FP7-KBBE-2007-1

4F – Future Crops

Cost breakdown of Conventional Crops in Europe

SECOND PROJECT REPORT

Agricultural University of Athens
Department of Agricultural Economics and Rural Development

Peter Soldatos
Vassilis Lychnaras
Dimitris Asimakis

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Part I. Introduction

In our previous report we have outlined the current situation and trends in EU agriculture with focus on the most popular crop cultivations in each country. We have also surveyed the yields and selling prices of about ten crops in ten EU regions, which cover over 90% of the arable land of the European countries. It was found that land and labour costs as well as irrigation patterns may differ significantly between European regions giving rise to substantial variability in the cost of agricultural production. Energy and chemicals costs may also differ from region to region with a less significant effect on total production cost.

The selection of countries is based on the work of other work packages of this project with a view to include regions from all geo-climatic parts of Europe. After selecting all crops covering anything over 1% of the total arable land in each selected country, we ended up with the table of regions and crops for economic analysis shown below.

The methodology for economic analysis was also detailed in our earlier six-month report of this project.

The present report is a collection of cost breakdown for all selected crops based on the same assumptions and following the same methodology. The format is the same in all cases, since all cases have been analysed with the same software, the ABC[1] package, developed by the Agricultural University of Athens.

[1] Activity Based Costing. The package is splitting each case in any number of activities or operations and each operation has "needs", e.g. labour, machinery, raw materials, etc. Costs in volumes as well as prices are supplied by the researcher or extracted from extensive information bases maintained by the Agricultural University of Athens, or from more popular databases such as FAO and Eurostat, easily accessible on the internet.

TABLE OF SELECTED CONVENTIONAL CROPS

	Soil and Climatic Regions	Agricultural Land	Current Crops	% of Agricultural Land
Germany	• Continental • Atlantic Central • Atlantic North	17 million ha **9%** of EU27 Total Agricultural Land	• Wheat • Barley • Rapeseed • Maize • Sugar beet	18% 11% 9% 2% 2%
Netherlands	• Atlantic Central • Atlantic North	1.9 million ha **1%** of EU27 Total Agricultural Land	• Wheat • Sugar beet • Barley • Maize	7% 4% 2% 1%
Poland	• Continental	15,9 million ha **8%** of EU27 Total Agricultural Land	• Wheat • Barley • Rapeseed • Maize • Sugar beet	13% 8% 5% 2% 2%
Romania	• Continental • Panonian	14,5 million ha **8%** of EU27 Total Agricultural Land	• Maize • Wheat • Sunflower • Barley • Alfalfa • Rapeseed	15% 13% 6% 3% 2% 2%
Italy	• Med. North • Med. South	14,7 million ha **8%** of EU27 Total Agricultural Land	• Wheat • Maize • Alfalfa • Barley	14% 7% 5% 2%
Spain	• Lusitanian • Med. North • Med. South	29 million ha **15%** of EU27 Total Agricultural Land	• Barley • Wheat • Sunflower	11% 6% 2%
Portugal	• Lusitanian • Med. North • Med. South	3,7 million ha **2%** of EU27 Total Agricultural Land	• Maize • Wheat • Barley	3% 2% 1%
Greece	• Med. North • Med. South	8,4 million ha **4%** of EU27 Total Agricultural Land	• Wheat • Barley • Maize	8% 1% 2%
France	• Atlantic Central • Lusitanian • Med. North • Med. South	29,6 million ha **15%** of EU27 Total Agricultural Land	• Wheat • Barley • Maize • Rapeseed • Sunflower	18% 6% 5% 5% 2%
UK	• Atlantic Central • Atlantic North	16,6 million ha **9%** of EU27 Total Agricultural Land	• Wheat • Barley • Rapeseed	11% 5% 4%

Cost Analysis

For the analysis of costs of the selected conventional (current) crops, all activities and operations required for agricultural production have been examined and evaluated. For any given plant, these operations are not necessarily the same in all countries (for example irrigation may be required only in southern regions), but there are many common activities. Available technical information regarding the crops combined with current prices of factors of production has formed the basis of cost valuation.

Labour costs are also different in the EU countries; therefore a database of labour costs has been constructed with data from Eurostat and FAO. It has though been assumed that labour productivity is similar in all regions examined, when the level of mechanisation is the same.

The cost of land differs from country to country very significantly. In effect, it can even be very different from site to site in the same country or region. This causes some problems when using country averages that may be well out of scope. To give an example, in Greece, land in the North Eastern region of Thrace is much less expensive although it is very fertile and precipitation levels are much higher in the area. The cost of land is more related to social, transport network and geographical reasons than the fertility of land. In the cost analysis tables that follow, all costs other than land rent are firstly identified and added up to calculate the *production cost*. Then the cost of land is added to estimate *total production cost*.

Total production cost is further compared to the selling price per tonne of product to give an estimate of the profit that has been or is expected to be achieved.

It is of interest to note that in most cases, the net profit (before any subsidy, direct or indirect) is negative, which practically means that the European farmer is in many cases working in order to receive a small reward for his (and possibly his family) labour and land.

Part II. Synopsis of Results

In view of the revenue received by farmers at current selling prices, the cost of production of crops is too high for the achievement of profit in most of the crops that have been examined. The need for rotation of several crops is only making things worse. However, there are a good number of cases of profitable crop farming in several countries. Among the most profitable examples are the cultivation of wheat in France, Germany, Sweden and the UK, the cultivation of sugar beets in Germany, Poland, Sweden and the Netherlands and the cultivation of Alfalfa in Italy and Romania. European subsidisation of the farmers is compensating for their losses in all other cases and preventing them from abandoning their land.

Many of the conventional food and feed crops examined in this volume are also today being used for energy purposes, e.g. for the production of biofuels (wheat, corn, sunflower, sugar beets, etc.). Nevertheless here they are analysed with their conventional use in mind. For example, their selling price is the price of the products in markets for food purposes.

All costs are in the form of *annual equivalent costs*, which is important in the cases of multiannual crops. This insures that, for example, initial investment costs are reflected in the cost per tonne or per ha.

The cost of land is on the one hand its opportunity cost, which in turn depends upon its fertility or productivity with regard to possible plantations. In the case of Europe, since we assume that there is sufficiently large market for land, we have adopted the land rent as it is recorded in European and international statistics (Eurostat and FAO). Although the figures found in these databases may not be the best estimates of land rent, as well as other costs, they provide a common and consistent data reference, accessible to all and official. With regard to the cost of land, we have found that there are great differences among the European countries, which are partly explained by equally big land fertility / productivity differences. In other words, it seems that land is rewarded in proportion to the income it may offer to the farmer. In southern countries, where irrigation is required, there are also great differences in land rent between irrigated and non irrigated land, although in general, irrigation is profitable in spite of the extra cost of land. In the tables that follow costs are first aggregated without the cost of land, which is in all cases one of the most important cost items, and the land rent is added afterwards. Moreover, all costs have been expressed in a “per tonne” of output form in order to facilitate comparisons among countries. However, in the appendix, we have also added the corresponding tables with the cost analysis “per hectare”.

Part III. Cost analysis – Summary Tables

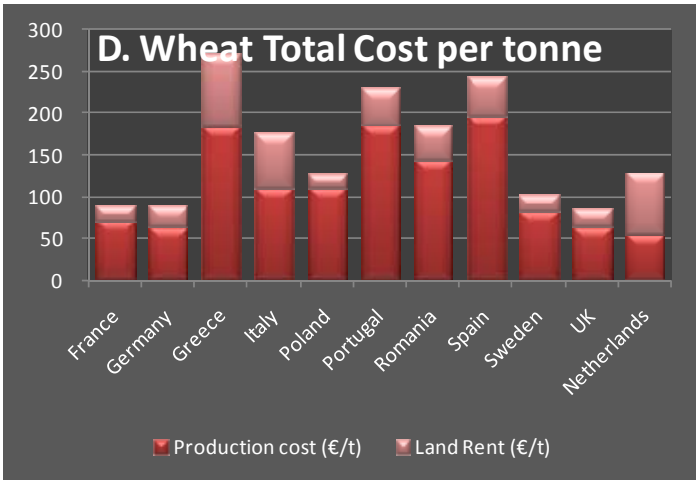
Durum Wheat

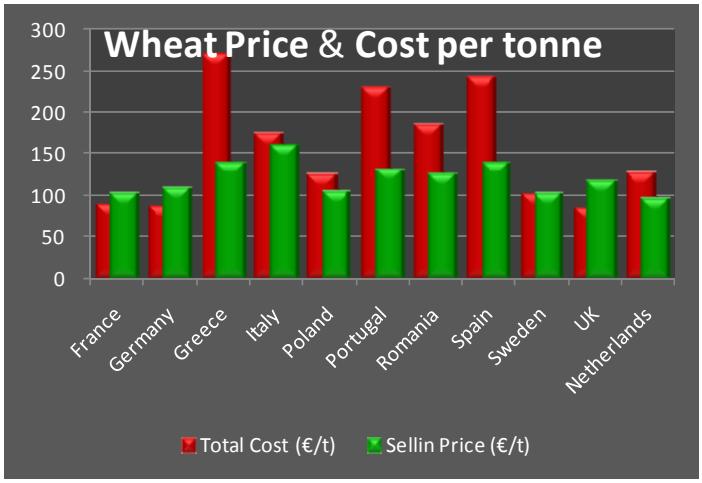
D. Wheat EUR/tonne

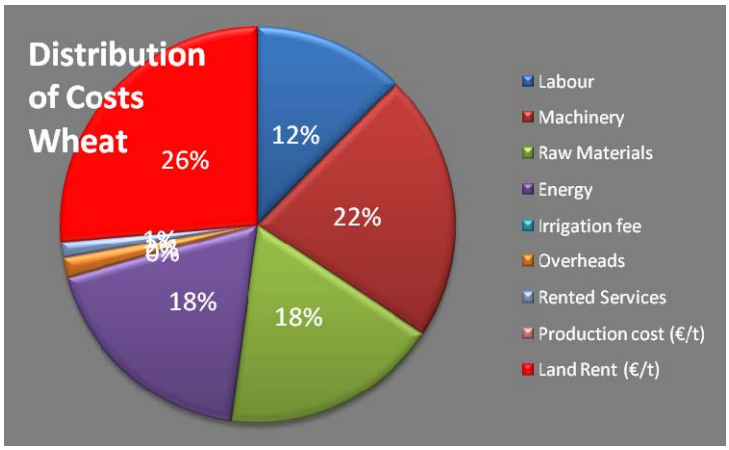
	France	Germany	Greece	Italy	Poland	Portugal	Romania	Spain	Sweden	UK	Netherlands	EU %
Labour	18	13	27	28	10	18	10	45	19	14	12	12%
Machinery	20	19	59	29	25	61	52	58	23	17	16	22%
Raw Materials	16	15	47	23	28	49	41	46	18	14	12	18%
Energy	16	15	47	29	21	54	39	45	22	18	14	18%
Irrigation fee												0%
Overheads	1	1	4	2	3	5	4	4	2	1	1	2%
Rented Services	0	0	0	0	23	0	0	0	0	0	0	1%
Production cost (€/t)	71	63	184	111	110	187	146	198	84	64	55	
Land Rent (€/t)	19	27	87	***64***	16	43	38	45	19	22	***73***	26%
Total Cost (€/t)	90	90	271	175	126	230	184	243	102	86	128	100%
Yield (t/ha)	6.8	7.3	***2.3***	4.7	3.8	***2.2***	***2.6***	***2.4***	5.9	7.8	8.7	
Total Cost (€/ha)	612	656	622	822	480	505	479	570	604	671	1,116	
Sellin Price (€/t)	103	109	140	160	106	132	126	140	104	117	97	
Profit (€/t)	13	19	-131	-15	-20	-98	-58	-103	2	31	-31	

Notes

D. Wheat production in Greece, Portugal Romania and Spain is at reasonable cost levels. Nevertheless, the low average yield is the main reason for negative profits. For Italy and the Netherlands, the main cost item is the high land rent which increases the final cost of production.







Barley

Barley

EUR/tonne

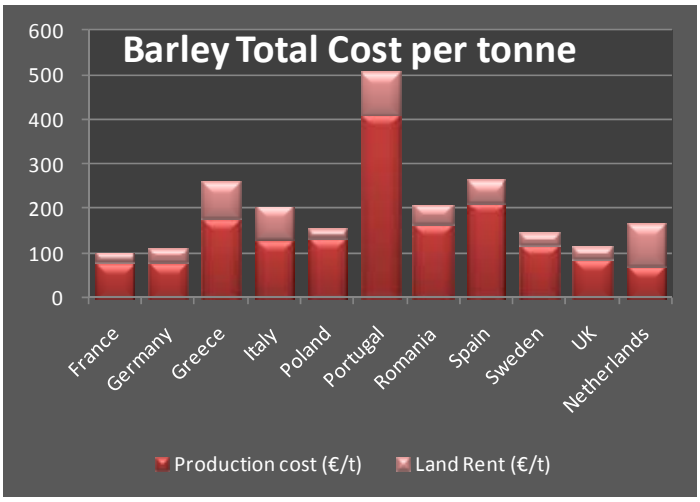
	France	Germany	Greece	Italy	Poland	Portugal	Romania	Spain	Sweden	UK	Netherlands	EU %
Labour	20	16	26	33	12	39	11	49	27	18	16	12%
Machinery	22	23	57	34	31	135	59	63	33	23	20	22%
Raw Materials	17	18	44	26	34	106	46	49	25	18	16	18%
Energy	18	19	45	34	26	118	44	50	31	23	18	19%
Irrigation fee												0%
Overheads	2	2	4	3	3	10	4	5	2	2	1	2%
Rented Services	0	0	0	0	28	0	0	0	0	0	0	1%
Production cost (€/t)	79	79	176	130	134	408	164	215	119	84	71	
Land Rent (€/t)	21	34	84	***75***	20	95	43	49	27	30	***95***	26%
Total Cost (€/t)	100	112	259	205	154	503	208	264	145	114	166	100%
Yield (t/ha)	6.1	5.8	***2.4***	4.0	3.1	***1.0***	***2.3***	***2.2***	4.2	5.9	6.7	
Total Cost (€/ha)	610	654	620	820	478	503	477	568	602	669	1,114	
Sellin Price (€/t)	99	97	145	130	106	135	130	125	93	101	90	
Profit (€/t)	-1	-15	-114	-75	-48	-368	-78	-139	-52	-13	-76	

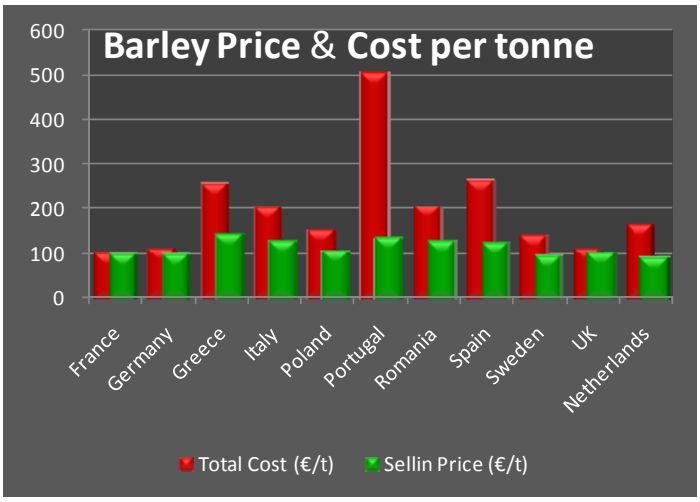
Notes

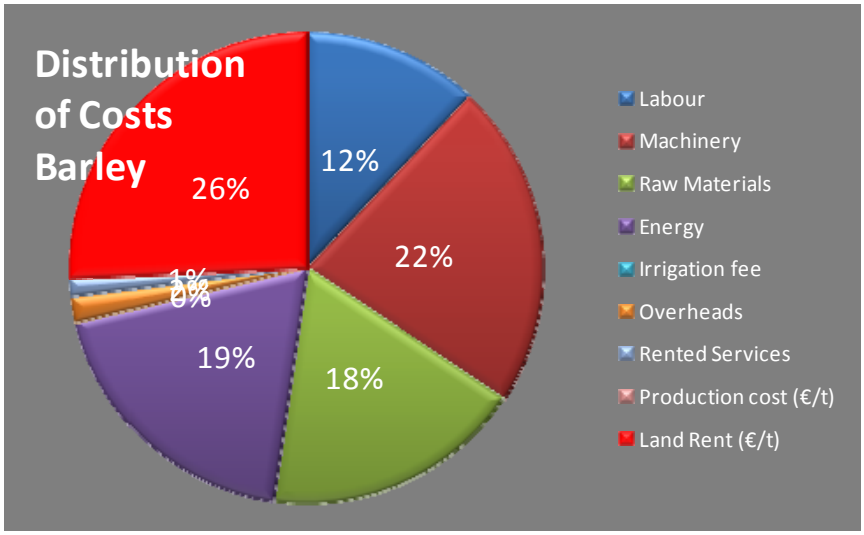
Barley production in Greece, Portugal Romania and Spain is at reasonable cost levels per ha. Nevertheless, low yields are the cause negative profits.

For Italy and Netherlands, the main problem is the high cost for land the increases the final cost of production.

Sweden has negative profits because many of the cost parameters are in higher levels compared to the other countries.







Maize

Maize

EUR/tonne

	France	Germany	Greece	Italy	Poland	Portugal	Romania	Netherlands	***EU %***
Labour	21	12	12	29	8	17	8	14	7%
Machinery	25	18	26	29	21	45	43	19	14%
Raw Materials	**91**	64	54	**121**	95	**134**	155	67	47%
Energy	15	13	13	22	15	21	30	15	9%
Irrigation Fee	0	0	**10**	0	0	**10**	0	0	1%
Overheads	2	2	2	3	4	3	6	2	1%
Rented Services	0	0	0	0	16	0	0	0	1%
Production cost (€/t)	155	109	117	204	158	231	242	118	
Land Rent (€/t)	16	23	**50**	**64**	11	43	29	**79**	19%
Total Cost (€/t)	170	132	167	268	169	274	271	197	100%
Yield (t/ha)	8.4	8.6	10.0	7.0	**5.7**	7.0	**3.5**	8.1	
Total Cost (€/ha)	1,421	1,131	1,677	1,876	965	1,916	947	1,592	
Sellin Price (€/t)	112	118	144	135	100	145	135	86	
Profit (€/t)	-58	-14	-23	-133	-69	-129	-136	-111	

Notes

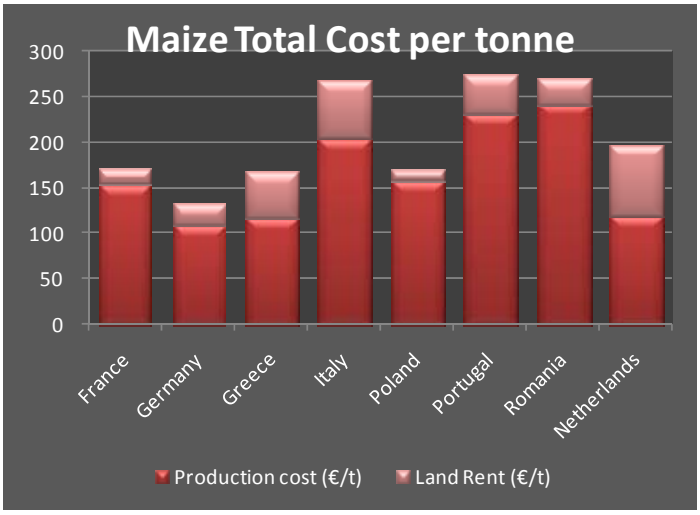
France, Italy and Portugal have increased cost of raw materials because water cost is included.

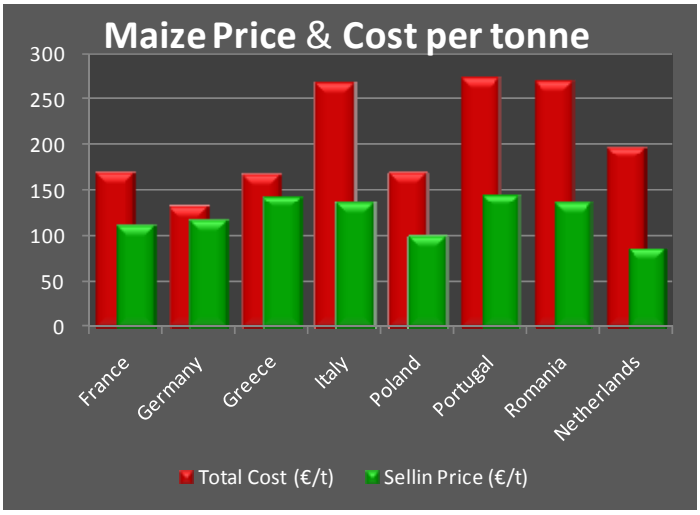
For Italy increased irrigated land rent is also considered.

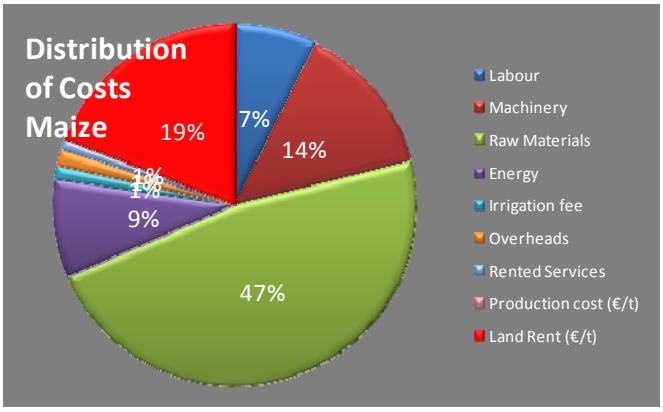
In Greece and Portugal there is an additional irrigation fee per hectare.

For Poland and Romania the low yields are the main reason for economic losses

Land rent in the Netherlands is very high.







Rape seed

Rapeseed

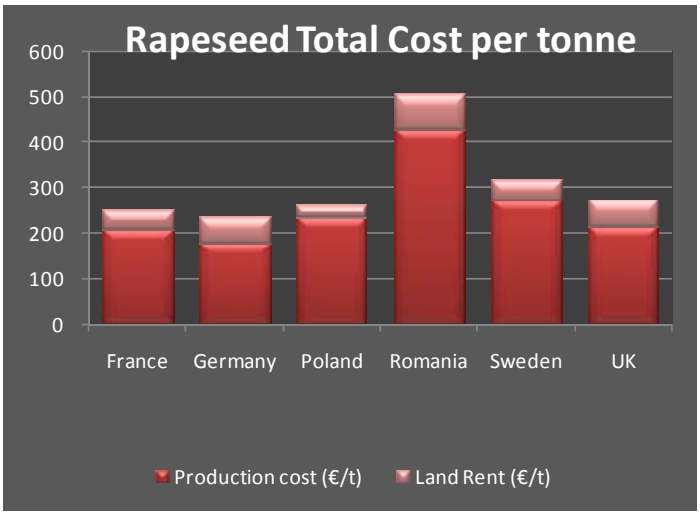
EUR/tonne

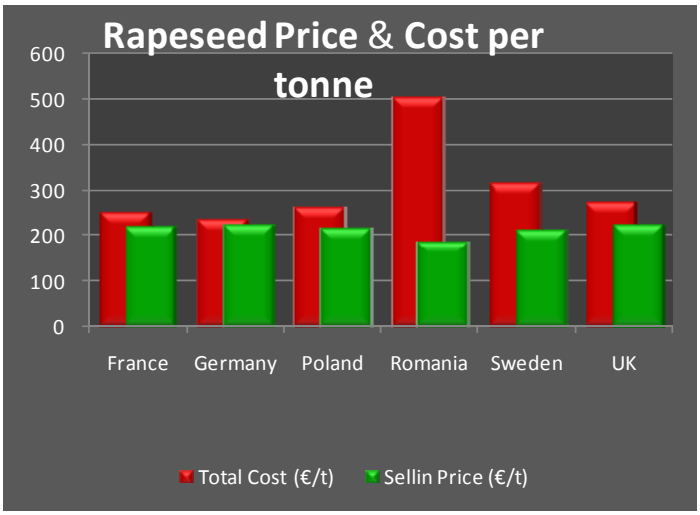
	France	Germany	Poland	Romania	Sweden	UK	***EU %***
Labour	40	28	**16**	**21**	**48**	35	10%
Machinery	45	40	39	110	57	45	18%
Raw Materials	87	77	107	213	111	88	37%
Energy	35	32	32	79	52	45	15%
Irrigation fee	0	0	0	0	0	0	0%
Overheads	3	3	4	8	4	3	1%
Rented Services	0	0	40	0	0	0	2%
Production cost (€/t)	209	180	237	431	272	216	
Land Rent (€/t)	41	55	24	77	44	56	16%
Total Cost (€/t)	250	235	261	508	316	272	100%
Yield (t/ha)	3.2	3.6	2.6	1.3	2.5	3.2	
Total Cost (€/ha)	799	841	678	660	791	857	
Sellin Price (€/t)	218	224	215	185	211	224	
Profit (€/t)	-32	-11	-46	-323	-105	-48	

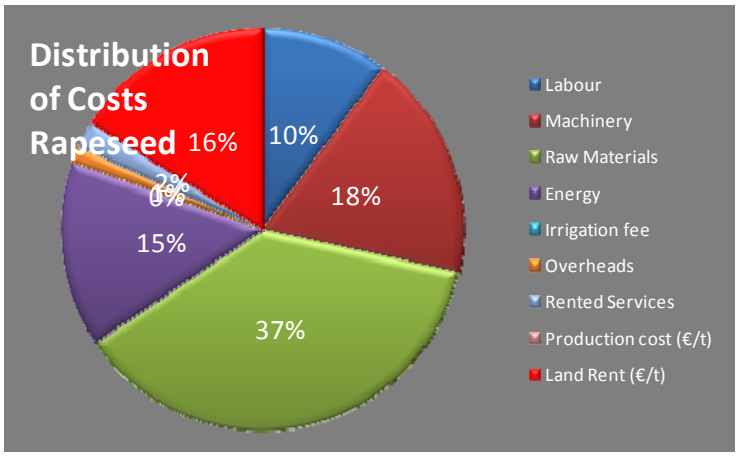
Notes

Rapeseed production in Poland and Romania is at reasonable cost levels. Nevertheless, the low average yield is the main cause of negative profits, (see eg. Romania).

For Sweden also the main problem is the low yield.







Sunflower

Sunflower

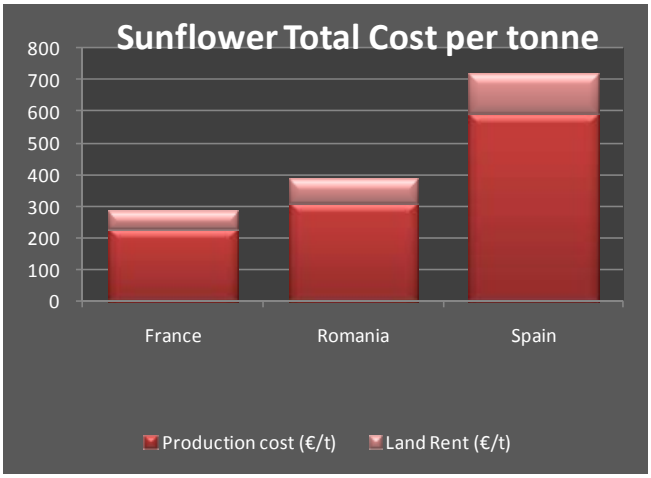
EUR/tonne

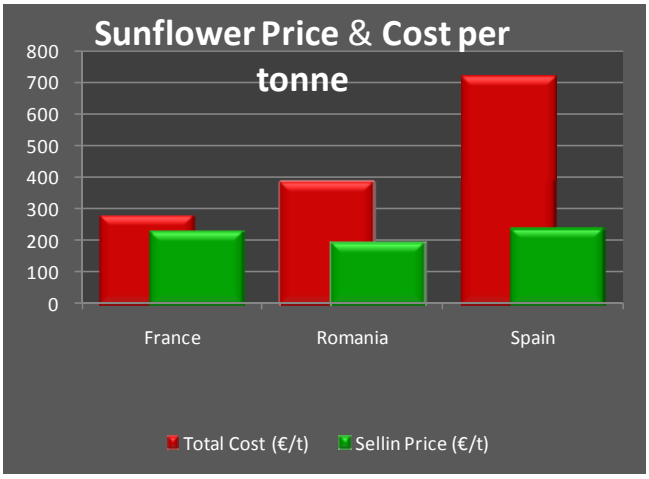
	France	Romania	Spain	***EU %***
Labour	52	19	124	14%
Machinery	59	100	159	23%
Raw Materials	66	112	177	25%
Energy	47	73	124	18%
Irrigation fee	0	0	0	0%
Overheads	4	7	12	2%
Rented Services	0	0	0	0%
Production cost (€/t)	228	312	596	
Land Rent (€/t)	57	74	125	18%
Total Cost (€/t)	285	386	721	100%
Yield (t/ha)	2.3	**1.35**	**0.9**	
Total Cost (€/ha)	655	522	613	
Sellin Price (€/t)	226	195	235	
Profit (€/t)	-59	-191	-486	

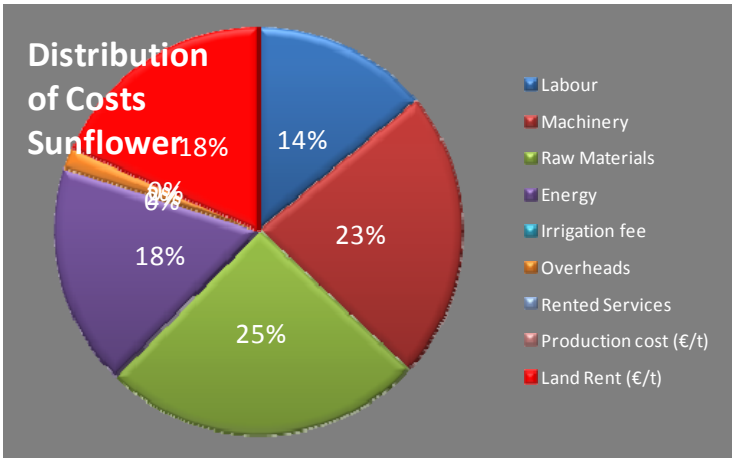
Notes

All countries have reasonable cost levels.

In Romania and Spain the yield is very low.







Sugar beet

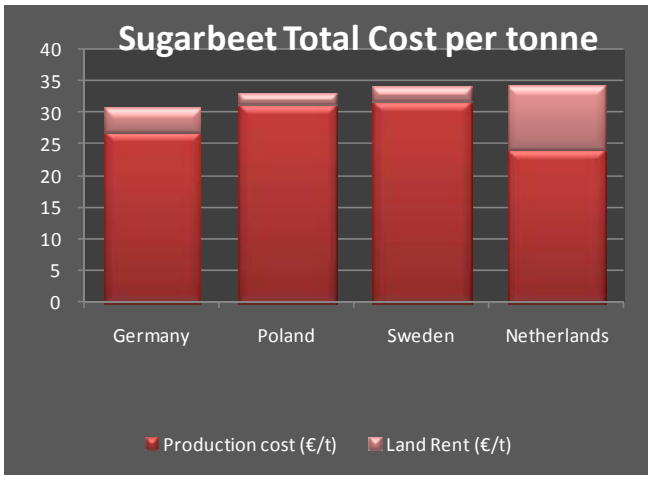
Sugar beet

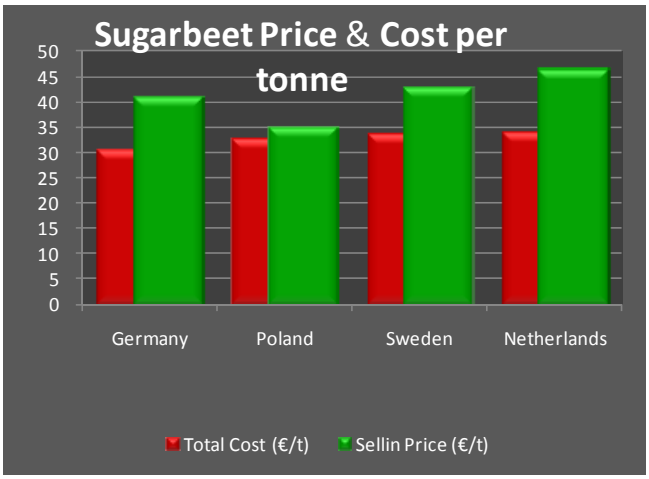
EUR/tonne

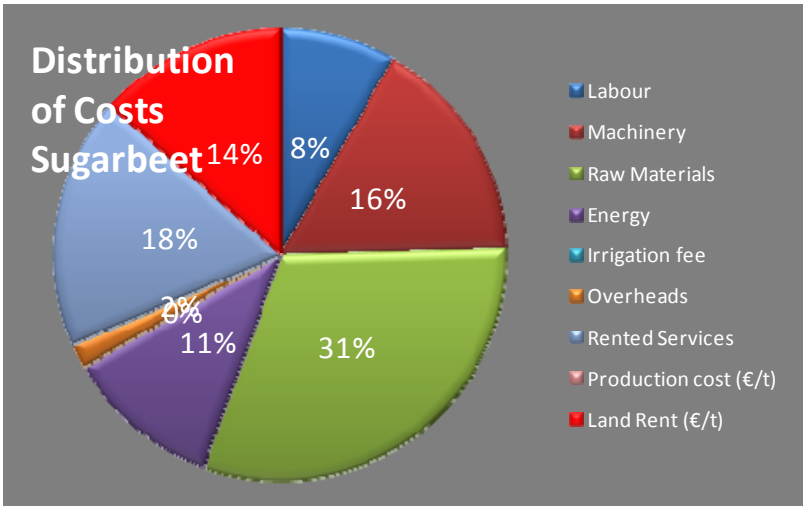
	Germany	Poland	Sweden	Netherlands	***EU %***
Labour	2	2	4	3	8%
Machinery	5	6	6	4	16%
Raw Materials	10	12	11	8	31%
Energy	4	4	4	3	11%
Irrigation fee	0	0	0	0	0%
Overheads	1	1	1	0	2%
Rented Services	6	7	6	5	18%
Production cost (€/t)	27	31	32	24	
Land Rent (€/t)	4	2	2	10	14%
Total Cost (€/t)	31	33	34	34	100%
Yield (t/ha)	51.5	44.1	48.9	63.8	
Total Cost (€/ha)	1,581	1,456	1,656	2,186	
Sellin Price (€/t)	41	35	43	47	
Profit (€/t)	10	2	9	13	

Notes

For all countries the high yield and selling price are the cause of positive profits.







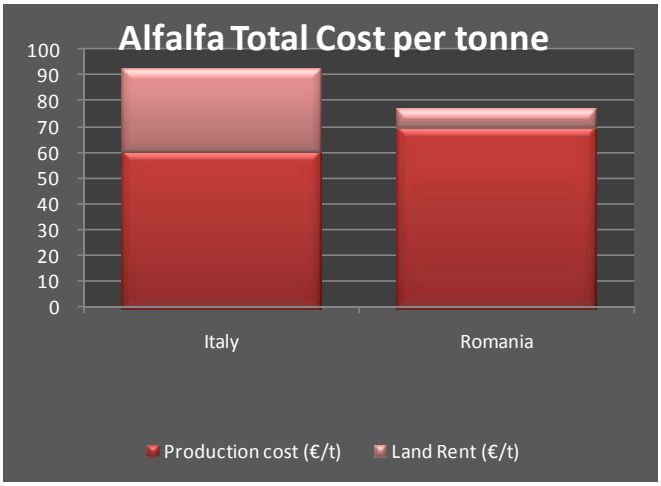
Alfalfa

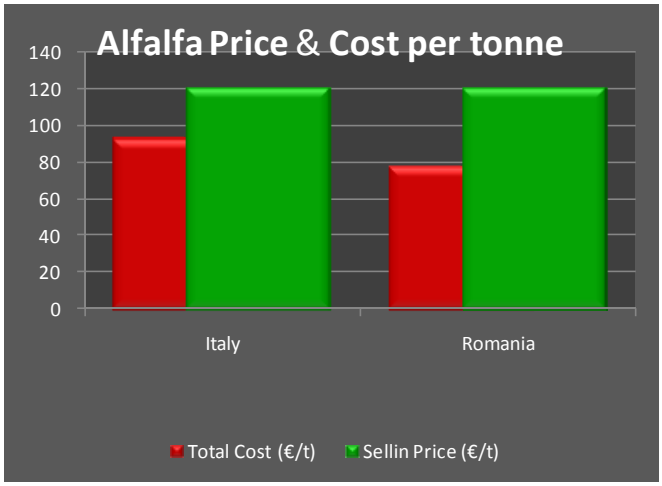
Alfalfa	EUR/tonne		
	Italy	Romania	***EU %***
Labour	13	7	12%
Machinery	14	17	18%
Raw Materials	25	40	38%
Energy	7	5	7%
Irrigation fee	0	0	0%
Overheads	1	1	2%
Rented Services	0	0	0%
Production cost (€/t)	60	70	
Land Rent (€/t)	32	7	23%
Total Cost (€/t)	93	77	100%
Yield (t/ha)	14.0	14.0	
Total Cost (€/ha)	1,295	1,078	
Sellin Price (€/t)	120	120	
Profit (€/t)	27	43	

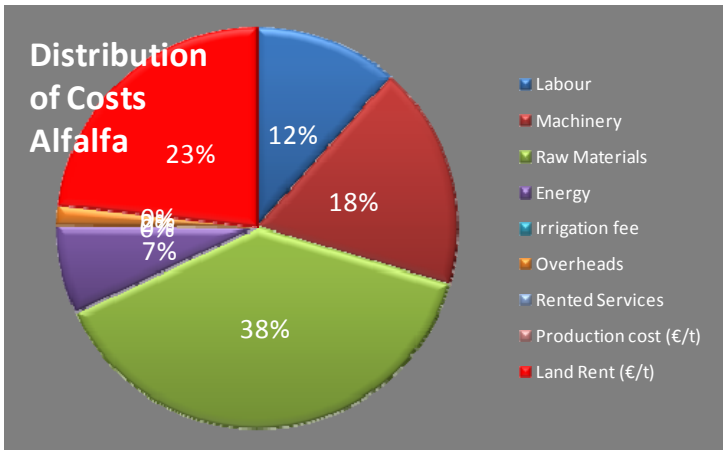
Notes

Alfalfa has an average life of 3 years with low inputs for the 2nd and 3rd year. This decreases its annual equivalent cost.

Both the yield and the price are high enough to cover the cost.







Annex 1. Operations, Machinery and Raw materials

Durum Wheat

Operation	Machinery Used	Raw Materials Used
Ploughing	Plough	
Cultivator	Medium Scale Cultivator	
Harrowing	Disk harrow	
Basic Fertilisation	Fertiliser distributor	250 Kg/ha Fertiliser 20-10-10
Sowing	Grains seeder	50 kg/ha Seeds
Weed Control	Sprayer	1 l/ha 2.4D
Harvesting	Combine Harvester	

Barley

Operation	Machinery Used	Raw Materials Used
Ploughing	Plough	
Cultivator	Medium Scale Cultivator	
Harrowing	Disk harrow	
Basic Fertilisation	Fertiliser distributor	250 Kg/ha Fertiliser 20-10-10
Sowing	Grains seeder	45 kg/ha Seeds
Weed Control	Sprayer	1 l/ha 2.4D
Harvesting	Combine Harvester	

Maize

Operation	Machinery Used	Raw Materials Used
Ploughing	Plough	
Cultivator	Medium Scale Cultivator	
Harrowing	Disk harrow	
Basic Fertilisation	Fertiliser distributor	500 Kg/ha Fertiliser 20-10-10
Sowing	Maize seeder	27.3 kg/ha Seeds (70.000 plants/ha)
Weed Control	Sprayer	Bamvel 0.6 l/ha
Fertilisation	Fertiliser distributor	250 Kg/ha Ammonium nitrate (33% N)
Irrigation	Travelling Gun	Depending on regional climatic conditions
Weed Control	Sprayer	1 l/ha 2.4D
Harvesting	Combine Harvester	

Sunflower

Operation	Machinery Used	Raw Materials Used
Ploughing	Plough	
Cultivator	Medium Scale Cultivator	
Weed Control	Sprayer	2 l/ha Trifluralin (Treflan)
Basic Fertilisation	Fertiliser distributor	250 Kg/ha Fertiliser 20-10-10
Sowing	Grains seeder	3,5 kg/ha Seeds
Mechanical Weed Control	Hoe	
Harvesting	Combine Harvester	

Rapeseed

Operation	Machinery Used	Raw Materials Used
Ploughing	Plough	
Cultivator	Medium Scale Cultivator	
Weed Control	Sprayer	2 l/ha Trifluralin (Treflan)
Basic Fertilisation	Fertiliser distributor	250 Kg/ha Fertiliser 11-15-15
Sowing	Grains seeder	5 kg/ha Seeds
Fertilisation	Fertiliser distributor	250 Kg/ha Ammonium nitrate (33% N)
Mechanical Weed Control	Hoe	
Harvesting	Combine Harvester	

Alfalfa

Establishment Operations	Machinery Used	Raw Materials Used
Ploughing	Plough	
Cultivator	Medium Scale Cultivator	
Harrowing	Disk harrow	
Basic Fertilisation	Fertiliser distributor	500 Kg/ha Fertiliser 11-15-15
Weed Control	Sprayer	Roundup 10l/ha
Harrowing	Disk harrow	
Sowing	Alfalfa seeder	20 kg/ha Seeds
Irrigation	Travelling Gun	Depending on regional climatic conditions
3x Pesticiding	Talstar	0,12 l/ha
4x Harvesting and Baling	Cutter and Round Baler	
Annual Operations	**Machinery Used**	**Raw Materials Used**
Irrigation	Travelling Gun	Depending on regional climatic conditions
3x Pesticiding	Talstar	0,12 l/ha
4x Harvesting and Baling	Self propelled Cutter+Round Baler	

Sugarbeet

Operations	Machinery Used	Raw Materials Used
Subsoil Tilling	Ripper	
Ploughing	Plough	
Cultivator	Medium Scale Cultivator	
Basic Fertilisation	Fertiliser distributor	750 Kg/ha Fertiliser 11-15-15
Harrowing	Disk harrow	
Seeding	Seeder	Seeds 1.35 U/ha
Fertilisation	Fertiliser distributor	250 Kg/ha Fertiliser 20-10-10
Hoeing	Hoe (simple)	
Hoeing	Hoe (simple)	
Weed and Pest Control (x10)	Sprayer	Agrochemicals

Annex 2. Data bases and Sources of Info

Machinery data base

Machinery	Purchase Cost (€) before VAT	Economic Life (yrs)	Maintenance (€/yr)	Insyurance (€/yr)	Average Annual Operation (hrs)	Fuel
Baler (Round)	25.000	20	100		200	
Cultivator (medium scale)	1.500	12			150	
Cutter - Alfalfa (sp)	59.000	20	1.000	200	400	diesel
Cutter (sp)	25.000	20	500	100	400	diesel
Cutter double	1.800	15			200	
Cutter simple	1.500	15			200	
Diesel pump	6.000	30	100		150	diesel
Diskharrow	1.300	12			100	
Fertilizer distributor	800	12			50	
Hoe monosem	5.500	15			150	
Hoe simple	2.500	15			150	
Leverer	1.000	15			70	
Plough	2.000	15			300	
Seeder - Alfalfa	9.000	20			150	
Seeder - Cotton	18.000	20			100	
Seeder - Grains	5.000	15			50	
Seeder - Maize	13.000	15			100	
Sillage Harvester	200.000	20	6.000	500	800	diesel
Sprayer	1.500	15			100	
Sub-How	1.400	15			300	
Ripper	1.300	10			100	
Tractor 100hp	53.000	25	1.500	170	800	diesel
Tractor 105hp	60.000	25	1.500	180	800	diesel
Tractor 110hp	80.000	25	1.800	200	500	diesel
Tractor 130hp	85.000	25	3.000	250	500	diesel
Tractor 50hp	25.000	25	500	150	300	diesel
Tractor 70hp	35.000	25	800	150	400	diesel
Tractor 80hp	40.000	25	800	160	400	diesel
Tractor 85hp	42.000	25	800	170	400	diesel
Tractor 95hp	45.000	25	1.500	170	800	diesel
Tractor pump	1.000	20			200	
Traveling gun	12.000	15			1000	
Cereals Combine Harvester	220.000	20	6000	500	1000	diesel
Lorry 10t	65.000	10	2000	1500	1500	diesel

Source: Greek market (2006 prices)

Raw Materials data base

	Price 2006	Source
2,4D	7 €/l	1
Weed seed	400 €/t	1
Maize seed	7,8 €/kg	1
Ammonium nitrate (33% N)	548 €/t	2
Urea	564 €/t	2
Rapeseed	9 €/Kg	1
Fertilizer 11-15-15	340 €/t	1
Fertilizer 20-10-10	323 €/t	2
Sulphuric Ammonia	240 €/t	1
Trifluralin	5 €/l	1
Sunflower Seed	12 €/Kg	1
Fertilizer 22-11-0	266 €/t	1
Trifluralin	5 €/l	1

Sources: 1. Greek market (2006 prices), 2. Eurostat

Land Rent

EU Countries	Irrigated (€/ha)	Non-Irrigated (€/ha)	Year	Source
France	129,70	129,70	2006	Eurostat
Germany		197,00	2005	Eurostat
Greece	500,00	200,00	2006	V. Lychnaras - AUA data
Italy	450,00	300,00	2009	A. Monti, UNIBO data
Poland	61,70	61,70	2009	Ewa Ganko - EC BREC data
Portugal	143-454 average 299	17-156; average 95	2008	Ana Luisa Fernando - UniNOVA data
Romania	100,00	100,00		Estimation
Spain	482,00	106,00	2009	INIA data
Sweden		109,90	2006	Eurostat
The Netherlands		639,00	2009	Wolter Elbersen - A&F data
UK		175,80	2006	Eurostat

Labour cost (skilled)

EU Countries	€/hr	Year	Source
France	13,70	2006	Previous Research
Germany	10,94	2006	Eurostat
Greece	7,10	2006	V. Lychnaras - AUA data
Italy	15,00	2009	A. Monti, UNIBO data
Poland	5,10	2009	Ewa Ganko - EC BREC data
Portugal	4,25	2008	Ana Luisa Fernando - UniNOVA data
Romania	3,00		Estimation
Spain	12,00	2009	INIA data
Sweden	13,00		Estimation
The Netherlands	12,00	2009	Wolter Elbersen - A&F data
UK	12,04	2006	Eurostat

Diesel price (2009)

EU Countries	€/l
France	1,03
Germany	1,04
Greece	1,09
Italy	1,29
Poland	0,94
Portugal	1,11
Romania	0,94
Spain	1,00
Sweden	1,20
The Netherlands	1,12
UK	1,29

Source: http://gasoline-germany.com/

Cost of water

EU Countries	€/m3	€/ha	Source - Notes
France	0,11	-	Rieu, T., 2005. "Water pricing for agriculture between cost recovery and water conservation: Where do we stand in France?", OECD Workshop on Agriculture and Water: Sustainability, Market and Policies, 14-18 November 2006, South Australia.
Germany	-	-	*Arable crops are non-irrigated*
Greece	-	100,00	V. Lychnaras - AUA data (Central Greece)
Italy	0,15	-	A. Monti, UNIBO data
Poland	-	-	*Non-irrigated*
Portugal	0.0030-0.0404	31.5-115	Ana Luisa Fernando - UniNOVA data
Romania			
Spain	0,06		INIA data
Sweden	-	-	*Non-irrigated*
The Netherlands	-	-	*Non-irrigated*
UK	-	-	*Non-irrigated*

Annex 3. Yield (t/ha)

D. Wheat

Country	Yield (t/ha)	Source
France	6,8	FAO (average 2003-2007)
Germany	7,3	FAO (average 2003-2007)
Greece	2,3	FAO (average 2003-2007)
Italy	4,7	A. Monti, UNIBO data
Poland	3,8	Ewa Ganko - EC BREC data
Portugal	2,2	Ana Luisa Fernando - UniNOVA data
Romania	2,6	FAO (average 2003-2007)
Spain	2,4	INIA data
Sweden	5,9	FAO (average 2003-2007)
The Netherlands	8,3	Wolter Elbersen - A&F data
UK	7,8	FAO (average 2003-2007)

Barley

Country	Yield (t/ha)	Source
France	6,1	FAO (average 2003-2007)
Germany	5,8	FAO (average 2003-2007)
Greece	2,4	FAO (average 2003-2007)
Italy	4,0	A. Monti, UNIBO data
Poland	3,1	Ewa Ganko - EC BREC data
Portugal	1,0	Ana Luisa Fernando - UniNOVA data
Romania	2,3	FAO (average 2003-2007)
Spain	2,2	INIA data
Sweden	4,2	FAO (average 2003-2007)
The Netherlands	6,1	Wolter Elbersen - A&F data
UK	5,9	FAO (average 2003-2007)

Maize

Country	Yield (t/ha)	Source
France	8,4	FAO (average 2003-2007)
Germany	8,6	FAO (average 2003-2007)
Greece	10,0	FAO (average 2003-2007)
Italy	7,0	A. Monti, UNIBO data
Poland	5,7	Ewa Ganko - EC BREC data
Portugal	7,0	Ana Luisa Fernando - UniNOVA data
Romania	3,5	FAO (average 2003-2007)
Spain	9,7	FAO (average 2003-2007)
Sweden	-	
The Netherlands	11,3	Wolter Elbersen - A&F data
UK	-	

Rapeseed

Country	Yield (t/ha)	Source
France	3,2	FAO (average 2003-2007)
Germany	3,6	FAO (average 2003-2007)
Greece	1,7	FAO (average 2003-2007)
Italy	1,8	A. Monti, UNIBO data
Poland	2,6	Ewa Ganko - EC BREC data
Portugal	-	
Romania	1,3	FAO (average 2003-2007)
Spain	1,7	FAO (average 2003-2007)
Sweden	2,5	FAO (average 2003-2007)
The Netherlands	3,7	FAO (average 2003-2007)
UK	3,1	FAO (average 2003-2007)

Sunflower

Country	Yield (t/ha)	Source
France	2,3	FAO (average 2003-2007)
Germany	2,2	FAO (average 2003-2007)
Greece	1,5	FAO (average 2003-2007)
Italy	2,0	FAO (average 2003-2007)
Poland	1,5	FAO (average 2003-2007)
Portugal	0,6	FAO (average 2003-2007)
Romania	1,3	FAO (average 2003-2007)
Spain	0,9	INIA
Sweden	-	
The Netherlands	-	
UK	-	

Sugar beet

Country	Yield (t/ha)	Source
France	79,3	FAO (average 2003-2007)
Germany	59,5	FAO (average 2003-2007)
Greece	59,9	FAO (average 2003-2007)
Italy	47,2	FAO (average 2003-2007)
Poland	44,1	Ewa Ganko - EC BREC data
Portugal	71,8	FAO (average 2003-2007)
Romania	26,8	FAO (average 2003-2007)
Spain	68,8	FAO (average 2003-2007)
Sweden	48,9	FAO (average 2003-2007)
The Netherlands	63,8	Wolter Elbersen - A&F data
UK	56,6	FAO (average 2003-2007)

Alfalfa

Country	Yield (t/ha)	Source
France	-	
Germany	-	
Greece	14,5	V. Lychnaras - AUA data
Italy	14,0	A. Monti, UNIBO data
Poland	-	
Portugal	-	
Romania	14,0	Estimation
Spain	-	
Sweden	-	
The Netherlands	-	
UK	-	

Annex 4. Cost Analysis per hectare

D. Wheat (not irrigated)

Table 1: D. Wheat cost of production (€/ha)s

EUR / ha	France	Germany	Greece	Italy	Poland	Portugal	Romania	Spain	Sweden	UK	Netherlands
Yield (t/ha)	**6,8**	**7,3**	**2,29**	**4,7**	**3,8**	**2,2**	**2,6**	**2,35**	**5,9**	**7,8**	**8,7**
SELLING PRICE (eur/t)	**103**	**109**	**140**	**160**	**106**	**132**	**126**	**140**	**104**	**117**	**97**
Energy	110	111	107	137	81	118	100	107	128	137	119
Labour	120	96	62	131	38	39	26	105	114	105	105
Land	130	197	200	300	62	95	100	106	110	175	639
Machinery	135	135	135	135	95	135	135	135	135	135	135
Overheads	30	30	30	30	30	30	30	30	30	30	30
Raw Materials	108	108	108	108	108	108	108	108	108	108	108
Rented Services					86						
Grand Total	**632**	**676**	**642**	**842**	**500**	**525**	**499**	**590**	**624**	**691**	**1136**
Land % on TOT	**21%**	**29%**	**31%**	**36%**	**12%**	**18%**	**20%**	**18%**	**18%**	**25%**	**56%**
Profits (€/ha)	68	119	-321	-90	-97	-235	-172	-261	-11	222	-292
Profits (€/ha) – Land	198	316	-121	210	-35	-140	-72	-155	110	397	347

Notes

- D. Wheat production in Greece, Portugal Romania and Spain is at reasonable cost levels. Nevertheless, the low average yield is the main reason for negative profits.
- For Italy and the Netherlands, the main cost item is the high land rent which increases the final cost of production.
- Positive profits only for UK, Germany and France.
- Positive profits for Italy, Sweden and The Netherlands when land rent is excluded.
- The yield is very high in The Netherlands, UK, Germany and France.
- The highest labour cost in Italy.
- High energy cost for Italy, UK and Sweden.
- The highest land rent for The Netherlands.

- Poland, Portugal and Romania have the lowest labour cost and land rent that leads to the lowest cost of productions.
- Harvesting is usually subcontracted in Poland. The cost is higher.

Barley (not irrigated)

Table 2: Barley cost of production (€/ha)

EUR / ha	France	Germany	Greece	Italy	Poland	Portugal	Romania	Spain	Sweden	UK	Netherlands
Yield (t/ha)	**6,1**	**5,82**	**2,39**	**4**	**3,1**	**1**	**2,3**	**2,15**	**4,15**	**5,85**	**6,7**
SELLING PRICE (eur/t)	**99**	**97**	**145**	**130**	**106**	**135**	**130**	**125**	**93**	**101**	**90**
Energy	110	111	107	137	81	118	100	107	128	137	119
Labour	120	96	62	131	38	39	26	105	114	105	105
Land	130	197	200	300	62	95	100	106	110	175	639
Machinery	135	135	135	135	95	135	135	135	135	135	135
Overheads	30	30	30	30	30	30	30	30	30	30	30
Raw Materials	106	106	106	106	106	106	106	106	106	106	106
Rented Services					86						
Grand Total	**630**	**674**	**640**	**840**	**498**	**523**	**497**	**588**	**622**	**689**	**1134**
Land % on TOT	**21%**	**29%**	**31%**	**36%**	**12%**	**18%**	**20%**	**18%**	**18%**	**25%**	**56%**
Profits (€/ha)	-27	-110	-293	-320	-169	-388	-198	-320	-237	-98	-531
Profits (€/ha) – Land	103	87	-93	-20	-107	-293	-98	-214	-127	77	108

Notes

- Barley production in Greece, Portugal Romania and Spain is at reasonable cost levels per ha. Nevertheless, low yields are the cause negative profits.
- For Italy and Netherlands, the main problem is the high cost for land the increases the final cost of production.
- Sweden has negative profits because many of the cost parameters are in higher levels compared to the other countries.
- Positive profits for France, Germany, UK and The Netherlands when the land rent is excluded.
- High productivity in France, Germany, UK and The Netherlands.
- The highest labour cost in Italy.
- High energy cost for Italy, UK and Sweden.
- The highest land rent for The Netherlands.
- Poland, Portugal and Romania have the lowest labour cost and land rent that leads to the lowest cost of productions.
- Harvesting is usually subcontracted in Poland. The cost is higher.

Maize

Table 3: Maize cost of production (€/ha)

EUR / ha	France	Germany	Greece	Italy	Poland	Portugal	Romania	Netherlands
Yield (t/ha)	**8,35**	**8,56**	**10,03**	**7**	**5,7**	**7**	**3,5**	**8,1**
SELLING PRICE (eur/t)	**112**	**118**	**144**	**135**	**100**	**145**	**135**	**86**
Energy	123	115	127	154	86	149	104	124
Labour	178	104	124	203	43	117	29	114
Land	130	197	500	450	62	300	100	639
Machinery	206	151	262	206	118	318	151	151
Overheads	30	30	130	30	30	103	30	30
Raw Materials	764	544	544	844	544	940	544	544
Rented Services					92			
Grand Total	**1431**	**1141**	**1687**	**1886**	**975**	**1926**	**957**	**1602**
Land % on TOT	**9%**	**17%**	**30%**	**24%**	**6%**	**16%**	**10%**	**40%**
Profits (€/ha)	-496	-131	-243	-941	-405	-911	-485	-905
Profits (€/ha) - Land	-366	66	258	-491	-343	-611	-385	-266

Notes

- Maize was considered irrigated in France, Greece, Italy and Portugal and not irrigated for the rest.
- France, Italy and Portugal have increased cost of raw materials because water cost is included.
- For Greece, Italy and Portugal increased irrigated land rent is also considered.
- In Greece, the land rent for irrigated land is 2.5 times higher than the one for not irrigated.
- In Portugal, the irrigated land rent is 3 times higher than the non-irrigated land rent.
- In Greece the water cost is not included in raw materials. It is paid as an annual fee per hectare.
- For Portugal there is a €/m^3 charge of water and an additional irrigation fee per hectare.
- For Poland and Romania the low yields are the main reason for economic losses
- The land rent in the Netherlands is the highest.
- Positive profits only for Greece and Germany when the land rent is excluded.
- High yield in Greece, Germany, France and The Netherlands
- The highest labour and energy cost for Italy
- Harvesting is usually subcontracted in Poland. The cost is higher.

Rapeseed (not irrigated)

Table 4: Rapeseed cost of production (€/ha)

EUR / ha	France	Germany	Poland	Romania	Sweden	UK
Yield (t/ha)	**3,2**	**3,58**	**2,6**	**1,3**	**2,5**	**3,15**
SELLING PRICE (eur/t)	**218**	**224**	**215**	**185**	**211**	**224**
Energy	112	113	84	102	131	141
Labour	127	101	41	28	120	111
Land	130	197	62	100	110	175
Machinery	143	143	102	143	143	143
Overheads	30	30	30	30	30	30
Raw Materials	277	277	277	277	277	277
Rented Services			103			
Grand Total	**819**	**861**	**698**	**680**	**811**	**877**
Land % on TOT	**16%**	**23%**	**9%**	**15%**	**14%**	**20%**
Profits (€/ha)	-121	-59	-139	-439	-283	-171
Profits (€/ha) - Land	9	138	-77	-339	-173	4

Notes

- Rapeseed production in Poland and Romania is at reasonable cost levels. Nevertheless, the low average yield is the main cause of negative profits, (see eg. Romania).
- For Sweden also the main problem is the low yield.
- Positive profits for France, Germany and UK, when the cost of land is not considered.
- High average yield in France, Germany and UK.
- Harvesting is usually subcontracted in Poland. The cost is higher.

Sunflower (not irrigated)

Table 5: Sunflower cost of production (€/ha)

EUR / ha	France	Romania	Spain
Yield (t/ha)	**2,3**	**1,35**	**0,85**
SELLING PRICE (eur/t)	**226**	**195**	**235**
Labour	120	26	105
Land	130	100	106
Machinery	135	135	135
Overheads	30	30	30
Raw Materials	151	151	151
Grand Total	**675**	**542**	**633**
Land % on TOT	**19%**	**18%**	**17%**
Profits (€/ha)	-155	-278	-433
Profits (€/ha) - Land	-25	-178	-327

Notes

- All countries have reasonable cost levels.
- In Romania and Spain the yield is very low.
- In Spain there is the lowest yield, because of the dry conditions.
- High average yield and selling price in France.
-

Sugar beets (not irrigated)

Table 6: Sugar beets cost of production (€/ha)

EUR / ha	Germany	Poland	Sweden	Netherlands
Yield (t/ha)	**51,5**	**44,1**	**48,9**	**63,8**
SELLING PRICE (eur/t)	**41**	**35**	**43**	**47**
Energy	185	175	201	193
Labour	79	81	215	202
Land	197	78	110	639
Machinery	274	274	274	274
Overheads	30	30	30	30
Raw Materials	516	525	525	525
Rented Services	300	292	300	322
Grand Total	**1581**	**1456**	**1656**	**2186**
Land % on TOT	**12%**	**5%**	**7%**	**29%**
Profits (€/ha)	530	88	447	813
Profits (€/ha) - Land	727	166	557	1452

Notes

- For all countries the high yield and selling price are the cause of positive profits.
- For The Netherlands the results show the highest cost because of the high land rent and the highest profits because of the high average yield and selling price.
- Harvesting was considered as rented operation for all countries.

Alfalfa (irrigated) – 3 yrs economic life

Table 7: Alfalfa annual equivalent cost of production (€/ha)

EUR / ha	**Italy**	**Romania**
Yield (t/ha)	**14**	**14**
SELLING PRICE (eur/t)	**120**	**120**
Energy	93	76
Labour	181	93
Land	450	100
Machinery	196	232
Overheads	25	25
Raw Materials	355	557
Grand Total	**1300**	**1083**
Land % on TOT	**35%**	**9%**
Profits (€/ha)	380	597
Profits (€/ha) - Land	830	697

Notes

- Alfalfa has an average life of 3 years with low inputs for the 2nd and 3rd year. This decreases its annual equivalent cost.
- Both the yield and the price are high enough to cover the cost.
- For Italy the irrigated land rent is very high and equals 35% of total cost.
- For Romania the raw materials is the highest cost item (baling net included).

Annex 5. Definitions

Agricultural area

Agricultural area is the sum of areas under (a) arable land - land under temporary agricultural crops (multiple-cropped areas are counted only once), temporary meadows for mowing or pasture, land under market and kitchen gardens and land temporarily fallow (less than five years). The abandoned land resulting from shifting cultivation is not included in this category. Data for *arable land* are not meant to indicate the amount of land that is potentially cultivable; (b) permanent crops - land cultivated with long-term crops which do not have to be replanted for several years (such as cocoa and coffee); land under trees and shrubs producing flowers, such as roses and jasmine; and nurseries (except those for forest trees, which should be classified under "forest"); and (c) permanent meadows and pastures - land used permanently (five years or more) to grow herbaceous forage crops, either cultivated or growing wild (wild prairie or grazing land).

Arable land

Arable land is the land under temporary agricultural crops (multiple-cropped areas are counted only once), temporary meadows for mowing or pasture, land under market and kitchen gardens and land temporarily fallow (less than five years). The abandoned land resulting from shifting cultivation is not included in this category. Data for “Arable land” are not meant to indicate the amount of land that is potentially cultivable. Data are expressed in 1000 hectares.

Fallow land

Fallow land (temporary) is the cultivated land that is not seeded for one or more growing seasons. The maximum idle period is usually less than five years.
Land remaining fallow for two long may acquire characteristics requiring to be reclassified, such as "permanent meadows and pastures" (if used for grazing), "forest or wooded land" (if overgrown with trees), or "other land" (if it becomes wasteland). Data are expressed in 1000 hectares.

Source: *FAO Statistics Division*

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