1. Introduction

After November 2005 new arrangements will be applied to the European olive and olive oil sector as the income support to olive growers will be partially integrated into the single payment scheme, following the 2003 Common Agricultural Policy reform process.

This partial decoupling scheme intends to prevent abandonment of olive growing that is in general concentrated in regions lagging behind in their economic development. In addition, olive growers will only benefit from support if they comply with some conditions, to be defined soon, in order to respect certain cultural practices of good maintenance of their olive groves.

These new rules will require some adapting or restructuring efforts of this sector as under this framework, environmental respect, competitiveness and market-orientation have been enhanced. They also represent an opportunity to transfer support in favor of less productive and more costly production systems like the sloping ones.

The capacity of the different olive production systems to react to this recent policy changes will be determined not only by the specific methods under which the new rules will be applied in each country (for the moment not completely known) but also by the structural and technical characteristics of the olive farming systems in each producing region.

Production aid, directly linked to olive oil production, has been the main income policy support instrument for the European olive growers since the first olive oil Common Market Organization (CMO) has been laid down in 1966. After a transitional reform in 1998, it was only in 2004 that this sector has been submitted to a deep reform following the CAP aid decoupling decided in 2003 for the main crop and animal products. Meanwhile olive growers have also benefited from rural development measures, particularly agri-environmental aid. This article aims to review the main effects of the olive and olive oil regime, previous to the recent reform, on the European olive growing sector and to discuss the possible impact of two scenarios of decoupling, for the main production systems in the region of Trás-os-Montes in the North East of Portugal. This research has been developed under the framework of the European project OLIVERO where this region has been chosen as the Portuguese target area.

Résumé


This paper has two main objectives: (i) one is to describe the main features of the olive oil market regime and the changes introduced with the 2003/2004 reform; and (ii) the other is to evaluate the impact of this reform, under different scenarios of decoupling, for the region of Trás-os-Montes, one of the main Portuguese olive oil producing regions. This region has been selected as Portuguese research target area within the framework of OLIVERO project 1.

In order to achieve these objectives we start with the analysis of the olive and olive oil current market regime and its recent reform. As olive growers have benefited also from rural development measures, namely agri-environmental incentives, a short presentation of this type of aid and its application to olive growing is also undertaken. Then Trás-os-Montes olive and olive oil sector is characterized and its main production systems identified. Finally, for each production system, costs and results under current policy conditions are evaluated, and the impact on Trás-os-Montes olive growers' income for two different scenarios of decoupling is estimated.

1 It should be mentioned that this paper results from the research undertaken by the DEASR/ISA, in the European project “The Future of Olive Plantation Systems on Sloping and Mountainous Land; Scenarios for Production and Natural Resource Conservation” (OLIVERO), contract N°QLK5-CT-2002-01841.
2. CAP and the European Olive and Olive Oil Sector

2.1 The transitional reform of the olive oil regime

With a Common Market Organisation (CMO) laid down in 1966, it was only in 1998, with Council Regulation (EC) Nº. 1638/98, that the olive and olive oil sector was submitted to a transitional reform of its support regime. The new rules were to be applied from 1 November 1998 to 31 October 2001 but since then they have been extended till the 2003/2004 reform.

These new rules have been designated a transitional reform as, by then, it was already clear that the sector would need a more fundamental reform, not possible at the moment, due to the lack of accurate information concerning olive orchard areas.

Since 1966 the main olive producer’s support has been the production aid. This aid was different for small producers (with an average production of less than 500kg of olives), paid per tree according to the average historical yields of their district, and for other producers proportionately to its olive oil production.

Beyond production aid, the market organisation comprised a system of reference prices (target price, intervention price and representative market price), export refunds, consumption aid, buying-in intervention, refunds for the canning industry and specific measures to promote the consumption of table olives.

The olive oil market organisation has been the object of strong criticism, namely from the European Parliament and the Court of Auditors (European Commission, 2002a), urging for the need to simplify and for a more effective control of the olive oil market, in order to eliminate fraud. It should be remarked that after Spain joined the by then known as European Community, the EU became by far the largest world olive oil producer and consumer.

The new rules introduced in 1998 aimed not only to simplify and better monitor this sector, but also to improve quality, to reach a balance between supply and demand and to reinforce sector competitiveness.

Main changes to the previous support regime have been: (i) the abolishment of reference prices, (ii) consumption aid and small producers specific production aid, (iii) the replacement of buying-in intervention by private storage for stabilising the market, and (iv) the introduction of National Guaranteed Quantities (NGQs) in substitution of the Maximum Guaranteed Quantity.

Consumption aid had not clear effects on the market and was also difficult to administer. The buying-in intervention was considered a non-appropriate method for stabilizing the market in face of the imbalance between supply and demand, as it is an incentive to produce. The introduction of NGQs was a mean to make farmers more aware of market imbalance, as production aid would decrease only for those countries that exceeded it. The option to use part of the NGQs for the table olive sector has been introduced.

The distinction between small producers and others has been abandoned, as it revealed difficult to monitor. A production aid granted to all producers on the basis of the quantity they actually produce was introduced.

The implementation of an olive GIS database and its use to monitor this sector was reinforced in order to have a more effective control, a key issue for a wider reform to have place after 2001.

Concerning quality improvement, this council regulation states that part of the production aid can be retained to finance programmes with that aim, to be developed by producers’ organisations. With the same purpose a common strategy would also be implemented, namely through the adjustment of the characteristic features of the different categories of olive oil.

Finally, in order to prevent a stronger imbalance of the olive oil market, plantations after 1998 would not be granted the production aid, safe in exceptional cases like those plantations under a specific programme approved by the Commission (3 500 ha for Greece and France and 30 000 ha for Portugal).

2.2. Review of main impacts of the olive and olive oil Common Market Organisation

In what concerns olive farmers’ income support, the CMO provided a good example of a deficiency payment, with production aid being the main mechanism. As economic theory shows, such a mechanism despite not interfering in the short term with price determination, will tend, if implemented over the years, to expand supply, decreasing market prices.

Under such a scheme producers received, over the years, an aid per kg of olive oil produced, constituting a clear incentive to expand production, particularly after the transitional reform of 1998, when this aid became linked to the current output, for each producer.

Requested by the European Commission, a detailed study has taken place to evaluate the impact of the main market-management measures in the olive oil market over the period 1995-2000 (ADE, 2002). From its summary, the following comments, conclusions and recommendations can be retained:
- Over the 1980s EU olive production of the five producing countries registered an average annual growth of 0.6% while in the 1990s this growth has been of almost 5% a year;
- This increase was not only due to new plantations but also to the intensification of olive growing: increased densities, higher use of chemical fertilizers, better plant health care, higher yields;
- The production increase was not only stimulated by production aid but also by a higher demand from EU non-producing countries and third countries;
Production aid makes up an important part of olive growers’ incomes (27-30% of gross product per 100 kg of oil) depending on the country, but it was not a very effective instrument to promote fair incomes for farmers. The factor that most influences and differentiates olive growers’ incomes is olive groves’ productivity;

The main recommendation of this study is to change from an aid per kg of olive oil to an aid per ha that would have the benefit of making production decisions more market oriented. Payments under the new aid scheme should comply with sound farming practices.

These recommendations go in line with the 2003 Commission proposals to reform the olive oil market regime that will be commented later.

Another study (Junta de Andalucia, 2003), concerning the olive oil aid impact, shows its relevance to support income of Andaluzia olive growers. According to this study, and for the 1998/99 campaign, if this aid is not considered, only 41.7% of regional olive farms and 61.5% of the olive area would have a positive net revenue. So, as the authors of this study remark, any change of the aid scheme would have an enormous and differentiated impact upon olive farms in this region.

On the other hand, an aid directly linked to production penalizes mainly small producers in marginal areas, with low levels of productivity. On the opposite, large intensive olive groves were clearly favoured.

In fact, the olive production sector of the Community is clearly diversified and, as a result, production aid support was not equally distributed among the different types of producers.

Beyond the lack of equity, another negative consequence of the aid per kg is that, as it favours intensification, it generated negative environmental impacts, observed on the main producing countries. “Intensified olive farming is a major cause of one of the biggest environmental problems affecting the EU today: the widespread soil erosion and desertification in Spain, Greece, Italy and Portugal” (Beaufoy, 2001). The olive growing sector of the Community is indeed quite diversified in what concerns structural characteristics of the farms as well as structural and technological features of the olive groves. According to Beaufoy (1998), three broad types of olive plantations can be identified:

- Low-input traditional plantations - old orchards, some of them planted on terraces, with low density and low use of chemical inputs and high labour;
- Intensified traditional plantations - some features similar to the traditional ones but more intensified, an increased tree density, more use of fertilizers and pesticides, more intense weed control and soil management, and sometimes irrigated;
- Intensive Modern Plantations - smaller varieties, high density, usually irrigated and highly mechanised.

Many traditional plantations are located in sloping areas and have a potential high natural value, in terms of biodiversity and landscape. Intensified traditional and particularly intensive modern plantations, on the opposite, have the most negative environmental impacts, as they contribute to soil erosion, ground water pollution, degradation of habitats and landscape and exploitation of scarce water resources.

According to Baldock et al. (2002), most EU olive production comes from these intensified modern irrigated plantations, especially in some regions, like Jaén and Córdoba in Spain, Puglia in Italy and Crete in Greece. However, as for policy support, these plantations are those that benefited the most from production aid since they have the highest productivities. According to Beaufoy (2001), this kind of plantations can receive a support per ha 10-20 times higher.

The transitional reform of 1998, abolishing the special arrangements for small producers, increased the incentive to intensify in order to expand oil production, not taking into account the nature conservation function of traditional systems as de Graff and Eppink (1999) point out. As a result of this policy, as well as of technological progress, the Spanish average annual production almost doubled over the nineties (Baldock et al., 2002).

Many traditional systems have been abandoned, as agricultural environmental aid, that could offset this trend, didn’t have a large application.

Olive farming is also far from homogeneous in what concerns farm structures and specialisation. Olive growing holdings are, on average, bigger in Spain (4.6 ha) than in Portugal (2.1 ha), in Greece (1.5 ha), and in Italy (1.1 ha). In Spain, olive groves of 5 ha or bigger account for 72% of the total area with olive trees, while in Greece only 25% (Marquer, 2003).

In some regions, like the provinces of Jaén and Córdoba in Spain (accounting for a large share of world olive production), farms are quite specialised and the average size of olive groves is relatively high, while in others, like Trás-os-Montes in the North of Portugal, most of the olive farms are very small and non-specialised, as it will be shown later.

2.3 The integration in the single payment scheme of the support for olive oil and table olives

From 1998 to 2003, a package of measures has been adopted by the Commission, in order to implement the above-mentioned quality strategy. These measures were related to: (i) the adjustment of the characteristics of olive oil; (ii) relevant analysis methods; (iii) marketing standards for olive oil (standards for packaging, labelling and presentation); and (iv) new rules for olive oil sector operators’ organisations and for approved mills (European Commission, 2002b and 2003a). All these measures intended to enhance quality and to increase consumer’s confidence in the product.

A detailed analysis of environmental effects of olive farming can be found in Beaufoy, G., 2001 and Beaufoy 1998, op cit.
But it was only by the end of 2003 that the European Commission published proposals that would result in a deep change of the olive regime, following a pattern similar to the one introduced for the main arable land crops and livestock regimes.

In general, these proposals can be seen as a result of the criticisms of the European Parliament and Court of Auditors related with fraud, and the environmental concerns expressed by different organisations like the World Wild Fund and Bird International, during the nineties. They intend to stop the environmental negative effects of intensification and to promote a more sustainable and market oriented olive farming in the Community.

In order to avoid the possibility of abandonment of certain olive groves that might have negative environmental and social impacts, the current production linked support system in the olive sector is not completely integrated in the single payment scheme. These proposals have been approved and are now included in two Council Regulations: Council Regulation (EC) Nº. 864/2004, amending Council Regulation (EC) Nº. 1782/2003, establishing common rules for direct support schemes under the common agricultural policy; Council Regulation (EC) Nº. 865/2004, on the common organisation of the market in olive oil and table olives and amending Council Regulation (EEC) Nº. 827/68.

In fact, Council Regulation (EC) Nº. 864/2004 states that at least 60% of the average of production aid payments during the reference period of 2000 to 2002 (100% for holdings with less than 0.3 ha of olive orchard that are fully integrated in the scheme), are to be converted into entitlements under the single payment scheme, meaning that each farmer would then benefit from an equivalent income support.

These new rules cut the link between production and income support, and it is up to each Member State to decide the degree of decoupling to be applied to its olive sector, before August 2005.

The remaining part is retained by the Member States as national envelopes, that will be used to grant farmers an aid per olive GIS ha. A common method will be established to determine this area based on Olive GIS database.

This aid, called aid for olive groves, intends to be a contribution to the maintenance of olive groves of environmental and social value.

Only areas corresponding to olive trees planted before 1 May 1998, or covered by a programme approved by the Commission, are eligible for this aid as well as for the single payment scheme. More, these areas shall be registered in the Olive GIS database.

If the 60% decoupling is adopted by all Member States, the maximum amount of the aid for olive groves will be as follows: Portugal 22.66, Greece 208.14, Italy 272.05 and Spain 412.45 EUR million.

In order to distribute this amount, each producing country is supposed to identify up to a maximum of five categories of olive grove areas. These categories are supposed to be identified with a common framework of environmental and social criteria, aiming to favour the maintenance of olive growing in marginal areas. In any case, the aid per olive GIS ha should cover maintenance costs excluding harvest costs.

On the other hand, Member States are afforded the possibility of withholding from the maximum amounts, up to 10%, to finance activities related to quality improvement, monitoring and information, developed under work programmes established by approved operator’s organisations (Council Regulation (EC) Nº. 865/2004).

For the moment, the precise way the decoupling will be applied is not known, as Member States will have to decide until August 2005. At a later stage, to assess the olive market regime 2003/2004 reform, two scenarios are admitted for Portugal as they are now under discussion: a 60% and a 90% decoupling.

Another important issue introduced by the single payment scheme is cross-compliance. In fact, as for other crop or animal productions, olive growers will only be able to benefit from support if they comply with certain rules of good agricultural and environmental practices. Each Member State is supposed to define minimum requirements at national or regional level on the basis of the general framework set up in Annex IV of Council Regulation (EC) Nº. 1782/2003. In this Annex, standards to protect soil from erosion may be expressed as minimum soil cover or minimum soil management or retain terraces conditions.

Farmers not complying with these conditions will suffer a reduction or even a complete exclusion from direct payments (payments granted directly to farmers under an income support scheme).

In addition and according to modulation, direct payments will be reduced by 3% in 2005, 4% in 2006, and 5% of the initial amounts for the years 2007 up to 2012.

2.4 Agri-environmental measures

European olive producers have benefited not only from the support of the market regime for olive oil but also from measures covered by the second pillar of the CAP.

These measures, called rural development measures, are now eligible under Council Regulation (EC) Nº. 1257/99 and can be split in two groups:

- Measures to modernize and diversify agricultural holdings: farm investment, setting-up young farmers, training, investment aid for processing and marketing facilities, among others.

\[ ^{1} \text{Regulation establishing common rules for direct support schemes under the common agricultural policy and establishing certain support schemes for farmers.} \]
From this wide range of measures we will focus here on agri-environmental measures as they may contribute to offset the negative environmental effects of some olive growing practices and contribute to a more sustainable olive production.

In fact, the aim of these measures is to grant a support to farmers who use agricultural production methods designed to protect the environment and maintain the countryside. It encourages farming methods that are compatible with the protection of the environment, extensification, and landscape conservation.

These incentives remained optional until the CAP reform of 1992, when they became compulsory for the Member States as “accompanying measures” of this reform, under Council Regulation (EEC) No. 2078/92 (European Commission, 2005). According to this Regulation, Member States were required to implement an agri-environmental programme, for a five years period, introducing the group of measures more suitable for each reality.

According to Council Regulation (EEC) No. 2078/92, each Member State, beyond defining the appropriate measures, should also determine the commitments to apply to the different measures, as well as the amounts of aid to be granted. Each agri-environmental programme should be able to respond to different natural conditions, farming structures and priorities.

In 1999, the provisions for agri-environmental measures were included into the Rural Development Regulation (Council Regulation (EC) No. 1257/99), as part of the “Agenda 2000” CAP Reform (European Commission, 2005).

Within this framework, the role of the farmer as an environmental protector is enhanced as he is compensated to adopt practices directed to maintain the environment. In fact to qualify for support, farmers have to accept some commitments for at least five years. These commitments should go further than good agricultural practices. Farmers are supposed to offer some services to the society, and the aid intends to compensate them for the income foregone and for additional costs, associated with those services.

According to article 2 of Council Regulation (EEC) No. 2078/92, the following interventions may benefit from agri-environmental measures:

- Reduce substantially the use of fertilizers and/or plant protection products, or to keep to the reductions already made, or to introduce or continue with organic farming methods;
- Change, by means other than those referred above to more extensive forms of crop, including forage production, or to maintain extensive production methods introduced in the past, or to convert arable land into extensive grassland;
- Reduce sheep and cattle proportion per forage area;
- Use other farming practices compatible with the requirements of environmental protection and natural resources, as well as countryside and landscape maintenance, or to rear animals of local breeds in danger of extinction;
- Ensure the upkeep of abandoned farmland or woodlands;
- Set aside farmland for at least 20 years for purposes connected with the environment, in particular for the establishment of biotope reserves or natural parks or for the hydrological systems protection;
- Manage land for public access and leisure activities.

Agri-environmental programmes may still include measures to improve farmers’ training with regard to farming and forestry practices compatible with the environment.

The application of an agri-environmental programme is compulsory for the Member-States but it is voluntary for the farmers. Regional or national authorities manage them, after approval by the Commission.

These programmes are co-financed by the Member-States, 25% in regions objective 1, 50% in the others. The European Agricultural Guidance and Guarantee Fund (EAGGF) finance the other part. In 1998 the part financed from the EU budget was estimated in ECU 1.7 billion, about 4% of EAGGF guarantee expenditure (EC, 1998). Following the 2003 reform, these co-financing rates turned to 15% and 40% respectively. Besides it is expected that modulation will bring increased availability of funds to these schemes (EC, 2003b).

According to the European Commission, “agri-environmental measures have become the principal instrument for achieving environmental objectives within the CAP” (European Commission, 2003b, op cit.).

Conclusions of a 1998 evaluation of agri-environmental programmes (EC, 1998) recognize that, despite in many of these the identification of objectives needed to be more specific and the application in some regions increased, substantial environmental benefits were identified particularly for N reduction and nature protection.

Analyzing also the application of agri-environmental programmes, Baldock et al. 2002 (op cit) conclude: “Agri-environment measures, now with a clear environmental objectives and stronger monitoring and reporting requirements under the Rural Development Regulation are a potentially more powerful instrument for environmental integration than in the past. However to realize this potential, sufficient resources must be allocated to funding them and continual improvements made in scheme design and implementation. If it is to become the centrepiece of an expanded second pillar, the available resources (including Community co-financing), the scope of application and the basis of payment for farmers delivering environmental services in some regions, would need to be broadened, in order to give the policy a more ambitious role in supporting cultural landscape across Europe”.

As mentioned before, premia calculations only take into account variable costs and income losses associated with a particular measure. However some evaluators of agri-environmental programmes point out that, in some regions where there is an abandonment risk, full costs of keeping environmental desirable farming, should be considered (EC, 2005). In practice, without this reinforcement of pre-
nia, good results seem to have been obtained from the combination of agri-environmental measures with less favoured areas payments. This combination may have contributed to preserve low intensity olive farming systems in marginal areas, as it will be shown later for the particular case of Trás-os-Montes.

Portugal started to apply agri-environmental incentives in 1994 under the framework of Council Regulation (EEC) N°. 2078/92. The first agri-environmental programme that started in 1994 has been modified in 1998. The main measures under this programme that concerned olive growers were a measure called “Traditional Olive Grove” and another called “Organic Farming”.

Despite being a country where traditional low intensity systems are predominant and with very low productivities of the olive groves, there was already a trend to abandon olive groves in marginal areas and to substitute them by more intensified groves in some regions. The two above measures intended to offset this trend giving incentives to organic olive growing and to low intensity systems.

In 2000 Portugal approved its Rural Development Plan (Plano de Desenvolvimento Rural- RURIS) under the framework of Council Regulation (EC) N°. 1257/99. This includes, among other measures, agri-environmental measures to be in application from 2000 to 2006.

Although the new agri-environmental scheme gave continuity to the previous one, some changes in order to obtain a more effective support for those systems that preserve environment and the countryside were introduced.

With some amendments, the two previous measures “Traditional Olive Grove” and “Organic Farming” continued to benefit olive growers. “Integrated Pest Management” and “Integrated Production” were then extended to the olive plantations, as by that time national rules to define integrated pest and crop management for this crop were already available.

After some changes to the original plan in 2003, and more recently in March 2005, these three measures continue to be those with major impact on olive growing, and so have been those considered ahead for the calculations of economic results of the different olive production systems in Trás-os-Montes.

3. Trás-os-Montes Sloping and Mountainous Olive Production Systems in face of the Integration of the Olive Oil Regime in the Single Payment Scheme

3.1 The olive and olive oil sector in Trás-os-Montes

Despite being a small olive oil producing country (compared to Spain, Italy or Greece), olive orchards are still a matter of concern for the Portuguese agricultural policy makers, due to their economic and socio-environmental importance. Some key statistics of the olive oil sector in Portugal will help us to present the current situation.

In 2001 (EC, 2003c and 2004), the area under olive trees in Portugal was about 369 000 ha, approximately 7.8% of the corresponding EU-15 area. However the share of olive trees area in Usable Arable Area (UAA) is very significant in Portugal, as it accounts for 9.7% of the total UAA, comparable to the one verified in other producing countries (more or less the same, in Spain, 9.5%, or Italy, 7.5%).

The main difference between Portugal and the other European producing countries relies on the lower share of olive oil in agricultural production, only 0.7% in Portugal against 11.2% in Greece, and around 5% in Spain and Italy in 2001 (EC, 2003c and 2004).

Although spread throughout the country, area under olive trees is concentrated in three main regions: Alentejo in the South with 41%, Trás-os-Montes in the North-East with 22% and Beira Interior in the East Centre with 18%.

Portuguese olive oil production varies considerably from one year to another suggesting rather traditional production features, namely, old and low density groves, rain-fed orchard conduction, reduced fertilising and strong pruning. These features show that olive orchards in Portugal may be considered, with some exceptions, as low input farming systems, with a small productivity per olive tree, averaging at the national level and for the three harvest campaigns 1997/98, 98/99 and 99/2000: 9.1, 7.2 and 8.7 kg/tree respectively (ACCASA, 1999, 2000 and 2001). In spite of that, it keeps strong socio-economic and ecological roles.

Portuguese olive oil sector competitiveness can also be evaluated comparing the evolution of olive oil production relatively to consumption and trade. Though Portugal has been traditionally more than self-sufficient in what concerns olive oil, this situation has however changed through the 1990s. In fact, nowadays Portuguese olive oil production represents only 60% of domestic uses (against 103% in 1990) (INE, 1999).

Similarly to what happens in other producing countries, in Portugal olive oil has always been a basic component of the everyday diet, particularly in rural areas. However consumption has been decreasing since the beginning of the 1970s until very recently, in the mid-nineties, when this negative trend was reversed. From 1990 to 1997 olive oil per capita annual consumption increased in Portugal by 70% (from 3.3kg to 5.6kg, INE, 1999). Increased health concerns of the Portuguese population associated with better information on olive oil attributes, higher per capita incomes as well as improved quality and better marketing of olive oil producers, may explain this recovery.

From the main Portuguese producing regions, Trás-os-Montes has been selected in this study, due to its relevance in olive oil production (around 30% of total) and to the fact

\[1\] Less Favoured area allowances aim to enable the continuation of farming in difficult conditions. They were introduced by the Community in the mid-seventies and are now under Council Regulation (EC) N°. 1257/99. The type and structure of this support varies in line with the type and structure of farming across (Agra CEAS Consulting, 2003).
that it is one of the Portuguese regions where sloping and mountainous production systems are highly represented\(^5\).

Trás-os-Montes accounts for 21.6\% (72 288 ha) of the national olive orchard area and presents the larger number of farms with olive trees (37 344 ha, 23.5\% from total). More than 50\% of the farms in this region have olive trees. Olive orchard represents 15.8\% of regional Usable Arable Area (UAA), but in some municipalities (like Mirandela, Alfândega da Fé and Vila Flor) this share is above 40\%.

A considerable part of the olive oil produced in Trás-os-Montes region is characterised by high standards of quality, in terms of acidity characterisation (78.3\% of regional olive oil production has less than 1º acidity) as well as in other quality indicators.

Some producers are already engaged in the process of quality certification and according to Instituto do Desenvolvimento Rural e Hidráulica Agrícola (IDRA) from the total regional olive oil production, 3500hl (2.7\%) have been marketed with PDO labels (Protected Designation of Origin) in 2001.

We might say that, considering the relevance of olive production in Trás-os-Montes, effects from the new policy rules will surely be of great importance, namely for those low intensity olive farming systems in general more environment friendly and linked with demographic sustainability, remaining still relevant for total olive oil production.

### 3.2 Structure of olive growing holdings in Trás-os-Montes

The main objective of olive production in Trás-os-Montes is clearly a productive/economic one, meaning that this activity aims to provide a source of income to the local olive farmers.

According to INE (2002d), the olive and olive oil production represented 7\% of the Regional Agricultural Production (average from 1998 to 2000), a considerably high share when compared with 2\% at the national level.

In addition, Trás-os-Montes, a low-income region where industry is almost absent, has a regional economy much more dependent on agricultural production. Olive production systems strongly contribute to regional income generation and employment, not only directly from olive farms, but also through the processing units and services associated ed. These contributions help to secure the livability of a region with a declining and aging population, relatively high levels of illiteracy and unemployment\(^6\).

In order to identify the main structural features of the olive growing holdings and the socio-economic situation of olive farmers in Trás-os-Montes, the information from the last Portuguese Agricultural Census will be used\(^7\).

Two different units of observation have been used: farms with olive trees having at least 1 ha of Usable Arable Area (UAA) and specialist olive growing farms (those relying on olive production for more than two thirds of their standard gross margin).

Using the breakdown of olive farms according to olive grove size, it is possible to identify different situations concerning labour and land use, origin of income and specialisation. Four classes of olive producers have been considered according to the size of the olive grove: very small producers <5 ha, small producers 5-10 ha, medium producers 10-25 ha, and large producers e25 ha.

Few farms with olive orchards in Trás-os-Montes are specialist olive growing farms. In fact, only 15.5\% of the farms and 28.6\% of the orchard area (GPPAA, 2003 based on RGA99 data) belongs to this type of farms. As a consequence most of Trás-os-Montes olive orchard area is associated with farms with other kind of specialisation, namely permanent crops or mixed sheep/permanent crops specialised farms.

Average Trás-os-Montes olive orchard area is 1.94 ha, however in Mirandela municipality, where olive orchards have a stronger presence, representing 44\% of the respec-

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\(^1\) According to Olive GIS information and for twelve selected municipalities of Trás-os-Montes more than 50\% of total olive orchard area is located in parcels with a physiographic index of classes 2 to 5 having a strong/steep slope (Duarte, F. et alii., 2004).

\(^2\) These features can be confirmed by the following information based on Portuguese Population Census of 1991 and 2001:

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<tbody>
<tr>
<td>Portugal</td>
<td>5</td>
<td>105.5</td>
<td>9</td>
<td>6.8</td>
</tr>
<tr>
<td>Trás-os-Montes</td>
<td>-5.1</td>
<td>177.5</td>
<td>15.8</td>
<td>8.6</td>
</tr>
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\(^3\) This information has been supplied by Gabinete de Planeamento e Política Agro-alimentar (GPPAA) of the Portuguese Ministry of Agriculture on request of the Portuguese OLIVERO team.
tive UAA, average olive orchard area is 3.4 ha. This same municipality has the strongest representation of specialist olive growing farms among all the farms with olive trees (41%).

The rather low average orchard area per farm confirms the higher predominance of very small producers. In fact in what concerns the number of farms (93%), olive orchard area (56%), labour (86%) and standard gross margin (72%) as can be checked in table 1, very small olive producers are by far the most representative in the region.

In general, despite not being specialist olive growing, the share of olive groves in UAA and of olive gross margin in total gross margin, associated with Trás-os-Montes olive farms are high, ranging from 21% to more than 50% (table 2).

Labour use intensifies with the increase of farm size, as expected (table 3), ranging from 1 annual working unit (AWU) to 5.6 AWU. On the other hand, while small and very small producers depend mainly on family work, medium and large size olive producers are those where non family work represents more than a half of total AWU (close to 90% for the higher size class). Labour productivity in physical terms (olive orchard area/AWU) or in monetary terms (GM/AWU) grows also with olive orchard area per farm.

The classification of farms according to olive orchard size classes highlights different situations concerning farmer's income sources. In fact, according to table 4, representing olive farms breakdown by income origin, it is for medium and large olive producers that agriculture plays the most important role in the household income. It is only in these producers' size classes that the number of farms with incomes coming mainly or exclusively from agriculture is bigger than the number of those with incomes mainly from extra-agriculture activities. These classes are also, as mentioned above, those with a stronger contribution of olive growing to agriculture income generation (table 2).

So, despite not being the more representative in terms of number of farms nor in terms of olive orchard area, medium and large olive farms are those more associated with professional farmers, depending mainly or exclusively on agriculture.

On the other hand, for almost 66% of the very small producers, and 46% of the small ones, income derives mainly from off-farm activities. Detailing a bit further these income sources (table 5), it can be shown that for the very small and small producers extra-farm incomes are essentially retirement pensions, while for medium and large size producers' salaries in services sector represent the larger share.

This suggests that for the very small producers, who largely predominate in this region, agriculture activity may constitute an income complement for elderly farmers or for those with at least some members of the family working in services.

### 3.3. Typology of Sloping and Mountainous Olive Production Systems (SMOPS) in Trás-os-Montes

Under the framework of OLIVERO project, a typology of sloping and mountainous olive production systems (SMOPS) has been established. The following...
criteria have been adopted for SMOPS inventory approach in Trás-os-Montes:
- Orchard’s structural characteristics: plant density, variety (olive oil/table olive varieties), age of the trees;
- Slope;
- Cultivation practices: tillage/no tillage, irrigation/no irrigation;
- Socio-economic criteria: producer size, type of farm (share of family labour, sources of income).

The experience and knowledge of local officers of the Ministry of Agriculture, DRATM (Direcção Regional de Agricultura de Trás-os-Montes) and also of the technicians from a local olive producers association, AOTAD (Associação de Oliveicultores de Trás-os-Montes e Alto Douro), have also been taken into account, as well as typologies previously established for other Portuguese olive producing regions (Mansinho e Henriques, 2000). Also the analysis of the information collected from an agro-socio-economic survey of sixty regional selected olive farms allowed a more extended and precise characterization of the regional olive producing systems, presented in table 6.

“Traditional System” represents the most common regional olive production system, associated with older olive orchards and variable parcel slope.

“Semi-intensive Olive Oil System” represents some of the more recent plantations (mostly settled after 1986, when Portugal had access to EC agricultural structural funding). Mechanical harvest is frequent and, in general, there is no irrigation.

“Semi-intensive Table Olive System” is a mix of younger (after 1986) and older plantations that according to the normal product destination, table olives, have a higher plant density. Many of these orchards are located on strong/steep slope parcels along the riverbanks (“arribas”) of Douro and Sabor, in order to have easy access to irrigation water, collected from those rivers.

An “Organic System”, with olive oil production purpose, has also been identified. This system is quite similar to the traditional one in what concerns olive orchard’s structural characteristics.

Associating different types of olive orchards with different producer’s types, the definition of SMOPS can be extended. Four types of producers have been identified according to olive grove size: very small producers (olive orchard <5 ha), small (5-10 ha), medium (10-25 ha) and large producers (≥25 ha).

During the survey it was possible to confirm that two or more types of olive orchards can be present on the same farm. However it has also been possible to realise that for small producers the traditional system is the most representative one, while the majority of producers associated with semi-intensive olive oil and organic systems were mainly medium/large ones.

The different types of production systems identified are very similar in what concerns soil management and weed control. In fact tillage is nowadays the most common practice for weed control in the region of Trás-os-Montes. Over the last years crop cultivation and grazing on olive orchards have been progressively abandoned, a fact that has characterized also other European producing regions since the seventies (Beaufoy, no date).

Irrigation is not a common practice in this region except for some table olive production orchards and some very young plantations.

Pest control (mainly against Bactrocera oleae and Prays Oleae) is more frequent in semi-intensive orchards, being essential for table olive production purpose. Natural conditions are in general favourable to a good sanitary status of olive groves (Silva, 2000), making olive growers more willing to adopt integrated pest management (IPM) practices, which benefit from an agri-environmental aid in 2003 ca.15 000 ha orchards were under IPM agro-environmental measure, according to IDRHa (2007)). Both farmers with traditional and semi-intensive systems are adopting IPM.

While integrated pest management can be

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Tab. 6. Sloping and Mountainous Olive Production Systems (SMOPS) Classification in Trás-os-Montes

<table>
<thead>
<tr>
<th></th>
<th>Traditional</th>
<th>Semi-Intensive (Olive Oil)</th>
<th>Semi-intensive (Table Olives)</th>
<th>Organic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees per hectare</td>
<td>100</td>
<td>200</td>
<td>280</td>
<td>100</td>
</tr>
<tr>
<td>Slope</td>
<td>Low to Moderate</td>
<td>Low to Moderate</td>
<td>Steep</td>
<td>Low to Moderate</td>
</tr>
<tr>
<td>Orchard’s Age</td>
<td>&gt; 50 years</td>
<td>15 years</td>
<td>15 years</td>
<td>&gt; 50 years</td>
</tr>
<tr>
<td>Tillage</td>
<td>2 operations</td>
<td>2 operations</td>
<td>2 operations</td>
<td>2 operations</td>
</tr>
<tr>
<td>Weed Control</td>
<td>Tillage</td>
<td>Tillage</td>
<td>Tillage</td>
<td>Tillage</td>
</tr>
<tr>
<td>Irrigation</td>
<td>No</td>
<td>No</td>
<td>Drip irrigation</td>
<td>No</td>
</tr>
<tr>
<td>Fertilization</td>
<td>2 applications</td>
<td>2 applications</td>
<td>2 applications</td>
<td>2 applications</td>
</tr>
<tr>
<td>N:K:O once in 2 years</td>
<td>Nitrulal + Borax</td>
<td>Nitrulal + Borax</td>
<td>Nitrulal + Borax</td>
<td>Nitrulal + Borax</td>
</tr>
<tr>
<td>Pest and Disease</td>
<td>None</td>
<td>2 treatments</td>
<td>2 treatments</td>
<td>2 treatments</td>
</tr>
<tr>
<td>Control</td>
<td>Every 2 years</td>
<td>Dimetoato + Cupric</td>
<td>Dimetoato + Cupric</td>
<td>Dimetoato + Cupric</td>
</tr>
<tr>
<td>Pruning</td>
<td>Chainsaw</td>
<td>Chainsaw</td>
<td>Chainsaw</td>
<td>Chainsaw</td>
</tr>
<tr>
<td>Harvest</td>
<td>Semi-mechanised (branch shaker)</td>
<td>Mechanised (trunk shaker)</td>
<td>Mechanised (trunk shaker)</td>
<td>Mechanised (trunk shaker)</td>
</tr>
<tr>
<td>Production (kg/ha)</td>
<td>1100</td>
<td>2250</td>
<td>4000</td>
<td>900</td>
</tr>
<tr>
<td>Producer Type</td>
<td>Small</td>
<td>Medium to Large</td>
<td>Medium to Large</td>
<td>Medium to Large</td>
</tr>
</tbody>
</table>
placed within the conventional framework, organic farming, meaning a production system complying with EU definition of organic production - Council Regulation (EEC) nº 2092/91 - was considered a completely distinct production system\(^4\).

Being mainly determined by the ongoing agricultural policy framework, the option between conventional, organic farming and integrated pest management schemes may change while structural features of orchards stay the same. That is why, for Trás-os-Montes region, those options have not been considered the starting criteria for the identification of the different production systems.

Inside each type of system, some variations may occur due to the fact that in some municipalities farms are strongly based on olive production, while in others a mixture of olive trees and vineyards is the predominant feature. However for the whole region, of 34 631 olive farms only 16% are in fact specialist olive growing farms (GPPAA, 2003 based on RGA99).

### 3.4. Analysis of the effects of the 2003/2004 reform of the olive oil regime on economic results of Trás-os-Montes Sloping and Mountainous Olive Production Systems

have been calculated, in order to evaluate the impact of current policy measures on income generation and changes associated with two possible scenarios of decoupling: 60% and 90%.

Assumptions concerning the prices of inputs and outputs were based on average values for 2004/2005 harvest campaign. Technical coefficients, namely the hours of labour needed to accomplish the different cultural operations, have been obtained directly from the farmers’ survey, from local technicians and other olive growing experts. Opportunity cost of labour has been considered equal to the local wage of a non-specialized worker, both for family and non-family work.

The following economic results have been calculated: Total Output, Gross Revenues, Gross Margin, Net Revenues and Net Profitability\(^10\).

As Net Profitability equals Total Output less Total Costs it shows the performance of the different systems without any kind of aid. From table 7 it is easy to conclude that all the four systems have a negative Net Profitability, slightly higher for the semi-intensive olive oil system.

Production aid represents between 27% and 35% of Gross Revenues, but even considering this aid the traditional and the organic systems show negative Net Revenues. As these systems have a clear productive function, it is important to explain this result.

As for the traditional system, it should be noticed that in most situations almost all the work is done by family members, that may have indeed a lower opportunity cost leading to a more sustainable situation in terms of olive production economic results.

For the organic system output evaluation, organic olive oil price has been considered equal to the conventional one, however many of these producers do process and market their own olive oil, benefiting from a higher price that can revert the negative result obtained.

In order to analyse the effect of the recent olive oil market regime reform, two scenarios of decoupling have been considered: 60% and 90% aid decoupling. For these two scenarios it was assumed that coupled aid would be the same for all the systems having a value equal to the total amount available to distribute (Portugal, 22.66 EUR million) divided by the total olive area (around 440 000 ha). It should be mentioned again that this area is not precisely known at the moment, being now under calculation in the different producing countries.

The results of this simulation are presented in table 8. All Trás-os-Montes systems seem to lose with the decoupling, this lost being higher for the 60% decoupling scenario than for the 90%. Semi-intensive systems, that have higher productivities, are those which lose more with decoupling. In fact only for very low productivities (less than 630 kg/ha, for olive oil production orchards) Gross Revenue would be decreasing countries.

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However, as mentioned before, olive producers have benefited also from Rural Development (RD) aid being the

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\(^{a}\) Information collected directly from “Instituto de Desenvolvimento Rural e Hidráulica, IDRH”.

\(^{b}\) A discussion of the positioning of Integrated Crop Management systems relative to conventional and organic production can be found in AgraCEAS 2002.

\(^{c}\) Net Profitability = Net Revenues - Aids
most important agri-environmental aid and less favoured areas allowances. So the same results have been calculated considering now this type of aid.

Considering these different types of aid, all systems show positive Net Revenues except the organic one (table 9). These results confirm that Rural Development measures are indeed important to sustain Trás-os-Montes olive producer’s income. However only with this aid and in the absence of production aid, none of the systems would be sustainable. In the absence of production aid, Rural Development aid should increase by the amount needed to offset the corresponding negative Net Revenue.

According to Council Regulation (EC) Nº 864/2004, per ha aid for olive groves (coupled aid) may amount, but not exceed, the level of maintenance costs excluding harvest costs. This amount has been estimated (table 9) for the different Trás-os-Montes olive production systems and is largely above the amount of coupled aid that seems to be available for Portugal.

So being, the main expected effect of this coupled aid, the prevention of olive systems abandonment with high social and environmental interest, seems to be reduced, particularly if only one system is considered. An adequate definition of cross-compliance rules will probably be more effective.

4. Conclusions

In the context of the recent CAP reform, Member States are supposed to choose a degree of decoupling of olive production aid ranging from 60% till total decoupling in order to prevent abandonment of olive orchards in marginal areas.

In this presentation a review of the main features of the olive oil regime since its first implementation till the recent reform has been undertaken. From this review it is clear that the 2003/2004 reform intends to correct the main negative effects associated with the previous regime: lack of equity and negative environmental effects.

The integration of the olive oil regime in the single payment scheme provides an opportunity to support olive production systems of high social and environmental values in marginal areas.

In order to evaluate the possible impacts of the new regime on Trás-os-Montes olive production sector, four olive production systems have been identified and characterised. Costs and results under different circumstances have been calculated for these systems and the effects of changing support policies evaluated. From this analysis it was possible to confirm that partial decoupling does not seem enough to prevent abandonment as the amount of coupled aid is too low to cover maintenance costs. On the other hand, with partial decoupling Gross Revenues will decrease when compared to total decoupling situation.

In these simulations an equal coupled aid has been considered, thus excluding support transfers among systems. Only if the coupled aid was differentiated, providing increased support for those systems in less favoured situations, for instance in medium/high slopes, the new system might achieve its purpose. However this option seems difficult to adopt, as it will have additional administrative and serious political constraints.

Acknowledgments

We are indebted to our colleagues from Trás-os-Montes, Fernando Martins, José Figueiredo, Meneres Manso, João

<table>
<thead>
<tr>
<th>SMOPS</th>
<th>Output</th>
<th>Actual Situation</th>
<th>60% Decoupling</th>
<th>90% Decoupling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aid</td>
<td>Gross Revenues (a)</td>
<td>Coupled Aid</td>
<td>Gross Revenues (b)</td>
</tr>
<tr>
<td>Traditional</td>
<td>422.62</td>
<td>222.53</td>
<td>645.15</td>
<td>133.52</td>
</tr>
<tr>
<td>SI Olive Oil</td>
<td>864.45</td>
<td>455.18</td>
<td>1319.63</td>
<td>273.11</td>
</tr>
<tr>
<td>SI Table</td>
<td>1600.0</td>
<td>603.6</td>
<td>2203.6</td>
<td>362.16</td>
</tr>
<tr>
<td>Organic</td>
<td>345.78</td>
<td>182.07</td>
<td>527.85</td>
<td>109.24</td>
</tr>
</tbody>
</table>

Table 8. Gross revenues on the actual aid framework and with 60% and 90% decoupling hypothesis

<table>
<thead>
<tr>
<th>Tab. 9. SMOPS Economic Results with production aid and rural development measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>OUPUT</td>
</tr>
<tr>
<td>Production aid</td>
</tr>
<tr>
<td>Agro-environmental aids</td>
</tr>
<tr>
<td>Less favoured areas allowances</td>
</tr>
<tr>
<td>TOTAL AID (% on GROSS REVENUE S)</td>
</tr>
<tr>
<td>(% GROSS REVENUE S)</td>
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<tr>
<td>GROSS REVENUE S</td>
</tr>
<tr>
<td>Total Costs</td>
</tr>
<tr>
<td>Costs without Harvest</td>
</tr>
<tr>
<td>NET REVENUE S</td>
</tr>
<tr>
<td>NET REVENUE S without production aid</td>
</tr>
</tbody>
</table>
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