DOSSIER TÈCNIC
FORMACIÓ I ASSESSORAMENT AL SECTOR AGROALIMENTARI

N69 COSTS IN AGRICULTURE

April 2014

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PRESENTATION

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Secretary-General of the Ministry of Agriculture, Livestock, Fisheries, Food and Natural Environment

The vast majority of agricultural publications focus on agronomic or more technical issues and leave aside essential aspects for businesses such as business management (costs, accounting, etc.).

In recent years, efforts have been made to improve the level of knowledge among our agricultural entrepreneurs and the employers of the future in terms of business management. For this reason, in addition to the training given at other institutions such as universities, business administration schools, and so on, the DAAM is providing professionals in the sector with a significant range of training, which takes place through initial face-to-face training at Agricultural Training schools and through the Agricultural Distance Learning continuous training programme using ICT, i.e. through the RuralCat portal.

As a result of these efforts, it is apparent that the economic issues linked to the production, marketing and taxation are beginning to take their place within the management of agricultural enterprises.

This major change means that farmers are becoming increasingly aware of the role they play as an agricultural business, with all that this implies. Not only knowing how and what species or varieties should be sown or planted, but also assessing the costs (fixed, variable, external, internal, etc.) that their selection entails. Finally, it is clear that the viability and profitability of an agricultural enterprise is the result of the cohesion of economic and agronomic knowledge.

The information that the producer may have is another factor to consider. This high-quality information is based on the collection of the prices and costs of various production factors in different parts of Catalonia provided for rural entrepreneurs by the Ministry, and obtained by the Accounting Network of Catalonia – a tool for the monitoring and assessment of the income of our farms.

However, there is still a long way to go, and it is for this reason that the Ministry of Agriculture, Livestock, Fisheries, Food and Natural Environment is committed to continuing to promote everything that may improve the financial management of agricultural enterprises. This business and economic viability management must take place in the context of the new European guidelines aimed at environmental sustainability in farming.

This *Dossier Tècnic,* which is now in its 69th issue, aims to provide data on the costs of extensive crops and viticulture, which occupy more than 50% of the area of agricultural crops in Catalonia. It should be remembered, however, that as in many of these studies, the reader may have different approaches or figures from those presented herein, which are under no circumstances intended to be dogmatic but rather a benchmark for reflection and reference.

I hope that this *Dossier Tècnic* will be useful and will give you a more accurate perspective on an area that is very important for the viability of agricultural enterprises.

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Cover photo:
Field of barley. Author: Jaume Lloveras Vilamanyà

THE FARMING ACCOUNTANCY NETWORK IN CATALONIA, AN INSTRUMENT FOR MONITORING AND ASSESSING THE SECTOR

Figure 1. *Wheat. Author: Rosario Márquez.*

01 What is the XCAC?

The Farming Accountancy Network in Catalonia (XCAC) is a tool for identifying and assessing the income earned by Catalonia's farms and the impact that different agricultural policies have on them. It is a wide-ranging statistical operation, and is part of a Spanish framework (the Agricultural Accountancy Data Network - RECAN) and a European framework (Farm Accountancy Data Network – FADN) , as well as being a source of standardised microeconomic data, as the accounting principles applied to calculate the results are the same throughout the European Union.

This operation takes place as part of the cooperation agreement on statistics signed by the Spanish Ministry of Agriculture, Food and the Environment and the Catalan Ministry of Agriculture, Livestock, Fisheries, Food and Natural Environment.

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The XCAC is a source of standardised microeconomic data. The accounting principles applied for the calculation are the same throughout the European Union.

[1] The RICA was organised by Regulation No 79/65/EEC of the Council of 15 June 1965 setting up a network for the collection of accountancy data on the incomes and business operation of agricultural holdings in the European Economic Community. Obviously, this provision has undergone changes as a result of the passage of time, the incorporation of new technical requirements and the accession of new Member States to the EU.

02 **A little history**

The XCAC was created by the Order of 1 December 1981. It was an attempt to systematise various initiatives for introducing accounting on farms that had been undertaken in previous years. It aimed simply to organise the collection of information, and to subject it to a statistical analysis in order to establish indicators that would show the economic health of the sector.

This model operated until 1985, when as a result of the Order of 30 January, the XCAC was integrated with the segment of RECAN operating in Catalonia, thereby forming a single project. Meanwhile, the same provision reviewed certain methodological aspects, with a view to Spain's accession to the European Community, which took place in 1986, in anticipation that it would be necessary to adapt the system in order to meet Eurostat requirements. This is clearly set out in the second article, which lists the structural characteristics that farms must have to be members of the XCAC. Paragraph a) reads:

- The farm must be subject to single management.

- Its production must be oriented towards the sale of agricultural products.

- It must be the basis of the work done by the Head of the farm and account for at least 0.75 to 1 AWU (annual work units)[2] , or 1,800-2,400 hours/year, depending on the various types and economic sizes.

The current benchmark provision, which was the basis for the implementation of adaptations to production conditions in Catalonia, is Regulation (EC) 1217/2009 of the Council of 30 November 2009, setting up a network for the collection of accountancy data on the incomes and business operation of agricultural holdings in the European Community[3].

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The XCAC and the section of the RECAN that operated in Catalonia were integrated in 1985.

03 **The sample of farms: criteria for selection**

As mentioned above, as a statistical operation, the XCAC collects information about agricultural farms in Catalonia, which is provided by the owners on a strictly voluntary basis. They receive a small financial sum in return for providing the information.

Data is collected for a representative sample of 665 farms[4], taking into account the various types and economic sizes and the financial dimensions of each production unit, as defined in Regulation (EC) 1242/2008, as amended by Regulation (EC) 867/2009. The regulation provides for a sample size of 8,700 farms in Spain, of which 664, one less than those in the current selection, are located in Catalonia. Each farm is assigned a farm return. This sample has been designed taking into account the various types and economic sizes; in other words, the type of activity or activities engaged in by the farm unit concerned and its inclusion in the Agricultural Census[5]. A certain number of units need to be selected depending on the weight of each one. The aim is therefore to ensure that the range of the results obtained from the figures supplied by the different production units gives as accurate a picture of real conditions in the sector as possible. As this operation takes place every year, the sequence of data provides an evolving image that highlights changes that have been confirmed over time.

However, despite following the RICA criteria, the XCAC contains a representative sample of farms in Catalonia, which means that this is not an exhaustive statistical operation; it does not cover all the farms in the country, only those large enough to be considered professional. According to EU regulations, what is known as the 'economic size threshold' is established for Spain as a whole at 4,000 euros. This means that in order to be part of the sample that includes the XCAC, farms must obtain an income amounting to that figure or above.

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Data was collected from a sample of 665 farms, selected based on the various types and economic sizes and the financial dimensions.

04 **Information compiled**

Regulation (EC) 868/2008 of the Commission of 3 September 2008, which establishes the types of accounting information to be included in farm returns. This is an extremely comprehensive provision, which lists the precise contents of this farm return and how to process the data in order to be able to integrate them within common guidelines for processing across the EU.

The information contained in each farm return includes:

- Physical and structural data: location of the farm, cultivated area, number of animals, labour force, etc.

- Economic and financial data: production value of the various crops, stocks, sales and

[2] See the concepts described in the annex to this article.
[3] Apart from this benchmark regulation, the provisions of the following regulations must also be taken into account:
-Commission Regulation (EU) No 1291/2009 of 18 December 2009 concerning the selection of returning holdings for the purpose of determining incomes of agricultural holdings. This is the regulation on preparation of the Selection Plan for the sample selection of agricultural holdings and annual updates.
-Regulation (EC) 868/2008 of the Commission of 3 September 2008, which establishes the types of accounting information to be included in farm returns.
-Commission Regulation (EC) No 1242/2008 of 8 December 2008 establishing a Community typology for agricultural holdings.
[4] For the European Union, the sample currently includes about 80,000 farms, representing the 5,000,000 in the twenty-eight Member States, and representing 90% of the Used Agricultural Area (UAA) and 90% of final agricultural output in the EU-28.
[5] A statistical operation performed every ten years, to count existing holdings and to list their characteristics. The most recent took place in 2009.

purchases, production costs, capital, debt, production quotas and subsidies, and especially those related to the implementation of CAP measures.

The regulation includes an extensive range of headings covering specific data. Examples include the location of the farm, the type and economic size of farm, the UAA, the manpower and the breakdown of livestock by species. In synthetic terms, the information is grouped in the following sections:

A. GENERAL INFORMATION ABOUT THE FARM

B. UAA TENANCY FORMULA

C. LABOUR FORCE

D. NUMBERS AND VALUE OF ANIMALS

E. SALES AND PURCHASES OF ANIMALS

F. COSTS

G. REAL ESTATE, MACHINERY AND EQUIPMENT AND WORKING CAPITAL

H. DEBTS

I. VALUE ADDED TAX (VAT)

J. GRANTS AND SUBSIDIES

K. PRODUCTION (excluding animals)

L. FEES AND OTHER DUTIES

M. DIRECT PAYMENTS

N. BREAKDOWN OF PURCHASES AND SALES OF ANIMALS

05 Methodological innovations

Beginning in the 2010 financial year, and as a consequence of the new guidelines introduced by Eurostat, a number of changes were made to the methodology used in preparing the XCAC. As a result, the new category of agricultural farms, defined in accordance with Regulation (EC) 1242/2008, was applied for the first time. The main innovation involves a change in the definitions of the Type and Economic Sizes (TES), which are similar to the previous categories—based on their various activities—but there are some variations in the names and codes, and nuances in the logical-arithmetical ratios that define them.

Figure 2. *Herd of Bruna cows. Author: Francesc Reguant.*

In the same vein, there was a change in the concept of the Economic size of the holding (ESH) which is an EU unit of measurement to determine the size of a farm. Until that point, one ESH had been a total gross margin of 1,200 euros (see SGM definition). The new category introduced the concept of Standard Output (SO) and the economic size of a farm was determined as a function of its total standard output and expressed in euros. In the case of Catalonia, the minimum SO for a farm to be included in the XCAC sample was set at 4,000 euros.

Due to these changes, which directly affect the criteria for grouping and weighting of individual data (farms), the results for farms obtained since 2010 are not comparable with those for the previous years.

06 Some specific concepts

Standard Gross Margin (SGM): The gross margin of a farm is the difference between the monetary value of total gross output and the value of certain direct costs inherent in that output. The standard gross margin is an indirect measurement of the gross margin, which

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The information contained in each farm return includes physical and structural data and other economic and financial information.

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The methodology for the calculation of sizes and indicators has undergone various modifications since 2010.

Figure 3. *Poultry farm. Author:Josep Maria Masses Tarragó.*

is obtained by calculating a normalised coefficient in the autonomous community, expressed in monetary units/hectare or head of livestock. A base period of three consecutive years is always used to calculate the average value.

Type and Economic Size (TES): This classifies a farm according to the predominant type in the firm's production system, based on its various activities. It groups agricultural farms in relatively homogeneous separate categories, based on the relative proportion of the SO that each crop and livestock species provides in terms of the farm's TSO.

The different categories comprising the typology of farms according to their TES are divided into different levels of disaggregation.

Used Agricultural Area (UAA): This is the area of cultivated land and land for permanent pastures. Cultivated land includes herbaceous crops, fallow crops, family orchards and land devoted to woody crops.

Livestock Unit (UR): This is the unit used to measure the stocking density on a farm. It is obtained by applying a coefficient to each species and type in order to be able to use the same equivalent unit to present different species: dairy cows, sheep and goats, pigs and poultry.

Annual Work Unit (AWU): The data for work on the farm is expressed in annual work units. One AWU is equivalent to the work done by one person working full-time for a year. In quantitative terms, it is 1,920 hours a year, or 228 full days or more.

07 Further reading:

MAGRAMA
http://www.magrama.gob.es/es/estadistica/temas/estadisticas-agrarias/Red_contable_agraria_(RECAN)_(Metodolog%C3%ADa)_tcm7-201118.pdf

IDESCAT
http://www.idescat.cat/Classif/?TC=4&V0=1&V1=108

DAAM
http://www20.gencat.cat/portal/site/DAR/menuitem.5fbcc9934b5f463053b88e10b031e1a0/?vgnextoid=afbedd89072c9110VgnVCM1000008d0c1e0aRCRD&vgnextchannel=afbedd89072c9110VgnVCM1000008d0c1e0aRCRD&vgnextfmt=default

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ASSESSMENT OF PRODUCTION COSTS OF LARGE DRYLAND FARMS

Figure 1. *Barley and wheat in Foradada. Author: Jaume Lloveras.*

01 Introduction

This study is the result of an agreement between the company ASG (Aigües del Segarra Garrigues) and the University of Lleida (UDL) for the assessment of production costs of Extensive Crops, which may be of interest in the area of influence of the Segarra-Garrigues system.

As a result, neither fruit nor vegetable crops are considered in this study, as these would require a separate analysis.

02 Objectives and working methodology

This study aims to obtain a real and updated understanding of the direct costs of production of a number of dry and irrigated crops, which are sown or can be sown in the production systems around irrigated areas in the province of Lleida.

To that end, we have used an extensive database of producers, and finally interviewed a significant number of farmers and services companies. We interviewed producers with land in various locations, but resident in: Algerri, Agramunt, Almacelles, Calaf, Bellcaire d'Urgell, Binèfar, Gimenells, Pradell, Sariñena and Tàrrega. We carried out at least four surveys for each of the most important crops and two for the minor crops, for which it is very difficult to find professionals who calculate their production costs correctly.

Finally, with regard to direct costs, we considered the various production tasks required for different crops, which were basically standardised as follows: planting, seed, fertiliser (basal dressing and cover dressing), herbicide, fungicide and insecticide, harvesting of grain, forage and stubble (if applicable), waste removal, insurance, transportation and water. This study only considers field operations for barley, as an example for all crops, since it is impossible to present all the crops in detail for reasons of space.

The cost of water is highly dependent on which irrigation canal is used (Urgell, Algerri-Balaguer, Aragó i Catalunya, Segarra-Garrigues, etc.) so in order to standardise the calculation of costs in the irrigation area, we considered the cost of water in the Segarra-Garrigues system. It is important to remember that first, the prices of production included here are the rental of the specific machinery for each operation, and second,

Table 1. Average water consumption (m^3)

Crop	*Type*	*Water consumption*	*Water consumption of crop 1 (%)*
Single crop foxtail millet	*Grain*	(7,000 - 8,000)	100
Double crop foxtail millet	*Grain*	5,500	69 - 76[1]
Barley	*Grain*	1,750	24
Peas for grain	*Grain*	2,500	31
Peas for freezing	*Grain*	2,250	25
Italian ryegrass	*Forage*	2,300	29

[1] Depending on the consumption of the supplementary crop from the second harvest.
Source: in-house data based on surveys.

Table 2. Production cost of dry barley

Activities	*Average cost*	*Variation*	On total (%)
Direct sowing	67	(55 - 80)	14
Seed	63	(60 - 72)	13
Fertiliser	162	(97 - 199)	34
Herbicide	40	(38 - 70)	9
Harvest	61	(50 - 68)	13
Packing (straw)	35	(30 - 55)	7
Insurance	13	(9 - 26)	3
Transport (grain)	11	(9 - 11)	2
Transport (straw)	18	18	4
Total	***€471***	(422 - 527)	
Anticipated production (kg/ha)	2,220	(1,500 - 4,000)	
Anticipated straw production (kg/ha)	1,800	(1,400 - 3,500)	
Cost per t	***€212***		

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As can be seen in table 2.1, the average production cost of dry barley is 471 €/ha, with a variation from 422 to 527 €/ha, and an average cost of 212 €/t.

when the cost of water is considered in the cases of double crops, it has been applied to each crop proportionally.

Given the limited (and sometimes vague) official public information on crop production costs in Catalonia and Spain, we believe this study is an interesting document for the territory covered, as it closely portrays the current situation.

03 **Results**

The results for direct production costs, obtained by surveys, are presented individually in the relevant tables (tables 2 to 12). The result for the average cost of each crop is the sum of the average of each individual activity in production, although the range of variation is also presented next to each one and the anticipated production is the average production in each survey conducted. Meanwhile, in order to standardise the calculations, the prices of the production tasks which have been considered relate to the rental of the specific machinery (with a driver) for each operation in the current market. It should be borne in mind that production costs can vary if the farmers use their own equipment, and therefore the calculation of depreciation and remuneration for work done may be different from the cost included in the study.

The various soil and climatic conditions in each location and the skills and preferences of each producer mean that not all of them combine agricultural inputs in the same proportion and quantities. As a result, some spend more on one input while others save, and instead spend more elsewhere. For this reason, as mentioned in the previous paragraph, the variation in the total real costs of farms has been added at the end of the table for each crop.

The cost of water for the Segarra-Garrigues system[1] has been calculated, and at the same time, for the calculation of fixed costs, as we consider that consumption has taken into account whether it is a single crop with a double harvest, as can be seen in Table 1 below:

The crops which have been considered double crops are: barley, peas, flowering oats and Italian ryegrass, as they are the most popular.

03.01 **Grain crops**

03.01.01 **Dry barley**

Six producers of dry barley residing in Alfés, Algerri, Agramunt and Calaf were interviewed. The average production achieved varies between 2,800 and 3,600 kg/ha depending on the location and year. Meanwhile, in some places near the town of Alfés average production is around 1,500 kg/ha. It should be noted that in exceptional years such as 2012-2013, average production reached 7,000-8,000 kg in some places. The field operations are very similar among all the producers interviewed, and basically consist of:

a. Direct sowing and application of Glifosat herbicide.

[1]The cost of water in the Segarra-Garrigues Canal includes a fixed proportion of 181 €/ha and a variable proportion of 0.08 €/m^3 at the time of writing of this study.

Table 3. Average production cost of irrigated barley (€/ha)

Activities	*Single crop cost*	On total (%)	*Double crop cost*	On total (%)	*Variation*
Direct sowing[1]	169	17	169	*20*	(100 - 205)
Seed	85	9	85	*10*	(54 - 103)
Fertiliser	182	19	182	*22*	(86 - 240)
Herbicide	42	4	42	*5*	(18 - 60)
Harvest	65	7	65	*8*	(51 - 85)
Packing (straw)	30	3	30	*4*	30
Insurance	26	3	26	*3*	(24 - 26)
Transport (grain)	21	2	21	*3*	(18 - 27)
Transport (straw)	27	3	27	*3*	27
Subtotal *(without water)*	***€647***		***€647***	-	(464 - 740)
Water[2]	321	33	184	*22*	
Total	***€968***		***€831***	***€(648 - 924)***	
Anticipated production (kg/ha)	6,000		6,000		
Anticipated straw production (kg/ha)	5,000		5,000		
Cost per t	***€161***		***€139***		

[1]Among other items, this includes the cost of cutting and burying stubble from the previous crop, which is usually foxtail millet.
[2]The lower cost of water for double crops is because the fixed part of the price must be divided proportionally between the two crops (see Table 1, page 5).

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As can be seen in table 3, the average production cost of double-crop irrigated barley is 831 €/ha, with a variation from 648 to 924 €/ha, and an average cost of 139 € /t. Average water consumption of 1,500 and 2,000 m³/ha depending on the year.

b. Seed: adapted (the majority) or R2 (a minority which buys part of its needs each year).

c. Fertilisation:

- Basal dressing fertiliser: this is a task that can vary widely between farmers and ranges from the application of mineral basil dressing fertilisers, type (2-4-12), to the use of organic fertilisers (slurry/poultry litter).

- Cover fertiliser: all the respondents apply type N26 or N32 fertilisers, although the amount depends on the year (weather). Some apply it with a herbicide treatments machine.

d. All the farmers apply a broadleaf herbicide, while a minority use a narrow leaf herbicide, which is usually much more expensive, and this is only applied in fields or parts of fields suffering the most from weed invasions, which may account for around 10% of their area.

e. Harvest.

f. Collecting and packing stubble.

g. Insurance (two types, comprehensive and hail and fire).

Figure 2. *Barley. Author: Jaume Lloveras.*

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As can be seen in table 4, the average production cost of dry wheat is 488 €/ha, with a variation from 460 to 514 €/ha, and an average cost of 168 €/t.

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As can be seen in table 5, the average production cost of irrigated wheat is 1,029 €/ha, with a variation from 826 to 1,297 €/ha, and an average cost of 155 €/t.
Average water consumption of 2,300 m³/ha with a variation between 1,400 and 3,500 m³/ha depending on the year and the location.

Figure 3. *Dry wheat in Pradell. Author: Jaume Lloveras.*

Table 4. Average production cost of dry wheat (€/ha)

Activities	*Cost*	*Variation*	On total (%)
Direct sowing	67	(54 - 80)	14
Seed	65	(62 - 67)	13
Fertiliser	182	(167 - 196)	37
Herbicide	49	(27 - 70)	10
Harvest	59	(69 - 50)	12
Packing (straw)	30	(30 - 30)	6
Insurance	9	9	2
Transport (grain)	9	9	2
Transport (straw)	18	18	4
Total	***€488***	€(460 - 514)	
Anticipated production (kg/ha)	2,900	(2,800 - 3,000)	
Anticipated straw production (kg/ha)	2,500	(2,400 - 2,800)	
Cost per t		***€168***	

Table 5. Average production cost of irrigated wheat (€/ha)

Activities	*Cost*	*Variation*	On total (%)
Direct sowing	110	(85 - 149)	11
Seed	100	(62 - 130)	10
Fertiliser	220	(131 - 392)	21
Herbicide	47	(20 - 60)	5
Fungicide and insecticide	21	(0 - 62)	2
Harvest	56	(50 - 68)	5
Packing (straw)	36	(30 - 48)	3
Insurance	24	(20 - 26)	2
Transport (grain)	20	(5 - 48)	2
Transport (straw)	30	(27 - 38)	3
Subtotal *(without water)*	***€664***	(461 - 932)	-
Water	365	-	35
Total	***€1029***	***€(826-1,297)***	
Anticipated production (kg/ha)	6,625	(6,000-8,500)	
Anticipated straw production (kg/ha)	5,500	(5,000-7,800)	
Cost per t		***€155***	

03.01.02 **Irrigated barley**

Four producers of dry barley residing in Algerri, Agramunt, Binèfar and Sariñena were interviewed. Average production of this crop, which is often a double harvest with foxtail millet and sunflower, is usually around 6,000 kg/ha, bearing in mind that in an extraordinary year it can reach 8,000 kg/ha.

The field operations are very similar to those for dry barley but with a crop intensification involving a larger proportion of R2 seed, a larger amount of herbicide, especially narrow leaf, which is rarely used in dry barley, more fertiliser, primarily nitrogen fertilisers, and of course the added cost of water.

Table 6. Average production cost of peas for freezing (€/ha)

Activities	Cost	Variation	On total (%)
Direct sowing[1)]	164	(149 - 189)	*15*
Seed	373	(361 - 396)	*34*
Fertiliser	222	(200 - 266)	*20*
Herbicide	50	(48 - 51)	*5*
Fungicide and Insecticide	37	(22 - 44)	*3*
Insurance	12	(10 - 15)	*1*
Subtotal *(without water)*	***€858***	€(790 - 926)	-
Water	225	-	*21*
Total	***€1,083***	***€(1,015 - 1,151)***	
Anticipated production (kg/ha)	6,833	(6,500 - 7,000)	
Cost per t	***€159***		

[1] Among other items, this includes the cost of cutting and burying stubble from the previous crop, which is usually foxtail millet.

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As can be seen in table 6, the average production cost of peas for freezing is 1,083 €/ha, with a variation from 1,015 to 1,151 €/ha, and an average cost of 159 €/t. Average water consumption 2,250 m³/ha.

Table 7. Average production cost of peas for grain (€/ha)

Activities	*Single crop cost*	On total (%)	*Double crop cost*	On total (%)	*Variation*
Direct sowing	146	13	146	*15*	(127 - 165)
Seed	161	15	161	*16*	(132 - 190)
Fertiliser	208	19	208	*21*	(150 - 266)
Herbicide	53	5	53	*5*	(50 - 55)
Fungicide and Insecticide	29	3	29	*3*	(20 - 37)
Harvest and chopping	100	9	100	*10*	(90-110)
Insurance	14	1	14	*1*	(7 - 20)
Transport	10	1	10	*1*	10
Subtotal *(without water)*	***€721***	-	***€721***	-	(644 - 795)
Water[1]	381	35	256	*26*	
Total	***€1,102***		***€977***	***€(900 - 1,051)***	
Anticipated production (kg/ha)	5,000		5,000		
Cost per t	***€220***		***€195***		

[1] The lower cost of water for double crops is because the fixed part of the price must be divided proportionally between the two crops (see Table 1, page 5).

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As can be seen in table 7, the average production cost of double-crop peas for grain is 977 €/ha, with a variation from 900 to 1,051 €/ha, and an average cost of 195 €/t. Average water consumption 2,500 m³/ha.

Figure 4. *Peas in Algerri. Author: Jaume Lloveras.*

03.01.03 **Dry wheat**

Three producers of dry wheat residing in Agramunt, Algerri and Calaf were interviewed. Average production of dry wheat varies between 2,800 and 3,000 kg/ha depending on the location and year, and under the best conditions can reach 4,000 kg/ha. It should be note that in exceptional years such as 2012-2013, in some places average production reached 7,000 kg.

The field operations are very similar among the producers interviewed, and for reasons of space they will not be presented in detail as for barley, as explained in the working methodology.

03.01.04 **Irrigated wheat**

Five irrigated wheat producers were interviewed, residing in Algerri, Agramunt, Vilanova and Gimenells. Average production of irrigated wheat is approximately 6,625 kg/ha depending on the location and year, bearing in mind that in the best years it can reach 9,000 kg/ha although production depends a great deal on the type of irrigation. With furrow irrigation production levels are usually lower than with sprinkler irrigation (1000-2000 kg/ha lower, depending on the location).

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As can be seen in table 8, the average production cost of dry rapeseed is 467 €/ha, with a variation from 424 to 481 €/ha, and an average cost of 200 €/t.

Table 8. Average production cost of dry rapeseed (€/ha)

Activities	*Cost*	*Variation*	On total (%)
Direct sowing	63	(40 - 95)	13
Seed	76	(48 - 94)	16
Fertiliser	137	(110 - 153)	29
Herbicide	83	(58 - 120)	18
Harvest	83	(60 - 98)	18
Insurance	15	15	3
Transport	10	10	2
Total	***€467***	€(424 - 481)	
Anticipated production (kg/ha)	2,333	(2,000 - 2,500)	
Cost per t		***€200***	

→

As can be seen in table 10, the average production cost of double-crop sunflower is 656 €/ha, and an average cost of 268 €/t.Average water consumption 2,500 m³/ha.

Table 9. Average production cost of double-crop sunflower (€/ha)

Activities	*Cost*	*Variation*	On total (%)
Direct sowing	55	(50 - 60)	8
Seed	65	65	10
Fertiliser	96	(90 - 101)	15
Herbicide	82	(69 - 95)	13
Harvest	78	(60 - 95)	12
Insurance	16	(10 - 22)	2
Transport	9	9	1
Subtotal *(without water)*	***€400***	€(398 - 402)	
Water	256	-	39
Total	***€656***	-	
Anticipated production (kg/ha)	2,450	(2,200-2,700)	
Cost per t		***€268***	

Figure 5. *Field of rapeseed in Segarra. Author: Jaume Lloveras.*

03.01.05. **Peas for freezing**

The data presented on peas for freezing are considered for a double crop, as it this the usual type of cultivation. Four producers of peas for freezing residing in Algerri, Almacelles and Sariñena were interviewed. Average production is around 6,800 kg/ha, with little variation between farmers. The profit is balanced between production, quality and price, as a very significant proportion of the market price is its quality, which is measured by the tenderometer of the grain (hardness), so that the harder it is, the less money it earns, but the higher the production levels. In cases of double crops, the water costs have been applied proportionally.

03.01.06. **Peas for grain**

Two producers of peas for grain were interviewed residing in Gimenells and Sariñena, as well as in other locations where after some tests the farmers decided that this crop was difficult to include on their farm. Some farmers sow peas in order to leave the ground very well prepared for foxtail millet, since they usually have a double harvest.

Average production of forage peas is around 5,000 kg/ha, although it can vary widely depending on the year. This is one of the main problems with the crop. The production levels can be very good, but they decline every 3-5 years, because of weather conditions and disease, which discourages many farmers from planting it, because they usually consider it to be a crop that is too inconsistent.

03.01.07. **Dry rapeseed**

Four producers of dry rapeseed residing in Agramunt, Calaf, Pradell and Tàrrega were

Figure 6. *Barley of the species Avena strigosa, which is usually grown for fodder. Author: Jaume Lloveras.*

Table 10. Average production cost of dry flowering oats (€/ha)

Activities	*Cost*	*Variation*	On total (%)
Direct sowing	68	(55 - 80)	15
Seed	60	60	13
Fertiliser	162	(150 - 174)	35
Herbicide	17	17	4
Harvesting, raking and packing	151	(112 - 190)	33
Total	***€458***	€(444 - 472)	
Anticipated production (kg/ha)	6,500	(6,000 - 7,000)	
Cost per t	***€70***		

Table 11. Average production cost of ryegrass (€/ha)

Activities	*Single crop cost*	On total (%)	*Double crop cost*	On total (%)	*Variation*
Direct sowing	130	14	130	*16*	(105 - 155)
Seed	56	6	56	*7*	(45 - 67)
Fertiliser	97	10	97	*12*	(38 - 156)
Harvesting, raking and packing	288	31	288	*36*	(252 - 324)
Subtotal *(without water)*	***€571***	-	***€571***	-	(462 - 680)
Water[1]	365	39	237	*29*	-
Total	***€936***		***€808***		***€(699-917)***
Anticipated production (kg/ha)	8,000		8,000		
Cost per t	***€117***		***€101***		

[1]The lower cost of water for double crops is because the fixed part of the price must be divided proportionally between the two crops (see Table 1, page 5).

→

As shown in table 11, the average production cost of dry flowering oats is around 458 €/ha and the average cost is 70 €/t.

→

As can be seen in table 13, the average production cost of double-crop ryegrass is 808 €/ha, with a variation from 699 to 917 €/ha, and an average cost of 101 €/t. Average water consumption 2,300 m³/ha.

interviewed. Average production of rapeseed varies between 2,000 and 2,500 kg/ha depending on the location and year, and under the best conditions can reach 4,000 kg/ha. Sometimes dry rapeseed is not cultivated so much for its profitability but rather to have a crop rotation that leaves the fields clean of weeds for the subsequent cereal crops.

Figure 7. *Alfalfa harvested in Gimenells. Author: Jaume Lloveras.*

03.01.08 **Irrigated sunflower**

This is a relatively common crop in some irrigated areas of the Ebro Valley, after wheat and barley, and therefore as a double crop. Two producers of double-crop sunflower residing in Gimenells and Pradell were interviewed. Average production is between 2,000 and 2,500 kg/ha.

03.02 **Forage**

The forage production presented below is considered a commercial dry matter product.

03.02.01 **Dry flowering oats**

Two producers of dry flowering oats were interviewed, residing in Agramunt and Calaf. Anticipated average production is approximately 3,500 kg/ha, depending on the year.

03.02.02 **Ryegrass**

Two producers of ryegrass residing in Gimenells and Sariñena were interviewed. Anticipated production is dry matter (16% - 18% humidity) amounting to about 8,000 kg/ha. Some producers cut the crop once while others do so twice. In addition, in the areas analysed this crop is frequently grown as a double crop.
Single-crop ryegrass is often very similar to double-crop ryegrass when its production cycle ends, and as such the production costs are considered similar.

03.02.03 **Alfalfa**

The companies in the forage dehydration sector are those mostly cultivating alfalfa in the Ebro Valley. We interviewed the production manager of one of them for this study, who showed us the data for many farms, as well as an agricultural farmer and the specialists at a cooperative. Anticipated average production is approximately 15,000 kg/ha, although this figure is often not reached in all fields.

In field operations, there are annual operations such as scything five or six times per year and phytosanitary treatments between one and four times per year, and others that only take place in the first year such as preparation of the land and planting. In this case the cost of preparatory work and planting has been distributed among the four years that cultivation usually takes place in the field. The data presented refer to sprinkler irrigation.

04 **Summary**

The following table (Table 14) summarises the average results presented individually in the tables 2 to 13, showing that the irrigated double cultivation crops are: barley, beans and peas for freezing, rapeseed, flowering oats, sunflower and Italian ryegrass.

05 **Foxtail Millet For Grain**

The figures for production costs of foxtail millet presented in this section are very similar to those of J. Lloveras and A. Bosch in their communication 'Reflexions sobre la possibilitat del doble Cultiu' [Reflections on the Possibility of Double Crops] at the Sant Josep Fair in Mollerussa on 19 March 2012.

Although the figures presented refer to 2012, they are still considered valid, although it should be remembered that some sections such as fertiliser, drying, etc., may have increased in price due to fluctuations in energy or seed costs. During the presentation, some professionals in the sector pointed out that although they agreed with the figures for costs, they believed that most farmers were at the higher end of the range.

Note that average production with furrow irrigation is usually lower than with sprinkler irrigation; around 2,000 kg/ha less, on average. In furrow irrigation, the figures can vary widely, meaning that in areas with good cells it is easy to reach 15,000 ktst of production)

06 **Examples of double crop (Average cost of production)**

The figures presented are also very similar to those presented in the paper 'Reflexions sobre la possibilitat del doble Cultiu' [Reflections on the Possibility of Double Crops] at the Seminar on irrigated double crops organised by the DAAM and the Tàrrega Irrigation Authority at the Sant Josep Fair in Mollerussa on 19 March 2012.

We primarily considered three main double crop alternatives in fields with sprinkler irrigation (the planting and harvesting data vary depending on the weather):

a. Barley and foxtail millet fodder crops (the most common combination).

b. Winter forage (cereal/Italian ryegrass) and foxtail millet (grain and forage).

c. Pea and foxtail millet crops.

Taking the barley/foxtail millet double crop as an example, the production costs for irrigated

Table 12. Average production cost of alfalfa (€/ha)

Activities	*Cost*	*Variation*	On total (%)
Direct sowing	51	(35 - 68)	5
Seed	50	(43 - 58)	5
Fertiliser	193	(160 - 226)	18
Herbicide	58	(28 - 89)	6
Insecticide	76	(66 - 85)	7
Harvesting, raking and packing	452	452	43
Subtotal *(without water)*	***€880***	€(817 - 944)	
Water	981	-	17
Total	***€1,861***	€(1,798 - 1,925)	
Anticipated production (kg/ha)	15,000	15,000	
Cost per t		***€124***	

→
As can be seen in table 12, the average production cost per hectare of alfalfa is 1,861 €/ha, with a variation from 1,798 to 1,925 €/ha, and an average cost of 124 €/t. Average water consumption 10,000 m³/ha.

barley production are those shown in Table 3.1. and those for foxtail millet, with lower production costs in a single harvest (less water and fertiliser consumption and lower preparation costs as direct sowing usually takes place) are calculated at around 1,604€/ha.

An initial conclusion that can be drawn from the production costs presented is that in general, the gross profit per ha for double crops (barley-foxtail millet), are very similar in a 'normal' year compared to a single crop of foxtail millet.

We have not considered the possible variations in the double crop system (barley-foxtail millet for grain, peas-foxtail millet or winter forage, such as cereal-Italian ryegrass) and the variety of uses of foxtail millet (grain or fodder). We have also not analysed the advantages (the effects of residual N from the production of peas or the earliest sowing figures) and the risks of each one (early autumn frosts if the foxtail millet is for grain).

07 Calculation of gross profit *(Dry compared to irrigated)*

This section compares the anticipated gross profit from producing the most common crop in dry farmed areas (barley, at least in the area of influence of the Segarra-Garrigues system irrigation area) compared to the most common crop in irrigated areas (foxtail millet). The possibility of production with fruit trees or industrial crops such as cotton, hemp, flax or soy, for example, is not considered.

Three grain prices are included – 170€/t, an intermediate price of 200€/t and 250€/t (the price in 2012) and two production levels for each crop (medium-low and medium-high). The yields considered do not include either extraordinary production of barley or wheat in the current 2013 campaign, nor the decline in production due to hail, like those of this year. The price of water will be the Segarra-Garrigues canal price and no possible income from the CAP is included.

Average production levels of 3,000 kg/ha are considered for barley, although as mentioned above, those in the area around Alfés very rarely reach an average of 1,500 kg/ha. The average level for foxtail millet is 13,000 kg/ha, although this can reach 15,000 kg/ha relatively easily on very good land.

An analysis of the results shown in table 19 shows that irrigated grain production in our region (mainly foxtail millet), is five to eight times the level of grain production in dry areas

Figure 8. *Wheat field. La Vall de Bianya. Author: Jaume Lloveras.*

→

We believe that in some places, for some dry-farmed crops such as barley, selling the grain often fails to offset the production costs.
In this case, a very important aspect to consider is whether the agricultural producer takes the cost of labour and the depreciation of machinery into account.

Table 13. Summary of average production and water consumption costs

Crop	*Production cost (€/ha)*	*Average production (kg/ha)*	Approximate irrigation water consumption (m^3/ha)
Dry barley	471	2,220	-
Irrigated barley	831	6,000	1,500 – 2,000
Dry wheat	488	2,900	-
Irrigated wheat	1,029	6,650	2,300
Peas for freezing (irrigated)	1,083	6,800	2,250
Peas for grain (irrigated)	977	5,000	2,500
Dry rapeseed	467	2,300	-
Sunflower (irrigation)	656	2,450	2,500
Dry flowering oats	458	6,500	-
Italian ryegrass (irrigated)	808	8,000	2,300
Alfalfa (irrigated)	1,861	15,000	10,000

→

In the production of foxtail millet, in addition to the cost of water in some canals, fertilisation, and especially mineral fertilisation, is the highest production cost. Hence the need to comply with the recommendations for irrigation by the Irrigation Office to save water and those of the Fertilisation and Livestock Manure Office to reduce fertilisation costs.

Table 14. Average production cost of irrigated foxtail millet (€/ha)

Activities	*Cost*	*Variation*	On total (%)
Soil preparation and planting	200	(136 - 252)	9
Seed	270	(220 - 340)	13
Mineral fertiliser	444	(288 - 550)	21
Phytosanitary treatments	100	(80 - 120)	5
Harvesting and transport	130	(126 - 134)	6
Drying	164	(130 - 216)	8
Insurance	24	(20 - 31)	1
Subtotal *(without water)*	***€1,332***	€(1,095 - 1,386)	-
Water[1]	781	-	38
Total	***€2,113***	€(1,876 - 2,167)	
Anticipated production (kg/ha)[2]	13,500	-	
Cost per t	***€157***		

[1] The price of water varies depending on the irrigation community. This figure is for consumption of about 7,500 m^3, while the amounts for sprinkler irrigation may be lower.
[2] Production levels can vary widely. A 'normal' production level of sprinkler irrigated foxtail millet is around 13,500 kg/ha, although some farmers easily produce 16,000 kg/ha and others (very few) reach 20,000 kg/ha. Weather conditions during a year can vary production levels by around 2,000 kg/ha.

(mainly barley). The economic impact of irrigation (only taking into account grain production and excluding the cost of water connection and installing the irrigation) could be calculated at between 358 and 1058 €/ha and the price of grain considered at 200€/t.

08 **Final considerations**

In Catalonia and with figures for 2012 (IDESCAT, 2012), the irrigated area exceeds 247,600 ha with the various existing irrigation channels (7% of the Spanish total). With the construction of the Segarra-Garrigues system, it may expand by another 40,000 ha (a maximum of 70,000 ha), in a mainly agricultural area. In other words, this new system allows dry-farmed crops to be converted into irrigated crops, and in specific terms, extensive crop production to be multiplied by between five and eight times with a positive economic impact on the region.

Table 15. Approximate comparison of production costs of double crop irrigated foxtail millet and barley and single-crop foxtail millet in areas similar to the Segarra-Garrigues irrigation system (€/ha)

	BARLEY	FOXTAIL MILLET
Barley + foxtail millet		
Average water consumption (m^3/ha)	(1,500 - 2,000)	(5,000 - 6,000)
Average production (kg/ha)	(5,000 - 6,000)	(10,000 - 10,500)
Production cost (€/ha)	***831***	***1,604***
Cost per t	(108 - 143)	(153 - 160)
Single crop foxtail millet		
Average water consumption (m^3/ha)		(7,000 - 8,000)
Average production (kg/ha)		13,500
Production cost (€/ha)		***2,113***
Cost per t		157

Table 16. Approximate financial balance of production of double-barley and foxtail millet for grain compared to single-crop foxtail millet taking into account water prices in the Segarra-Garrigues canal area (€/ha)

Crop	Production (kg/ha)	Revenue (€/ha) Sale price		Average expenditure (€/ha)	Gross profit (€/ha)	
		200€/t	250€/t			
Foxtail millet single-crop	13,000	2,600	3,250	2,113	***487***	***1,137***
	15,000	3,000	3,750	2,113	***887***	***1,637***
Barley + foxtail millet	5,000	1,000	1,250	831	169	419
	10,000	2,000	2,500	1,604	396	896
	15,000		*Subtotal*		***565***	***1,315***
	6,000	1,200	1,500	831	369	669
	10,500	2,100	2,625	1,604	496	1,021
	16,500		*Subtotal*		***865***	***1,690***

Table 17. Approximate financial balance of dry (barley) and irrigated (foxtail millet) grain production taking into account water prices in the Segarra-Garrigues canal area (€/ha)

Crop	Production (kg/ha)	Revenue (€/ha) Sale price			Average expenditure (€/ha)	Gross profit (€/ha)		
		170€/t	200€/t	250€/t				
Barley	1,500	255	300	375	471	-216[1]	-171[1]	-96[1]
	3,000	510	600	750	471	39	129	279
Foxtail millet	13,000	2,210	2,600	3,250	2,113	97	487	1,137
	15,000	2,550	3,000	3,750	2,113	437	887	1,637

[1] In some places and years, the profit from barley production is basically the grant from the CAP or the daily wage.

→

For extensive crops, irrigation means that the production levels obtained with dry farming are multiplied between fivefold and eightfold, thus increasing the wealth generated in the entire area, while allowing production to be stabilised.

In addition to other cereals, Spain imports 3-4 million tonnes of foxtail millet every year.

If cereals were produced on irrigated farmland, they would not be surpluses difficult to sell.

Figure 9. *Wheat in irrigation channels in Algerri-Balaguer. Author: Jaume Lloveras.*

It is also important to remember that the implementation of the new irrigation in dry-farmed areas leads to a significant increase in the value of the land, so that according to the Catalan Irrigation Plan (DAR, 2010), the added value may vary between 11,500 and 19,500€/ha depending on the according to the provision and/or support from the irrigation.

These figures, which the farmers are well aware of, provide some basic information about the economic benefits of irrigation, both individually and collectively, in terms of extensive crop production.

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ECONOMIC COMPARISON OF VARIOUS WINE-GROWING REGIONS. YEAR 2011

Figure 1. *Vines in the Albera hills. Author: Josep Maria Masses Tarragó.*

01 Introduction

This article presents an analysis of the economic performance of vineyards in different regions in Europe. The source used is the European Union's FADN (Farm Accountancy Data Network) database for 2011. This is the last year for which results are available (consulted in February 2014). The economic results for each farm presented only include **wine-producing farms[1].**

Due to the sample size in the regions analysed, the data should be interpreted with caution. However, the results obtained provide some guidance on what the main economic indicators for farms should be (production, costs, income, etc.).

02 Wine-producing regions analysed

Catalonia is obviously the first region considered, as the primary objective of this analysis is a comparison of the economic results obtained in Catalonia with those of other European regions specialising in wine production.

La Rioja is included in this analysis because of its reputation as a region producing high-quality wine, and **Castilla-La Mancha** is the autonomous community with the highest levels of wine production in Spain: its wine production in 2011 accounted for 44.2% of all Spanish output (MARM Yearbook 2012).

In La Rioja, wine production accounts for 35% of final agricultural production. Its wine-producing area accounts for 34.6% of the cultivated land (Ministry of Agriculture, Livestock and the Environment of La Rioja, Agricultural Statistics, 2011), which is a high level of specialisation in this crop[2]. There is only one specific designation of origin in La Rioja, the La Rioja DOC, and one Protected Geographical Indicator (Valles de Sadacia). Meanwhile, there are 9 DOP in Castilla La Mancha (La Mancha, Valdepeñas, Jumilla, Ribera del Júcar, Méntrida, Almansa, Manchuela, Uclés and Mondéjar), as well as four single vineyard wines (Dehesa del Carrizal, Dominio de Valdepusa, Finca Élez and Guijoso) and one IGP (Vinos de la Tierra de Castilla) (MARM. Protected Designations of Origin and Geographical Indications).

[1]The type and economic size (TES) of a farm classifies it according to the predominant type in the firm's production system, based on its various activities. It is determined based on the relative contribution of the MBT made by each crop and livestock species.
[2]In Catalonia the wine-producing area accounts for 8.2% of the cultivated area (IDESCAT agricultural structure survey 2007)

The **French regions** analysed include the DO (or AOC) with the greatest international recognition: the **Champagne, Burgundy and Bordeaux AOC,** which are in the administrative regions of Champagne-Ardenne, Burgundy and Aquitaine, respectively. Viticulture makes a major contribution to final agricultural output in these regions.

In the Champagne-Ardenne region, viticulture accounts for 43.4% of total agricultural output, the figure is 34.5% and 33.1% for the regions of Burgundy and Aquitaine, respectively (Service Régional de l'Information Statistique, Économique et Territoriale. Mementos any 2013).

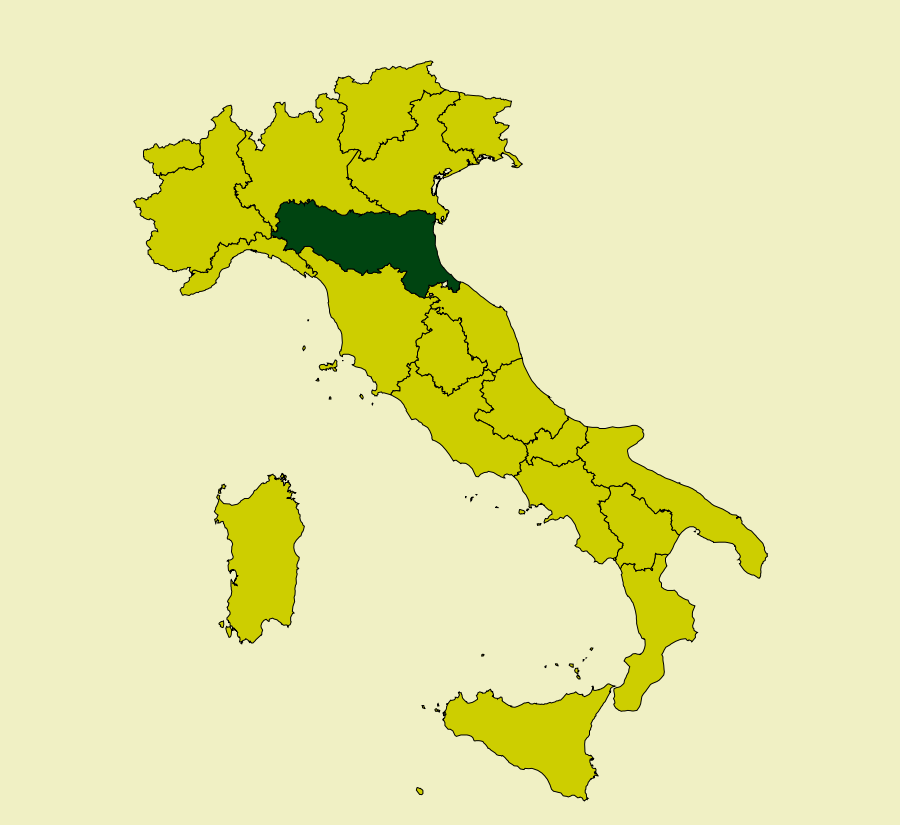
Aquitaine is France's leading wine-producing region, with 144,500 hectares of vineyards, and a particularly important concentration of this crop in the department of Gironde, at the confluence of the Dordogne and Garonne rivers after it passes through Bordeaux (Service Régional de l'Information Statistique, Économique et Territoriale. Memento, 2013).

Burgundy contains more than 30,000 hectares of vineyards, which are mainly located on the banks of the River Rhone. In Champagne-Ardenne, which has a wine-producing area similar to Burgundy, the plantations are mainly located in the Marne department (Service Régional de l'Information Statistique, Économique et Territoriale. Mementos, 2013).

The geographical location of the French administrative regions analysed is presented in Map 1.

Map 1. *Geographical location of the French administrative regions analysed. Source: http://www.imagenesdeposito.com/*

Emilia-Romagna is one of Italy's largest wine-producing regions. In 2012, it accounted for 15.3% of total Italian wine production (Istituto Nazionale di Statistica). Despite containing many designations of origin (18 DO and one DOC), this region is mostly known for its production of **Lambrusco wine**, which is concentrated in three DO located in the centre of the region, very near the city of Modena *(www.winecountry.it)* (Map 2).



Map 2. *Geographical location of the Italian region of Emilia-Romagna. Source: http://www.maplandia.net*

03 Structure of farms

The **manpower** used on wine-producing farms varies depending on the region. Howe-

[3]*AWU: Annual Work Unit. One AWU is equivalent to the work done by one person working full-time for a year (228 days or more).*

Figure 2. *Vines in the Alt Empordà. Author: Josep M. Masses Tarragó.*

ver, the French regions analysed have a comparatively larger number of AWU[3], especially in Burgundy and Aquitaine. Meanwhile, if the workforce used is calculated in terms of Used Agricultural Area (UAA), as an indicator of the intensity of labour force use, it is apparent that the most labour-intensive regions are also two French regions, namely Champagne-Ardenne and Burgundy, with levels of use of 0.36 and 0.28 AWU/ha, respectively. Catalonia, La Rioja, Aquitaine and Emilia-Romagna have similar values, ranging between 0.08 and 0.16 UTA per hectare (in that order). Castilla-La Mancha has the lowest level of intensity (0.04 AWU/ha) (Table 1).

The proportion of family labour used tends to decline as the use of labour on the farm increases. The French regions that use the most labour therefore have a lower propor-

		Catalonia(*)	La Rioja	Castilla - La Mancha	Champagne - Ardenne	Burgundy	Aquitaine	Emilia-Romagna
SYS03	Farms in sample	40 - <100	40 - <100		100 - <200	40 - <100	100 - <200	40 - <100
	Work on the farm							
SE010	Total AWU (AWU)	**1.6**	**1.3**	**1.5**	**2.7**	**3.8**	**3.6**	**1.1**
SE015	Family AWU (FWU)	1.1	1.,0	1.2	1.2	1.6	1.4	1.0
SE020	Wage-earning AWU	0.5	0.4	0.3	1.5	2.3	2.2	0.1
SE011	Time worked (hours)	3,142	2,555	2,945	4,285	6,286	5,869	2,449
SE021	Wage-earning hours	1,007	637	579	2,412	3,804	3,629	240
	Area and Type of Tenancy (ha)							
SE025	Total UAA	**16.3**	**13.4**	**33.7**	**7.3**	**13.6**	**27.9**	**6.9**
SE030	Leased UAA	2.3	2.2	1,.0	5.2	11.1	22.1	2.3
	Other areas (ha)							
SE035	Cereals	0.7	1.6	2.4	2.7	2.1	2.1	1.6
SE041	Other extensive crops	0.1	0.1	0.3	0.7	0.6	1.3	0.3
SE042	Energy Crops	0.0	0.0	0.0	0.1	0.0	0.0	0.0
SE050	**Grapevine**	**12.7**	**9.9**	**16.8**	**3.4**	**10.2**	**20.4**	**3.6**
SE054	Permanent crops	1.5	0.2	1.5	0.0	0.0	0.1	0.3
SE055	Fruit trees	0.9	0.1	0.2	0.0	0.0	0.1	0.3
SE060	Olive groves	0.6	0.1	1.3	0.0	0.0	0.0	0.0
SE071	Forage and pastures	0.0	0.0	0.0	0.3	0.5	3.5	1.1
SE072 + SE073	Total fallow	0.7	1.4	12.7	0.2	0.1	0.6	0.1
SE075	Forestry	1.6	1.4	12.7	0.2	0.1	0.6	0.1
SE080	Livestock Units (LU)	0.0	0.0	0.0	0.0	0.0	1.5	0.1

N.B.: 'Permanent crops' do not include vineyards (as defined by the FADN = SE054).

Table 1. *Structure of farms in the sample: labour, areas and land use. Year 2011. Source: In-house data based on FADN and XCAC (DAAM) data (*)*

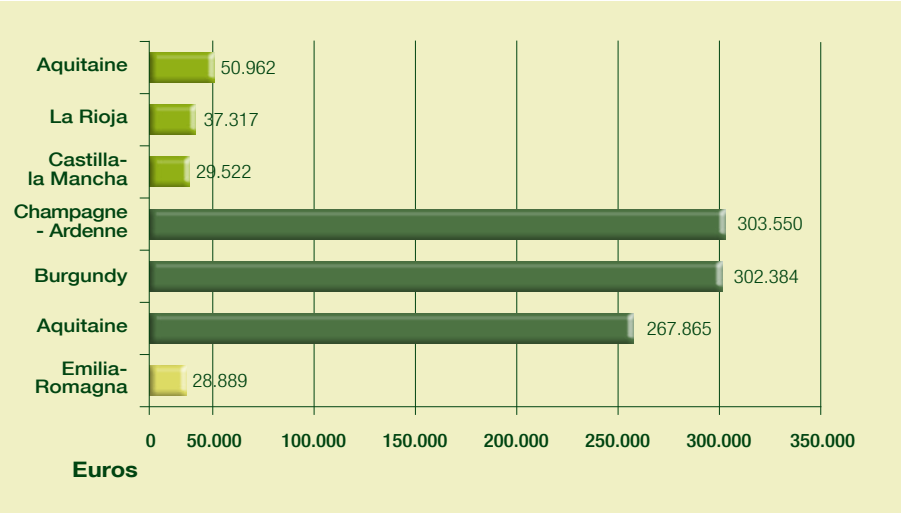


Figure 1. *Total of the components of family income from the farm for 2011. Data in euros per farm*
Source: In-house data based on FADN and XCAC (DAAM) data (for Catalonia)

tion of family labour than the other regions, at between 38.9% and 44.2% of the AWU. In Catalonia, 68.0% of the workforce comes from the family - a lower proportion than the other non-French regions. The proportion of family labour is highest in the Italian region of Emilia-Romagna, where it reaches 87.6%.

As for the **average size of the farms,** Emilia-Romagna is the region with the smallest farms (6.9 ha of UAA), closely followed by Champagne-Ardenne (7.3 ha). Castilla-La Mancha has the largest average farm size (33.7 ha), followed closely by Aquitaine (27.9 ha). The regions of Burgundy and La Rioja have similar average farm sizes (13.6 ha and 13.4 ha respectively). These figures are slightly exceeded by Catalan farms (16.3 ha) (Table 1).

As for the **type of tenancy** of the farms, figures are available for the proportion of area leased in each of the regions. This proportion is much higher in the French regions, where farms lease between 71.3% and 81.9% of the land area. There are similar proportions of leased land in Catalonia and Emilia-Romagna (30.8% and 33.3%, respectively), exceeding the proportion observed in La Rioja (16.5%). In the region of Castilla-La Mancha, the leased land area could be considered as being at a token level (2.8%).

The rest of the cultivated land area may belong to the farmer or be subject to a crop share contract. The latter category is more common in southern Europe, which could explain some of the differences observed in the proportion of leased land between French and non-French regions.

Because they are viticulture farms, the primary land use in the sample analysed of farms is cultivation of **vines,** accounting for a maximum of 78.4% of the UAA in Catalonia, and a minimum of 46.7% in Champagne-Ardenne. In some regions the other uses are therefore irrelevant.

In Catalonia, the second most extensive land use is permanent crops, accounting for 11.6% of the UAA and consisting of fruit and olive trees. The third land use is cereals (5.3%). In the Champagne-Ardenne region, cereal cultivation is also the second land use in terms of importance, accounting for 36.2% of the UAA. However, this figure only represents a value of 2.7 ha, as a result of the small size of the farms in this region.

The figures for the main land uses in Burgundy and La Rioja are similar, in terms of both values and percentages. Viticulture accounts for a high proportion of UAA (75.5% and 74.5% respectively), while the second land use is cereal crops (15.3% and 12.1% of the UAA respectively).

Aquitaine also has similar proportions of vineyards to the regions above (73.1% of the UAA). However, unlike other regions, forage and pastures are the second most important use (12.5% of the UAA). The importance of this use could be due to the livestock farming in the region, linked to cattle farming. Aquitaine is the only wine-producing region analysed with land used for livestock farming.

Emilia-Romagna and Castilla-La Mancha have a smaller proportion of their for area vineyard cultivation (51.5% and 49.9% of the UAA respectively). However, the structure of farms in these regions is very different because as mentioned above, Emilia-Romagna has smaller farms, while in Castilla-La Mancha the opposite is true, i.e. the farms are the largest in all the regions analysed.

As a result, in Emilia-Romagna cereal crops are the second most extensive land use, followed by forage and pasture (22.9% and 15.5%, respectively), although the area for these is small (1.6 ha and 1.1 ha respectively). In Castilla-La Mancha, fallow crops is the second use, with a significant proportion (37.6% of the UAA).

Castilla-La Mancha is also notable for its forestry, with an average of 12.7 hectares of forest per farm. Farms in Catalonia also have hectares of forest. However, the values are much lower than those for Castilla-La Mancha (1.6 ha per farm).

04 Financial results

Table 2 presents the financial results for the wine-producing farms in the various regions analysed. As can be seen, the FADN provides various indicators for the farm's economic activity, such as production, intermediate consumption, gross added value, the net added value of the farm and the family income from the farm.

This analysis is based initially on the family income from the farm, which is the indicator that aggregates all the others, and subsequently highlights some of its components in a little more detail.

04.01 Family income from the farm

The family income from the farm is an indicator of the operating profit of farms, and is the remuneration from the family's fixed production factors (land, capital and labour) and business risk (profit or loss). This indicator is

[4]*An outline of the calculation of the variables is available at: http://ec.europa.eu/agriculture/rica/annex003_en.cfm#iii Definitions of the variables are available at: http://ec.europa.eu/agriculture/rica/definitions_en.cfm*

calculated by adding the production value and subsidies (total subsidies and taxes and total subsidies and taxes on investment) minus total costs (intermediate consumption, amortisations and remuneration of the external production factors)[4].

Family income from viticultural farms in the regions analysed varies widely depending on the region. In general terms, it is possible to establish two categories based on the order of magnitude: French regions and non-French regions. The family income obtained from farms in the French regions is significantly higher than in other regions (including the only Italian region analysed). The region with the highest income is Champagne-Ardenne (€110,009), followed by Burgundy (€70,535) and Aquitaine (€51,286). In the other regions, Catalonia has the highest family income (€19,065), closely followed by Castilla-La Mancha and La Rioja (€17,934 and €17,319 respectively). The region with the lowest values is Emilia-Romagna (€10,726) (Table 2).

04.02 Components of the family income from the farm

As mentioned above, there are major differences in the order of magnitude in the components of household income: **the total production cost plus total subsidies amounts to much higher values in the French regions.** These regions obtain a family income of €291,266 per farm, compared to the €36,675 obtained in the other regions (average figures for the regions considered). The latter figure represents only 12.6% of the figure for the French regions as a whole (Figure 1). For this reason, the breakdown of the components of the family income from the farm is presented as absolute values in two different figures (Figures 2 (a) Catalonia, La Rioja, Castilla-La Mancha and Emilia-Romagna, and (b) Champagne-Ardenne, Burgundy and Aquitaine).

Leaving aside the results for the French regions, it is apparent how the total costs are highest in Catalonia (€31,897). It is followed, in the following order and with much lower values, by the other regions: La Rioja, Emilia-Romagna and Castilla-La Mancha (with values of €19,998, €18,174 and €11,588 respectively). For the **total production plus**

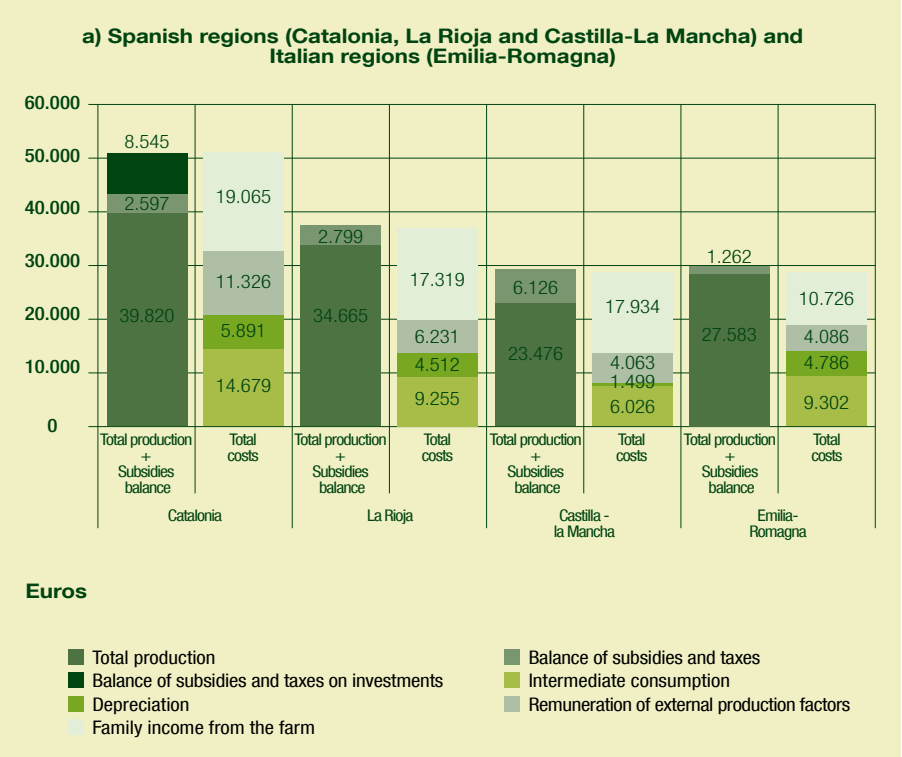


Figure 2a. *Components of family income from the farm for 2011. Data in euros per farm*
Source: In-house data based on FADN and XCAC (DAAM) data (for Catalonia)

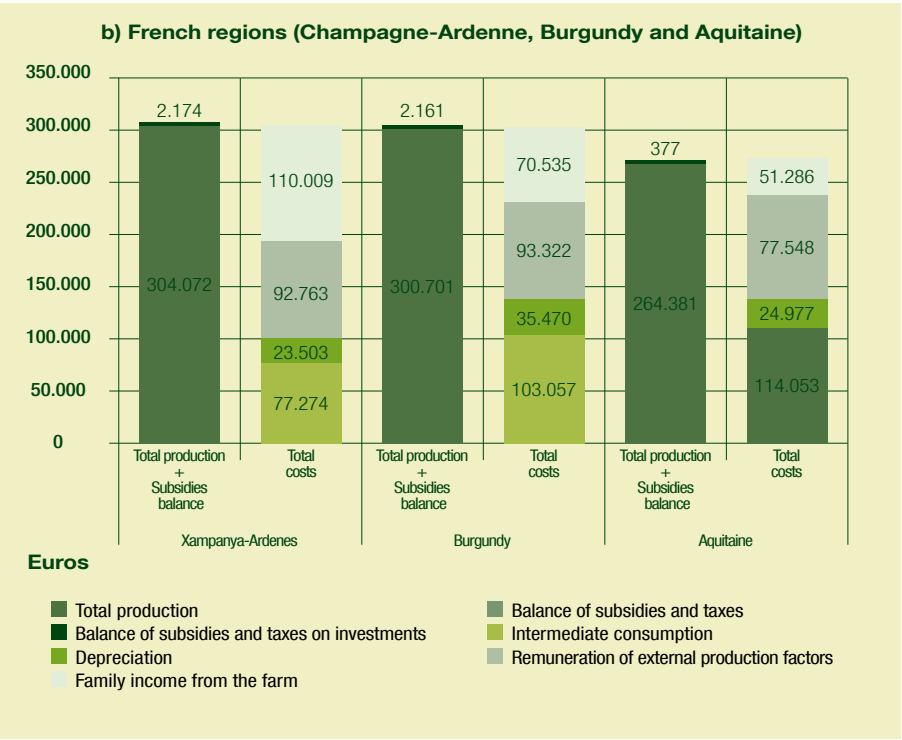


Figure 2b. *Components of family income from the farm for 2011. Data in euros per farm*
Source: In-house data based on FADN and XCAC (DAAM) data (for Catalonia)

Family income from the farm = Total output[5] + Subsidies[6] – Total costs
where
Total costs[7] = Intermediate consumption + Depreciations + Remuneration of external production factors

		Catalonia (*)	La Rioja	Castilla la Mancha	Champagne-Ardenne	Burgundy	Aquitaine	Emilia-Romagna
SYS02	**Farms represented**	**3,340**	**3,080**	**17,620**	**7,390**	**2,930**	**6,780**	**7,240**
SYS03	**Farms in sample**	**46**	**40 - <100**	**100 - <200**	**100 - <200**	**40 - <100**	**100 - <200**	**40 - <100**
SE131	**Total production**	**39,820**	**34,665**	**23,476**	**304,072**	**300,701**	**264,381**	**27,583**
SE135	Total crop production	37,030	33,938	23,453	295,372	292,817	251,803	25,362
SE140	Cereals	507	1,119	1,157	3,483	2,651	2,732	2,431
SE145	Protein crops	23	0	55	28	0	0	66
SE146	Energy crops	0	0	0	93	0	0	0
SE150	Potatoes	0	73	0	0	0	0	0
SE155	Beets	0	0	0	248	0	0	242
SE160	Oilseed crops	0	49	1	823	727	1,019	131
SE165	Industrial plants	0	0	0	0	0	66	0
SE170	Vegetable garden and flowers	0	22	4	70	0	272	35
SE175	Fruit	624	100	76	0	9	165	1,604
SE185	Vines and wine	**34,879**	**32,538**	**21,434**	**289,578**	**289,283**	**246,927**	**19,540**
SE190	Olives and olive oil	847	31	718	0	0	0	181
SE195	Fodder crops	151	3	0	248	72	108	1,129
SE200	Other vegetable production	0	2	7	894	75	512	3
SE206	Total livestock production	0	0	0	0	-2	688	3
SE206	Other output	2,790	728	23	8,700	7,886	11,890	2,219
SE275	**Intermediate consumption**	**14,679**	**9,255**	**6,026**	**77,274**	**103,057**	**114,053**	**9,302**
SE281	**Specific costs**	**4,010**	**4,065**	**2,202**	**9,713**	**17,512**	**21,898**	**3,611**
SE285	Seeds and plants	88	351	170	782	1,088	1,784	245
SE290	Seeds and reused plants	0	0	0	0	7	3	0
SE295	Fertilisers	925	916	1,202	3,775	2,398	3,135	913
SE300	Phytosanitary treatments	2,850	2,525	780	5,155	8,612	8,580	2,182
SE305	Other non-specific crop costs	147	272	49	0	5,399	8,211	269
SE310 - 30	Specific feed for livestock	0	0	0	0	15	232	2
SE336	**Non-specific costs**	**10,669**	**5,191**	**3,825**	**67,562**	**85,545**	**92,155**	**5,691**
SE340	Maintenance of machinery and buildings	2,756	1,246	633	12,424	15,238	15,025	295
SE345	Energy	2,857	1,805	2,242	2,404	4,053	5,584	2,081
SE350	Work by third parties	2,450	657	614	9,158	10,397	14,775	576
SE356	Other non-specific costs	2,607	1,483	335	43,576	55,857	56,772	2,739
SE600	**Balance of subsidies and taxes**	**2,597**	**2,799**	**6,126**	**-2,696**	**-478**	**377**	**1,262**
SE605	Operating subsidies	2,355	1,057	4,777	1,327	1,685	4,788	1,089
SE395	Special VAT regime balance	713	2,165	1,528	0	0	0	741
SE390	Taxes	472	424	178	4,022	2,163	4,412	568
SE410	**Gross added value**	**27,738**	**28,209**	**23,576**	**224,102**	**197,165**	**150,704**	**19,543**
SE360	**Depreciations**	**5,891**	**4,512**	**1,499**	**23,503**	**35,470**	**24,977**	**4,786**
SE415	**Farm net value added (FNVA)**	**21,846**	**23,697**	**22,077**	**200,599**	**161,695**	**125,727**	**14,757**
SE405	**Balance of subsidies and taxes on investments**	**8,545**	**-147**	**-80**	**2,174**	**2,161**	**3,107**	**54**
SE406	Subsidies for investments	8,657	213	0	2,174	2,161	3,107	54
SE408	VAT paid on investments	112	360	80	0	0	0	0
SE365	**Remuneration of external production factors**	**11,326**	**6,231**	**4,063**	**92,763**	**93,322**	**77,548**	**4,086**
SE370	Salaries	9,034	4,913	3,973	39,979	53,111	52,789	3,304
SE375	Leases	1,566	1,083	88	46,961	33,252	18,372	483
SE380	Interest	726	235	2	5,823	6,959	6,388	299
SE420	**Family income from the farm (FIF)**	**19,065**	**17,319**	**17,934**	**110,009**	**70,535**	**51,286**	**10,726**
SE425	FNVA/AWU	13,906	18,089	14,621	75,698	42,329	34,924	13,059
SE430	FIF/FWU	17,858	18,041	14,945	94,025	45,506	36,633	10,834

Table 2. *Average financial results of viticultural holdings in the sample (viticulture TES). Figures in euros per farm. Year 2011. SExxx equivalent to codes for FADN variables. Source: In-house data based on FADN and XCAC (DAAM) data (*)*

total subsidies[8], Catalonia is again the region with the highest values. For this variable, the level for La Rioja is 73.2% of that obtained in Catalonia, and Castilla-La Mancha and Emilia-Romagna have 57.9% and 56.7%, respectively (Figure 2 (a)).

Among the French regions, the total costs have their highest values in Burgundy (€231,849), followed by Aquitaine and Champagne-Ardenne (with values of €216,578 and €193,540 respectively). For the sum of total production plus total subsidies8, Champagne-Ardenne and Burgundy have very similar values, followed by Aquitaine. This region obtains 88.4% of the average value obtained by the regions above (Figure 2 (b))

The income components in the different regions are expressed in percentage terms in Figure 3. This facilitates comparison between them regardless of their magnitude. Unlike Figure 2 in this case, family income from the farm has been removed, so that the sum of costs is 100%.

Regions in Spain have higher values than other regions for the **contribution of subsidies and taxes** to farms' income. Catalonia is the main beneficiary, followed closely by Castilla-La Mancha. In these regions, the sum of the balances accounts for 21.9% and 20.5% of revenues respectively. This proportion is also considerable in La Rioja (7.1%). There is a minority or negative proportion of balances of subsidies and taxes in the French regions. In Emilia-Romagna, this proportion is below the levels reached by the Spanish regions (4.6%).

As regards costs, for the average of the regions analysed, the intermediate consumption accounts for a higher proportion of total costs, followed by remuneration for production factors and lastly, for depreciations.

The proportion of intermediate consumption compared to total costs ranges between 52.7% (Aquitaine) and 39.9% (Champagne-Ardenne). The results for remuneration for production factors are more variable, ranging from 47.9% (Champagne-Ardenne) to 22.5% (Emilia-Romagna) of total costs. The proportion represented by depreciations compared to total costs is lower, ranging between 26.3% (Emilia-Romagna) and 11.5% (Aquitaine).

04.03 **Costs**

Figure 4 shows the distribution of costs broken down by the different regions analysed, expressed as a percentage of total costs.

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Family income from viticultural farms in the regions analysed varies widely depending on the region. In general terms, it is possible to establish two categories based on the order of magnitude: French regions and non-French regions.

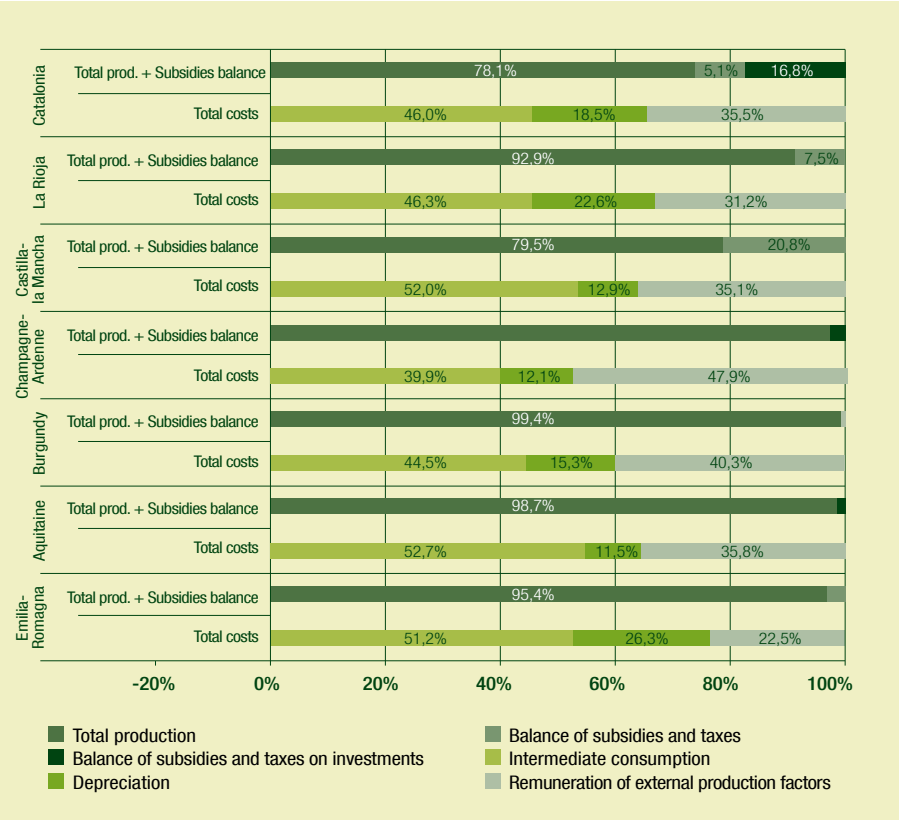

Figure 3. *Components of family income from the farm for 2011. Data in euros per farm. Source: In-house data based on FADN and XCAC (DAAM) data (for Catalonia)*

[5]The calculation of total production is: Total production (SE131) = Total crop production (SE135) + Total livestock production (SE206) + Other productions (SE256).
Total crop production (SE135) = Sales + reuse + on-farm consumption + final inventory - initial inventory.
Other productions (SE256) refer to leased land ready for planting, income from occasional leases of forage acreage, livestock with food, forestry products, work for third parties, rental of equipment, interest on liquid assets necessary for operation of the farm, income from rural tourism, income from previous financial years and other products and income.
[6]For simplification purposes, 'Subsidies' are considered here as: Balance of subsidies and taxes (SE600) + Balance of subsidies and taxes on investments (SE405).
[7]Taxes and duties are not included in the total cost, but instead under 'Balance of subsidies and taxes' or 'Balance of subsidies and taxes on investments'.
[8]FADN codes: SE131 + SE600 + SE405

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Intermediate consumption (specific and non-specific costs of the farm) account for a larger proportion of the total costs, followed by payment for production factors (wages, rents and interest) and finally, by depreciation.

In Catalonia, the main costs are **wages paid,** followed by **depreciations.** Wages are one of the main costs incurred in all the regions analysed. Although depreciations are also important in general terms, their relative importance depends on the region analysed.

In Catalonia, the cost of wages and depreciations combined amounts to 46.8% of total costs. These proportions are similar to **La Rioja.** Wages are also the major costs in **Castilla-La Mancha,** reaching higher proportions, i.e. 34.3% of total costs. However, in this region, the second most important cost is **energy costs** (19.3% of total costs).

Depreciations are the main cost in the region of **Emilia-Romagna** (26.3%), followed by wage costs and other non-specific cultivation costs (18.2% and 15.1%, respectively). The latter cost is especially important in **the French regions,** where it is the highest cost on farms. In these regions, other non-specific cultivation costs account for a proportion of between 22.5% and 26.2% of total costs. Another significant cost in these regions is the cost of wages. However, this is not the second most important cost in all cases, since leasing costs are also high, especially in the region of Champagne-Ardenne, where they are the most important cost (24.3% of total costs).

The Other Non-Specific Costs refer to water, insurance (except that related to buildings and workplace accidents), and other general operating expenses (accounting fees, telephone bills, etc.). The differences observed for this cost in the French regions are not specific to viticulture (source: FADN Public Database) and may be caused by different costs included as non-specific.

Apart from the cost of water, and the tendency for farmers to insure their crops, in France, unlike in Spain and apparently in Italy, most farms have the legal personality of small companies, in which spouses or relatives are also part of the company. Farms with this legal personality generally bear more costs, such as accounting fees and other related costs. At the same time, family farms generally tend not to account for some non-specific costs, while more professionalised farms record them systematically.

Another possible reason for these differences is the tax regime in each country. Although farmers should not be guided by it, when they complete the data for the calculation of agricultural income, according to the FADN technical department, farmers generally tend to record their costs on that basis. A higher tax exemption for certain costs could lead to increased recording of incurred expenses.

Moreover, there are also considerable differences between Spanish and French regions as regards the proportion accounted for by leases within total costs. These differences are determined by the proportion of leased hectares on farms. As mentioned above, farms in France have a greater tendency to lease land, reaching a maximum of 81.0% of the UAA in the region of Burgundy.

04.04 **Total production and total costs**

The following ratio can be calculated to determine the relationship between costs accrued and the production value obtained:

$$\frac{\text{Costs}}{\text{Total production}} \times 100$$

This indicator shows the proportion of operating costs compared to the value of production, and can be interpreted as what it costs the farm to produce €100.

The results obtained show how this indicator varies depending on the region of production (Figure 5). The costs in the regions analysed range from 81.9% of the production value in the Aquitaine region, to 49.4% in Castilla-La Mancha.

In this respect, Catalonia is closer to the level of the French than the Spanish regions, which have lower values. However, among the French regions, Champagne-Ardenne has a lower value than the other French regions and a similar value to Emilia-Romagna, which has an intermediate value. This shows how a higher household income is not associated with relatively lower costs.

05 **Conclusions**

The accounting data presented here are for wine-producing farms associated with the EU's Farm Accountancy Data Network. 2011 is the most recent year available. The wine-producing regions chosen for Spain are Catalonia, La Rioja and Castilla-La Mancha and for France, Champagne-Ardenne (Champagne AOC), Burgundy and Aquitaine (Bordeaux AOC). The Italian region of Emilia-Romagna is also included.

As for the **structure** of farms, the French regions studied use a larger amount of labour (AWU), than the other regions analysed. This is accompanied by a reduction in the proportion of family labour, as the results show that as AWU increase, family labour decreases. Significantly, the leased area in the French regions is much higher than in the other areas.

The French regions outperform other regions as regards family income from farms. In these regions, the overall total production plus the total subsidies has much higher values than in other regions, resulting in values for family income from the farm that are also higher. However, it is the same for total costs. For this reason, the relationship between total costs and total production is not more efficient in these regions - on the contrary. In

fact, it is in a French region, Aquitaine, where the cost of producing €100 is highest.

Another significant difference is in the magnitude of Other Non-Specific Costs, which is the main cost for farms in the three French regions. It appears because these farms are constituted with the legal personality of a small company, they have to bear more associated costs, in addition to this situation involving a more systematic capture of costs, among other items.

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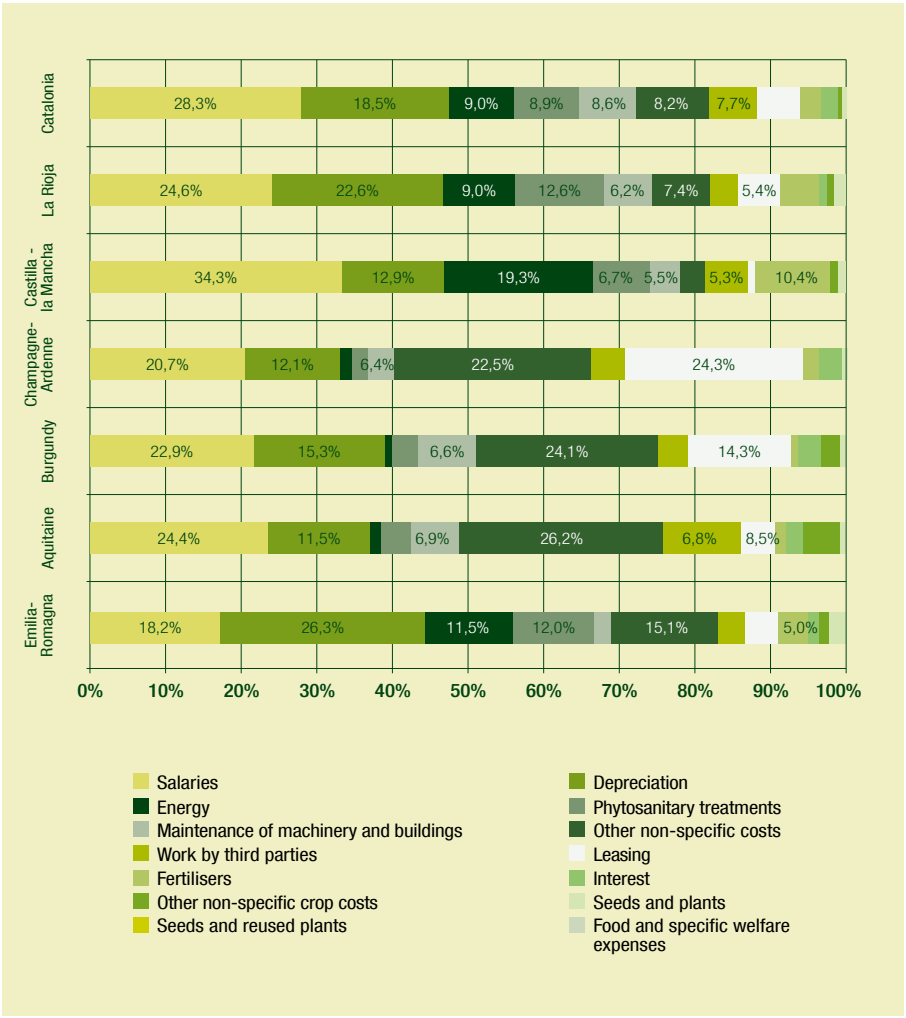

Figure 4. *Distribution of costs expressed as a percentage for the 2011 financial year. Source: In-house data based on FADN and XCAC (DAAM) data (for Catalonia)*

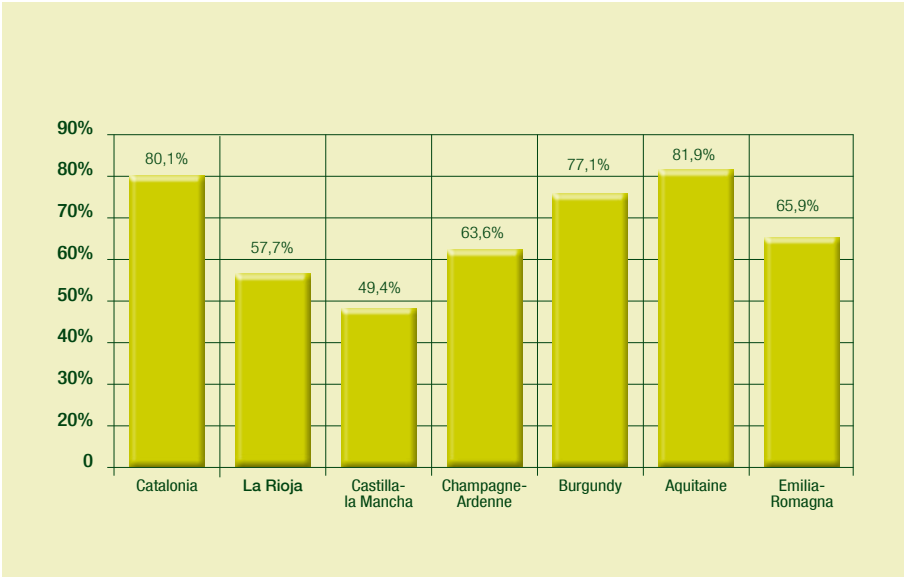

Figure 5. *Percentage of total costs compared to total production. Year 2011 Source: In-house data based on FADN and XCAC (DAAM) data (for Catalonia)*

THE INTERVIEW

Joan Salvador Minguet Pla
Head of the DAAM agricultural training service
Castellnou de Seana (Pla d'Urgell)

"BEFORE MAKING ANY INVESTMENT, AGRICULTURAL ENTREPRENEURS SHOULD BE AWARE AS TO WHETHER IT CAN BE EASILY BE RECOVERED AND THE FINANCIAL DIFFICULTIES THEY MAY HAVE IN CARRYING IT OUT"

Excerpt from the interview published in www.ruralcat.net

→

Joan Salvador Minguet Pla

We would like to talk to Joan Minguet, agricultural engineer and graduate in Business Administration and Management, about the subject of the management training that agricultural entrepreneurs and the owners and workers of farms have and could receive. He has always been linked to training in the business sphere—as a lecturer at the agricultural school in Tàrrega—and in this dossier he talks to us about the training in 'numbers and accounts' which has been somewhat neglected for many years, with primary consideration being given to the need to produce crop volume.

How important do you think training is in agricultural business management, and particularly in the area of operating costs?

I think it is very important. Agricultural businesses have a lot of ground to make up in the field of business management. Many companies are very familiar with the technical side of production, but very few know the cost of a kilogram of their products. Bearing that in mind, I think that they are lacking something fundamental, which is the profitability of what they are producing, and whether they are making a living or not, and how,
what they do it with.

Do agricultural entrepreneurs today analyse investments and future costs before making an improvement to their farm?

Before making any investment, agricultural entrepreneurs should be aware as to whether it can easily be recovered (how long it will take) and the financial difficulties they may have in carrying it out. Ideally, they should also consider the future costs, and use them to determine the return on the investment.

I think that only those who are well advised think in those terms, and that the general trend is not to take these considerations into account when considering a possible investment.

But do agricultural entrepreneurs have to be responsible for their own accounting?

If they want, they can do it themselves, but they need to be strict when making entries, get some training and be able to use a spreadsheet. They should be clear about the basics. They need to have the information, and if this is prepared for them by an expert in the field, so much the better.

What training is available in this area?

Over the last six or seven years, the Agricultural Training Service has made significant changes in this area. Today, there is more business management training available in vocational training. And in our schools we have a special training module which incorporates all areas of the farming family, bearing in mind that the majority of those who complete the series will have to deal with running a family farm.

The training available can be found in the Annual Agricultural Training Plan and also through RuralCat, where distance learning is possible.

For continuing education, we have quite a few courses organised for training young people entering the agricultural sector, as well as for all professionals who want them. Young people who take an entrepreneurship course (we're now running it for the sixteenth time) spend more than 100 hours—a third of the time—receiving business management training.

Where can you get training in agricultural business management and in operating costs in particular?

Details of the training available can be found in the Annual Agricultural Training Plan, which publishes a booklet on Food and Agriculture Innovation at the beginning of every year; and also through RuralCat, where all this training is available online. We have: a basic course in agricultural management, a course on developing a business plan, with a practical part, a course of supplements for management of an agricultural company, including a practical part, an introductory course in Excel and a course on calculating costs and the return on an investment.
These courses can be taken face-to-face and in blended learning format at various schools, and by distance learning at www.ruralcat.net

Can you tell us something about the difference in costs depending on the different crops to be established?

For costs, it is necessary to keep in mind that some costs are fixed and some are variable. The former can be understood simply by virtue of having an agricultural business (depreciation of machinery and buildings and installations, social security costs, leases, etc.); and the latter are based on the amount of production (fertilisers used, plant protection, soil work, harvesting costs, etc.)
Obviously, the variable costs differ widely depending on the type of crop.

What is your opinion of this Dossier - do you think it is useful?

I think it is a very interesting _Technical Dossier_. I believe it is essential to discuss the economic issues that directly touch our pockets and which have to make us reflect.

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