield change in gross margin (table grape)

GROSS MARGIN		-20%	-10%	Scenario with basic yield	10%	20%
		9,600	10,800	12,000	13,200	14,400
-20%	0.46	1,955.13	2,511.93	3,068.73	3,625.53	4,182.33
-10%	0.52	2,511.93	3,138.33	3,764.73	4,391.13	5,017.53
Scenario with basic price	0.58	3,068.73	3,764.73	**4,460.73**	5,156.73	5,852.73
10%	0.64	3,625.53	4,391.13	5,156.73	5,922.33	6,687.93
20%	0.70	4,182.33	5,017.53	5,852.73	6,687.93	7,523.13

Source: MAFRD-DEAAS

Table 31: The impact of price and yield change in net income (table grape)

NET INCOME		-20%	-10%	Scenario with basic yield	10%	20%
		9,600	10,800	12,000	13,200	14,400
-20%	0.46	409.70	921.50	1,433.30	1,945.10	2,456.90
-10%	0.52	966.50	1,547.90	2,129.30	2,710.70	3,292.10
Scenario with basic price	0.58	1,523.30	2,174.30	**2,825.30**	3,476.30	4,127.30
10%	0.64	2,080.10	2,800.70	3,521.30	4,241.90	4,962.50
20%	0.70	2,636.90	3,427.10	4,217.30	5,007.50	5,797.70

Source: MAFRD-DEAAS

2.7 Pepper

2.7.1 Gross margin and net income per ha

Table 32: Peppers production cost

3. Calculation of vegetable production cost, 2017 3.1 Pepper in open field (red pepper) Area 1 ha				
	Unit	**Quantity**	**Price per unit**	**Value in €**
INCOMES				
Pepper	kg	35,000.00	0.30	10,500.00
Total incomes				**10,500.00**
VARIABLE COSTS				
Inputs				
Seedlings	piece	70,000.00	0.01	806.00
Organic fertilizer	kg	50,000.00	0.01	500.00
NPK 15:15:15	kg	1,000.00	0.40	400.00
Urea	kg			
NAG	kg			
Foliar fertilizer (Vuksall)	litre	3.00	5.00	15.00
Fungicides	kg	4.50	18.00	81.00
Insecticides	litre	1.00	40.00	40.00
Herbicides	litre	4.00	8.00	32.00
Water	ha	1.00	150.00	150.00
Bags	piece	2,100.00	0.05	105.00
Boxes	piece	1,750.00	0.25	437.50
Total inputs				**2,566.50**
Machinery expenditures				
Fertilization	litre	40.00	1.02	40.80
Ploughing	litre	40.00	1.02	40.80
Disking x 2	litre	40.00	1.02	40.80
Harrowing	litre	10.00	1.02	10.20
Works between rows with tiller	litre	30.00	1.02	30.60
Spraying	litre	5.00	1.02	5.10
Transport from the field to market	flat rate			300.00
Transport from the field to collecting point	flat rate			100.00
Maintenance	flat rate			150.00
Total machinery expenditures				**718.30**
Total variable expenditures				**3,248.80**
GROSS MARGIN				**7,215.20**
WORKFORCE				
Fertilization	p/d	10.00	15.00	150.00
Ploughing	p/d	1.00	15.00	15.00
Disking and harrowing	p/d	1.50	15.00	22.50
Planting	p/d	30.00	15.00	450.00
Spraying	p/d	3.50	15.00	52.50
Irrigation	p/d	15.00	15.00	225.00

Harvesting (seasonal workers)	p/d	45.00	15.00	675.00
Transport to the market	p/d	15.00	15.00	225.00
Total workforce expenditures				**1,815.00**
GROSS MARGIN BEFORE DEPRECIATION				**5,400.20**
Depreciation				200.00
NET INCOMES				**5,200.20**
Subsidies	€/ha			300.00
NET INCOMES + Subsidies				**5,500.20**

Source: MAFRD-DEAAS

Table 33: The impact of price and yield change in gross margin (peppers)

GROSS MARGIN		-20%	-10%	Scenario with basic yield	10%	20%
		28,000	31,500	35,000	38,500	42,000
-20%	0.24	3,543.70	4,329.45	5,115.20	5,900.95	6,686.70
-10%	0.27	4,383.70	5,274.45	6,165.20	7,055.95	7,946.70
Scenario with basic price	0.30	5,223.70	6,219.45	**7,215.20**	8,210.95	9,206.70
10%	0.33	6,063.70	7,164.45	8,265.20	9,365.95	10,466.70
20%	0.36	6,903.70	8,109.45	9,315.20	10,520.95	11,726.70

Source: MAFRD-DEAAS

Table 34: The impact of price and yield change in net income (peppers)

NET INCOME		-20%	-10%	Scenario with basic yield	10%	20%
		28,000	31,500	35,000	38,500	42,000
-20%	0.24	1,708.70	2,404.45	3,100.20	3,795.95	4,491.70
-10%	0.27	2,548.70	3,349.45	4,150.20	4,950.95	5,751.70
Scenario with basic price	0.30	3,388.70	4,294.45	**5,200.20**	6,105.95	7,011.70
10%	0.33	4,228.70	5,239.45	6,250.20	7,260.95	8,271.70
20%	0.36	5,068.70	6,184.45	7,300.20	8,415.95	9,531.70

Source: MAFRD-DEAAS

2.8 Onion

2.8.1 Gross margin and net income per ha

Table 35: Onion production cost

3. Calculation of vegetable production cost, 2017 3.1 Onion in open field Area 1 ha				
	Unit	**Quantity**	**Price per unit**	**Value in €**
INCOMES				
Onion	kg	32,000.00	0.32	10,240.00
Total incomes				**10,240.00**
VARIABLE COSTS				
Inputs				
Scallion	kg	600.00	1.70	1,020.00
NPK 15:15:15	kg	800.00	0.40	320.00
NAG	kg	400.00	0.32	128.00
Total fungicides	kg			180.00
Total insecticides	litre	6.00	8.00	48.00
Total herbicides	litre	4.00	8.00	32.00
Water	ha	1.00	150.00	150.00
Box	piece	3,200.00	0.05	160.00
Total inputs				**2,038.00**
Machinery expenditures				
Ploughing	litre	40.00	1.02	50.00
Disking x 2	litre	60.00	1.02	61.20
Harrowing	litre	10.00	1.02	12.50
Planting	operations	1.00	140.00	140.00
Transport from the field to market	litre	300.00	1.02	306.00
Maintenance	flat rate			150.00
Total machinery expenditures				**719.70**
Total variable expenditures				**2,757.70**
GROSS MARGIN				**7,482.30**
WORKFORCE				
Ploughing	p/d	1.00	15.00	7.50
Disking and harrowing	p/d	1.00	15.00	15.00
Spraying	p/d	2.36	15.00	39.38
Irrigation	p/d	12.00	15.00	180.00
Harvesting (seasonal workers)	p/d	50.00	15.00	750.00
Transport to the market	p/d	7.00	15.00	105.00
Total workforce expenditures				**1,096.88**
GROSS MARGIN BEFORE DEPRECIATION				**7,262.93**
Depreciation				200.00
NET INCOMES				**6,185.43**
Subsidies	€/ha			300.00
NET INCOMES + Subsidies				**6,485.43**

Source: MAFRD-DEASS

Table 36: The impact of price and yield change in gross margin (onion)

GROSS MARGIN		-20%	-10%	Scenario with basic yield	10%	20%
		25,600	28,800	32,000	35,200	38,400
-20%	0.26	3,827.90	4,631.10	5,434.30	6,237.50	7,040.70
-10%	0.29	4,647.10	5,552.70	6,458.30	7,363.90	8,269.50
Scenario with basic price	0.32	5,466.30	6,474.30	**7,482.30**	8,490.30	9,498.30
10%	0.35	6,285.50	7,395.90	8,506.30	9,616.70	10,727.10
20%	0.38	7,104.70	8,317.50	9,530.30	10,743.10	11,955.90

Source: MAFRD-DEASS

Table 37: The impact of price and yield change in net income (onion)

NET INCOME		-20%	-10%	Scenario with basic yield	10%	20%
		25,600	28,800	32,000	35,200	38,400
-20%	0.26	2,702.03	3,419.73	4,137.43	4,855.13	5,572.83
-10%	0.29	534.30	4,341.33	5,161.43	5,981.53	6,801.63
Scenario with basic price	0.32	1,158.30	5,262.92	**6,185.43**	7,107.93	8,030.43
10%	0.35	1,782.30	6,184.53	7,209.43	8,234.33	9,259.23
20%	0.38	2,406.30	7,106.13	8,233.43	9,360.73	10,488.03

Source: MAFRD-DEASS

2.9 Tomatoes

2.9.1 Gross margin and net income per 10 Ares in a traditional greenhouse

Table 38: Tomato production cost in a traditional greenhouse

3. Calculation of vegetable production cost 2017 3.2.a Tomatoes in a traditional greenhouse Area 10 Ares				
	Unit	**Quantity**	**Price per unit**	**Value in €**
INCOMES				
Tomatoes	kg	15,200.00	0.40	6,080.00
Total income				**6,080.00**
VARIABLE COSTS				
Inputs				
Seedlings	Pieces	3,200.00	0.10	316.02
Organic fertiliser	kg	5,000.00	0.01	33.33
NPK 15:15:15	kg	75.00	0.40	30.00
NAG	kg	32.00	0.32	10.24
Protective preparation				21.01
Vitamins (Sall preparation)	litre	0.9	3	2.7
Water	Flat rate			15.00
Support system (rope)	m	6,400.00	0.003	21.12
Packaging	Pieces	2,200.00	0.29	638.00
Total inputs				**1,087.43**
Machinery expenses				
Ploughing (by multi cultivator)	litre	10.00	1.02	10.20
Tilling x 2	litre	8.00	1.02	8.16
Harrowing	litre	4.00	1.02	4.08
Fertilisation	litre	15.00	1.02	15.30
Work between rows with multi cultivator	litre	8.00	1.02	8.16
Transport from the field to the market	Flat rate			400.00
Maintenance	Flat rate			25.00
Total machinery expenditures 469.10				**470.90**
Total variable expenditures				**1,558.33**
GROSS MARGIN				**4,521.67**
WORKFORCE				
Fertilisation	p/d	1.00	15.00	15.00
Ploughing (by multi cultivator)	p/d	0.50	15.00	7.50
Tilling	p/d	0.50	15.00	7.50
Planting	p/d	2.00	15.00	30.00
Spraying	p/d	3.75	15.00	56.25
Irrigation	p/d	3.75	15.00	56.25
Harvesting	p/d	15.00	15.00	225.00
Transport from the field to the market	p/d	15.00	15.00	225.00
Other measures of care during vegetation	p/d	37.50	15.00	562.50
Total workforce expenditures				**1,185.00**
GROSS MARGIN BEFORE DEPRECIATION				**3,336.67**
Depreciation				366.10
NET INCOME				**2,970.58**

Source: MAFRD-DEAAS

Table 39: The impact of price and yield change in the gross margin (tomatoes in traditional greenhouses)

GROSS MARGIN		-20%	-10%	Scenario with basic yield	10%	20%
		12,160	13,680	15,200	16,720	18,240
-20%	0.32	2,460.47	2,883.07	3,305.67	3,728.27	4,150.87
-10%	0.36	2,946.87	3,430.27	3,913.67	4,397.07	4,880.47
Scenario with basic price	0.40	3,433.27	3,977.47	**4,521.67**	5,065.87	5,610.07
10%	0.44	3,919.67	4,524.67	5,129.67	5,734.67	6,339.67
20%	0.48	4,406.07	5,071.87	5,737.67	6,403.47	7,069.27

Source: MAFRD-DEAAS

Table 40: The impact of price and yield change in net income (tomatoes in traditional greenhouses)

NET INCOME		-20%	-10%	Scenario with basic yield	10%	20%
		12,160	13,680	15,200	16,720	18,240
-20%	0.32	999.38	1,376.98	1,754.58	2,132.18	2,509.78
-10%	0.36	1,485.78	1,924.18	2,362.58	2,800.98	3,239.38
Scenario with basic price	0.40	1,972.18	2,471.38	**2,970.58**	3,469.78	3,968.98
10%	0.44	2,458.58	3,018.58	3,578.58	4,138.58	4,698.58
20%	0.48	2,944.98	3,565.78	4,186.58	4,807.38	5,428.18

Source: MAFRD-DEAAS

2.9.2 Gross margin and net income per 10 Ares in a standard greenhouse

Table 41: Tomato production cost in a standard greenhouse

3. Calculation of vegetable production cost 2017 3.2.b Tomatoes in a standard greenhouse Area 10 Ares				
	Unit	**Quantity**	**Price per unit**	**Value in €**
INCOMES				
Tomatoes	kg	21,900.00	0.40	8,760.00
Total income				**8,760.00**
VARIABLE COSTS				
Inputs				
Seedlings	pieces	3,000.00	0.10	300.14
Organic fertiliser	kg	5,000.00	0.01	33.33
NPK 15:15:15	kg	75.00	0.40	30.00
Urea				
NAG	kg	30.00	0.32	9.60
Foliar feeding				
Protective preparations				21.01
Vitamins (Sall preparations)	litre	0.9	3	2.7
Water	Flat rate	0	0	15
Supportive system (rope)	m	7500	0.0033	24.75
Packaging	pieces	3000	0.29	870
Total inputs				**1,306.53**
Machinery expenses				
Ploughing (by multi cultivator)	litre	10.00	1.02	10.20
Tilling x 2	litre	8.00	1.02	8.16
Harrowing	litre	4.00	1.02	4.08
Fertilisation	litre	15.00	1.02	15.30
Work between rows by multi cultivator	litre	8.00	1.02	8.16
Transport from the field to the market	Flat rate			400.00
Maintenance	Flat rate			25.00
Total machinery expenditures				**470.90**
Total variable expenditures				**1,777.43**
GROSS MARGIN				**6,982.57**
WORKFORCE				
Fertilisation	p/d	1.00	15.00	15.00
Ploughing (by multi cultivator)	p/d	0.50	15.00	7.50
Tilling	p/d	0.50	15.00	7.50
Planting	p/d	2.00	15.00	30.00
Spraying	p/d	3.75	15.00	56.25
Irrigation	p/d	3.75	15.00	56.25
Harvesting	p/d	20.00	15.00	300.00
Transport from the field to the market	p/d	20.00	15.00	300.00
Other measures of care during vegetation	p/d	37.50	15.00	562.50
Total workforce expenditures				**1,335.00**
GROSS MARGIN BEFORE DEPRECIATION				**5,647.57**
Depreciation*				490.05
NET INCOME				**5,157.52**

Source: MAFRD-DEAAS; * Depreciation is calculated with 65% investment support in greenhouse construction

Table 42: The impact of price and yield change in the gross margin (tomatoes in standard greenhouses)

GROSS MARGIN		-20%	-10%	Scenario with basic yield	10%	20%
		17,520	19,710	21,900	24,090	26,280
-20%	0.32	4,002.97	4,616.77	5,230.57	5,844.37	6,458.17
-10%	0.36	4,703.77	5,405.17	6,106.57	6,807.97	7,509.37
Scenario with basic price	0.40	5,404.57	6,193.57	**6,982.57**	7,771.57	8,560.57
10%	0.44	6,105.37	6,981.97	7,858.57	8,735.17	9,611.77
20%	0.48	6,806.17	7,770.37	8,734.57	9,698.77	10,662.97

Source: MAFRD-DEAAS

Table 43: The impact of price and yield change in net income (tomatoes in standard greenhouses)

NET INCOME		-20%	-10%	Scenario with basic yield	10%	20%
		17,520	19,710	21,900	24,090	26,280
-20%	0.32	2,297.92	2,851.72	3,405.52	3,959.32	4,513.12
-10%	0.36	2,998.72	3,640.12	4,281.52	4,922.92	5,564.32
Scenario with basic price	0.40	3,699.52	4,428.52	**5,157.52**	5,886.52	6,615.52
10%	0.44	4,400.32	5,216.92	6,033.52	6,850.12	7,666.72
20%	0.48	5,101.12	6,005.32	6,909.52	7,813.72	8,717.92

Source: MAFRD-DEAAS

2.10 Cucumber

2.10.1 Gross margin and net income per 10 Ares in a traditional greenhouse

Table 44: Cucumber production cost in traditional greenhouses

3. Calculation of vegetable production cost 2017 3.3.a Cucumber in traditional greenhouses Area 10 Ares				
	Unit	**Quantity**	**Price per unit**	**Value in €**
INCOMES				
Cucumber	kg	17,500.00	0.30	5,250.00
Total income				**5,250.00**
VARIABLE COSTS				
Inputs				
Seedlings	Pieces	3,200.00	0.07	214.35
Organic fertiliser	kg	6,000.00	0.01	40.00
NPK 15:15:15	kg	100.00	0.40	40.00
NAG	kg	96.00	0.32	30.72
Protective preparations				61.67
Water	Flat rate	0	0	15
Support system (rope)	m	6,400.00	0.003	21.12
Packaging	Pieces	1,690.00	0.20	338.00
Total inputs				**760.86**
Machinery expenses				
Ploughing (by multi cultivator)	litre	10.00	1.02	10.20
Tilling x 2	litre	8.00	1.02	8.16
Harrowing	litre	4.00	1.02	4.08
Fertilisation	litre	15.00	1.02	15.30
Works between rows with multi cultivator	litre	8.00	1.02	8.16
Transport from the field to the market	Flat rate			500.00
Maintenance	Flat rate			25.00
Total machinery expenditures				**570.90**
Total variable expenditures				**1,331.76**
GROSS MARGIN				**3,918.24**
WORKFORCE				
Fertilisation	p/d	1.00	15.00	15.00
Ploughing (by multi cultivator)	p/d	0.50	15.00	7.50
Tilling	p/d	0.50	15.00	7.50
Planting	p/d	2.00	15.00	30.00
Spraying	p/d	3.75	15.00	56.25
Irrigation	p/d	3.75	15.00	56.25
Harvesting	p/d	17.50	15.00	262.50
Transport from the field to the market	p/d	15.00	15.00	225.00
Other measures of care during vegetation	p/d	33.75	15.00	506.25
Total workforce expenditures				**1,166.25**
GROSS MARGIN BEFORE DEPRECIATION				**2,751.99**
Depreciation				332.76
NET INCOME				**2,419.23**

Source: MAFRD-DEAAS

Table 45: The impact of price and yield change in the gross margin (cucumber in traditional greenhouses)

GROSS MARGIN		-20%	-10%	Scenario with basic yield	10%	20%
		14,000	15,750	17,500	19,250	21,000
-20%	0.24	2,095.84	2,482.04	2,868.24	3,254.44	3,640.64
-10%	0.27	2,515.84	2,954.54	3,393.24	3,831.94	4,270.64
Scenario with basic price	0.30	2,935.84	3,427.04	**3,918.24**	4,409.44	4,900.64
10%	0.33	3,355.84	3,899.54	4,443.24	4,986.94	5,530.64
20%	0.36	3,775.84	4,372.04	4,968.24	5,564.44	6,160.64

Source: MAFRD-DEAAS

Table 46: The impact of price and yield change in net income (cucumber in traditional greenhouses)

NET INCOME		-20%	-10%	Scenario with basic yield	10%	20%
		14,000	15,750	17,500	19,250	21,000
-20%	0.24	694.33	1,031.78	1,369.23	1,706.68	2,044.13
-10%	0.27	1,114.33	1,504.28	1,894.23	2,284.18	2,674.13
Scenario with basic price	0.30	1,534.33	1,976.78	**2,419.23**	2,861.68	3,304.13
10%	0.33	1,954.33	2,449.28	2,944.23	3,439.18	3,934.13
20%	0.36	2,374.33	2,921.78	3,469.23	4,016.68	4,564.13

Source: MAFRD-DEAAS

2.10.2 Gross margin and net income per 10 Ares in a standard greenhouse

Table 47: Cucumber production cost in standard greenhouse

3. Calculation of vegetable production cost 2017 3.3.b Cucumber in standard greenhouses Area 10 Ares				
	Unit	**Quantity**	**Price per unit**	**Value in €**
INCOMES				
Cucumber	kg	24,000.00	0.30	7,200.00
Total income				**7,200.00**
VARIABLE COSTS				
Inputs				
Seedlings	Pieces	3,000.00	0.07	206.27
Organic fertiliser	kg	6,000.00	0.01	40.00
NPK 15:15:15	kg	100.00	0.40	40.00
NAG	kg	90.00	0.32	28.80
Protective preparations				66.67
Water	Flat rate			15.00
Support system (rope)	m	7,500.00	0.003	24.75
Packaging	Pieces	2,300.00	0.20	460.00
Total inputs				**881.49**
Machinery expenses				
Ploughing (by multi cultivator)	litre	10.00	1.02	10.20
Tilling x 2	litre	8.00	1.02	8.16
Harrowing	litre	4.00	1.02	4.08
Fertilisation	litre	15.00	1.02	15.30
Work between rows by multi cultivator	litre	8.00	1.02	8.16
Transport from the field to the market	Flat rate			500.00
Maintenance	Flat rate			25.00
Total machinery expenditures				**570.90**
Total variable expenditures				**1,452.39**
GROSS MARGIN				**5,747.61**
WORKFORCE				
Fertilisation	p/d	1.00	15.00	15.00
Ploughing (by multi cultivator)	p/d	0.50	15.00	7.50
Tilling	p/d	0.50	15.00	7.50
Planting	p/d	2.00	15.00	30.00
Spraying	p/d	3.75	15.00	56.25
Irrigation	p/d	3.75	15.00	56.25
Harvesting	p/d	25.00	15.00	375.00
Transport from the field to the market	p/d	20.00	15.00	300.00
Other measures of care during vegetation	p/d	45.00	15.00	675.00
Total workforce expenditures				**1,522.50**
GROSS MARGIN BEFORE DEPRECIATION				**4,225.11**
Depreciation*				439.01
NET INCOME				**3,786.10**

Source: MAFRD-DEAAS; * Depreciation is calculated with 65% investment support in greenhouse construction

Table 48: The impact of price and yield change in the gross margin (cucumber in standard greenhouses)

GROSS MARGIN		-20%	-10%	Scenario with basic yield	10%	20%
		19,200	21,600	24,000	26,400	28,800
-20%	0.24	3,247.61	3,777.61	4,307.61	4,837.61	5,367.61
-10%	0.27	3,823.61	4,425.61	5,027.61	5,629.61	6,231.61
Scenario with basic price	0.30	4,399.61	5,073.61	**5,747.61**	6,421.61	7,095.61
10%	0.33	4,975.61	5,721.61	6,467.61	7,213.61	7,959.61
20%	0.36	5,551.61	6,369.61	7,187.61	8,005.61	8,823.61

Source: MAFRD-DEAAS

Table 49: The impact of price and yield change in net income (cucumber in standard greenhouses)

NET INCOME		-20%	-10%	Scenario with basic yield	10%	20%
		19,200	21,600	24,000	26,400	28,800
-20%	0.24	1,421.10	1,883.60	2,346.10	2,808.60	3,271.10
-10%	0.27	1,997.10	2,531.60	3,066.10	3,600.60	4,135.10
Scenario with basic price	0.30	2,573.10	3,179.60	**3,786.10**	4,392.60	4,999.10
10%	0.33	3,149.10	3,827.60	4,506.10	5,184.60	5,863.10
20%	0.36	3,725.10	4,475.60	5,226.10	5,976.60	6,727.10

Source: MAFRD-DEAAS

3 Price and yield at the profitability point

Table 50: Prices and yields at the breakeven point, in order to cover only the variable cost

Wheat (1ha)	
Base yield (kg)	4,500
Base price (€)	0.18
Price at the breakeven point (€)	**0.15**
Yield at the breakeven point kg	**3,682**

Corn grain with irrigation (1ha)	
Base yield (kg)	7,500
Base price (€)	0.23
Price at the breakeven point (€)	**0.12**
Yield at the breakeven point kg	**3,976**

Corn grain without irrigation (1 ha)	
Base yield (kg)	4,500
Base price (€)	0.23
Price at the breakeven point (€)	**0.12**
Yield at the breakeven point kg	**2,437**

Silage corn with irrigation (1ha)	
Base yield (kg)	45,000
Base price (€)	0.05
Price at the breakeven point (€)	**0.02**
Yield at the breakeven point kg	**20,218**

Silage corn without irrigation (1 ha)	
Base yield (kg)	35,000
Base price (€)	0.05
Price at the breakeven point (€)	**0.02**
Yield at the breakeven point kg	**13,146**

Apples (1 ha)	
Base yield (kg)	16,000
Base price (€)	0.38
Price at the breakeven point (€)	**0.33**
Yield at the breakeven point kg	**14,854**

Strawberries (10 Ares)	
Base yield (kg)	3,116
Base price (€)	1.78
Price at the breakeven point (€)	**0.45**
Yield at the breakeven point kg	**798.94**

Grapes (1 ha)	
Base yield (kg)	12.000
Base price (€)	0.58
Price at the breakeven point (€)	**0.29**
Yield at the breakeven point kg	**6,042**

Tomatoes in a traditional greenhouse (10 Ares)	
Base yield (kg)	15,200
Base price (€)	0.40
Price at the breakeven point (€)	**0.18**
Yield at the breakeven point kg/ha	**11,003**

Tomatoes in a standard greenhouse (10 Ares)	
Base yield (kg)	21,900
Base price (€)	0.40
Price at the breakeven point (€)	**0.14**
Yield at the breakeven point kg/ha	**7,781**

Cucumber in a traditional greenhouse (10 Ares)	
Base yield (kg)	17,500
Base price (€)	0.30
Price at the breakeven point (€)	**0.14**
Yield at the breakeven point kg/ha	**8,327**

Cucumber in a standard greenhouse (10 Ares)	
Base yield (kg)	24,000
Base price (€)	0.30
Price at the breakeven point (€)	**0.12**
Yield at the breakeven point kg/ha	**9,916**

Open field pepper (1 ha)	
Base yield (kg)	35,500
Base price (€)	0.30
Price at the breakeven point (€)	**0.15**
Yield at the breakeven point kg/ha	**16,999**

Open field onion (1ha)	
Base yield (kg)	32,000
Base price (€)	0.32
Price at the breakeven point (€)	**0.12**
Yield at the breakeven point kg/ha	**12,046**

4 Technical information

Table 51: Agro-technical measures on wheat

Activity / Month	January		February		March		April		May		June		July		August		September		October		November		December	
Ploughing																								
Preparation for planting																								
Fertilization NPK																								
Planting																								
Re-fertilization (N2)																								
Spraying against weeds																								
Spraying against insects																								
Protection against diseases																								
Foliar fertilizer/feeding																								
Harvesting																								
Netting																								
Transport of wheat and straw																								

Source: DEAAS-MAFRD

Table 52: Agro-technical measures on corn

Activity / Month	January		February		March		April		May		June		July		August		September		October		November		December	
Basic ploughing																								
Basic fertilization 50% NPK (before ploughing)																								
Basic fertilization 50% NPK																								
Preparation for planting																								
Planting (grain corn)																								
Protection against weeds*																								
Spraying against insects (as needed)																								
Re-fertilization (N2)																								
Foliar fertilizer/feeding																								
Harvesting																								
Planting (corn for silage)																								

Source: DEAAS-MAFRD; * Protection against weeds may be done before and after planting

Table 53: Agro-technical measures on apple

Activity / Month	January		February		March		April		May		June		July		August		September		October		November		December	
Shearing																								
Protection																								
Basic feeding 7:20:18																								
Cristal feeding																								
Foliar feeding																								
Network covering																								
Green shearing																								
Mulchering																								
Mowing																								
Protection against weeds																								
Irrigation as needed																								
Water drainage																								
Picking																								
Tightening of strings and netting																								
Removal of network																								

Source: DEAAS-MAFRD

Table 54: Agro-technical measures on grape

Activity / Month	January		February		March		April		May		June		July		August		September		October		November		December	
Shearing																								
Netting (porting)																								
Preparation for ploughing/ tilling																								
Application of herbicides																								
Treatment with pesticides																								
Fertilization NPK																								
Weeding and shearing																								
Thinning of grape clusters																								
Grape harvest (vine grape)																								
Grape harvest (table grape)																								

Source: DEAAS-MAFRD

Table 55: Agro-technical measures on strawberry

Activity / Month	January		February		March		April		May		June		July		August		September		October		November		December	
Planting																								
Shearing																								
Protection (Acaricide)																								
Protection (insecticides and fungicides)																								
Feeding																								
Irrigation																								
Picking																								
Picking (in greenhouse)																								

Source: DEAAS-MAFRD

Table 56: Agro-technical measures on onion

Activity / Month	January		February		March		April		May		June		July		August		September		October		November		December	
Basic ploughing																								
Planting of pearl onions																								
Fertilization NPK																								
Treatment from weeds																								
Protection (diseases and pests)																								
Foliar feeding																								
Irrigation																								
Protection against diseases																								
Picking																								

Source: DEAAS-MAFRD

Table 57: Agro-technical measures on tomatoes

Activity / Month	January		February		March		April		May		June		July		August		September		October		November		December	
Basic fertilization																								
Basic ploughing																								
Land preparation																								
Planting of seedlings (in modules)																								
Planting of seedlings (in permanent place)																								
Protection																								
Protection against weeds																								
Foliar feeding																								
Cristal feeding																								
Picking																								

Source: DEAAS-MAFRD

Table 58: Agro-technical measures on tomatoes in greenhouse

Activity / Month	January		February		March		April		May		June		July		August		September		October		November		December	
Land preparation																								
Organic fertilization																								
Basic fertilization																								
Planting of seedlings (in modules)																								
Covering of land with foil and planting in rows																								
Protection																								
Cristal feeding																								
Foliar feeding																								
Shearing																								
Netting of plants																								
Picking																								

Source: DEAAS-MAFRD

Table 59: Agro-technical measures on peppers

Activity / Month	January		February		March		April		May		June		July		August		September		October		November		December	
Planting of seedlings (in modules)																								
Ploughing and land preparation																								
Basic fertilization																								
Planting in permanent place																								
Protection																								
Foliar fertilization																								
Cristal fertilization																								
Picking																								
Irrigation-as needed																								

Source: DEAAS-MAFRD

Table 60: Agro-technical measures on peppers in greenhouse

Activity / Month	January		February		March		April		May		June		July		August		September		October		November		December	
Planting of seedlings (in modules)																								
Land preparation																								
Foil covering																								
Planting of seedlings (in permanent place)																								
Protection																								
Netting of plants																								
Shearing																								
Picking time																								
Organic feeding																								
Cristal feeding																								
Foliar feeding																								

Source: DEAAS-MAFRD

Table 61: Agro-technical measures on cucumbers

Activity / Month	January		February		March		April		May		June		July		August		September		October		November		December	
Planting of seeds for seedling																								
Basic fertilization																								
Land preparation																								
Mulchering																								
Planting of seedlings																								
Protection (insecticides and fungicides)																								
Foliar fertilization																								
Cristal fertilization																								
Picking																								

Source: DEAAS-MAFRD

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